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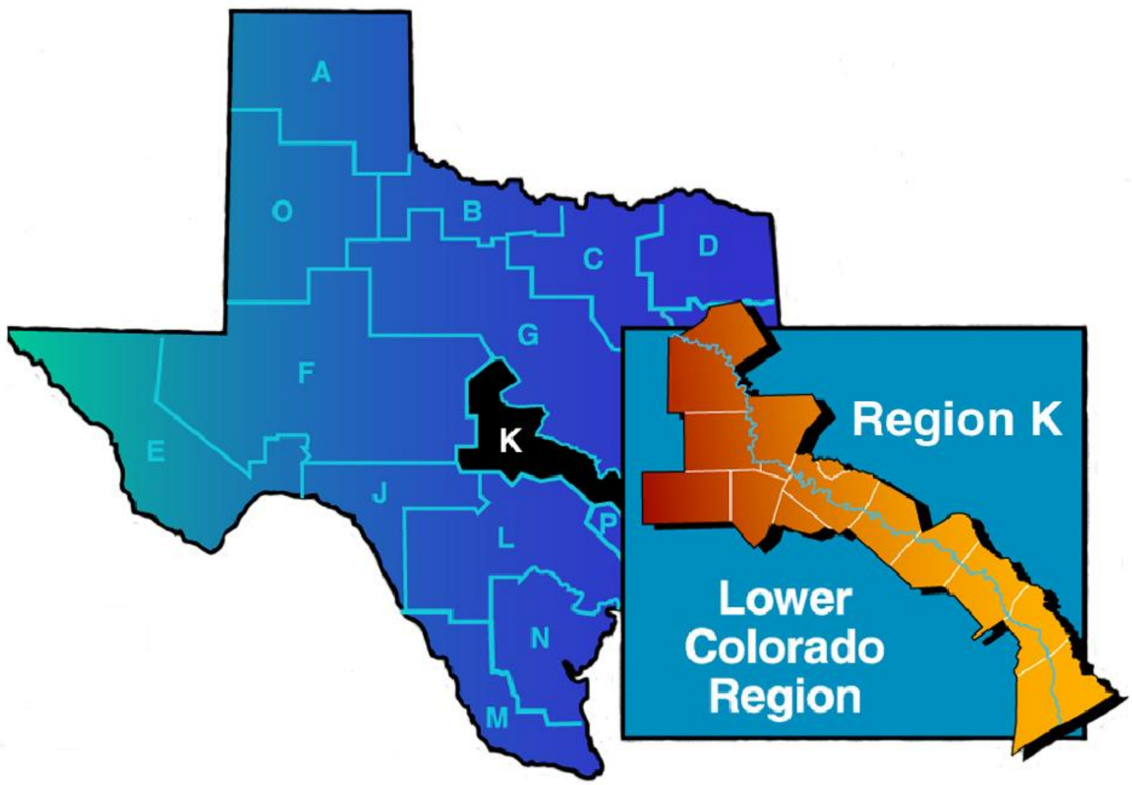
2011 Region K Water Plan
for the
Lower Colorado Regional Water Planning Group

Volume II
(Chapters 5 – 10)



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CHAPTER 5.0: IMPACTS OF WATER MANAGEMENT STRATEGIES ON KEY PARAMETERS OF WATER QUALITY AND IMPACTS OF MOVING WATER FROM RURAL AND AGRICULTURAL AREAS

5.1 SCOPE OF WORK

This activity is part of a consensus-based planning effort to include local concerns in the statewide water supply planning process. This chapter presents the results of Task 5 of the project scope, which addresses:

- Impacts of Water Management Strategies on Key Parameters of Water Quality
- Impacts of Moving Water from Rural and Agricultural Areas

Additional scope items included the development of legislative recommendations regarding water quality impacts as a result of the strategies outlined in Chapter 4 and discussed herein. The legislative recommendations developed by the Lower Colorado Regional Water Planning Group (LCRWPG) are discussed further in Chapter 8 of this report.

5.2 IMPACTS OF WATER MANAGEMENT STRATEGIES ON KEY PARAMETERS OF WATER QUALITY

The potential impacts that water management strategies (WMS) may have on water quality are discussed in this section, including the identified water quality parameters which are deemed important to the use of the water resources within the region. Under the Clean Water Act, Texas must define designated uses for all major water bodies and, consequently, the water quality standards that are appropriate for that designated water use. The water quality parameters which are listed for the Lower Colorado Regional Water Planning Area (LCRWPA) below were selected based on the *TCEQ Water Quality Inventory for Designated Water Body Uses* as well as the water quality parameters identified in the Texas Commission on Environmental Quality (TCEQ) 303d list of impaired water bodies. For reference purposes, *Appendix 5A* contains the TCEQ 303d list of impaired waters within the region as well as the tabular summaries of use support for the water bodies that are part of LCRWPA.

5.2.1 Surface Water

Key surface water parameters identified within LCRWPA fall into two broad categories:

Nutrients and Non-Conservative Substances

- Bacteria
- pH
- Dissolved Oxygen
- Total Suspended Solids (TSS)
- Temperature
- Nutrients (nitrogen, phosphorus)
- Minerals and conservative Substances:
- Total Dissolved Solids (TDS)

- Chlorides
- Mercury
- Salinity
- Sediment Contaminants

Non-conservative substances are those parameters that undergo rapid degradation or change as the substance flows downstream, such as nutrients which are consumed by plant life. Nutrients and non-conservative loadings to surface water originate from a variety of natural and man-made sources. One significant source of these loads is wastewater treatment facilities. As population increases, the number and size of these wastewater discharges will likely increase as well. Stormwater runoff from certain land use types constitutes another significant source of nutrient loading to the region's watercourses, including such land use types as agricultural areas, golf courses, residential development, or other landscaped areas where fertilizers are applied. Nutrient loads in LCRWPA are typically within the limits deemed acceptable for conventional water treatment facilities and are, therefore, not considered a major concern as related to source of supply.

Conservative Substances

Conservative substances are those that do not undergo rapid degradation or do not significantly change in water as the substance flows downstream, such as metals. Minerals and other conservative substances contributing to surface water generally originate from three sources: (1) nonpoint source runoff or groundwater seepage from mineralized areas, either natural or man-made, (2) wastewater discharges, and (3) sea water migration above estuaries. Wastewater discharges in general, and industrial discharges in particular, have improved over the past 30 years due to the requirements of the Clean Water Act. If local concentrations of conservative contaminants are identified, they are remediated by the appropriate agency. Natural features such as elevation tend to limit salinity migration above estuaries.

5.2.2 Groundwater

Groundwater in the LCRWPA is generally of good quality with no usage limitations. Quality parameters of interest include TDS, metals, and hardness. Groundwater in the Gulf Coast aquifer containing less than 500 mg/l dissolved solids is located at various depths throughout the lower three counties, but at no depths greater than 3,200 feet. The Carrizo-Wilcox aquifer has localized areas of water quality problems which include hydrogen sulfide, methane, increased salinity levels, and dissolved solids. The Edwards aquifer is typically fresh, although hard, with dissolved solids concentrations typically less than 500 mg/l.

Water quality from the Trinity aquifer is acceptable for most municipal and industrial purposes; however, excess concentrations of certain constituents in many places exceed drinking water standards. Heavy pumpage and water level declines in this region have contributed to deteriorating water quality in the aquifer. Wells completed in the Middle Trinity aquifer (especially the Hensell Sand) may exhibit levels of sodium, sulfate, and chloride, which are believed to be the result of leakage from the overlying Glen Rose Formation. This is less likely to be true for wells completed in the Lower Trinity aquifer. The Hammett Shale acts as an aquitard and effectively prevents leakage from the overlying formations. In some areas, poor quality water occurs in and near wells that have not been properly cased. These wells may have deteriorated casings, insufficient casing or cement, or the casing may have been perforated at multiple depths in an effort to maximize the well yield. These wells serve as a conduit for poor quality water originating in the evaporite beds near the contact of the Upper and Lower Glen Rose Formations. Water quality declines in the downdip direction of all of the Trinity aquifer water-bearing units.

Natural chemical quality of Edwards-Trinity (Plateau) water ranges from fresh to slightly saline. The water is typically hard and may vary widely in concentrations of dissolved solids, composed mostly of calcium and bicarbonate. The salinity of the groundwater tends to increase toward the west. Water quality of springs issuing from the aquifer in the southern and eastern border areas is typically excellent.

In general, the quality of water from the Hickory aquifer could be described as moderate to low quality. The TDS concentrations vary from 300 to 500 mg/l. In some areas the groundwater may have dissolved solids concentrations as high as 3,000 mg/l. The water may contain alpha particle and total radium concentrations that may exceed the safe drinking water levels of the U.S. Environmental Protection Agency (EPA) and TCEQ. Radon gas may also be entrained, although no limits have been established for radon. Most of the radioactive groundwater is thought to be produced from the middle Hickory unit, while the upper Hickory unit produces water that exceeds secondary limits for concentration of iron. High nitrate levels may be found in the shallower portions of the aquifer where there may be interaction with surface activities such as fertilizer applications and septic systems.

Throughout most of the LCRWPA, the chemical quality of the Queen City aquifer water is excellent, but water quality may deteriorate fairly rapidly downdip. The water may be fairly acidic (low pH), have high iron concentrations, or contain hydrogen sulfide gas. All of these conditions are relatively easy to remedy with standard water treatment methods.

Usable quality water is commonly found within the Sparta aquifer outcrop and for a few miles downdip. The water quality in most of this aquifer is excellent, but the quality does decrease in the downdip direction. In some areas, the water can contain iron concentrations exceeding the secondary drinking water standards.

Water produced from the Ellenburger-San Saba aquifer may have dissolved concentrations that range from 200 mg/l to as high as 3,000 mg/l, but in most cases is usually less than 1,000 mg/l. The quality of water declines rapidly in the downdip direction.

The water produced from the Marble Falls aquifer is suitable for most purposes, but some wells in Blanco County have produced water with high nitrate concentrations. The downdip portion of the aquifer is not extensive, but in these areas, the water becomes highly mineralized. Because the limestone formation comprising this aquifer is relatively shallow, it is susceptible to pollution by surface uses and activities.

Water quality in the Yegua-Jackson aquifer varies greatly. Water produced from the Yegua-Jackson aquifer may have dissolved concentrations as high as 3,000 mg/L. Chlorides and sulfates are also a concern for this aquifer, as well as some areas of high concentrations of dissolved manganese. In general, small amounts of usable water can be found at less than 300 feet deep throughout most of the aquifer.

5.2.3 Management Strategies

The Lower Colorado River Authority (LCRA) has implemented regulatory programs within their jurisdiction to aid in pollution prevention. LCRA regulations include both land-based activities and surface water usage. Land-based activities include on-site sewage facilities, septic systems, construction, and nonpoint source pollution. In addition, LCRA has supported the “no discharge” designation by TCEQ for the Highland Lakes. LCRA also sponsors household hazardous waste collection days to remove potential sources of contamination from the basin.

The water quality parameters and water management strategies selected by the LCRWPG were evaluated to determine the impacts on water quality as a result of these recommended strategies. This evaluation used the data available to compare current conditions to future conditions with LCRWPA management strategies in place. The recommended management strategies, as described in Chapter 4 of this report and used in this evaluation, are:

- Water Conservation (Municipal and Industrial)
- Expansion of Current Groundwater Supplies
- Development of New Groundwater Supplies
- City of Austin Return Flows/Reuse
- Transfer/Allocate/Purchase Water From Water User Groups (WUGs) With Surplus
- Construct Goldthwaite Channel Dam
- House Bill (HB) 1437
- Desalination of Brackish Groundwater
- Lower Colorado River Authority-San Antonio Water System (LCRA-SAWS) Water Project: Gulf Coast Aquifer
- LCRA-SAWS Water Project: On-Farm Water Conservation
- LCRA-SAWS Water Project: Irrigation Delivery System Water Conservation
- LCRA-SAWS Water Project: Water Conserving Rice Variety
- LCRA Water Management Plan for Interruptible Supplies
- Matagorda County Seawater and Brackish Groundwater Desalination Project
- LCRA excess flows permit and off-channel storage
- Aquifer Storage and Recovery (ASR)
- Reuse by Highland Lakes Communities
- Blending tidally-influenced water in the STPNOC reservoir

The following paragraphs discuss the impacts of each management strategy on the chosen water quality parameters.

<u>Water Conservation</u>, including municipal and industrial, can have both positive and negative impacts on water quality. Water that is being processed through a wastewater treatment plant typically has acquired additional dissolved solids prior to discharge to the waters of the state. Conventional wastewater treatment reduces suspended solids, but does not reduce dissolved solids in the effluent. Water conservation measures will reduce the volume of water passing through the wastewater plants without reducing the mass loading rates (a 1.6-gallon flush carries the same waste mass to the plant that a 6-gallon flush once carried). This may result in increased constituent loads to the wastewater treatment plants. In the event that, over time, water conservation causes changes to wastewater concentrations, treatment processes may need to be adjusted to maintain permitted discharge parameters. It should be noted that during low flow conditions, the wastewater effluent in a stream may represent water that helps to augment and maintain the minimum streamflows.

The impacts on water quality of the <u>Expansion of Current Groundwater Supplies and Development of New Groundwater Supplies</u> are uncertain. However, they are not expected to have adverse impacts to the water quality in the aquifer or sustainable water levels. During drought of record (DOR) conditions, some limited over-pumping of the Gulf Coast Aquifer in Colorado, Matagorda, and Wharton Counties is expected to occur to meet temporary water supply shortages. As rainfall conditions return to normal, this limited over-pumping of the aquifer is expected to decline and water levels in the aquifer should return to near normal levels without impacting water quality.

In some particular situations, this strategy may negatively influence water quality. As previously stated, water quality in the Hickory aquifer could be described as moderate to low quality. The use of this aquifer by municipal users may require additional treatment compared to a standard groundwater treatment plant, especially in areas of high concentrations of TDS, areas that may contain alpha particle and total radium concentrations that may exceed the safe drinking water levels of the EPA and TCEQ, and areas with high nutrient levels. The use of this aquifer by irrigators potentially could release the above constituents into surface water sources, thus causing increased levels of the above described water quality parameters. In addition this plan is consistent with the nine point policy identified by the RWPG for inter-basin transfers.

The LCRA-SAWS Water Project is subject to a number of special legislative environmental conditions as well as statutory requirements. A part of the project includes the conservation of irrigation water (through on-farm water conservation measures, irrigation district conveyance improvements, and new high yielding/water efficient rice varieties), pump limited amounts of groundwater during drought conditions, and primarily capture the remaining permitted portion of Colorado River flows. Return flows generated by runoff from rice irrigation are returned via tail water runoff in the Colorado River Basin or the coastal basin.

Tail water is the term used to describe that water returned to the stream after application to irrigated cropland. Tail water may carry nutrients, sediments, salts, and other pollutants from the farmland. This return flow can have a negative impact on water quality, and by implementing conservation measures which reduce tail water losses, the nutrient and sediment loading can be reduced. However, this return flow tends to be introduced into the receiving stream during normally dry periods so it may have a net beneficial effect in terms of maintaining minimum streamflow conditions. The conjunctive use of groundwater has been studied in terms of its impact on drawdown only; there has been no modeling done to predict the transport of saline water into freshwater areas. It is recommended in Section 5.4.3.1 that this potential impact be studied in the future. The use of new rice varieties may impact water quality as a result of changes in the amount of tail water that would be returned to streams following harvest. As part of the project, a study is being conducted to determine whether the project benefits both Region L and the LCRWPA without adverse impacts to the river and bay system. However, the location of the diversion may be a significant distance from or in another basin than the location where tail water is discharged.

Reuse is part of the COA's management strategy to meet future growth and subsequent water supply shortages. The COA plans to use a portion of their wastewater effluent to extend current supplies and help alleviate future shortages. The COA will either use indirect reuse, if authorized by TCEQ, or direct reuse with piping to move to the location of shortage. This reuse is projected to occur gradually over time as the overall water use of the LCRWPA increases. While reuse is projected to increase, municipal return flows are also projected to increase over the planning period. When available on an interruptible basis, downstream water rights can continue to divert, in seniority order, these return flows. In any event, the quality of water produced by City of Austin wastewater facilities is such that no adverse impacts on water quality are anticipated.

Reallocation of Surplus Supplies and Contract Increases as management strategies can decrease instream and bay and estuary freshwater inflows as a result of the full utilization of water supplies. Fully utilizing existing water supply projects may amplify some existing concerns, particularly contaminant concentrations due to reduced opportunities for instream dilution. The continued return of flows via wastewater treatment facility discharges will provide some mitigation of that effect. Typical municipal return flows are approximately 60 percent of the total quantity diverted for use.

Additional Goldthwaite Channel Dams will reduce instream flows by capturing interruptible flow during periods of normal conditions. During periods of drought, the reservoir will pass inflows to meet downstream senior water rights. The on-channel reservoirs will potentially beneficially impact the quality of water by allowing sediment and other water quality pollutants to settle out and subsequently release a higher quality water downstream.

LCRA Excess Flows Off-Channel Reservoir potentially will have positive impact on water quality since it will operate as a "scalping reservoir." The water that is diverted and stored in reservoirs would allow some sediments to settle out, so that water released from the reservoir would be of higher quality. However, the water would be stored for consumptive use, and instream flows along with bay and estuary freshwater inflows would slightly decrease. In general, increased return flows will occur in this region as demand increases, and this increase in return flows will continue to occur during low flow events, thus, potentially increasing instream flows during DOR conditions.

LCRA Water Management Plan for Interruptible Supplies allows LCRA to supply rice irrigators in the Lower Colorado River Basin with interruptible supplies of water from the Highland Lakes, when available. When these interruptible supplies are not available, LCRA will supply irrigators with groundwater produced as a part of the LSWP. Additional demand reductions will be achieved through conservation.

The House Bill (HB) 1437 management strategy involves the transfer of up to 25,000 acre-feet of water from the Colorado River Basin to certain users in Williamson County under contract with BRA. As part of this strategy, HB 1437 provides that no net loss of water occurs in the basin of origin funded by a surcharge on the sale of water authorized by HB 1437. To assist with this clause, the LCRA is investing in irrigation conservation measures. Environmental instream flow and freshwater inflow requirements contained in LCRA's Water Management Plan will continue to be met. The effects on water quality as a result of this strategy are not qualifiable at this time. Under both HB 1437 and the LCRA-SAWS Water Project, the transfer of water would be to off-channel storage facilities and treatment plants, rather than a raw water discharge to a stream.

Tail water is the term used to describe that water returned to the stream after application to irrigated cropland. Tail water may carry nutrients, sediments, salts, and other pollutants from the farmland. This return flow can have a negative impact on water quality, and by implementing conservation measures which reduce tail water losses, the nutrient and sediment loading can be reduced. Once again, however, this return flow tends to be introduced into the receiving stream during normally dry periods so it may have a net beneficial effect in terms of maintaining minimum streamflow conditions. Furthermore, the loss of the return flows could be offset by a reduction in irrigation diversions resulting in no net affect on the streamflow. However, the location of the diversion may be a significant distance from or in another basin than the location where tail water is discharged.

Desalination of Brackish Groundwater, such as the Edwards-BFZ Saline Zone, will provide a usable water supply with a level of dissolved solids low enough to be used for municipal purposes. A significant side effect of this strategy is the disposal of wastes generated from the desalination process. If deep well injection is used for brine disposal, minimal impacts to water quality should occur.

The Matagorda County Seawater or Brackish Groundwater Desalination Project will provide a usable water supply with a level of dissolved solids low enough to be used in steam-electric power generation. A significant side effect of this strategy is the disposal of wastes generated from the desalination process. The discharge of this brine, with a TDS loading rate of between 10,000 to 20,000 parts per million, to the tidally influenced segment of the Colorado River may have impacts on environmental factors from the associated increased loading of dissolved solids and concentration of constituents in the water. An offshore discharge point may be required to minimize the effects of this discharge. Due to the location of this strategy, none of the water quality impacts associated with desalination can potentially affect the implementation of other water management strategies upstream.

Post-treatment will be necessary for the water leaving the desalination process so that it is non-aggressive toward power generation equipment and compatible with instream water chemistry. The use of this desalinated water for steam-electric power will also introduce some additional return flows that are discharged from the power generation process. However, there may be impacts from the elevated temperature of water leaving the power generation facility.

Aquifer Storage and Recovery (ASR) utilizes surface water that is diverted from the Colorado River and treated at a surface water treatment facility. The treated water would either be delivered to meet existing demands, or diverted to aquifer storage for later recovery and use. The diversion of surface water could reduce instream flows downstream, which in turn, could negatively impact water quality during certain months of the year when instream flows are already lower.

Reuse by communities in the Highland Lakes area provides a purposeful use for treated wastewater effluent that cannot otherwise be discharged to the Highland Lakes, due to TCEQ restrictions. This effluent is currently being used to irrigate areas that do not normally require irrigation. In a sense, this strategy would simply relocate the treated effluent to more useful locations that are currently irrigated with potable water. Because of the treatment standards of the effluent, there should be no water quality issues from this strategy. Because the effluent is currently not allowed to be discharged to the Highland Lakes, there is also no issue of reduced return flows downstream.

Blending tidally-influenced water in the STPNOC reservoir will increase the TDS levels in the reservoir. As long as there is sufficient freshwater in the reservoir, the TDS levels should remain low enough to be used for steam-electric power generation. No desalination process should be necessary.

5.3 IMPACTS OF MOVING WATER FROM RURAL AND AGRICULTURAL AREAS

Currently, the water used in rural (livestock) and agricultural areas represent 55 percent of the total water used in LCRWPA. It is estimated that this will be reduced to 35 percent of the region's 1,382,500 acre-feet (ac-ft) demand projected in year 2060 as a result of growth in municipal and industrial demands and a decrease in agricultural production. A projected decrease in irrigation demand is anticipated to be approximately 20 percent between 2010 and 2060. Livestock demand is constant over the planning period.

Water management strategies, along with current sources of water supply, are available to agricultural users throughout the planning period; therefore, the impacts on agricultural users are not directly related to moving water from these areas. The potential impacts of moving water from rural and agricultural areas are mainly associated with socio-economic impacts to third parties. The potential impetus for moving water is expected to occur from two sources: (1) the cost of raw water may become too great for the local irrigator to afford, and he may elect to voluntarily leave the industry for economic reasons; or (2) the value of the raw water for municipal or industrial purposes may create a market for the wholesale owner to redirect the sale of the water making it unavailable to the irrigator. Several management strategies are outlined in the Plan to provide water to irrigators, especially in the lower basin counties of Colorado, Wharton, and Matagorda.

The LCRA-SAWS strategies represent a unique solution to obtaining additional water supplies for municipal uses while enhancing agricultural resources. By participating in this program, the LCRWPA will achieve an additional 201,950 ac-ft of water supply annually through conservation and groundwater (62,000 ac-ft/yr averaged over the total years of the drought of record with a maximum of 95,000 ac-ft/yr during the worst year of the drought) improvements funded by SAWS. A portion of the water conserved, above this amount, will be provided by SAWS to meet its municipal demands. This approach is an example of implementing management strategies with mutual benefit to meet both urban and rural needs. As has been noted previously in this document, the LSWP allows the needs of the various parties to the agreement to be met. The LSWP is required by statute to demonstrate that it can be implemented without significant detriment to the environment. Without meeting the needs of the environment, the agreement may not become an implemented strategy.

As illustrated by the LCRA-SAWS strategy, it may be feasible for a third party to pay for conservation measures and then utilize the saved water for their own needs (through recontracting or other agreements) and allow the irrigator to remain in business; however, there are few contractual and institutional measures in effect to allow this trade-off to occur at this time. The intent of this Plan is to provide water or the conservation means to meet all projected water demands, including agricultural and rural needs, throughout the planning period.

5.4 POTENTIAL CHANGES TO AQUIFER QUALITY

Total dissolved solids is the most commonly used parameter to describe overall groundwater quality because it is a measure of all of the dissolved constituents in water. In this section of the report, TDS will be used as the general description of groundwater quality. The term “brackish”, as used in this section of the report, describes slightly-saline or moderately-saline groundwater and thus includes water between 1,000 and 10,000 mg/L TDS.

5.4.1 Brackish Groundwater in Region K

Many water-bearing formations in Texas contain a large volume of brackish groundwater. Discussion on brackish groundwater in Region K are based on information found in the report entitled “Brackish Groundwater Manual for Texas Regional Planning Groups”, prepared for TWDB in February 2003.

Historically, the TWDB has defined aquifer water quality in terms of TDS concentrations expressed in milligrams per liter (mg/L) and has classified water into four broad categories; fresh (less than 1,000 mg/L), slightly-saline (1,000 - 3,000 mg/L), moderately-saline (3,000 - 10,000 mg/L), and very-saline (10,000 - 35,000 mg/L).

Official TWDB delineations of the down-dip boundaries of such aquifers as the Edwards (BFZ), Trinity, Queen City, Sparta, and Carrizo-Wilcox have historically been based on water quality, specifically the TDS concentrations that meet the needs of the aquifers' primary uses. The down-dip extent of most aquifers in the state is defined by the 3,000 mg/L dissolved solids level, as groundwater with less than 3,000 mg/L TDS meets most agricultural and industrial needs. However, a few aquifers have different TDS criteria defining the aquifer extent, including: Edwards (BFZ) (1,000 mg/L TDS).

The availability of brackish groundwater is a general measure of the amount of brackish groundwater in a water-bearing unit. All of the major and minor aquifers in Region K water planning area contain brackish groundwater, which are listed below:

Major Aquifers

- Carrizo-Wilcox
- Edwards (BFZ)
- Edwards-Trinity (Plateau)
- Gulf Coast
- Trinity

Minor Aquifers

- Ellenburger-San Saba
- Hickory
- Marble Falls
- Queen City
- Sparta
- Yegua-Jackson

5.4.1.1 Carrizo-Wilcox Aquifer

The Carrizo-Wilcox aquifer is one of the most continuous and permeable waterbearing formations in Texas. In the LCRWPA, it extends in Bastrop and Fayette counties. Throughout the extent of the aquifer, it provides groundwater acceptable for most irrigation, public supply and industrial purposes. It also has significant brackish water resources in down-dip portions of the aquifer that may be used as additional water supplies.

In Central Texas groundwater from the Carrizo is principally sodium chloride and sodium sulfate types. The availability of brackish groundwater from the Carrizo-Wilcox aquifer in Region K is considered high.[1]

[1] "*Brackish Groundwater Manual for Texas Regional Planning Groups*", prepared for TWDB by LBG-Guyton Associate in association with NRS Consulting Engineers, February, 2003.

5.4.1.2 Edwards (BFZ) Aquifer

The Edwards (Balcones Fault Zone-BFZ) aquifer extends in Travis and Hays counties in Region K. The boundary between the fresh-water and brackish sections of the Edwards aquifer is commonly referred to as the “Bad Water Line”, which is the 1,000 mg/L TDS line.

Groundwater in the fresh portion of the Edwards is a hard, calcium-bicarbonate water. As the salinity of the water increases in the saline portion of the aquifer, the concentrations of sulfate and chloride increase, as does the concentration of sodium, and the waters become a sodium-mixed anion type water. The quality of the saline water in the Edwards aquifer does not appear to vary significantly areally. In general, poorer quality water in the aquifer is found in the down-dip portions of the aquifer, and may also correlate with low permeability sections of the formations. Similarly, there are no consistent vertical trends in water quality. In places, wells produce fresh water at shallow depths, brackish to saline water at greater depths, and fresh water again at even greater depths. Hydrogen sulfide is often found in the Bad Water Zone.

Availability of brackish groundwater from Edwards (BFZ) aquifer in Region K is low to moderate[1].

5.4.1.3 Edwards-Trinity (Plateau) Aquifer

Much of the groundwater found in the Edwards-Trinity (Plateau) aquifer is fresh to slightly-saline. The chemical quality of the Edwards and associated limestones is generally better than that in the underlying Trinity aquifer in the Plateau region. Groundwater is fairly uniform in quality, with water from the Edwards and associated limestones being a very hard, calcium bicarbonate type, usually containing less than 500 mg/L TDS, although in some areas the TDS can exceed 1,000 mg/L. The water quality in the Trinity tends to be poorer than in the Edwards.

Availability of brackish groundwater from Edwards Trinity (Plateau) aquifer in Region K is none[2].

5.4.1.4 Trinity Aquifer

Trinity Group deposits include sands, limestones, shales and clays. The stratigraphy of the Trinity Group is complicated, in part because of the large area that it covers.

In Central Texas, the Hensell and Hosston Sands are the most productive units in the Trinity aquifer. The Hensell is fairly prolific in many areas, and is known to yield small to large amounts of water to wells. It is also referred to as the “First” or “Upper” Trinity Sand by drillers and locals in Central Texas.

A significant source of brackish water may be found in the down-dip areas of the Trinity aquifer. The availability of brackish groundwater from the Trinity aquifer in most of Region K is considered moderate[2].

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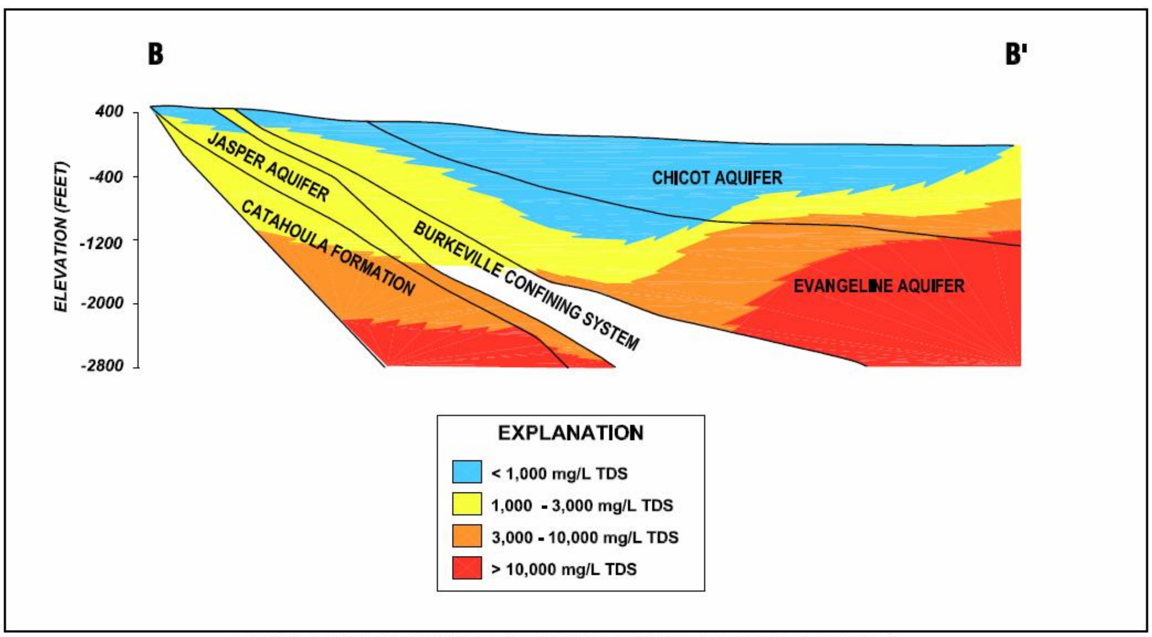
[2] “*Brackish Groundwater Manual for Texas Regional Planning Groups*”, prepared for TWDB by LBG-Guyton Associate in association with NRS Consulting Engineers, February, 2003.

5.4.1.5 Gulf Coast Aquifer

The Gulf Coast aquifer extends through a large area in Region K in Fayette, Colorado, Wharton and Matagorda counties.

Water quality varies with depth and locality in the Gulf Coast aquifer. The water quality is generally fresh in the northeastern half of the aquifer, from the Coastal Bend region to Louisiana. Some areas in this half do produce slightly-saline water, in particular near the coast between the City of Houston and Louisiana. The groundwater quality in the southwestern half of the aquifer (generally south of the San Antonio River) is generally more brackish than in the northern section, with most areas containing slightly- to moderately-saline groundwater, and very few areas containing fresh water. The depths that fresh, slightly-saline, moderately-saline, and saline groundwater is found varies from individual aquifer to aquifer throughout the extent of the aquifer system. *Figure* 5.1 shows concentrations of total dissolved solids in Gulf Coast aquifer in a cross-section running through Lavaca, Wharton and Matagorda counties[2].

Figure 5.1 Simplified Cross-Section of the Gulf Coast Aquifer System running through Lavaca, Wharton and Matagorda Counties



SIMPLIFIED CROSS SECTION B-B' OF THE GULF COAST AQUIFER SYSTEM WITH GENERALIZED WATER QUALITY RANGES
(Modified from Baker, 1979)

The availability of brackish groundwater from the Gulf Coast aquifer in most of Region K is considered moderate to high[3].

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[3] "*Brackish Groundwater Manual for Texas Regional Planning Groups*", prepared for TWDB by LBG-Guyton Associate in association with NRS Consulting Engineers, February, 2003.

5.4.2 Other Aquifer Water Quality Information

While the Groundwater Availability Model (GAM) reports may contain information pertaining water quality of aquifer formations, the models do not provide any outcomes concerning water quality issues.

TWDB's water well database tracks concentration of several water quality constituents including Sodium, Potassium, Strontium, Bi carbonates, Sulfate, Chloride, Fluorides, Nitrates, Alkalinity and Hardness.

5.4.3 Potential Water Quality Impacts Resulting from Increased Drawdown of Aquifers

The potential water quality impacts resulting from increased drawdown in the LCRWPA are currently not well understood. The following is a discussion of potential water quality issues:

The wells close to the coast have greater risk to be impacted. As they are drawn down, there is a greater potential for salt water intrusion which begins to increase the total dissolved solids in the water. Overall, water quality has been good throughout the lower counties, and they have experienced higher demands and lower water tables in the past than what is currently projected under this plan.

However, some aquifers are more susceptible to drawing in water of lower quality as the upper strata are dewatered and other water begins to flow into the wells. This is the case for the Simsboro formation and the Carrizo Wilcox aquifer which extends in the Bastrop and Fayette counties in Region K.

Concerns for most of the Central Texas Aquifers are largely based on limiting or ceasing spring flows rather than quality reasons. With the lack of current knowledge on the locations of the potential salt deposits, it can be stated that greatly increased drawdown could result in deteriorated water quality associated with total dissolved solids and radiation in some areas.

5.4.3.1 Recommended Future Studies

The Gulf Coast Aquifer in Wharton and Matagorda counties is the area most likely to be affected by increased drawdown in the future. While one of the LSWP studies looked at the impact of conjunctive use on drawdowns in the Gulf Coast Aquifer, the LSWP groundwater availability model (LSWP GAM) does not have the capability to simulate the transport of total dissolved solids. It is recommended that work be conducted in the future to better define the impact on water quality of higher withdrawals and lowered water tables in the Gulf Coast Aquifer. It is recommended that the LSWP GAM be used to determine if the area of reduced water levels extends to the portion of the aquifer with brackish or saline water. If the increased cone of depression reaches the brackish or saline zones, the rate at which the brackish or saline water may intrude on freshwater areas, and the aerial extent of the intrusion, through the year 2060, should be assessed.

APPENDIX 5A

TCEQ 303(D) LIST OF IMPAIRED WATERS

PARTIAL LIST ON THOSE WATERWAYS IN LCRWPA AND TABULAR SUMMARIES FOR WATER BODY USE SUPPORT BY RIVER BASIN

2008 Texas 303(d) List (March 19, 2008)

As required under Sections 303(d) and 304(a) of the federal Clean Water Act, this list identifies the water bodies in or bordering Texas for which effluent limitations are not stringent enough to implement water quality standards, and for which the associated pollutants are suitable for measurement by maximum daily load.

In addition, the TCEQ also develops a schedule identifying Total Maximum Daily Loads (TMDLs) that will be initiated in the next two years for priority impaired waters. Issuance of permits to discharge into 303(d)-listed water bodies is described in the TCEQ regulatory guidance document *Procedures to Implement the Texas Surface Water Quality Standards* (August 2002, RG-194).

Impairments are limited to the geographic area described by the Assessment Unit and identified with a six or seven-digit AU_ID. A TMDL for each impaired parameter will be developed to allocate pollutant loads from contributing sources that affect the parameter of concern in each Assessment Unit. The TMDL will be identified and counted using a four or five-digit SegID. Water Quality permits that are issued before a TMDL is approved will not increase pollutant loading that would contribute to the impairment identified for the Assessment Unit.

Information Provided

SegID and Name: The unique identifier (SegID), segment name, and location of the water body. The SegID may be one of two types of numbers. The first type is a classified segment number (4 digits, *e.g*., 0218), as defined in Appendix A of the Texas Surface Water Quality Standards (TSWQS). The second type (five digits, e.g., 0218A) is a partially classified water body described in Appendix D of the TSWQS, or an unclassified water body, not defined in the TSWQS, though associated with a classified water body because it is in the same watershed. The segment name and description immediately follow SegID.

Area: Identifies the assessment unit (AU_ID, six or seven digits, *e.g.,* 0101A_01) and describes the location of the specific area in which one or more water quality standards are not met.

Parameter(s): Pollutants or water quality conditions that assessment procedures indicate do not meet assigned water quality standards.

Category: In the 2008 Assessment, one of three subcategories was assigned to each impaired parameter to provide information about water quality status and management activities on that water body.
The categories are defined below:

Category 5: The water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants.

- *Category 5a* - A TMDL is underway, scheduled, or will be scheduled.
- *Category 5b* - A review of the water quality standards for this water body will be conducted before a TMDL is scheduled.
- *Category 5c* - Additional data and information will be collected before a TMDL is scheduled.

Year First Listed: The assessment year the pollutant or water quality condition in this water body initially did not meet water quality standards as indicated in any of the areas assessed (AU_IDs).

SegID: 1217 **Lampasas River Above Stillhouse Hollow Lake**
From a point immediately upstream of the confluence of Rock Creek in Bell County to FM 2005 in Hamilton County

Area		Category	Year First Listed
1217_04	*From the FM 1690 crossing to the CR 117 crossing* bacteria	5c	2002
1217_05	*From CR 117 crossing to the upper end of the segment* bacteria	5c	2002

SegID: 1217D **North Fork Rocky Creek (unclassified water body)**
From its confluence with South Rocky Creek, upstream to its headwaters 7 miles west of US Hwy 183 in Burnet County

Area		Category	Year First Listed
1217D_01	*entire water body* depressed dissolved oxygen	5b	2006

SegID: 1302 **San Bernard River Above Tidal**
From a point 3.2 km (2.0 miles) upstream of SH 35 in Brazoria County to the county road southeast of New Ulm in Austin County

Area		Category	Year First Listed
1302_01	*Lower 25 miles of segment* bacteria	5a	2002
1302_02	*25 miles from just upstream of FM 442 to downstream of US 90A* bacteria	5a	2002
1302_03	*25 miles from downstream of US 90A to upstream of FM 3013* bacteria	5a	2002

SegID: 1302A **Gum Tree Branch (unclassified water body)**
From the confluence with West Bernard Creek near Wharton CR 252 to the headwaters approximately 15 miles upstream near RR 102

Area		Category	Year First Listed
1302A_01	*The entire 15 miles of the segment* bacteria	5c	2006

SegID: 1302B **West Bernard Creek (unclassified water body)**
From the confluence with the San Bernard River Above Tidal downstream of US highway 59 to the headwaters approximately 40 miles upstream near FM 1093

Area		Category	Year First Listed
1302B_01	*Lower 15 miles of segment*		
	depressed dissolved oxygen	5c	2006
1302B_02	*Upper 25 miles of segment*		
	bacteria	5c	2006

SegID: 1304 **Caney Creek Tidal**
From the confluence with the Intracoastal Waterway in Matagorda County to a point 1.9 km (1.2 miles) upstream of the confluence of Linnville Bayou in Matagorda County

Area		Category	Year First Listed
1304_01	*Lower 25 miles of segment*		
	bacteria	5c	2006

SegID: 1305 **Caney Creek Above Tidal**
From a point 1.9 km (1.2 miles) upstream of the confluence of Linnville Bayou in Matagorda County to Old Caney Road in Wharton County

Area		Category	Year First Listed
1305_02	*25 miles surrounding SH 35*		
	bacteria	5a	2002
	depressed dissolved oxygen	5b	1999
1305_03	*Upper 55 miles of segment*		
	depressed dissolved oxygen	5b	1999

SegID: 1401 **Colorado River Tidal**
From the confluence with the Gulf of Mexico in Matagorda County to a point 2.1 km (1.3 miles) downstream of the Missouri-Pacific Railroad in Matagorda County

Area		Category	Year First Listed
1401_01	*Entire segment*		
	bacteria	5a	2006

SegID: 1402H Skull Creek (unclassified water body)
From the confluence with the Colorado River west of Eagle Lake in Colorado County to the upstream perennial portion southwest of Columbus

Area		Category	Year First Listed
1402H_01	*Entire water body*		
	depressed dissolved oxygen	5b	2008

SegID: 1403A Bull Creek (unclassified water body)
From the confluence of Lake Austin in northwest Austin in Travis County to the upstream perennial portion of the stream north of Austin in Travis County

Area		Category	Year First Listed
1403A_04	*From Spicewood Springs Rd. crossing near Yaupon Dr. upstream to the Spicewood Springs Dr. crossing near Oak Grove cemetery*		
	impaired macrobenthic community	5c	2002

SegID: 1403J Spicewood Tributary to Shoal Creek (unclassified water body)
From the MoPac Expressway in north Austin in Travis County to a point west of Hart Lane in Travis County

Area		Category	Year First Listed
1403J_01	*Entire water body*		
	bacteria	5c	2002

SegID: 1403K Taylor Slough South (unclassified water body)
Form the confluence of Lake Austin in Travis County to a point west of Pecos Street in Austin in Travis County

Area		Category	Year First Listed
1403K_01	*Entire water body*		
	bacteria	5c	2002

SegID: 1403R Westlake-Davenport Tributary to Lake Austin (unclassified water body)
From the confluence of Lake Austin in Travis County to a point east of Loop 360 and The High Road in Travis County

Area		Category	Year First Listed
1403R_01	*Entire water body* bacteria	5c	2006

SegID: 1416 San Saba River
From the confluence with the Colorado River in San Saba County to the confluence of the North Valley Prong and the Middle Valley Prong in Schleicher County

Area		Category	Year First Listed
1416_01	*From the confluence with the Colorado River in San Saba County upstream to the US 190* bacteria	5c	2008

SegID: 1416A Brady Creek (unclassified water body)
From the confluence of the San Saba River southwest of San Saba in San Saba County to Brady Lake Dam west of Brady in McCulloch County

Area		Category	Year First Listed
1416A_03	*From FM 714 upstream to Brady Lake dam* depressed dissolved oxygen	5c	2004

SegID: 1427A Slaughter Creek (unclassified water body)
Intermittent stream with perennial pools from the confluence with Onion Creek to above US 290 west of Austin

Area		Category	Year First Listed
1427A_01	*Entire water body* impaired macrobenthic community	5b	2002

SegID: 1428 **Colorado River Below Town Lake**
From a point 100 meters (110 yards) upstream of FM 969 near Utley in Bastrop County to Longhorn Dam in Travis County

Area		Category	Year First Listed
1428_03	*Walnut Creek to Longhorn Dam*		
	bacteria	5c	2006

SegID: 1428B **Walnut Creek (unclassified water body)**
From the confluence of the Colorado River in east Austin in Travis County to the upstream perennial portion of the stream in north Austin in Travis County

Area		Category	Year First Listed
1428B_01	*From the Colorado River upstream to FM 969*		
	bacteria	5c	2006
1428B_03	*From old Manor Road upstream to Dessau Road*		
	bacteria	5c	2006
1428B_05	*From MoPac/Loop 1 upstream to railroad tracks west of Loop 1*		
	bacteria	5c	2006

SegID: 1428C **Gilleland Creek (unclassified water body)**
Perennial stream and intermittent stream with perennial pools from the confluence with the Colorado River up to the spring source (Ward Spring) northwest of Pflugerville, in Travis County

Area		Category	Year First Listed
1428C_01	*From the Colorado River upstream to Taylor Lane*		
	bacteria	5a	1999

SegID: 1429B **Eanes Creek (unclassified water body)**
From the confluence of Town Lake in central Austin in Travis County to the upstream perennial portion of the stream in west Austin in Travis County

Area		Category	Year First Listed
1429B_01	*Entire water body*		
	bacteria	5c	1999

SegID: 1429C Waller Creek (unclassified water body)
From the confluence of Town Lake in central Austin in Travis County to the upstream portion of the stream in north Austin in Travis County

Area		Category	Year First Listed
1429C_01	*From the confluence with Town Lake to East MLK Blvd.*		
	bacteria	5c	2004
	impaired macrobenthic community	5c	2002
1429C_03	*Upper portion of creek*		
	bacteria	5c	2004

SegID: 1501 Tres Palacios Creek Tidal
From the confluence with Tres Palacios Bay in Matagorda County to a point 1.0 km (0.6 miles) upstream of the confluence of Wilson creek in Matagorda County

Area		Category	Year First Listed
1501_01	*Entire segment*		
	bacteria	5a	2006
	depressed dissolved oxygen	5b	1996

SegID: 1502 Tres Palacios Creek Above Tidal
From a point 1.0 km (0.6 miles) upstream of the confluence of Wilson Creek in Matagorda County to US 59 in Wharton County

Area		Category	Year First Listed
1502_01	*Middle 23 miles of segment*		
	bacteria	5c	1996

SegID: 2441 East Matagorda Bay

Area		Category	Year First Listed
2441_01	*Caney Creek am and western shoreline area*		
	bacteria (oyster waters)	5a	1998

SegID: 2442 Cedar Lakes

Area		Category	Year First Listed
2442_01	*Entire segment*		
	bacteria (oyster waters)	5a	1998

SegID: 2451 Matagorda Bay/Powderhorn Lake

Area		Category	Year First Listed
2451_01	*Northern end of Matagorda Bay*		
	bacteria (oyster waters)	5a	1996

SegID: 2452 Tres Palacios Bay/Turtle Bay

Area		Category	Year First Listed
2452_02	*Turtle Bay*		
	bacteria (oyster waters)	5a	1998
2452_03	*Tres Palacios Creek Arm*		
	bacteria (oyster waters)	5a	1998

Basin Tabular Summaries

For each basin, there are two documents: Tabular Summary of Use Support and Tabular Summary of Water Quality Concerns

Tabular Summary of Use Support

This series of tables provides a quick, detailed reference to water quality status within a basin. The summary identifies the indicators used to assess support of designated uses. For each indicator, support codes are used to identify the level of attainment as fully supporting (FS), partial supporting (PS), not supporting (NS), not assessed (NA), and not applicable (X). Indicators that contribute to partially supporting and not supporting uses are in bold type.

Tabular Summary of Water Quality Concerns

This series of tables provides a quick, detailed reference to water quality problems within a basin. The summary identifies the indicators used to assess water quality concerns. For each indicator, the presence of a water quality problem is identified as a concern (C), no concern (NC), threatened (TH), not assessed (NA), or not applicable (X). Indicators that contribute to concerns are in bold type.

Brazos River Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1201 Brazos River Tidal	1202 Brazos River Below Navasota River	1202H Allen's Creek	1202I Bessie's Creek	1202J Big Creek	1202K Mill Creek	1203 Whitney Lake	1203A Steele Creek	1204 Brazos River Below Lake Granbury	1205 Lake Granbury	1206 Brazos River Below Possum Kingdom Lake	1206D Palo Pinto Creek below Palo Pinto Reservoir
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	**NS**	NA	**NS**	FS	FS	NA	FS	FS	FS	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	FS	X	X	X	X	FS	X	X	FS	X	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	NA	FS	FS	FS	NA	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	FS	X	X	X	X	FS	X	FS	FS	FS	X
pH	FS	FS	X	X	X	X	FS	X	FS	FS	FS	X
Chloride	X	FS	X	X	X	X	FS	X	FS	FS	FS	X
Sulfate	X	FS	X	X	X	X	FS	X	FS	FS	FS	X
Total Dissolved Solids	X	FS	X	X	X	X	FS	X	FS	FS	FS	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1207 Possum Kingdom Lake	1208 Brazos River Above Possum Kingdom Lake	1209 Navasota River Below Lake Limestone	1209A Country Club Lake	1209B Fin Feather Lake	1209C Carters Creek	1209D Country Club Branch	1209G Cedar Creek	1209H Duck Creek	1209I Gibbons Creek	1209J Shepherd Creek	1209K Steele Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	**NS**	NA	NA	**NS**	NA	**NS**	FS	**NS**	**NS**	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	X	FS	X	X	X	X	X	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	NA	NA	FS	NA	FS	FS	**NS**	NA	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	FS	FS	X	X	X	X	X	X	X	X	X
pH	FS	FS	FS	X	X	X	X	X	X	X	X	X
Chloride	FS	FS	FS	X	X	X	X	X	X	X	X	X
Sulfate	FS	FS	FS	X	X	X	X	X	X	X	X	X
Total Dissolved Solids	FS	FS	FS	X	X	X	X	X	X	X	X	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1210 Lake Mexia	1210A Navasota River above Lake Mexia	1211 Yegua Creek	1211A Davidson Creek	1212 Somerville Lake	1212A Middle Yegua Creek	1212B East Yegua Creek	1213 Little River	1214 San Gabriel River	1215 Lampasas River Below Stillhouse Hollow Lake	1216 Stillhouse Hollow Lake	1217 Lampasas River Above Stillhouse Hollow Lake
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	**NS**	FS	**NS**	FS	FS	**NS**	FS	FS	FS	FS	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	X	FS	X	FS	X	X	FS	FS	FS	FS	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	X	FS	X	FS	X	X	FS	FS	FS	FS	FS
pH	FS	X	FS	X	**PS**	X	X	FS	FS	FS	FS	FS
Chloride	FS	X	FS	X	FS	X	X	FS	FS	FS	FS	FS
Sulfate	FS	X	FS	X	FS	X	X	FS	FS	FS	FS	FS
Total Dissolved Solids	FS	X	FS	X	FS	X	X	FS	FS	FS	FS	FS

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1217A Rocky Creek	1217B Sulphur Creek	1217C Simms Creek	1218 Nolan Creek/ South Nolan Creek	1219 Leon River Below Belton Lake	1220 Belton Lake	1220A Cowhouse Creek	1221 Leon River Below Proctor Lake	1221A Resley Creek	1221B South Leon River	1222 Proctor Lake	1222A Duncan Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	**NS**	NA	FS	FS	**NS**	NA	FS	FS	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	X	FS	FS	X	FS	X	X	FS	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	NA	FS	FS	NA
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	X	FS	FS	FS	X	FS	X	X	FS	X
pH	X	X	X	FS	FS	FS	X	FS	X	X	FS	X
Chloride	X	X	X	FS	FS	FS	X	FS	X	X	FS	X
Sulfate	X	X	X	FS	FS	FS	X	FS	X	X	FS	X
Total Dissolved Solids	X	X	X	FS	FS	FS	X	FS	X	X	FS	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1222B Rush-Copperas Creek	1222C Sabana River	1223 Leon River Below Leon Reservoir	1224 Leon Reservoir	1225 Waco Lake	1225A Hog Creek	1226 North Bosque River	1226A Duffau Creek	1226B Green Creek	1226C Meridian Creek	1226D Neils Creek	1226E Indian Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	NA	FS	FS	FS	FS	**NS**	FS	FS	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	FS	FS	FS	X	FS	X	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	NA	FS	NA	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	FS	NA	FS	X	FS	X	X	X	X	X
pH	X	X	FS	NA	FS	X	FS	X	X	X	X	X
Chloride	X	X	FS	FS	FS	X	FS	X	X	X	X	X
Sulfate	X	X	FS	FS	FS	X	FS	X	X	X	X	X
Total Dissolved Solids	X	X	FS	FS	FS	X	FS	X	X	X	X	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1226F Sims Creek	1226G Spring Creek	1227 Nolan River	1228 Lake Pat Cleburne	1229 Paluxy River /North Paluxy River	1230 Lake Palo Pinto	1231 Lake Graham	1232 Clear Fork Brazos River	1232A California Creek	1232B Deadman Creek	1233 Hubbard Creek Reservoir	1234 Lake Cisco
DESIGNATED USE SUPPORT												
Contact Recreation Use	**NS**	FS	**NS**	NA	FS	NA	NA	FS	FS	FS	NA	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	FS	FS	FS	FS	X	X	X	FS	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	NA	FS	NA	NA	FS	FS	FS	FS	NA
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	FS	NA	FS	NA	NA	FS	X	X	FS	NA
pH	X	X	FS	NA	FS	NA	NA	FS	X	X	FS	NA
Chloride	X	X	FS	NA	FS	NA	NA	FS	X	X	FS	NA
Sulfate	X	X	**NS**	NA	FS	NA	NA	FS	X	X	FS	NA
Total Dissolved Solids	X	X	FS	NA	FS	NA	NA	FS	X	X	FS	NA

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1235 Lake Stamford	1236 Fort Phantom Hill Reservoir	1237 Lake Sweetwater	1238 Salt Fork Brazos River	1239 White River	1240 White River Lake	1240A White River above White River Reservoir	1241 Double Mountain Fork Brazos River	1241A N. Fork Double Mtn. Fork Brazos River	1242 Brazos River Above Navasota River	1242A Marlin City Lake System	1242D Thompson Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	NA	NA	FS	NA	FS	NA	FS	FS	**NS**	NA	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	FS	FS	X	FS	FS	X	X	X	FS	FS	X
Aquatic Life Use												
Dissolved Oxygen grab min	NA	NA	NA	FS	NA	FS	NA	FS	FS	FS	NA	**PS**
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	NA	NA	NA	FS	X	FS	X	FS	X	FS	X	X
pH	NA	NA	NA	FS	X	FS	X	FS	X	FS	X	X
Chloride	NA	NA	NA	**NS**	X	**NS**	X	FS	X	FS	X	X
Sulfate	NA	NA	NA	FS	X	FS	X	FS	X	FS	X	X
Total Dissolved Solids	NA	NA	NA	**NS**	X	FS	X	FS	X	FS	X	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1242E Little Brazos River	1242F Pond Creek	1242I Campbells Creek	1242J Deer Creek	1242K Mud Creek	1242L Pin Oak Creek	1242M Spring Creek	1242N Tehuacana Creek	1242O Walnut Creek	1242P Big Creek	1243 Salado Creek	1244 Brushy Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	**NS**	FS	**NS**	**NS**	**NS**	**NS**	FS	**NS**	FS	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	X	X	X	X	X	X	X	FS	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	X	X	X	X	X	X	X	X	FS	FS
pH	X	X	X	X	X	X	X	X	X	X	FS	FS
Chloride	X	X	X	X	X	X	X	X	X	X	FS	FS
Sulfate	X	X	X	X	X	X	X	X	X	X	FS	FS
Total Dissolved Solids	X	X	X	X	X	X	X	X	X	X	FS	FS

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1244A Brushy Creek Above South Brushy Creek	1245 Upper Oyster Creek	1246 Middle Bosque/South Bosque River	1246D Tonk Creek	1246E Wasp Creek	1247 Granger Lake	1247A Willis Creek	1248 San Gabriel/North Fork San Gabriel River	1248A Berry Creek	1248B Huddleston Branch	1248C Mankins Branch	1249 Lake Georgetown
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	**NS**	FS	FS	**NS**	FS	**NS**	FS	FS	NA	NA	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	FS	X	X	X	FS	X	FS	X	X	X	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	NA	NA	NA	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	FS	FS	X	X	FS	X	FS	X	X	X	FS
pH	X	FS	FS	X	X	FS	X	FS	X	X	X	FS
Chloride	X	FS	FS	X	X	FS	X	FS	X	X	X	FS
Sulfate	X	FS	FS	X	X	FS	X	FS	X	X	X	FS
Total Dissolved Solids	X	FS	FS	X	X	FS	X	**NS**	X	X	X	FS

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	South Fork San Gabriel River 1250	North Fork San Gabriel River 1251	Lake Limestone 1252	Navasota River Below Lake Mexia 1253	Aquilla Reservoir 1254	Upper North Bosque River 1255	Goose Branch 1255A	North Fork Upper North Bosque River 1255B	Scarborough Creek 1255C	South Fork North Bosque River 1255D	Unnamed tributary of Goose Branch 1255E	Unnamed tributary of Scarborough Creek 1255F
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	NA	FS	FS	FS	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	FS	FS	FS	FS	X	X	X	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	FS	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	FS	FS	FS	FS	FS	X	X	X	X	X	X
pH	FS	FS	FS	FS	FS	FS	X	X	X	X	X	X
Chloride	FS	FS	FS	FS	FS	FS	X	X	X	X	X	X
Sulfate	FS	FS	FS	FS	FS	FS	X	X	X	X	X	X
Total Dissolved Solids	FS	FS	FS	FS	FS	FS	X	X	X	X	X	X

Brazos River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1255G Woodhollow Branch	1256 Brazos River/Lake Brazos	1256A Aquilla Creek	1257 Brazos River Below Lake Whitney
DESIGNATED USE SUPPORT				
Contact Recreation Use	**NS**	FS	FS	FS
Noncontact Recreation Use	X	X	X	X
Public Water Supply Use	X	FS	X	FS
Aquatic Life Use				
Dissolved Oxygen grab min	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA
Habitat	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA
Fish Consumption Use				
Advisories and Closures	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA
GENERAL USE SUPPORT				
Water Temperature	X	FS	X	FS
pH	X	FS	X	FS
Chloride	X	FS	X	FS
Sulfate	X	FS	X	FS
Total Dissolved Solids	X	FS	X	FS

Brazos River Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1201 Brazos River Tidal	1202 Brazos River Below Navasota River	1202H Allen's Creek	1202I Bessie's Creek	1202J Big Creek	1202K Mill Creek	1203 Whitney Lake	1203A Steele Creek	1204 Brazos River Below Lake Granbury	1205 Lake Granbury	1206 Brazos River Below Possum Kingdom Lake	1206D Palo Pinto Creek below Palo Pinto Reservoir
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NA	NA	NA	NC	NA	NA	NC	NA	NC	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	NA	NC	NC	**C**	NA	NC	NC	NC	NC
Orthophosphorus	NC	NC	**C**	NA	NC	NC	NC	NA	NC	NC	NC	NC
Total Phosphorus	NC	NC	NA	NA	NA	NC	NA	NA	NA	NA	NC	NA
Algal Growth												
Chlorophyll *a*	NC	**C**	NA	NA	NA	NC	NA	NA	NA	NA	NC	NA
Public Water Supply												
Finished Water: Chloride	NC	NC	X	X	X	X	NC	X	X	NC	X	NC
Finished Water: Sulfate	NC	NC	X	X	X	X	NC	X	X	NC	X	NC
Finished Water: TDS	NC	NC	X	X	X	X	NC	X	X	NC	X	NC
Surface Water: Chloride	NA	NC	X	X	X	X	**C**	X	X	**C**	X	NC
Surface Water: Sulfate	NA	NC	X	X	X	X	NC	X	X	NC	X	**C**
Surface Water: TDS	NA	NC	X	X	X	X	NC	X	X	**C**	X	NC

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1207 Possum Kingdom Lake	1208 Brazos River Above Possum Kingdom Lake	1209 Navasota River Below Lake Limestone	1209A Country Club Lake	1209B Fin Feather Lake	1209C Carters Creek	1209D Country Club Branch	1209G Cedar Creek	1209H Duck Creek	1209I Gibbons Creek	1209J Shepherd Creek	1209K Steele Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	**C**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	**C**	**C**	NC	**C**	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	NA	NA	**C**	NA	NC	NC	NC	NC	NC
Orthophosphorus	NC	NC	NC	NA	NA	**C**	NA	NC	NC	NC	NC	NC
Total Phosphorus	NA	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NA	**C**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	**C**	X	NC	X	X	X	X	X	X	X	X	X
Finished Water: Sulfate	**C**	X	NC	X	X	X	X	X	X	X	X	X
Finished Water: TDS	**C**	X	NC	X	X	X	X	X	X	X	X	X
Surface Water: Chloride	**C**	X	NC	X	X	X	X	X	X	X	X	X
Surface Water: Sulfate	**C**	X	NC	X	X	X	X	X	X	X	X	X
Surface Water: TDS	**C**	X	NC	X	X	X	X	X	X	X	X	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1210 Lake Mexia	1210A Navasota River above Lake Mexia	1211 Yegua Creek	1211A Davidson Creek	1212 Somerville Lake	1212A Middle Yegua Creek	1212B East Yegua Creek	1213 Little River	1214 San Gabriel River	1215 Lampasas River Below Stillhouse Hollow Lake	1216 Stillhouse Hollow Lake	1217 Lampasas River Above Stillhouse Hollow Lake
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NA	NA	NA	NA	NA	NA	NA	NC	NC	NC	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Orthophosphorus	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Phosphorus	**C**	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NC	NA	NA	NA	NA	NA	NA	NA	NC	NC	NA	NA
Public Water Supply												
Finished Water: Chloride	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X
Finished Water: Sulfate	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X
Finished Water: TDS	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X
Surface Water: Chloride	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X
Surface Water: Sulfate	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X
Surface Water: TDS	NC	X	NC	X	NC	X	X	NC	NC	NC	NC	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1217A Rocky Creek	1217B Sulphur Creek	1217C Simms Creek	1218 Nolan Creek/ South Nolan Creek	1219 Leon River Below Belton Lake	1220 Belton Lake	1220A Cowhouse Creek	1221 Leon River Below Proctor Lake	1221A Resley Creek	1221B South Leon River	1222 Proctor Lake	1222A Duncan Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	**C**	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	NA	NC	NC	NC	NC	NC	NA	NC	NC	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	**C**	NC	**C**	NC	NC	NA	NC	NC	NA
Orthophosphorus	NC	NC	NC	**C**	NC	NC	NC	NC	NA	NC	NC	NA
Total Phosphorus	NA	NA	NA	**C**	NA	NC	NA	NC	NA	NC	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NC	NA	NC	NA	**C**	NA	NC	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	X	X	NC	NC	X	NC	X	X	NC	X
Finished Water: Sulfate	X	X	X	X	NC	NC	X	NC	X	X	NC	X
Finished Water: TDS	X	X	X	X	NC	NC	X	NC	X	X	NC	X
Surface Water: Chloride	X	X	X	X	NC	NC	X	NC	X	X	NC	X
Surface Water: Sulfate	X	X	X	X	NC	NC	X	NC	X	X	NC	X
Surface Water: TDS	X	X	X	X	NC	NC	X	NC	X	X	NC	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1222B Rush-Copperas Creek	1222C Sabana River	1223 Leon River Below Leon Reservoir	1224 Leon Reservoir	1225 Waco Lake	1225A Hog Creek	1226 North Bosque River	1226A Duffau Creek	1226B Green Creek	1226C Meridian Creek	1226D Neils Creek	1226E Indian Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC	**C**	NC	NC	NC	NC	NC	NC	**C**
Orthophosphorus	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total Phosphorus	NA	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Algal Growth												
Chlorophyll *a*	NA	NC	NC	NC	**C**	NC	**C**	NC	**C**	NC	NC	NA
Public Water Supply												
Finished Water: Chloride	X	X	NC	NC	NC	X	NC	X	X	X	X	X
Finished Water: Sulfate	X	X	NC	NC	NC	X	NC	X	X	X	X	X
Finished Water: TDS	X	X	NC	NC	NC	X	NC	X	X	X	X	X
Surface Water: Chloride	X	X	NC	NC	NC	X	NC	X	X	X	X	X
Surface Water: Sulfate	X	X	NC	NC	NC	X	NC	X	X	X	X	X
Surface Water: TDS	X	X	NC	NC	NC	X	NC	X	X	X	X	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1226F Sims Creek	1226G Spring Creek	1227 Nolan River	1228 Lake Pat Cleburne	1229 Paluxy River /North Paluxy River	1230 Lake Palo Pinto	1231 Lake Graham	1232 Clear Fork Brazos River	1232A California Creek	1232B Deadman Creek	1233 Hubbard Creek Reservoir	1234 Lake Cisco
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NC	NA	NC	NA	NA	NC	NA	NC	NC	NA
Nitrite + Nitrate Nitrogen	NC	NC	**C**	NA	NC	NA	NA	**C**	**C**	**C**	NC	NA
Orthophosphorus	NC	NC	**C**	NA	NC	NA	NA	**C**	NC	**C**	NC	NA
Total Phosphorus	NC	NC	NC	NA	NC	NA	NA	NC	NA	**C**	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NC	NA	NC	NA	NA	NC	NA	NC	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	X	NC	NC	NC	NC	X	X	X	NC	NC
Finished Water: Sulfate	X	X	X	NC	NC	NC	NC	X	X	X	NC	NC
Finished Water: TDS	X	X	X	NC	NC	NC	NC	X	X	X	NC	NC
Surface Water: Chloride	X	X	X	NA	NC	NA	NA	X	X	X	NC	NA
Surface Water: Sulfate	X	X	X	NA	NC	NA	NA	X	X	X	NC	NA
Surface Water: TDS	X	X	X	NA	NC	NA	NA	X	X	X	NC	NA

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1235 Lake Stamford	1236 Fort Phantom Hill Reservoir	1237 Lake Sweetwater	1238 Salt Fork Brazos River	1239 White River	1240 White River Lake	1240A White River above White River Reservoir	1241 Double Mountain Fork Brazos River	1241A N. Fork Double Mtn. Fork Brazos River	1242 Brazos River Above Navasota River	1242A Marlin City Lake System	1242D Thompson Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	NA	**C**	NA	NA	NA	NC	NC	NC	NA	NA
Nitrite + Nitrate Nitrogen	NA	NA	NA	NC	NA	NC	NA	NC	**C**	NC	NA	**C**
Orthophosphorus	NA	NA	NA	NC	NA	NC	NA	NC	NA	NC	NA	**C**
Total Phosphorus	NA	NA	NA	NC	NA	NA	NA	NC	NC	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NC	NA	NA	NA	NC	**C**	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	**C**	NC	NC	X	NC	NC	X	X	X	NC	NC	X
Finished Water: Sulfate	**C**	NC	**C**	X	NC	NC	X	X	X	NC	NC	X
Finished Water: TDS	**C**	NC	NC	X	NC	NC	X	X	X	NC	NC	X
Surface Water: Chloride	NA	NA	NA	X	NA	NC	X	X	X	NC	NC	X
Surface Water: Sulfate	NA	NA	NA	X	NA	NC	X	X	X	NC	NC	X
Surface Water: TDS	NA	NA	NA	X	NA	NC	X	X	X	NC	NC	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1242E Little Brazos River	1242F Pond Creek	1242I Campbells Creek	1242J Deer Creek	1242K Mud Creek	1242L Pin Oak Creek	1242M Spring Creek	1242N Tehuacana Creek	1242O Walnut Creek	1242P Big Creek	1243 Salado Creek	1244 Brushy Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**C**	**C**
Orthophosphorus	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**C**
Total Phosphorus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	X	X	X	X	X	X	X	X	NC	NC
Finished Water: Sulfate	X	X	X	X	X	X	X	X	X	X	NC	NC
Finished Water: TDS	X	X	X	X	X	X	X	X	X	X	NC	NC
Surface Water: Chloride	X	X	X	X	X	X	X	X	X	X	NC	NC
Surface Water: Sulfate	X	X	X	X	X	X	X	X	X	X	NC	NC
Surface Water: TDS	X	X	X	X	X	X	X	X	X	X	NC	NC

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	Brushy Creek Above South Brushy Creek 1244A	Upper Oyster Creek 1245	Middle Bosque/South Bosque River 1246	Tonk Creek 1246D	Wasp Creek 1246E	Granger Lake 1247	Willis Creek 1247A	San Gabriel/North Fork San Gabriel River 1248	Berry Creek 1248A	Huddleston Branch 1248B	Mankins Branch 1248C	Lake Georgetown 1249
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	**C**	NC	NC	NC	NC	NC	NC	NC	NC	NC	**C**	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NC	NC	NC	NC	NC	NA	NC	NC	NA	NA	NC
Nitrite + Nitrate Nitrogen	NC	NC	**C**	**C**	**C**	**C**	**C**	NC	NC	NA	NA	NC
Orthophosphorus	NC	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA	NC
Total Phosphorus	NA	NC	NC	NC	NC	NC	NA	NC	NC	NA	NA	NC
Algal Growth												
Chlorophyll *a*	NA	NC	NC	NC	NC	NC	NA	NC	NC	NA	NA	NC
Public Water Supply												
Finished Water: Chloride	X	NC	X	X	X	NC	X	NC	X	X	X	NC
Finished Water: Sulfate	X	NC	X	X	X	NC	X	NC	X	X	X	NC
Finished Water: TDS	X	NC	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: Chloride	X	NC	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: Sulfate	X	NC	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: TDS	X	NC	X	X	X	NC	X	NC	X	X	X	NC

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	South Fork San Gabriel River 1250	North Fork San Gabriel River 1251	Lake Limestone 1252	Navasota River Below Lake Mexia 1253	Aquilla Reservoir 1254	Upper North Bosque River 1255	Goose Branch 1255A	North Fork Upper North Bosque River 1255B	Scarborough Creek 1255C	South Fork North Bosque River 1255D	Unnamed tributary of Goose Branch 1255E	Unnamed tributary of Scarborough Creek 1255F
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NA	**C**	NC	**C**	**C**	**C**	**C**	**C**	**C**	NC
Nitrite + Nitrate Nitrogen	NC	NC	**C**	NC	**C**	**C**	**C**	NC	NC	NC	NC	NC
Orthophosphorus	NC	NC	NC	NC	NC	**C**	**C**	**C**	**C**	NC	**C**	NC
Total Phosphorus	NC	NC	NA	NC	NC	**C**	**C**	NC	**C**	NC	**C**	NC
Algal Growth												
Chlorophyll *a*	NC	NC	NA	**C**	NC	**C**	NA	**C**	NA	**C**	NA	NA
Public Water Supply												
Finished Water: Chloride	NC	NC	NC	NC	NC	X	X	X	X	X	X	X
Finished Water: Sulfate	NC	NC	NC	NC	NC	X	X	X	X	X	X	X
Finished Water: TDS	NC	NC	NC	NC	NC	X	X	X	X	X	X	X
Surface Water: Chloride	NC	NC	NC	NC	NC	X	X	X	X	X	X	X
Surface Water: Sulfate	NC	NC	NC	NC	NC	X	X	X	X	X	X	X
Surface Water: TDS	NC	NC	NC	NC	NC	X	X	X	X	X	X	X

Brazos River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1255G Woodhollow Branch	1256 Brazos River/Lake Brazos	1256A Aquilla Creek	1257 Brazos River Below Lake Whitney
WATER QUALITY CONCERNS				
Sediment Contaminants	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA
Narrative	NC	NC	NC	NC
Nutrient Enrichment				
Ammonia Nitrogen	NC	NC	NA	NA
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC
Orthophosphorus	NC	NC	NC	NC
Total Phosphorus	NC	NC	NA	NA
Algal Growth				
Chlorophyll *a*	NA	NC	NA	NA
Public Water Supply				
Finished Water: Chloride	X	NC	X	NC
Finished Water: Sulfate	X	NC	X	NC
Finished Water: TDS	X	NC	X	NC
Surface Water: Chloride	X	NC	X	NC
Surface Water: Sulfate	X	NC	X	NC
Surface Water: TDS	X	NC	X	NC

Brazos-Colorado Coastal Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1301 San Bernard River Tidal	1302 San Bernard River Above Tidal	1304 Caney Creek Tidal	1304A Linnville Bayou	1305 Caney Creek Above Tidal
DESIGNATED USE SUPPORT					
Contact Recreation Use	FS	**NS**	FS	FS	**NS**
Noncontact Recreation Use	X	X	X	X	X
Public Water Supply Use	X	FS	X	X	X
Aquatic Life Use					
Dissolved Oxygen grab min	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	FS	NA
Organics in water	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA
Fish Consumption Use					
Advisories and Closures	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	FS	NA
GENERAL USE SUPPORT					
Water Temperature	FS	FS	FS	X	FS
pH	FS	FS	FS	X	FS
Chloride	X	FS	X	X	FS
Sulfate	X	FS	X	X	FS
Total Dissolved Solids	X	FS	X	X	FS

Brazos-Colorado Coastal Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1301 San Bernard River Tidal	1302 San Bernard River Above Tidal	1304 Caney Creek Tidal	1304A Linnville Bayou	1305 Caney Creek Above Tidal
WATER QUALITY CONCERNS					
Sediment Contaminants	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA
Narrative	NC	NC	**C**	NC	**C**
Nutrient Enrichment					
Ammonia Nitrogen	NC	NC	NC	**C**	NC
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC	NC
Orthophosphorus	NC	NC	NC	NC	NC
Total Phosphorus	NC	NC	NC	NC	NC
Algal Growth					
Chlorophyll *a*	NC	NC	NC	NC	NC
Public Water Supply					
Finished Water: Chloride	X	NC	X	X	X
Finished Water: Sulfate	X	NC	X	X	X
Finished Water: TDS	X	NC	X	X	X
Surface Water: Chloride	X	NC	X	X	X
Surface Water: Sulfate	X	NC	X	X	X
Surface Water: TDS	X	NC	X	X	X

Colorado River Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1401 Colorado River Tidal	1402 Colorado River Below La Grange	1402A Cummins Creek	1402C Buckners Creek	1402F Blue Creek	1402G Fayette Reservoir	1402H Skull Creek	1403 Lake Austin	1403A Bull Creek	1403B West Bull Creek	1403C Cow Fork Bull Creek	1403D Barrow Preserve Tributary
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	NA	NA	FS	FS	FS	FS	NA	NA	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	FS	X	X	X	FS	X	FS	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	NA	FS	NA	FS	FS	FS	NA	NA
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	**NS**	NA	NA	NA	NA	NA	**NS**	FS	FS	NA
Fish Community	NA	NA	**NS**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	FS	X	X	X	X	X	FS	X	X	X	X
pH	FS	FS	X	X	X	X	X	FS	X	X	X	X
Chloride	X	FS	X	X	X	X	X	FS	X	X	X	X
Sulfate	X	FS	X	X	X	X	X	FS	X	X	X	X
Total Dissolved Solids	X	FS	X	X	X	X	X	FS	X	X	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	Stillhouse Hollow 1403E	Unnamed Tributary to Bull Creek 1403F	Tanglewood Tributary to Bull Creek 1403G	Unnamed Tributary to Bull Creek 1403H	Unnamed Tributary to Bull Creek 1403I	Spicewood Tributary to Shoal Creek 1403J	Taylor Slough South 1403K	Unnamed Tributary to Lake Austin 1403L	Turkey Creek 1403M	Panther Hollow Creek 1403N	Cuernavaca Creek 1403O	Bee Creek 1403P
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	FS	FS	**NS**	**NS**	FS	NA	NA	NA	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	X	X	X	X	X	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	FS	FS	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	X	X	X	X	X	X	X	X	X	X
pH	X	X	X	X	X	X	X	X	X	X	X	X
Chloride	X	X	X	X	X	X	X	X	X	X	X	X
Sulfate	X	X	X	X	X	X	X	X	X	X	X	X
Total Dissolved Solids	X	X	X	X	X	X	X	X	X	X	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1403Q Bear Creek	1403R Unnamed tributary to Lake Austin	1404 Lake Travis	1404A Hamilton Creek	1404B Cow Creek	1404C Long Hollow Creek	1405 Marble Falls Lake	1406 Lake Lyndon B. Johnson	1406A Sandy Creek	1407 Inks Lake	1408 Lake Buchanan	1409 Colorado River Above Lake Buchanan
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	FS	FS	NA	NA	NA	FS	FS	FS	FS	FS	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS
Aquatic Life Use												
Dissolved Oxygen grab min	NA	NA	FS	NA	NA	NA	FS	FS	FS	**PS**	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FS
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FS
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS
pH	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS
Chloride	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS
Sulfate	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS
Total Dissolved Solids	X	X	FS	X	X	X	FS	FS	X	FS	FS	FS

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1410 Colorado River Below O. H. Ivie Reservoir	1411 E. V. Spence Reservoir	1412 Colorado River Below Lake J. B. Thomas	1412A Lake Colorado City	1412B Beals Creek	1412C Deep Creek	1413 Lake J. B. Thomas	1414 Pedernales River	1414B Cypress Creek	1414C Live Oak Creek	1414D Miller Creek	1415 Llano River
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	NA	NA	NA	NA	NA	NA	FS	FS	NA	NA	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	FS	X	FS	X	X	FS	FS	X	X	X	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	NA	FS	NA	FS	FS	NA	FS	FS	NA	NA	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	NA	FS	X	X	X	NA	FS	X	X	X	FS
pH	FS	NA	FS	X	X	X	NA	FS	X	X	X	FS
Chloride	FS	NA	FS	X	X	X	NA	FS	X	X	X	FS
Sulfate	FS	NA	FS	X	X	X	NA	FS	X	X	X	FS
Total Dissolved Solids	FS	NA	FS	X	X	X	NA	FS	X	X	X	FS

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1415A Johnson Fork Creek	1416 San Saba River	1416A Brady Creek	1417 Lower Pecan Bayou	1418 Lake Brownwood	1418A Hords Creek	1418B Jim Ned Creek	1419 Lake Coleman	1420 Pecan Bayou Above Lake Brownwood	1421 Concho River	1421A Dry Hollow Creek	1421B Kickapoo Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	FS	FS	FS	NA	FS	NA	NA	FS	FS	NA	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	FS	X	X	FS	X	X	FS	FS	FS	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	NA	FS	FS	FS	NA	FS	NA	NA	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	FS	FS	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	FS	NA	NA	NA	NA	NA	NA	NA	**NS**	NA	NA
Fish Community	NA	FS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	FS	FS	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	FS	X	FS	NA	X	X	NA	FS	FS	X	X
pH	X	FS	X	FS	NA	X	X	NA	FS	FS	X	X
Chloride	X	FS	X	FS	FS	X	X	FS	FS	FS	X	X
Sulfate	X	FS	X	FS	FS	X	X	FS	FS	FS	X	X
Total Dissolved Solids	X	FS	X	FS	FS	X	X	FS	FS	FS	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1421C Lipan Creek	1421D Little Concho River	1422 Lake Nasworthy	1423 Twin Buttes Reservoir	1423A Spring Creek	1423B Dove Creek	1424 Middle Concho/South Concho River	1425 O. C. Fisher Lake	1425A North Concho River	1426 Colorado River Below E. V. Spence Reservoir	1426A Oak Creek Reservoir	1426B Elm Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	NA	FS	NA	FS	NA	FS	NA	NA	FS	NA	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	FS	FS	X	X	FS	FS	X	FS	FS	X
Aquatic Life Use												
Dissolved Oxygen grab min	NA	FS	FS	NA	FS	NA	FS	NA	NA	FS	NA	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	FS	NA	X	X	FS	NA	X	FS	X	X
pH	X	X	FS	NA	X	X	FS	NA	X	FS	X	X
Chloride	X	X	FS	FS	X	X	FS	**NS**	X	**NS**	X	X
Sulfate	X	X	FS	FS	X	X	FS	FS	X	FS	X	X
Total Dissolved Solids	X	X	FS	FS	X	X	FS	**NS**	X	**NS**	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1427 Onion Creek	1427A Slaughter Creek	1427B Williamson Creek	1427C Bear Creek	1427D Boggy Creek	1427E Marble Creek	1427F Rinard Creek	1427G Unnamed Tributary to Slaughter Creek	1428 Colorado River Below Town Lake	1428A Boggy Creek	1428B Walnut Creek	1428C Gilleland Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	NA	NA	FS	FS	NA	FS	NA	FS	**NS**
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	X	X	X	X	X	X	X	FS	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	NA	NA	FS	FS	NA	FS	NA	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	FS	**NS**	FS	NA	NA	NA	NA	NA	NA	NA	FS	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	X	X	X	X	X	X	X	FS	X	X	X
pH	FS	X	X	X	X	X	X	X	FS	X	X	X
Chloride	FS	X	X	X	X	X	X	X	FS	X	X	X
Sulfate	FS	X	X	X	X	X	X	X	FS	X	X	X
Total Dissolved Solids	FS	X	X	X	X	X	X	X	FS	X	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1428D Little Walnut Creek	1428E Fort Branch Creek	1428F Tannehill Branch Creek	1428G Wells Branch	1428H Carson Creek	1428I Decker Creek	1428J Harris Branch	1429 Town Lake	1429A Shoal Creek	1429B Eanes Creek	1429C Waller Creek	1429D East Bouldin Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	X	X	X	X	FS	X	X	X	X
Aquatic Life Use												
Dissolved Oxygen grab min	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	FS	NA	NA	NA	NA	FS	NA	FS	NA	**NS**	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	X	X	X	X	X	FS	X	X	X	X
pH	X	X	X	X	X	X	X	FS	X	X	X	X
Chloride	X	X	X	X	X	X	X	FS	X	X	X	X
Sulfate	X	X	X	X	X	X	X	FS	X	X	X	X
Total Dissolved Solids	X	X	X	X	X	X	X	FS	X	X	X	X

Colorado River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1429E West Bouldin Creek	1429F Blunn Creek	1429G Harper's Branch	1429H Johnson Creek	1430 Barton Creek	1430A Barton Springs	1430B Tributaries to Barton Creek	1431 Mid Pecan Bayou	1432 Upper Pecan Bayou	1433 O. H. Ivie Reservoir	1434 Colorado River above La Grange	1434B Cedar Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	NA	NA	NA	NA	FS	FS	FS	FS	FS	NA	FS	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	X	X	X	X	X	FS	FS	FS	X
Aquatic Life Use												
Dissolved Oxygen grab min	NA	NA	NA	NA	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	FS	FS	NA	NA	FS	NA	FS	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	X	X	X	X	FS	X	X	FS	FS	FS	FS	X
pH	X	X	X	X	FS	X	X	FS	FS	NA	FS	X
Chloride	X	X	X	X	FS	X	X	FS	FS	NA	FS	X
Sulfate	X	X	X	X	FS	X	X	FS	FS	NA	FS	X
Total Dissolved Solids	X	X	X	X	FS	X	X	FS	FS	NA	NA	X

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1434C Lake Bastrop
DESIGNATED USE SUPPORT	
Contact Recreation Use	FS
Noncontact Recreation Use	X
Public Water Supply Use	X
Aquatic Life Use	
Dissolved Oxygen grab min	FS
Dissolved Oxygen 24-hour avg	NA
Dissolved Oxygen 24-hour min	NA
Metals in water	NA
Organics in water	NA
Water Toxicity tests	NA
Sediment Toxicity tests	NA
Habitat	NA
Macrobenthos Community	NA
Fish Community	NA
Fish Consumption Use	
Advisories and Closures	NA
Human Health Criteria	NA
GENERAL USE SUPPORT	
Water Temperature	X
pH	X
Chloride	X
Sulfate	X
Total Dissolved Solids	X

Colorado River Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1401 Colorado River Tidal	1402 Colorado River Below La Grange	1402A Cummins Creek	1402C Buckners Creek	1402F Blue Creek	1402G Fayette Reservoir	1402H Skull Creek	1403 Lake Austin	1403A Bull Creek	1403B West Bull Creek	1403C Cow Fork Bull Creek	1403D Barrow Preserve Tributary
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NC	NC	NA	NC	NA	NC	NC	NC	NA	NC
Nitrite + Nitrate Nitrogen	NC	NC	NC	NC	NA	NC	NA	NC	NC	NC	NA	**C**
Orthophosphorus	NC	NC	NC	NC	NA	NC	NA	NC	NC	NC	NA	NC
Total Phosphorus	NC	NC	NC	NC	NA	NC	NA	NC	NC	NC	NA	NC
Algal Growth												
Chlorophyll *a*	NC	NC	NC	**C**	NA	**C**	NA	NC	NC	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	X	NC	X	X	X	NC	X	NC	X	X	X	X
Finished Water: Sulfate	X	NC	X	X	X	NC	X	NC	X	X	X	X
Finished Water: TDS	X	NC	X	X	X	NC	X	NC	X	X	X	X
Surface Water: Chloride	X	NC	X	X	X	NC	X	NC	X	X	X	X
Surface Water: Sulfate	X	NC	X	X	X	NC	X	NC	X	X	X	X
Surface Water: TDS	X	NC	X	X	X	NC	X	NC	X	X	X	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1403E Stillhouse Hollow	1403F Unnamed Tributary to Bull Creek	1403G Tanglewood Tributary to Bull Creek	1403H Unnamed Tributary to Bull Creek	1403I Unnamed Tributary to Bull Creek	1403J Spicewood Tributary to Shoal Creek	1403K Taylor Slough South	1403L Unnamed Tributary to Lake Austin	1403M Turkey Creek	1403N Panther Hollow Creek	1403O Cuernavaca Creek	1403P Bee Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA	NA	NC
Nitrite + Nitrate Nitrogen	**C**	NC	NC	NC	NC	**C**	**C**	NC	NA	NA	NA	NC
Orthophosphorus	NC	NC	NC	NC	NC	NC	NC	NC	NA	NA	NA	NC
Total Phosphorus	NC	NC	NC	NC	NC	NC	NA	NA	NA	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	X	X	X	X	X	X	X	X	X	X
Finished Water: Sulfate	X	X	X	X	X	X	X	X	X	X	X	X
Finished Water: TDS	X	X	X	X	X	X	X	X	X	X	X	X
Surface Water: Chloride	X	X	X	X	X	X	X	X	X	X	X	X
Surface Water: Sulfate	X	X	X	X	X	X	X	X	X	X	X	X
Surface Water: TDS	X	X	X	X	X	X	X	X	X	X	X	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1403Q Bear Creek	1403R Unnamed tributary to Lake Austin	1404 Lake Travis	1404A Hamilton Creek	1404B Cow Creek	1404C Long Hollow Creek	1405 Marble Falls Lake	1406 Lake Lyndon B. Johnson	1406A Sandy Creek	1407 Inks Lake	1408 Lake Buchanan	1409 Colorado River Above Lake Buchanan
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NC	NC	NA	NA	NA	NC	NC	NC	**C**	NC	NC
Nitrite + Nitrate Nitrogen	NA	NC	NC	NA	NA	NA	NC	NC	NC	NC	NC	NC
Orthophosphorus	NA	NC	NC	NA	NA	NA	NC	NC	NC	NC	NC	NC
Total Phosphorus	NA	NA	NC	NA	NA	NA	NC	NC	NC	NC	NC	NC
Algal Growth												
Chlorophyll *a*	NA	NA	NC	NA	NA	NA	NC	NC	NC	NC	**C**	NC
Public Water Supply												
Finished Water: Chloride	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC
Finished Water: Sulfate	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC
Finished Water: TDS	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC
Surface Water: Chloride	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC
Surface Water: Sulfate	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC
Surface Water: TDS	X	X	NC	X	X	X	NC	NC	X	NC	NC	NC

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1410 Colorado River Below O. H. Ivie Reservoir	1411 E. V. Spence Reservoir	1412 Colorado River Below Lake J. B. Thomas	1412A Lake Colorado City	1412B Beals Creek	1412C Deep Creek	1413 Lake J. B. Thomas	1414 Pedernales River	1414B Cypress Creek	1414C Live Oak Creek	1414D Miller Creek	1415 Llano River
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NA	NC	NA	NA	NA	NA	NC	NC	NA	NA	NC
Nitrite + Nitrate Nitrogen	NC	NA	NC	NA	**C**	NA	NA	NC	NC	NA	NA	NC
Orthophosphorus	NC	NA	NC	NA	NA	NA	NA	NC	NC	NA	NA	NC
Total Phosphorus	NC	NA	NA	NA	NA	NA	NA	NC	NC	NA	NA	NC
Algal Growth												
Chlorophyll *a*	NC	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NC
Public Water Supply												
Finished Water: Chloride	NC	NA	X	NC	X	X	NC	NC	X	X	X	NC
Finished Water: Sulfate	NC	NA	X	**C**	X	X	NC	NC	X	X	X	NC
Finished Water: TDS	NC	NA	X	**C**	X	X	NC	NC	X	X	X	NC
Surface Water: Chloride	**C**	**C**	X	NA	X	X	NA	NC	X	X	X	NC
Surface Water: Sulfate	NC	**C**	X	NA	X	X	NA	NC	X	X	X	NC
Surface Water: TDS	NC	**C**	X	NA	X	X	NA	NC	X	X	X	NC

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes
NC = no concern
C = concern
TH = threatened
NA = not assessed
X = not applicable

	1415A Johnson Fork Creek	1416 San Saba River	1416A Brady Creek	1417 Lower Pecan Bayou	1418 Lake Brownwood	1418A Hords Creek	1418B Jim Ned Creek	1419 Lake Coleman	1420 Pecan Bayou Above Lake Brownwood	1421 Concho River	1421A Dry Hollow Creek	1421B Kickapoo Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NC	NC	NC	NA	NC	NA	NC	NC	**C**	NA	NA
Nitrite + Nitrate Nitrogen	NA	NC	**C**	**C**	NA	NC	NA	NC	NC	**C**	**C**	**C**
Orthophosphorus	NA	NC	**C**	NC	NA	NC	NA	NC	NC	NC	NA	NA
Total Phosphorus	NA	NC	**C**	NC	NA	NC	NA	NC	NA	NC	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NC	**C**	**C**	NA	**C**	NA	NC	NA	**C**	NA	NA
Public Water Supply												
Finished Water: Chloride	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X
Finished Water: Sulfate	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X
Finished Water: TDS	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X
Surface Water: Chloride	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X
Surface Water: Sulfate	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X
Surface Water: TDS	X	NC	X	X	NC	X	X	NC	NC	**C**	X	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1421C Lipan Creek	1421D Little Concho River	1422 Lake Nasworthy	1423 Twin Buttes Reservoir	1423A Spring Creek	1423B Dove Creek	1424 Middle Concho/South Concho River	1425 O. C. Fisher Lake	1425A North Concho River	1426 Colorado River Below E. V. Spence Reservoir	1426A Oak Creek Reservoir	1426B Elm Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	**C**	NA	**C**	NA	NC	**C**	NA	**C**	NA	NA
Nitrite + Nitrate Nitrogen	NA	**C**	NC	NA	NC	NA	NC	NC	NA	NC	NA	**C**
Orthophosphorus	NA	NA	NC	NA	NC	NA	NC	NC	NA	NC	NA	NA
Total Phosphorus	NA	NA	NC	NA	NA	NA	NC	NA	NA	NC	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NC	NA	NA	NA	NC	NA	NA	**C**	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	NC	NC	X	X	NC	NC	X	NC	NA	X
Finished Water: Sulfate	X	X	NC	NC	X	X	NC	NC	X	NC	**C**	X
Finished Water: TDS	X	X	NC	NC	X	X	NC	NC	X	NC	NA	X
Surface Water: Chloride	X	X	**C**	NC	X	X	NC	**C**	X	**C**	NA	X
Surface Water: Sulfate	X	X	NC	NC	X	X	NC	NC	X	**C**	NA	X
Surface Water: TDS	X	X	NC	NC	X	X	NC	NC	X	**C**	NA	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1427 Onion Creek	1427A Slaughter Creek	1427B Williamson Creek	1427C Bear Creek	1427D Boggy Creek	1427E Marble Creek	1427F Rinard Creek	1427G Unnamed Tributary to Slaughter Creek	1428 Colorado River Below Town Lake	1428A Boggy Creek	1428B Walnut Creek	1428C Gilleland Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	**C**	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NC	NA	NA	NC	NC	NA	NC	NA	NC	NC
Nitrite + Nitrate Nitrogen	NC	NC	NC	NA	NA	NC	NC	NA	**C**	NA	**C**	**C**
Orthophosphorus	NC	NC	NC	NA	NA	NC	NC	NA	**C**	NA	NC	**C**
Total Phosphorus	NC	NC	NC	NA	NA	NC	NC	NA	NC	NA	**C**	NC
Algal Growth												
Chlorophyll *a*	NC	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NC
Public Water Supply												
Finished Water: Chloride	NC	X	X	X	X	X	X	X	NC	X	X	X
Finished Water: Sulfate	NC	X	X	X	X	X	X	X	NC	X	X	X
Finished Water: TDS	NC	X	X	X	X	X	X	X	NC	X	X	X
Surface Water: Chloride	NC	X	X	X	X	X	X	X	NC	X	X	X
Surface Water: Sulfate	NC	X	X	X	X	X	X	X	NC	X	X	X
Surface Water: TDS	NC	X	X	X	X	X	X	X	NC	X	X	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

<u>Key to concern codes</u> NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1428D Little Walnut Creek	1428E Fort Branch Creek	1428F Tannehill Branch Creek	1428G Wells Branch	1428H Carson Creek	1428I Decker Creek	1428J Harris Branch	1429 Town Lake	1429A Shoal Creek	1429B Eanes Creek	1429C Waller Creek	1429D East Bouldin Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**C**
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**C**	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA
Nitrite + Nitrate Nitrogen	NA	NA	NA	NA	NA	NA	NA	**C**	NA	NA	NA	NA
Orthophosphorus	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA
Total Phosphorus	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	X	X	X	X	X	X	X	NC	X	X	X	X
Finished Water: Sulfate	X	X	X	X	X	X	X	NC	X	X	X	X
Finished Water: TDS	X	X	X	X	X	X	X	NC	X	X	X	X
Surface Water: Chloride	X	X	X	X	X	X	X	NC	X	X	X	X
Surface Water: Sulfate	X	X	X	X	X	X	X	NC	X	X	X	X
Surface Water: TDS	X	X	X	X	X	X	X	NC	X	X	X	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1429E West Bouldin Creek	1429F Blunn Creek	1429G Harper's Branch	1429H Johnson Creek	1430 Barton Creek	1430A Barton Springs	1430B Tributaries to Barton Creek	1431 Mid Pecan Bayou	1432 Upper Pecan Bayou	1433 O. H. Ivie Reservoir	1434 Colorado River above La Grange	1434B Cedar Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	**C**	**C**	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NA	NA	NA	NA	NC	NC	NC	NC	NC	NA	NC	NC
Nitrite + Nitrate Nitrogen	NA	NA	NA	NA	NC	NC	NC	**C**	NC	NA	**C**	NC
Orthophosphorus	NA	NA	NA	NA	NC	NC	NC	**C**	NC	NA	NC	NC
Total Phosphorus	NA	NA	NA	NA	NC	NC	NC	**C**	NC	NA	NC	NC
Algal Growth												
Chlorophyll *a*	NA	NA	NA	NA	NC	NC	NA	NC	NC	NA	NC	NC
Public Water Supply												
Finished Water: Chloride	X	X	X	X	X	X	X	X	NC	NC	NC	X
Finished Water: Sulfate	X	X	X	X	X	X	X	X	NC	NC	NC	X
Finished Water: TDS	X	X	X	X	X	X	X	X	NC	NC	NC	X
Surface Water: Chloride	X	X	X	X	X	X	X	X	NC	**C**	NC	X
Surface Water: Sulfate	X	X	X	X	X	X	X	X	NC	NC	NC	X
Surface Water: TDS	X	X	X	X	X	X	X	X	NC	**C**	NA	X

Colorado River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1434C Lake Bastrop
WATER QUALITY CONCERNS	
Sediment Contaminants	NA
Fish Tissue Contaminants	NA
Narrative	NC
Nutrient Enrichment	
Ammonia Nitrogen	NC
Nitrite + Nitrate Nitrogen	NC
Orthophosphorus	NC
Total Phosphorus	NC
Algal Growth	
Chlorophyll *a*	NC
Public Water Supply	
Finished Water: Chloride	X
Finished Water: Sulfate	X
Finished Water: TDS	X
Surface Water: Chloride	X
Surface Water: Sulfate	X
Surface Water: TDS	X

Colorado-Lavaca Coastal Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1501 Tres Palacios Creek Tidal	1502 Tres Palacios Creek Above Tidal
DESIGNATED USE SUPPORT		
Contact Recreation Use	FS	**NS**
Noncontact Recreation Use	X	X
Public Water Supply Use	X	X
Aquatic Life Use		
Dissolved Oxygen grab min	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA
Dissolved Oxygen 24-hour min	NA	NA
Metals in water	NA	NA
Organics in water	NA	NA
Water Toxicity tests	NA	NA
Sediment Toxicity tests	NA	NA
Habitat	NA	NA
Macrobenthos Community	NA	NA
Fish Community	NA	NA
Fish Consumption Use		
Advisories and Closures	NA	NA
Human Health Criteria	NA	NA
GENERAL USE SUPPORT		
Water Temperature	FS	FS
pH	FS	FS
Chloride	X	FS
Sulfate	X	FS
Total Dissolved Solids	X	FS

Colorado-Lavaca Coastal Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1501 Tres Palacios Creek Tidal	1502 Tres Palacios Creek Above Tidal
WATER QUALITY CONCERNS		
Sediment Contaminants	NA	NA
Fish Tissue Contaminants	NA	NA
Narrative	NC	NC
Nutrient Enrichment		
Ammonia Nitrogen	NC	NC
Nitrite + Nitrate Nitrogen	NC	NC
Orthophosphorus	NC	NC
Total Phosphorus	NC	NC
Algal Growth		
Chlorophyll *a*	NC	NC
Public Water Supply		
Finished Water: Chloride	X	X
Finished Water: Sulfate	X	X
Finished Water: TDS	X	X
Surface Water: Chloride	X	X
Surface Water: Sulfate	X	X
Surface Water: TDS	X	X

Lavaca River Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1601 Lavaca River Tidal	1601A Catfish Bayou	1601B Redfish Bayou	1602 Lavaca River Above Tidal	1603 Navidad River Tidal	1604 Lake Texana	1604A East Mustang Creek	1604B West Mustang Creek	1604C Sandy Creek	1605 Navidad River Above Lake Texana
DESIGNATED USE SUPPORT										
Contact Recreation Use	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	X	X	FS	X	FS	X	X	X	FS
Aquatic Life Use										
Dissolved Oxygen grab min	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use										
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT										
Water Temperature	FS	X	X	FS	FS	FS	X	X	X	FS
pH	FS	X	X	FS	FS	FS	X	X	X	FS
Chloride	X	X	X	FS	X	FS	X	X	X	FS
Sulfate	X	X	X	FS	X	FS	X	X	X	FS
Total Dissolved Solids	X	X	X	FS	X	FS	X	X	X	FS

Lavaca River Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1601 Lavaca River Tidal	1601A Catfish Bayou	1601B Redfish Bayou	1602 Lavaca River Above Tidal	1603 Navidad River Tidal	1604 Lake Texana	1604A East Mustang Creek	1604B West Mustang Creek	1604C Sandy Creek	1605 Navidad River Above Lake Texana
WATER QUALITY CONCERNS										
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment										
Ammonia Nitrogen	NA	NA	NA	NA	NA	**C**	**C**	NA	NA	NA
Nitrite + Nitrate Nitrogen	NA	NA	NA	NC	NC	**C**	NC	NC	NC	NC
Orthophosphorus	NA	NA	NA	NC	NC	**C**	NC	NC	NC	NC
Total Phosphorus	NA	NA	NA	NA	NA	**C**	NC	NA	NA	NA
Algal Growth Concern										
Chlorophyll *a*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Public Water Supply Concern										
Finished Water: Chloride	X	X	X	NC	X	NC	X	X	X	NC
Finished Water: Sulfate	X	X	X	NC	X	NC	X	X	X	NC
Finished Water: TDS	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: Chloride	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: Sulfate	X	X	X	NC	X	NC	X	X	X	NC
Surface Water: TDS	X	X	X	NC	X	NC	X	X	X	NC

Guadalupe River Basin Tabular Summary of Use Support

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1801 Guadalupe River Tidal	1802 Guadalupe River Below San Antonio River	1803 Guadalupe River Below San Marcos River	1803A Elm Creek	1803B Sandies Creek	1803C Peach Creek	1804 Guadalupe River Below Comal River	1804A Geronimo Creek	1805 Canyon Lake	1806 Guadalupe River Above Canyon Lake	1806A Camp Meeting Creek	1807 Coleto Creek
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	FS	FS	NA	**NS**	**NS**	FS	FS	FS	**NS**	NA	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	X	FS	FS	X	X	X	FS	X	FS	FS	X	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	FS	FS	NA	FS	FS	FS	FS	FS	FS	NA	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	FS	FS	X	X	X	FS	X	FS	FS	X	FS
pH	FS	FS	FS	X	X	X	FS	X	FS	FS	X	FS
Chloride	X	FS	FS	X	X	X	FS	X	FS	FS	X	FS
Sulfate	X	FS	FS	X	X	X	FS	X	FS	FS	X	FS
Total Dissolved Solids	X	FS	FS	X	X	X	FS	X	FS	FS	X	FS

Guadalupe River Basin Tabular Summary of Use Support (continued)

Key to support codes FS = fully supporting PS = partially supporting NS = not supporting NA = not assessed X = not applicable	1808 Lower San Marcos River	1809 Lower Blanco River	1810 Plum Creek	1811 Comal River	1811A Dry Comal Creek	1812 Guadalupe River Below Canyon Dam	1813 Upper Blanco River	1814 Upper San Marcos River	1815 Cypress Creek	1816 Johnson Creek	1817 North Fork Guadalupe River	1818 South Fork Guadalupe River
DESIGNATED USE SUPPORT												
Contact Recreation Use	FS	NA	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Noncontact Recreation Use	X	X	X	X	X	X	X	X	X	X	X	X
Public Water Supply Use	FS	FS	X	FS	X	FS	FS	FS	FS	FS	FS	FS
Aquatic Life Use												
Dissolved Oxygen grab min	FS	NA	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Dissolved Oxygen 24-hour avg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen 24-hour min	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals in water	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA	NA
Organics in water	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Water Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sediment Toxicity tests	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Macrobenthos Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Community	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Consumption Use												
Advisories and Closures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Human Health Criteria	NA	NA	NA	NA	NA	NA	FS	NA	NA	NA	NA	NA
GENERAL USE SUPPORT												
Water Temperature	FS	NA	FS	FS	X	FS	FS	FS	FS	FS	FS	NA
pH	FS	NA	FS	FS	X	FS	FS	FS	FS	FS	FS	NA
Chloride	FS	NA	FS	FS	X	FS	FS	FS	FS	FS	FS	FS
Sulfate	FS	NA	FS	FS	X	FS	FS	FS	FS	FS	FS	FS
Total Dissolved Solids	FS	NA	FS	FS	X	FS	FS	FS	FS	FS	FS	FS

Guadalupe River Basin Tabular Summary of Water Quality Concerns

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1801 Guadalupe River Tidal	1802 Guadalupe River Below San Antonio River	1803 Guadalupe River Below San Marcos River	1803A Elm Creek	1803B Sandies Creek	1803C Peach Creek	1804 Guadalupe River Below Comal River	1804A Geronimo Creek	1805 Canyon Lake	1806 Guadalupe River Above Canyon Lake	1806A Camp Meeting Creek	1807 Coleto Creek
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	**C**	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NC	NC	NA	**C**	**C**	NC	NC	NC	NC	NA	NC
Nitrite + Nitrate Nitrogen	**C**	**C**	NC	NA	NC	NC	NC	**C**	NC	NC	NA	NC
Orthophosphorus	NC	NA	NA	NA	NA	NA	NC	NA	NC	NC	NA	NC
Total Phosphorus	NC	NC	NC	NA	NC	NC	NC	NC	NC	NC	NA	NC
Algal Growth												
Chlorophyll *a*	NC	NC	NC	NA	NC	NC	**C**	NC	NC	NC	NA	NC
Public Water Supply												
Finished Water: Chloride	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC
Finished Water: Sulfate	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC
Finished Water: TDS	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC
Surface Water: Chloride	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC
Surface Water: Sulfate	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC
Surface Water: TDS	X	NC	NC	X	X	X	NC	X	NC	NC	X	NC

Guadalupe River Basin Tabular Summary of Water Quality Concerns (continued)

Key to concern codes NC = no concern C = concern TH = threatened NA = not assessed X = not applicable	1808 Lower San Marcos River	1809 Lower Blanco River	1810 Plum Creek	1811 Comal River	1811A Dry Comal Creek	1812 Guadalupe River Below Canyon Dam	1813 Upper Blanco River	1814 Upper San Marcos River	1815 Cypress Creek	1816 Johnson Creek	1817 North Fork Guadalupe River	1818 South Fork Guadalupe River
WATER QUALITY CONCERNS												
Sediment Contaminants	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA	NA
Fish Tissue Contaminants	NA	NA	NA	NA	NA	NA	NC	NA	NA	NA	NA	NA
Narrative	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nutrient Enrichment												
Ammonia Nitrogen	NC	NA	**C**	NC	NC	NC	NC	NC	NC	NA	NA	NA
Nitrite + Nitrate Nitrogen	NC	NA	**C**	NC	NC	NC	NC	NC	NC	NC	NC	NA
Orthophosphorus	NA	NA	NA	NC	NA	NC	NC	NA	NA	NA	NC	NA
Total Phosphorus	NC	NA	**C**	NC	NC	NC	NC	NC	NC	NA	NA	NA
Algal Growth												
Chlorophyll *a*	NC	NA	NC	NC	NC	NC	NC	NC	NC	NA	NA	NA
Public Water Supply												
Finished Water: Chloride	NC	NC	X	NC	X	NC	NC	NC	NC	NC	NC	NC
Finished Water: Sulfate	NC	NC	X	NC	X	NC	NC	NC	NC	NC	NC	NC
Finished Water: TDS	NC	NC	X	NC	X	NC	NC	NC	NC	NC	NC	NC
Surface Water: Chloride	NC	NA	X	NC	X	NC	NC	NC	NC	NC	NC	NC
Surface Water: Sulfate	NC	NA	X	NC	X	NC	NC	NC	NC	NC	NC	NC
Surface Water: TDS	NC	NA	X	NC	X	NC	NC	NC	NC	NC	NC	NC

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APPENDICES

CHAPTER 6.0: WATER CONSERVATION AND DROUGHT MANAGEMENT PLANS

This chapter presents the minimum necessary requirements for conservation plans and drought contingency plans, as well as a summary of information provided by water systems in the Lower Colorado Regional Water Planning Area (LCRWPA) regarding water conservation and drought contingency measures that they currently implement.

Irrigation water usage represents 63 percent of the total water used in the LCRWPA in 2000 where irrigation of rice makes up a significant portion of total irrigation water demand. There is a potential for significant conservation savings in rice production, and conservation of water in rice irrigation may have one of the greatest impacts in reducing water usage in the LCRWPA. However, if the amount of water used in the cultivation of rice declines over time, as projected, and municipal and manufacturing demand continues to grow, as projected, the significance of planning for conservation savings in the municipal and manufacturing categories will become increasingly important. The following sections discuss which entities are required to have plans and what the plans, if required, must contain.

6.1 WATER CONSERVATION PLAN

Water conservation plans are required by the Texas Commission on Environmental Quality (TCEQ, formerly the TNRCC) and/or the Texas Water Development Board (TWDB) for the following water users:

- Applicants who apply for TWDB loans
- Applicants for new or amended surface water rights
- Any holder of an existing permit, certified filing, or certificate of adjudication if requested by TCEQ/TWDB for appropriation of a surface water right greater than 1,000 acre-feet per year (ac-ft/yr) for municipal, industrial, and other uses excluding irrigation. For irrigation uses, the threshold is 10,000 ac-ft/yr.
- Public water system suppliers that serve 3,300 connections or more.

Conservation plans developed for submittal with water right applications for appropriation of State water should discuss the evaluation of water conservation with respect to their application. This would include discussions of water conservation as an alternative to the potentially appropriated State water as well as the evaluation of any other conservation best management practices (BMP) as an alternative to the new water right.

Minimum conservation and drought management plan requirements for specific water use categories are discussed in the following subsections.

6.1.1 Municipal Uses by Public Water Suppliers[1]

Water conservation plans for municipal water use by public water suppliers (i.e., documented Lower Colorado Regional Municipal Water User Groups) must include specific information. If the plans do not provide information for each requirement, the public water supplier shall include in the plans an explanation of why the requirement is not applicable. The required water conservation plan information for municipal uses by public drinking water suppliers is as follows:

- A utility profile including, but not limited to, information regarding population and customer data, water use data, water supply system data, and wastewater system data.
- Since May 1, 2005, specific, quantified 5-year and 10-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day. The goals established by a public water supplier under this subparagraph are not enforceable.
- Metering device(s) within an accuracy of plus or minus 5.0 percent in order to measure and account for the amount of water diverted from the source of supply.
- A program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.
- Measures to determine and control unaccounted-for uses of water (for example: periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.).
- A program of continuing public education and information regarding water conservation.
- A water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water.
- A reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.
- A means of implementation and enforcement which should be shown by either of the following:
    - A copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the water supplier, or
    - A description of the authority by which the water supplier will implement and enforce the conservation plan.
- Documentation of coordination with the Lower Colorado Regional Water Planning Group (LCRWPG) for the service area of the public water supplier to ensure consistency with the appropriate, approved Lower Colorado Regional Water Plan.

Water conservation plans for municipal uses by public drinking water suppliers serving a current population of 5,000 or more and/or a projected population of 5,000 or more within the next 10 years subsequent to the effective date of the plan must also include the following information:

[1] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2.

- A program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system to control unaccounted-for uses of water.
- A record management system to record water pumped, water deliveries, water sales, and water losses that allows for the desegregation of water sales and uses into residential, commercial, public and institutional, and industrial users.
- A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

If the conservation goals cannot be achieved through the minimum conservation plan requirements, the water supplier can implement water conservation strategies to help achieve their goals. TCEQ can also require the water supplier to implement a conservation BMP strategy to achieve the goals set in the conservation plan. Some of the water conservation BMPs are listed below, and a more detailed list can be found in the *Water Conservation Best Management Practices Guide, Report 362* of the Texas Water Development Board, November 2004.

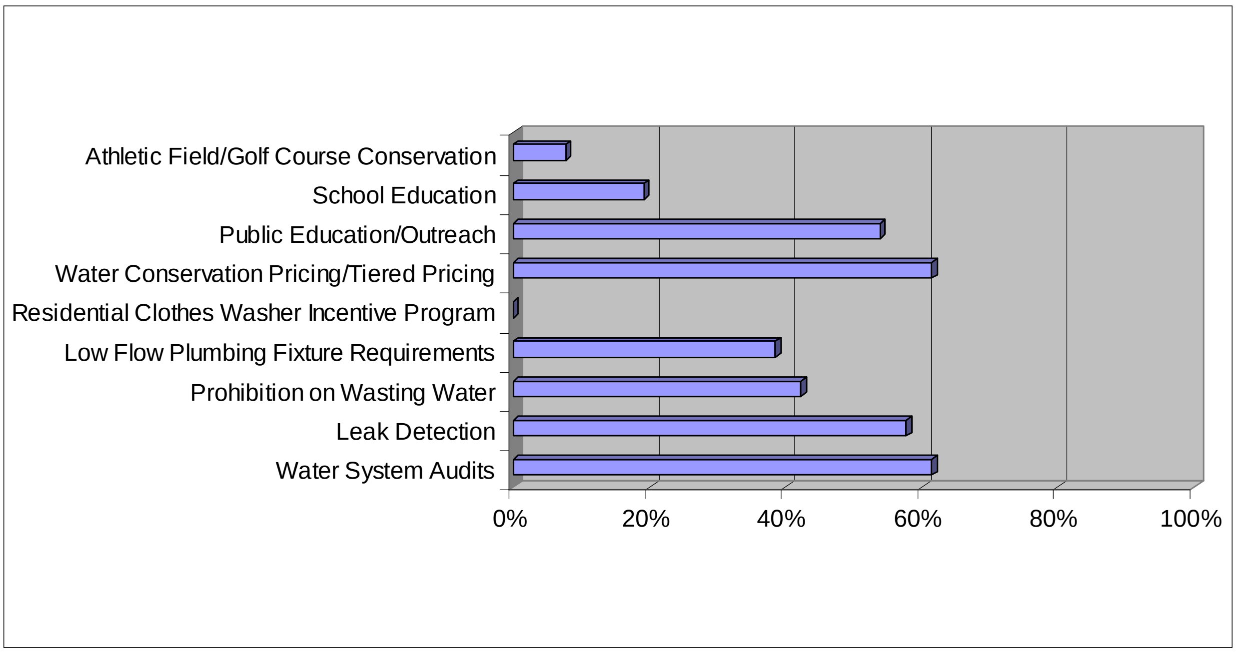
- Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates.
- Adoption of ordinances, plumbing codes, and/or rules requiring water-conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition.
- A program encouraging the replacement or retrofit of existing structures built prior to 1991 with water conserving plumbing fixtures.
- Reuse and/or recycling of wastewater and/or graywater.
- A program for pressure control and/or reduction in the distribution system and/or for customer connections.
- A program and/or ordinance(s) for landscape water management.
- A method for monitoring the effectiveness and efficiency of the water conservation plan.
- Any other water conservation practice, method, or technique which the water supplier shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

A water conservation plan prepared in accordance with 31 TAC §363.15 (relating to Required Water Conservation Plan) of the TWDB, and substantially meeting the requirements of this section and other applicable commission rules, may be submitted to meet application requirements in accordance with a memorandum of understanding between the commission and the TWDB.

Since May 1, 2005, a public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5-year and 10-year targets and any other new or updated information. The public water supplier for municipal use should have reviewed and updated the next revision of its water conservation plan no later than May 1, 2009, and every 5 years after that date to coincide with the Lower Colorado Regional Water Planning Group's regional water plan update.

Water conservation surveys were sent to all water systems within the Region K area. Of the small percentage of surveys completed and received (294 surveys mailed out, 32 completed surveys received), results indicate approximately 60% use water system audits and water conservation pricing/tiered pricing as one of their conservation measures. Other common measures include leak detection, public outreach and education, prohibition on wasting water and low flow plumbing fixture requirements. Survey results of water conservation measures currently being used by water systems in the Region K planning area are shown in *Figure 6.1*.

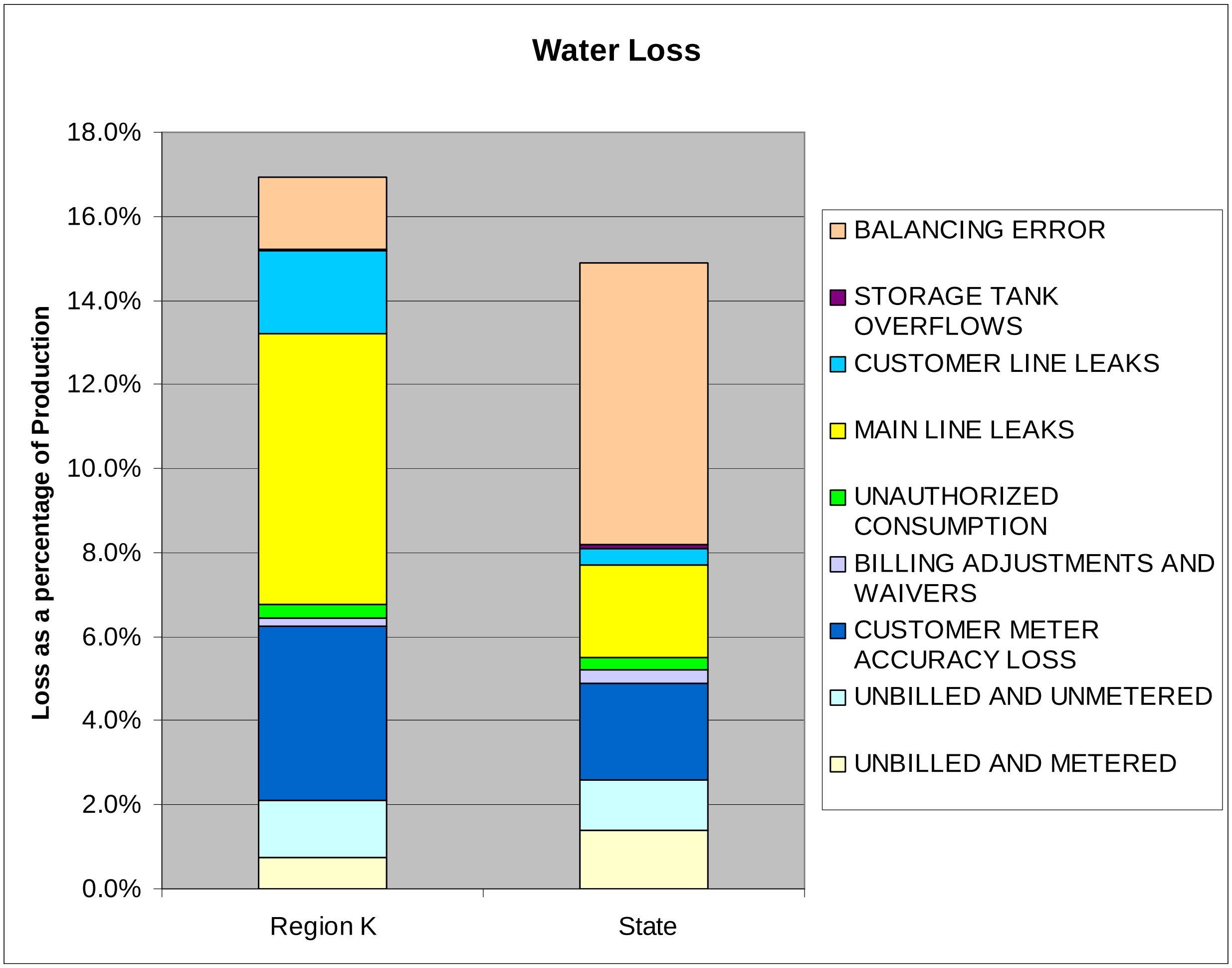
Figure 6.1: Existing Municipal Water Conservation Measures



Water system audits are one of the items shown in *Figure 6.1*. The 78th Texas Legislature passed House Bill 3338, which required retail public utilities that provide potable water to "perform and file with the [Texas Water Development Board] a water audit computing the utility's most recent annual system water loss" every five years. Under this authority, the TWDB instituted new water audit reporting requirements that require retail public utilities to carefully audit their system water use at least once every five years; to estimate system water use in standard, well-defined categories; and to report their first set of water loss data to the TWDB by March 31, 2006. The results of this statewide data gathering was compiled into the "Analysis of Water Loss As Reported by Public Water Suppliers in Texas", TWDB, January 24, 2007. A comparison between Region K and the state averages of the various water loss categories is presented below in *Figure 6.2*.

As is shown in *Figure 6.2*, main line leaks are approximately six percent of production for Region K, while averaging closer to two percent for the entire state. Fixing main line leaks is one way that water systems in the region could make a significant impact on water conservation.

Figure 6.2: Water Loss Comparison Between Region K and the State of Texas



6.1.2 Industrial or Mining[2]

Water conservation plans for industrial or mining uses of water must provide the information as outlined below. If the plan does not provide information for each requirement, the industrial or mining water user shall include in the plan an explanation of why the requirement is not applicable. Water conservation plans for industrial or mining uses of water should include, at a minimum, the following information.

[2] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.3.

- A description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal.
- Since May 1, 2005, specific, quantified 5-year and 10-year targets for water savings and the basis for the development of such goals. The goals established by industrial or mining water users under this paragraph are not enforceable.
- A description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.
- Leak-detection, repair, and accounting for water loss in the water distribution system.
- Application of state-of-the-art equipment and/or process modifications to improve water use efficiency.
- Any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

Since May 1, 2005, an industrial or mining water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5-year and 10-year targets and any other new or updated information. The industrial or mining water user should have reviewed and updated the next revision of its water conservation plan no later than May 1, 2009, and every 5 years after that date to coincide with the Lower Colorado Regional Water Planning Group regional water plan update.

6.1.3 Agriculture[3]

A water conservation plan for agricultural use of water must provide information in response to the following subsections. If the plan does not provide information for each requirement, the agricultural water user must include in the plan an explanation of why the requirement is not applicable.

For an individual agricultural user other than irrigation:

- A description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and the estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal.
- Since May 1, 2005, specific, quantified five-year and ten-year targets for water savings and the basis for the development of such goals. The goals established by agricultural water users under this subparagraph are not enforceable.
- A description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.
- Leak-detection, repair, and accounting for water loss in the water distribution system.

[3] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.4.

- Application of state-of-the-art equipment and/or process modifications to improve water use efficiency.
- Any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

For an individual irrigation user:

- A description of the irrigation production process which shall include, but is not limited to, the type of crops and acreage of each crop to be irrigated, monthly irrigation diversions, any seasonal or annual crop rotation, and soil types of the land to be irrigated.
- A description of the irrigation method or system and equipment including pumps, flow rates, plans, and/or sketches of the system layout.
- A description of the device(s) and/or methods within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.
- Since May 1, 2005, specific, quantified 5-year and 10-year targets for water savings including, where appropriate, quantitative goals for irrigation water use efficiency and a pollution abatement and prevention plan. The goals established by an individual irrigation water user under this subparagraph are not enforceable.
- Water-conserving irrigation equipment and application system or method including, but not limited to, surge irrigation, low pressure sprinkler, drip irrigation, and nonleaking pipe.
- Leak-detection, repair, and water-loss control.
- Scheduling the timing and/or measuring the amount of water applied (e.g., soil moisture monitoring).
- Land improvements for retaining or reducing runoff and increasing the infiltration of rain and irrigation water including, but not limited to, land leveling, furrow diking, terracing, and weed control.
- Tail water recovery and reuse.
- Any other water conservation practice, method, or technique which the user shows to be appropriate for preventing waste and achieving conservation.

For a system providing agricultural water to more than one user:

- A system inventory for the supplier's:
  - Structural facilities including the supplier's water storage, conveyance, and delivery structures.
  - Management practices, including the supplier's operating rules and regulations, water pricing policy, and a description of practices and/or devices used to account for water deliveries.
  - A user profile including square miles of the service area, number of customers taking delivery of water by the system, types of crops, types of irrigation systems, types of drainage systems, and total acreage under irrigation, both historical and projected.

- Since May 1, 2005, specific, quantified 5-year and 10-year targets for water savings including maximum allowable losses for the storage and distribution system. The goals established by a system providing agricultural water to more than one user under this subparagraph are not enforceable.
- A description of the practice(s) and/or device(s) which will be utilized to measure and account for the amount of water diverted from the source(s) of supply.
- A monitoring and record management program of water deliveries, sales, and losses.
- A leak-detection, repair, and water loss control program.
- A program to assist customers in the development of on-farm water conservation and pollution prevention plans and/or measures.
- A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter.
- Official adoption of the water conservation plan and goals, by ordinance, rule, resolution, or tariff, indicating that the plan reflects official policy of the supplier.
- Any other water conservation practice, method, or technique which the supplier shows to be appropriate for achieving conservation.
- Documentation of coordination with the regional water planning groups in order to ensure consistency with appropriate approved regional water plans.

A water conservation plan, prepared in accordance with the rules of the U.S. Department of Agriculture's Natural Resources Conservation Service, the Texas State Soil and Water Conservation Board, or other Federal or State agencies and substantially meeting the requirements of this section and other applicable commission rules, may be submitted to meet application requirements in accordance with a memorandum of understanding between the commission and that agency.

Since May 1, 2005, an agricultural water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5-year and 10-year targets and any other new or updated information. An agricultural water user should have reviewed and updated the next revision of its water conservation plan no later than May 1, 2009, and every 5 years after that date to coincide with the Lower Colorado Regional Water Planning Group regional water plan update.

6.1.4 Wholesale Water Providers[4]

A water conservation plan for a wholesale water supplier must provide information in response to each of the following paragraphs. If the plan does not provide information for each requirement, the wholesale

[4] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.5.

water supplier shall include in the plan an explanation of why the requirement is not applicable. All water conservation plans for wholesale water suppliers must include the following elements:

- A description of the wholesaler's service area, including population and customer data, water use data, water supply system data, and wastewater data.
- Since May 1, 2005, specific, quantified 5- and 10-year targets for water savings including, where appropriate, target goals for municipal use in gallons per capita per day for the wholesaler's service area, maximum acceptable unaccounted-for water, and the basis for the development of these goals. The goals established by wholesale water suppliers under this subparagraph are not enforceable.
- A description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply.
- A monitoring and record management program for determining water deliveries, sales, and losses.
- A program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system.
- A requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter.
- A reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plans shall include optimization of water supplies as one of the significant goals of the plan.
- A means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.
- Documentation of coordination with the regional water planning groups for the service area of the wholesale water supplier in order to ensure consistency with the Lower Colorado Regional Water Plan.

Additional Conservation Strategies

Any combination of the following strategies shall be selected by the water wholesaler, in addition to the minimum requirements of paragraph (1) of this section, if they are necessary in order to achieve the stated water conservation goals of the plan. The commission may require by commission order that any of the following strategies be implemented by the water supplier if the commission determines that the strategies are necessary in order for the conservation plan to be achieved.

- Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates.
- A program to assist agricultural customers in the development of conservation and pollution prevention and abatement plans.
- A program for reuse and/or recycling of wastewater and/or graywater.
- Any other water conservation practice, method, or technique which the wholesaler shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

Since May 1, 2005, the wholesale water supplier shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5-year and 10-year targets and any other new or updated information. A wholesale water supplier should have reviewed and updated the next revision of its water conservation plan no later than May 1, 2009, and every 5 years after that date to coincide with the Lower Colorado Regional Water Planning Group regional water plan update.

6.1.5 Other Water Uses[5]

A water conservation plan for any other purpose or use not covered in this subchapter shall provide information where applicable about those practices, techniques, and technologies that will be used to reduce the consumption of water, prevent or reduce the loss or waste of water, maintain or improve the efficiency in the use of water, increase the recycling and reuse of water, or prevent the pollution of water.

6.2 DROUGHT CONTINGENCY PLAN

Drought contingency plans can be required by the TCEQ/TWDB for certain applicants and water rights holders.

- The Commission shall by rule require wholesale and retail public water suppliers and irrigation districts to develop drought contingency plans consistent with the appropriate approved regional water plan to be implemented during periods of water shortages and drought.
- The wholesale and retail public water suppliers and irrigation districts shall provide an opportunity for public input during preparation of their drought contingency plans and before submission of the plans to the commission.
- Specific, quantified targets for water use reductions to be achieved during periods of water shortages and drought. The entity preparing the plan shall establish the targets.
- The commission and the board by joint rule shall identify quantified target goals for drought contingency plans that wholesale and retail public water suppliers, irrigation districts, and other entities may use as guidelines in preparing drought contingency plans. Goals established under this subsection are not enforceable requirements.

[5] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.6.

The commission and the board jointly shall develop model drought contingency programs for different types of water suppliers that suggest best management practices for accomplishing the highest practicable levels of water use reductions achievable during periods of water shortages and drought for each specific type of water supplier.

6.2.1 Municipal Uses by Public Water Suppliers[6]

Drought contingency plans for retail public water suppliers, where applicable, and for public water suppliers, must include the following minimum elements.

- Preparation of the plan shall include provisions to actively inform the public and affirmatively provide opportunity for public input. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.
- Provisions shall be made for a program of continuing public education and information regarding the drought contingency plan.
- The drought contingency plan must document coordination with the regional water planning groups for the service area of the retail public water supplier to ensure consistency with the appropriate approved regional water plans.
- The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.
- The drought contingency plan must include drought or emergency response stages providing for the implementation of measures in response to at least the following situations:
  - Reduction in available water supply up to a repeat of the drought of record.
  - Water production or distribution system limitations.
  - Supply source contamination.
  - System outage due to the failure or damage of major water system components (e.g., pumps).
- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.
- The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:

[6] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2.0

- o Curtailment of nonessential water uses.
- o Utilization of alternative water sources and/or alternative delivery mechanisms with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).

- The drought contingency plan must include the procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.
- The drought contingency plan must include procedures for granting variances to the plan.
- The drought contingency plan must include procedures for the enforcement of mandatory water use restrictions, including specification of penalties (e.g., fines, water rate surcharges, discontinuation of service) for violations of such restrictions.

Privately owned water utilities shall prepare a drought contingency plan in accordance with this section and incorporate such plan into their tariff.

Any water supplier that receives all or a portion of its water supply from another water supplier shall consult with that supplier and shall include in the drought contingency plan appropriate provisions for responding to reductions in that water supply. A wholesale or retail water supplier shall notify the executive director within 5 business days of the implementation of any mandatory provisions of the drought contingency plan.

The retail public water supplier shall review and update, as appropriate, the drought contingency plan, at least every 5 years, based on new or updated information, such as the adoption or revision of the Lower Colorado Regional Water Plan.

According to the water systems which participated in the water conservation and drought contingency survey, the majority use mandatory water-use restrictions as their most common drought contingency measure. Other systems listed voluntary water conservation as their measure. Of the entities that responded to the survey, water systems who have implemented mandatory water-use restrictions have seen as much as a 20% reduction in water use while those using voluntary water conservation have only seen a small drop in water use.

6.2.2 Irrigation Uses[7]

A drought contingency plan for an irrigation use, where applicable, must include the following minimum elements. Drought contingency plans for irrigation water suppliers must include policies and procedures for the equitable and efficient allocation of water on a pro rata basis during times of shortage in accordance with Texas Water Code, §11.039. Drought contingency plans for irrigation water suppliers should include at a minimum the following information:

- Preparation of the plan shall include provisions to actively inform and to affirmatively provide opportunity for users of water from the irrigation system to provide input into the preparation of the plan and to remain informed of the plan. Such acts may include, but are not limited to, having a

[7] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2.1

public meeting at a time and location convenient to the water users and providing written notice to the water users concerning the proposed plan and meeting.

- The drought contingency plan must document coordination with the regional water planning groups to ensure consistency with the appropriate approved regional water plans.
- The drought contingency plan must include water supply criteria and other considerations for determining when to initiate or terminate water allocation procedures, accompanied by an explanation of the rationale or basis for such triggering criteria.
- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.
- The drought contingency plan must include methods for determining the allocation of irrigation supplies to individual users.
- The drought contingency plan must include a description of the information to be monitored by the water supplier and the procedures to be followed for the initiation or termination of water allocation policies.
- The drought contingency plan must include procedures for use accounting during the implementation of water allocation policies.
- The drought contingency plan must include policies and procedures, if any, for the transfer of water allocations among individual users within the water supply system or to users outside the water supply system.
- The drought contingency plan must include procedures for the enforcement of water allocation policies, including specification of penalties for violations of such policies and for wasteful or excessive use of water.
- Wholesale water customers. Any irrigation water supplier that receives all or a portion of its water supply from another water supplier shall consult with that supplier, and shall include in the drought contingency plan appropriate provisions for responding to reductions in that water supply.
- Protection of public water supplies. Any irrigation water supplier that also provides or delivers water to a public water supplier(s) shall consult with that public water supplier(s) and shall include in the plan, mutually agreeable and appropriate provisions to ensure an uninterrupted supply of water necessary for essential uses relating to public health and safety. Nothing in this provision shall be construed as requiring the irrigation water supplier to transfer irrigation water supplies to non-irrigation use on a compulsory basis or without just compensation.

Irrigation water users shall review and update, as appropriate, the drought contingency plan at least every 5 years, based on new or updated information such as adoption or revision of the Lower Colorado Regional Water Plan.

6.2.3 Wholesale Water Providers[8]

A drought contingency plan for a wholesale water provider should include at a minimum the following information:

- Preparation of the plan shall include provisions to actively inform the public, to affirmatively provide opportunity for user input in the preparation of the plan, and for informing wholesale customers about the plan. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.
- The drought contingency plan must document coordination with the Lower Colorado Regional Water Planning Group for the service area of the wholesale water provider to ensure consistency with the Lower Colorado Regional Water Plan.
- The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.
- The drought contingency plan must include a minimum of three drought or emergency response stages providing for the implementation of measures in response to water supply conditions during a repeat of the drought-of-record.
- The drought contingency plan must include the procedures to be followed for the initiation or termination of drought response stages, including procedures for notification of wholesale customers regarding the initiation or termination of drought response stages.
- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this paragraph are not enforceable.
- The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:
- Pro rata curtailment of water deliveries to or diversions by wholesale water customers as provided in Texas Water Code, §11.039; and
- Utilization of alternative water sources with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).
- The drought contingency plan must include a provision in every wholesale water contract entered into or renewed after adoption of the plan, including contract extensions, that in case of a shortage of water resulting from drought, the water to be distributed shall be divided in accordance with Texas Water Code, §11.039.
- The drought contingency plan must include procedures for granting variances to the plan.

[8] Information in this subsection was obtained from the Texas Administrative Code, specifically TAC Title 30, Part 1, Chapter 288, Subchapter A, Rule 288.2.2

- The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions, including specification of penalties (e.g., liquidated damages, water rate surcharges, discontinuation of service) for violations of such restrictions.
- The wholesale water provider shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan. The wholesale water provider shall review and update, as appropriate, the drought contingency plan at least every 5 years, based on new or updated information such as adoption or revision of the Lower Colorado Regional Water Plan.

6.2.4 Drought Response Triggers

Many of the water supply sources in the region have explicit information regarding what specific factors will initiate a drought response by water providers or users. Available details regarding these triggers are discussed below.

Surface water sources:

- The LCRA Highland Lakes drought triggers are associated with specific lake levels. See below for details.

2010 Water Management Plan - Drought Triggers

When water in the lakes is ...	On this date ...	Action prescribed in 2010 Water Management Plan
Lakes Travis and Buchanan are full at 2.011 million acre-feet		
Less than 94 percent full	Jan. 1 or July 1	**Interruptible supplies** cease for all customers except irrigation operations.
Less than 1.7 million acre-feet	Jan. 1	Environmental releases for **bays and estuaries** are reduced to meet 150 percent of critical (to the extent of storable inflows).
Less than 1.6 million acre-feet	At any time	Request voluntary conservation from **firm water customers** and begin aggressive public information campaign.
Less than 1.4 million acre-feet	Jan. 1	Begin gradual curtailment of **interruptible supply** to irrigation operations. Amount of curtailment increases when water storage levels are lower. Environmental releases for **instream flows** are reduced to meet critical needs.
Less than 1.1 million acre-feet	Jan. 1	Environmental releases for **bays and estuaries** are reduced to meet critical needs.
900,000 acre-feet	At any time	Request **firm customers** to implement mandatory conservation restrictions. Meet with customers to develop curtailment plan should drought worsen.
600,000 acre-feet	At any time	If criteria indicate that drought is worse than the Drought of Record, then begin pro rata curtailment of **firm supply** after ceasing interruptible supply (timing based on duration of drought).
325,000 acre-feet	Jan. 1	No interruptible supply available.
200,000 acre-feet	At any time	No interruptible supply available.

- The City of Austin has year-round and summer watering restrictions to conserve water. They also use a combination of demand, supply, and emergency triggers to initiate a drought response. The information below describes the triggers in more detail:

	Triggers	Action	Goal	End Conditions
Demand Triggers	260 mgd [a] for 3 consecutive days	City Manager may order Stage 2 [b] Water Restrictions	Reduce water use by 15% of 260 mgd	City Manager ends based on daily supply and demand of water
	270 mgd for one day	City Manager may order Stage 2 [b] Water Restrictions	Reduce water use by 15% of 270 mgd	City Manager ends based on daily supply and demand of water
Supply Triggers	Combined Lake storage less than 900,000 acre-feet	City Manager may order Stage 2 [b] Water Restrictions	Reduce water use by 15%	City Manager ends based on daily supply and demand of water
	Combined Lake storage less than 681,000 [c] acre-feet	City Manager may order Stage 3 [d] Water Restrictions	Reduce water use to levels deemed necessary	City Manager ends based on daily supply and demand of water or the end of supply constraints
Emergency Triggers	As determined by City Manager, system outage, equipment failure, contamination of water source or other emergencies	City Manager may order Stage 3 [d] Water Restrictions	Reduce water use to levels deemed necessary	City Manager ends based on daily supply and demand of water or the end of supply constraints

[a] million gallons per day
[b] Austin City Code §6-4-65
[c] City of Austin Water Management Ordinance stipulates that the City Manager may prohibit outdoor watering at 681,000, Austin City Code §6-4-72
[d] Austin City Code §6-4-66

- The City of Llano uses the flow of the Llano River, water consumption rates, and water pressures within the system to determine whether to initiate a drought response. The City Manager monitors water supply and demand conditions and makes the determination of whether to initiate a drought response, and what level of drought response to initiate.

Groundwater Sources:

- In general, many of the groundwater conservation districts in the Region K planning area use the Palmer Drought Severity Index as published by the TWDB or similar agency to declare drought conditions. Upon declaration of a drought stage of “Moderate drought” or worse, water well owners or well operators or users are encouraged to implement the corresponding drought measures stipulated in any drought plan of the owner, operator, or user.

- The Barton Springs / Edwards Aquifer Conservation District (BS/EACD) monitors the Edwards-BFZ Aquifer and Trinity Aquifer for drought conditions using springflow and well depths. The information below details the various drought triggers and curtailment requirements.

Drought Stage Triggers and Pumpage Curtailment Requirements

Drought Stages	Drought Triggers[1]		Curtailments by Aquifer, Management Zone, and Permit Type							
	Barton Springs	Lovelady Mon. Well	Edwards Aquifer					Trinity Aquifer		
			Eastern/Western Freshwater				Saline	Middle	Lower	Outcrop
	springflow rate	*depth to water*	Historical		Conditional		Hist.	Hist.	Hist.	Hist.
			PWS	IRG/IND	Class A	Class B				
No Drought	> 38 cfs	< 175'	0%	0%	0%	0%	0%	0%	0%	0%
Alarm	≤ 38 cfs	≥ 175'	20%	20%	20%[4]	50%	20%	20%	20%	20%
Critical	≤ 20 cfs	≥ 190.7'[3]	30%	30%	30%[4]	75%	30%	30%	30%	30%
Exceptional	≤ 14 cfs	≥196.3'[3]	40%	40%	100%	100%	N/A	N/A	N/A	N/A
ERP[2]	≤ 10 cfs	≥200.0'[3]	40%	100%	100%	100%	N/A	N/A	N/A	N/A

[1] only one trigger required to enter a drought stage but both required to exit
[2] may be declared at Board's discretion with special Board Order
[3] pending Board approval (August 2010)
[4] will permanently convert to Class B schedule upon Exceptional declaration

- The Blanco-Pedernales GCD monitors several aquifers in Blanco County. Information from their rules regarding drought triggers is provided below:

  Drought Stages will be initiated and/or terminated by specific watershed. Drought Stages and the associated conservation and management practices shall apply only to the specific watershed designated and described in Rule 7.3. Declarations of initiation or termination of Drought Stages will be provided to Blanco County newspapers, posted at the District Office, or communicated to well owners in such a manner as may be deemed necessary by the District.

  A. Initiation of Drought Stages
  The District will maintain an ongoing aquifer water level monitoring program to provide the District with data to help identify the onset of drought conditions and stages of severity. The District will also monitor any declarations of drought stages by the City of Blanco and the City of Johnson City and take note of the triggering conditions which warranted such declarations. The District General Manager and District Staff shall review the water levels in the District Monitor Wells and determine if groundwater levels in either the Blanco River Watershed or the Pedernales River Watershed have been in a state of continuous decline. If such is the case, the General Manager may initiate an appropriate Drought Stage. If groundwater levels have not been in a state of continuous decline, or if aquifer, meteorological, Palmer Drought Index, or other conditions exist that need to be addressed by the Board of Directors, the General Manager may bring the

matter to the attention of the Board of Directors prior to taking any official action. The Board may consider the matter, along with any recommendations provided by the District Staff, and may declare the initiation of any of the Drought Stages warranted by this Rule.

If the General Manager recommends initiation of Drought Stage 3 or 4 that does not coincide with initiation by the City of Blanco or the City of Johnson City, the General Manager shall refer the matter to the Board for a decision.

- The Hays-Trinity GCD monitors discharge flow to the Pedernales River near Johnson City to determine whether a drought response is needed with respect to the Trinity Aquifer in Hays County. Discharge flow rates of 31.6 cfs and 10.2 cfs initiate the alarm trigger and critical trigger, respectively.

- The Lost Pines GCD monitors rainfall and water level records to determine whether drought conditions are impacting the aquifers in Bastrop County. According to the Lost Pines GCD, recharge appears to be relatively constant under the current climatic regime and little affected by drought conditions. It is anticipated, though that drought conditions will result in increased pumpage and decreased natural discharge, thereby affecting water levels in the aquifers.

6.3 WHOLESALE WATER PROVIDER WATER CONSERVATION PLANS

Region K has two wholesale water providers (WWPs), the Lower Colorado River Authority (LCRA) and the City of Austin, both of which have approved TCEQ water conservation and drought contingency plans. The water conservation programs for these WWPs are summarized below.

6.3.1 LCRA Water Conservation Programs

LCRA's municipal water conservation programs are predicated on the fact that the implementation of conservation measures must occur largely at the local level. Wholesale water use accounts for more than 90 percent of all LCRA potable water supply use. It is a mandatory requirement for LCRA, as the wholesale water rights holder, to require customers with new and amended plans to develop a water conservation plan. LCRA Water Conservation Rules for Water Sale Contracts, developed in 1991, are used to implement this requirement. LCRA also provides technical assistance with the development and review of wholesale customer water conservation plans and programs. LCRA assists with the development of rules and regulations that encourage water conservation, such as adding water conservation components into landscape ordinances.

LCRA provides public outreach activities in the area of conservation landscaping. LCRA programs that focus in this area are adoption of Hill Country Landscapes in new developments and with new homeowners, landscape irrigation audits for existing retail homeowners, and distribution of Grow Green landscaping materials to nurseries around the Highland Lakes. The Major Rivers 4th grade curriculum teacher workshops and materials are also provided through the LCRA Natural Science Centers.

LCRA's efforts in agricultural water conservation are focused on promoting water conservation at its irrigation districts, Lakeside, Gulf Coast, and Garwood. Proposed conservation efforts in the next 5- to 10-year period include laser land leveling on individual farms, adding automatic check valves and a control system for the Garwood Irrigation District, and replacement of lock control structures in the Lane City Pumping Plant canal system.

Each of LCRA's three power plants has industrial water conservation plans, which address water usage and return flow for the facilities. Opportunities to conserve water in the once-through cooling water process and boiler water treatment are not readily available because of efficiencies in existing processes. However, the plants' specific 5- and 10-year goals focus on reducing losses, reducing use, and reusing water.

6.3.2 City of Austin Water Conservation Program

Currently, the City of Austin has an aggressive water conservation program, one of the most active in the state, and it currently meets 20 of the 22 municipal best management practices recommended by the Water Conservation Implementation Task Force Report of the 79th Texas Legislature. The Water Conservation Program offers its customers a wide variety of initiatives for all customer classes designed to develop awareness of the need for water conservation. These initiatives include incentives to conserve water, services to reduce demand, educational programs, and regulatory measures.

Programs designed to reduce residential indoor water use include free water efficient toilets and toilet rebates, free water-efficient showerheads and sink aerators, high efficiency clothes washer rebates, and free leak detection kits. Programs designed to reduce residential outdoor water use include free irrigation system audits performed by licensed irrigators, WaterWise landscape rebates, rebates for water saving repairs or upgrades of irrigation systems, reduced price rainbarrels and rainbarrel rebates, and rainwater harvesting system rebates.

The Conservation Program also offers a number of free services and incentives for industrial, commercial and institutional (ICI) customers. Programs designed to reduce indoor consumption by ICI customers include helping them modify special equipment and processes to reduce water use or reuse water internally, as well as free water-efficient toilets and toilet rebates, free water-efficient showerheads and aerators, high efficiency clothes washer rebates, medical dry vacuum pump rebates, and free pre-rinse spray valves for food service establishments. Programs designed to reduce outdoor water consumption by ICI customers include free irrigation system audits, free whole system water audits, rebates for water saving repairs or upgrades of irrigation systems, and rebates of up to $40,000 for large water saving projects. The City of Austin also offers awards and recognition to ICI customers for achievements in water conservation.

The Conservation Program also administers water conservation education programs. One program designed to educate school children about water conservation is the Water in Our World program administered in partnership with the Austin Independent School District for 5th graders. Other educational efforts include conservation brochures, booklets, videos, radio, television and newspaper ads, an electronic newsletter, and the water conservation web page. In addition, the Program organizes rainwater harvesting and WaterWise landscape tours, produces an ICI water conservation newsletter, and offers a WaterWise training course for professional irrigators and ICI workshops. During the summer months, a substantial effort is made each year to educate customers about efficient water use in the landscape.

Regulatory measures include the water waste ordinance, which prohibits water waste year round and has several watering stages for the summer under which water use is further restricted; and building codes that require separate metering of duplexes, triplexes and fourplexes, as well as the installation of plumbing that would accommodate the installation of submeters on larger multifamily properties.

6.4 STP NUCLEAR OPERATING COMPANY WATER CONSERVATION PLAN

STP Nuclear Operating Company has developed an industrial Water Conservation Plan for the South Texas Project Electric Generating Station. Water is an essential component of electricity production. The South Texas Project uses both groundwater and surface water for station purposes. Most of the water used by the South Texas Project is needed to condense steam and provide cooling for plant generating systems. The main consumptive use of water is forced and natural evaporation from the Main Cooling Reservoir and Essential Cooling Pond.

Numerous water conservation measures have been put in place at the generating station. These include maintaining water quality in the Main Cooling Reservoir by selective diversion from the Colorado River during excess flow conditions, conjunctive use of groundwater for maintaining quality and level in the Essential Cooling Pond, and reuse of treated wastewater, HVAC condensate, and storm water. The water right for the South Texas Project includes a special provision to limit diversion from the Colorado River to 55 percent of the flow over 300 cubic feet per second, to protect environmental flows during low river flow conditions. In addition, a Water Delivery Plan has been incorporated into the amended and restated contract between STP Nuclear Operating Company and LCRA for water management during drought conditions, where reservoir water quality is sacrificed to maintain reservoir level during drought conditions.

STP Nuclear Operating Company is committed to operating the South Texas Project in a safe, reliable, economical, and environmentally sound manner. Water conservation is a part of that commitment. In reviewing water conservation measures, the ability to conserve water is most often a function of the design of the installed equipment and therefore there is limited potential to conserve additional water after a system is installed. Including water conservation, and its associated economic benefit, as one of the considerations used when comparing new project alternatives may ultimately have the greatest impact on water use at the generating station in the future.

APPENDIX 6A

Sample Water Conservation and Drought Contingency Survey

APPENDIX 6B

Model Water Conservation Plan and Drought Contingency Plan

AECOM

August 7, 2009

194 BUSH LTD
13000 W HIGHWAY 290
AUSTIN, TX 78737

Subject: Request for information regarding Water Conservation and Drought Management for Region K Water Planning

Dear Water System Representative:

We are writing this letter on behalf of the Lower Colorado Regional Water Planning Group (Region K). AECOM is currently engaged in assisting Region K in the process of preparing their 2011 Regional Water Plan (RWP). This plan is submitted to the Texas Water Development Board (TWDB) and will be used to assist in the development of the 2012 State Water Plan (SWP).

The consultant team is currently compiling information on water conservation and drought contingency measures for water systems in our region. As part of the data collection process, we would like to request copies of your Water Conservation Plan and Drought Contingency Plan. If you have already sent your Water Conservation Plan and Drought Contingency Plan to Region K, please disregard this particular request.

Attached with this letter is a survey regarding implementation of water conservation measures in your service area. This information will be used to evaluate water conservation and drought management in the Lower Colorado Region in the 2011 RWP. Your input in this matter is critical to our planning and we appreciate any assistance you may be able to provide. Due to the accelerated timeline of this planning round, please respond to the attached survey at your earliest convenience to:

Region K Water Planning Group
c/o Jaime Burke, P.E.
AECOM
400 W. 15th Street, Suite 500
Austin, TX 78701
512-472-7519 (fax)
Email: Jaime.burke@aecom.com

Please contact me should you have questions.

Sincerely,

Jaime J Burke

Jaime Burke
Project Manager
AECOM Water
512-457-7798

Attachment: Survey

Region K Water Planning Group
Water Conservation and Drought Contingency Survey

1. Contact Information	
a. City / Water System:	b. Contact Person:
c. Title:	d. Telephone Number:
e. Fax Number:	f. Email Address:
g. Mailing Address:	
2. Existing Water Conservation Measures	
a. What is the water system's average per-capita water demand?	
b. What are the water system's 5-yr and 10-yr water conservation reduction goals?	
c. What water conservation measures or programs are currently in place for the water system? (Please indicate your response on the attached Survey Form)	
d. What are the measurable impacts, if any, of current water conservation measures? (Please indicate your response on the attached Survey Form)	
e. What are the expected impacts of existing measures in the future? (Please indicate your response on the attached Survey Form)	
3. Proposed Water Conservation Measures	
a. What additional water conservation measures are planned for the water system?	

b. What is the expected impact of proposed conservation measures?
4. Water Conservation / Drought Contingency Plans
a. Has the water system revised or updated its Water Conservation Plan or Drought Contingency Plan since 2006? If so, please submit a copy of the plan along with the response to this survey. (Please disregard if you have already done so.)
b. What are the most commonly used drought contingency measures in your service area?
c. Have these measures been recently implemented in response to drought conditions? If so, which measures and when were they implemented?
d. What were the measured or observed impacts of enacting drought contingency measures?
5. Other comments
Please include any additional comments relating to water conservation.

Region K Water Planning Group 2011 RWP
Water Conservation and Drought Contingency Survey Form

City/ Water System:

Conservation Programs	Is this Strategy Currently Implemented? (Circle One)		Date Implemented (or Planned to be Implemented)?	Effectiveness (Circle One)					Annual Water Savings	
				Not At All Effective	Slightly Effective	Moderately Effective	Effective	Extremely Effective	Amount	Units
a. Municipal Conservation Measures										
i. Water System Audits	Y	N		1	2	3	4	5		
ii. Leak Detection	Y	N		1	2	3	4	5		
iii. Prohibition on Wasting Water	Y	N		1	2	3	4	5		
iv. Low Flow Plumbing Fixture Requirements	Y	N		1	2	3	4	5		
v. Residential Clothes Washer Incentive Program	Y	N		1	2	3	4	5		
vi. Water Conservation Pricing / Tiered Pricing	Y	N		1	2	3	4	5		
vii. Public Education or Outreach	Y	N		1	2	3	4	5		
viii. School Education	Y	N		1	2	3	4	5		
ix. Athletic Field & Golf Course Conservation	Y	N		1	2	3	4	5		
b. Industrial Conservation Measures										
i. Industrial Water Audit	Y	N		1	2	3	4	5		
ii. Industrial Water Waste Reduction	Y	N		1	2	3	4	5		
iii. Alternative Water Sources or Process Reuse	Y	N		1	2	3	4	5		
iv. Site Specific Industrial Conservation	Y	N		1	2	3	4	5		
v. Industrial Landscape	Y	N		1	2	3	4	5		
c. Other Conservation Measures (please indicate Municipal, Industrial or Agricultural use)										
i.	Y	N		1	2	3	4	5		
ii.	Y	N		1	2	3	4	5		
iii.	Y	N		1	2	3	4	5		
iv.	Y	N		1	2	3	4	5		
v.	Y	N		1	2	3	4	5		
vi.	Y	N		1	2	3	4	5		
vii.	Y	N		1	2	3	4	5		
viii.	Y	N		1	2	3	4	5		
ix.	Y	N		1	2	3	4	5		
x.	Y	N		1	2	3	4	5		

Model Water Conservation Plan Template
Municipal Uses

Model Water Conservation Plan Template – Municipal Uses
Introduction and Background

Brief introduction describing WUG, its provided services, and general information.

1. Purpose

Purpose is to identify and establish principles, practices, and standards to effectively conserve and efficiently use available water supplies and water distribution system capacity.

Possibly provide historical annual average residential water demands and the goals for reductions in municipal demand included in the plan.

2. Location

General location of WUG and its service area

3. Customer Data

Population and Service Area Data

- Provide CCN certificate (if applicable) from TCEQ and service area map.
- Provide service area size in square miles.
- Provide current population of service area.
- Provide current population served by utility (water, wastewater, etc.).
- Provide population served by utility for previous 5 years.
- Provide projected population for service area for 2010, 2020, 2030, 2040, and 2050.
- Provide source/method of calculating current and projected populations.

Active Connections

- Provide current number of active connections by user type and whether they are metered or not-metered (Metered Residential, Not-metered Residential, Metered Commercial, Not-metered Commercial, Metered Industrial, Not-metered Industrial, Metered Public, Not-metered Public, Metered Other, Not-metered Other).
- Provide net number of new connections/year for most recent 3 years by user type.

High Volume Customers

- Provide annual water use for five highest volume retail and wholesale customers indicating if treated or raw water delivery.

4. Water Use Data

Water Accounting Data

- Provide amount of water use monthly for previous 5 years in 1,000 gallons and indicate whether the water is raw water diverted or treated water distributed.
- Provide source/method of obtaining monthly water use for previous 5 years.
- Provide amount of water in 1,000 gallons delivered as recorded by user type (residential, commercial, industrial, wholesale, other).
- Provide previous 5 year records for unaccounted for water use.
- Provide previous 5 year records for annual peak-to-average daily use ratio.
- Provide municipal per capita water use for previous 5 years.
- Provide seasonal water use for previous 5 years (gpd).

Projected Water Demands

- Provide total water demand estimates for utility's planning horizon indicating data sources/methods for determining water demand.
- Discuss conservation measures already implemented, if any, including impacts of measures and methods of determination of impacts.

5. Water Supply System

Water Supply Sources

- Provide current water supply sources and amounts available for surface water, groundwater, contracts, and other.

Treatment and Distribution System

- Provide design daily system capacity.
- Provide storage capacity (elevated and ground).
- Provide description of water system including number of treatment plants, wells, storage tanks along with sketch of system.
- Provide estimates of time before additional facilities for supply, storage, and pumping will be needed without conservation measures.

6. Wastewater Utility System

Wastewater System Data

- Provide design capacity of wastewater treatment plant.
- Provide description of wastewater system in service area including TCEQ name, number of treatment plants, operator, owner, receiving stream of discharge if applicable.
- Provide sketch of plant and discharge point locations

Wastewater Data for Service Area

- Provide percent of water service area served by wastewater system.
- Provide monthly volume treated for previous 3 years.
- Provide quality information on treatment plant effluent for reuse applications.
- Determine ratio between treated water pumped and wastewater flow.

7. Utility Operating Data

Water and wastewater rates/ rate structure for all classes – provide list of rates

(Rates should be cost-based so that they do not promote the excessive use of water)

Other relevant data

8. Water Conservation Goals

Goals for municipal utilities established to maintain/reduce consumption measured in:

- Gallons per capita per day used
- Unaccounted for water uses
- Peak day to average day ratio
- Increase in reuse or recycling of water

TCEQ/TWDB will assess conservation goals based on whether the following is addressed:

- Identification of a water/wastewater problem
- Completion of utility profile
- Selection of goals based on technical potential to save water as in utility profile
- Performance of cost-benefit analysis of strategies

Complete following (in gpcd) to quantify conservation goals for utility's service area:

Estimation for reducing per capita water use:

- Reduction in unaccounted-for uses
- Reduction in indoor water use due to water-conserving plumbing fixtures
- Reduction in seasonal use
- Reduction in water use due to public education program

Planning goal (Specific quantified 5 and 10 year targets for water savings to include goals for water loss programs and goals for municipal use, in gallons per capita day)

A schedule for implementing the plan to achieve the applicant's targets and goals

Needed reduction in per capita to meet planning goal

9. Water Conservation Plan Elements – Other Programs/BMPs That Should be Part of the Conservation Plan

Supplier:

A method for tracking the implementation and effectiveness of the plan

Metering Program

- A master meter(s) to measure and account for the amount of water diverted from the source of supply

- A program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement)

Measures to Determine and Control Unaccounted for Water

- Measures to determine and control unaccounted-for uses of water (e.g., periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)

Leak Detection and Repair (a program for leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted-for uses of water)

Reservoir System Operating Plan

Customer:

Education Programs

- Media Campaign
- School Programs
- Public Exhibitions

Water Rate Structure

Examples of programs/BMPs that could be considered
Supplier:

- Plumbing and Landscape Ordinances
- Toilet Replacement/Rebates
- Clothes Washer Replacement/Rebates
- Hot-on-demand Rebate – circulating pumps installed to reduce water waste while waiting for the water to get warm
- Refrigerated Air Conditioning Cash Rebate
- Rain Barrel Rebate
- Rainwater Harvesting Program
- Efficient Irrigation Rebate

Customer:

- Reuse and Recycling of Wastewater and Graywater

10. Regional Water Planning and Coordination

11. Authority and Adoption

- Means of implementation and enforcement

Model Water Conservation Plan Template
Industrial and Mining Uses

Model Water Conservation Plan Template – Industrial and Mining Uses
Introduction and Background

Brief introduction describing WUG, its provided services, and general information.

1. Purpose

Purpose is to identify and establish principles, practices, and standards to effectively conserve and efficiently use available water supplies and water distribution system capacity.

Possibly provide historical annual average Industrial or Mining water demands and the goals for industrial or mining water demand reduction included in the plan. (The water conservation plan 5- and 10-year targets should be discussed in *Section 1.4 – Water Conservation Plan Goals*).

2. Location

General location of WUG and its service area

3. Water Use Data

Water Accounting Data

- Description of the use of the water in the production process, including how the water is diverted and transported from the source(s) of supply, how the water is utilized in the production process, and estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal.

Projected Water Demands

- Provide total water demand estimates for utility's planning horizon indicating data sources/methods for determining water demand.

- Discuss conservation measures already implemented, if any, including impacts of measures and methods of determination of impacts.

4. Water Conservation Goals

Planning goal (Specific quantified 5 and 10 year targets for water savings to include goals for water loss programs and goals for industrial and mining uses).

A schedule for implementing the plan to achieve the applicant's targets and goals.

Needed reduction in gallons per day (gpd) to meet planning goal.

5. Water Conservation Plan Elements –Other Programs/BMPs that should be part of the conservation plan

A method for tracking the implementation and effectiveness of the plan

Metering Program

- A master meter(s) (accurate to within plus or minus 5 percent) to measure and account for the amount of water diverted from the supply source

Measures to Determine and Control Unaccounted for Water

- Measures to determine and control unaccounted-for uses of water (e.g., periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)

Leak Detection and Repair (a program for leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted-for uses of water)

List any application of state-of-the-art equipment and/or process modifications to improve water use efficiency

Examples of programs/BMPs that could be considered in achieving the conservation goals:

- Industrial Water Audit
- Industrial Water Waste Reduction
- Industrial Submetering
- Cooling Towers
- Cooling Systems (other than cooling towers)
- Industrial Alternative Sources and Reuse of Process Water
- Rinsing/Cleaning
- Water Treatment
- Boiler and Steam Systems
- Refrigeration (including chilled water)
- Once through Cooling
- Management and Employee Programs
- Industrial Landscape
- Industrial Site Specific Conservation

6. Regional Water Planning and Coordination

Beginning May 1, 2005, an industrial or mining water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The industrial or mining water user shall review and update the plan with the next revision of this water conservation plan coinciding with the Lower Colorado regional water planning process.

Model Water Conservation Plan Template
Agricultural Uses

Model Water Conservation Plan Template – Agricultural Uses
Introduction and Background

Brief introduction describing WUG, its provided services, and general information

1. Purpose

Purpose is to identify and establish principles, practices, and standards to effectively conserve and efficiently use available water supplies and water distribution system capacity.

Possibly provide historical annual average agricultural water demands and the goals for reduction in agricultural water demand included in the plan.

2. Location and General Information

General location of WUG and its service area

System Providing Agricultural Water to More Than One User

- System Inventory for the Suppliers facilities including water storage, conveyance, and delivery structures. Also discuss the operating practices and rules as well as water pricing policy. Accounting practices for the water should be briefly discussed.

- User profile including square miles of the service area, the number of customers taking delivery of water by the system, the types of crops, the types of irrigation systems, the types of drainage systems, and total acreage under irrigation, both historical and projected.

3. Water Use Data

Water Accounting Data

Agricultural User Other than Irrigation

- Description of the use of the water in the production process, including how the water diverted and transported from the source(s) of supply, how the water is utilized in the production process, and estimated quantity of water consumed in the production process and therefore unavailable for reuse, discharge, or other means of disposal.

Individual Irrigation User

- Description of the irrigation production process, including type of crops to be irrigated, monthly irrigation diversions, any seasonal or annual crop rotation, and soil types of the land to be irrigated.

- A description of the irrigation method or delivery system and equipment including pumps, flow rates, plans, and/or schematics of the system layout.

All Agricultural Users

Projected Water Demands

- Provide total water demand estimates for utility's planning horizon indicating data sources/methods for determining water demand

- Discuss conservation measures already implemented, if any, including impacts of measures and methods for determination of impacts.

4. Water Conservation Goals

All Agricultural Users

- Planning goal (Specific, quantified five-year and ten-year targets for water savings including, where appropriate, quantitative goals for irrigation/agricultural water use efficiency and a pollution abatement and prevention plan. The targets established by a water user under this section are not enforceable.

5. Water Conservation Plan Elements –Other Programs/BMPs That Should be Part of the Conservation Plan

All Agricultural Users

- A method for tracking the implementation and effectiveness of the plan
- Metering Program
  - A master meter(s) or other **device/method** (accurate to within +/- 5 percent) to measure and account for the amount of water diverted from the source of supply.

- Measures to Determine and Control Unaccounted for Water
  - Measures to determine and control unaccounted-for uses of water (e.g., periodic visual inspections along distribution lines and canals; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)

- Leak Detection and Repair (a program for leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system in order to control unaccounted-for uses of water)

Agricultural User Other than Irrigation

- List any application of state-of-the-art equipment and/or process modifications to improve water use efficiency

- Any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

Individual Irrigation User

- Water-conserving irrigation equipment and application system or method including surge irrigation, low-pressure sprinkler, lining of on-farm irrigation ditches, and non-leaking pipe are a few examples of equipment to aid in conservation. List all conservation measures utilized to conserve water.

- Scheduling the timing and/or measuring the amount of water applied (e.g., soil moisture monitoring, etc.)

- Land improvements for retaining or reducing runoff, and increasing the infiltration of rain and irrigation water including, but not limited to, land leveling, furrow diking, terracing, and weed control

- Tail water recovery and reuse

- Any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

System Providing Agricultural Water to more than one User

- Monitoring and record management program of water deliveries, sales, and loses.

- A program to assist customers in the development of on-farm water conservation and pollution prevention plans and/or measures.

- Any other water conservation practice, method, or technique which the user shows to be appropriate for achieving the stated goal or goals of the water conservation plan. Lining of district irrigation canals and replacement of canals with pipelines are a few examples of measures to aid in conservation.

- The customers of the agricultural water provider should also develop a water conservation plan or implement water conservation measures.

6. Regional Water Planning and Coordination

System Providing Agricultural Water to more than one User

- Beginning May 1, 2005, an agricultural water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous five-year and ten-year targets and any other new or updated information. The industrial or mining water user shall review and update the plan with the next revision of this water conservation plan coinciding with the regional water planning process.

7. Adoption of Plan

Official adoption of the water conservation plan and goals, by ordinance, rule, resolution, or tariff, indicating that the plan reflects official policy.

A review and update of this plan should occur in conjunction with the regional water planning groups update of the Lower Colorado Regional Water Plan and the five and ten-year targets should be modified as necessary.

Model Water Conservation Plan Template

Wholesale Water Providers

Model Water Conservation Plan Template – Wholesale Water Providers
Introduction and Background

Brief introduction describing WWP, its provided services, and general information.

1. Purpose

Purpose is to identify and establish principles, practices, and standards to effectively conserve and efficiently use available water supplies and water distribution system capacity.

Possibly provide historical annual average residential water demands and the goals for reduction in water demands included in the plan.

2. Location

General location of WWP and its service area

3. Customer Data

Population and Service Area Data

- Provide CCN certificate from TCEQ and service area map
- Provide service area size in square miles
- Provide current population of service area
- Provide current population served by utility (water, wastewater, etc.)
- Provide population served by utility for previous 5 years
- Provide projected population for service area for 2010, 2020, 2030, 2040, 2050
- Provide source/method of calculating current and projected populations

Active Connections

- Provide current number of active connections by user type and whether they are metered or not-metered (Metered Residential, Not-metered Residential, Metered Commercial, Not-metered Commercial, Metered Industrial, Not-metered Industrial, Metered Public, Not-metered Public, Metered Other, Not-metered Other)
- Provide net number of new connections/year for most recent 3 years by user type

High Volume Customers

- Provide annual water use for five highest volume retail and wholesale customers indicating if treated or raw water delivery

4. Water Use Data

Water Accounting Data

- Provide amount of water use monthly for previous 5 years in 1,000 gallons and indicate whether the water is raw water diverted or treated water distributed
- Provide source/method of obtaining monthly water use for previous 5 years
- Provide amount of water in 1,000 gallons delivered as recorded by user type (residential, commercial, industrial, wholesale, other)
- Provide previous 5 year records for unaccounted for water use
- Provide previous 5 year records for annual peak-to-average daily use ratio
- Provide municipal per capita water use for previous 5 years
- Provide seasonal water use for previous 5 years (gpd)

Projected Water Demands

- Provide total water demand estimates for utility's planning horizon indicating data sources/methods for determining water demand
- Discuss conservation measures already implemented, if any, including impacts of measures and methods of determination of impacts.

5. Water Supply System

Water Supply Sources

- Provide current water supply sources and amounts available for surface water, groundwater, contracts, and other

Treatment and Distribution System

- Provide design daily system capacity
- Provide storage capacity (elevated and ground)
- Provide description of water system including number of treatment plants, wells, storage tanks along with sketch of system
- Provide estimates of time before additional facilities for supply, storage, and pumping will be needed without conservation measures.

6. Wastewater Utility System

Wastewater System Data

- Provide design capacity of wastewater treatment plant
- Provide description of wastewater system in service area including TCEQ name, number of treatment plants, operator, owner, receiving stream of discharge if applicable.
- Provide sketch of plant and discharge point locations

Wastewater Data for Service Area

- Provide percent of water service area served by wastewater system
- Provide monthly volume treated for previous 3 years
- Provide quality information on treatment plant effluent for reuse applications
- Determine ratio between treated water pumped and wastewater flow

7. Utility Operating Data

Water and wastewater rates/ rate structure for all classes – provide list of rates
(Rates should be cost-based so that they do not promote the excessive use of water)
Other relevant data

8. Water Conservation Goals

Goals for WWPs established to maintain/reduce consumption measured in

- Gallons per capita per day used
- Unaccounted for water uses
- Peak day to average day ratio
- Increase in reuse or recycling of water

TCEQ/TWDB will assess conservation goals based on whether the following is addressed:

- Identification of a water/wastewater problem
- Completion of utility profile
- Selection of goals based on technical potential to save water as in utility profile
- Performance of cost-benefit analysis of strategies

Complete following (in gpcd) to quantify conservation goals for WWP's service area:

- Estimation for reducing per capita water use:
    - Reduction in unaccounted-for uses
    - Reduction in indoor water use due to water-conserving plumbing fixtures
    - Reduction in seasonal use
    - Reduction in water use due to public education program
- Planning goal (Specific quantified 5 and 10 year targets for water savings to include goals for water loss programs and goals for municipal use, in gallons per capita day)
- A schedule for implementing the plan to achieve the applicant's targets and goals
- Needed reduction in per capita to meet planning goal

9. Water Conservation Plan Elements – Other Programs/BMPs That Should be Part of the Conservation Plan

Supplier:

- A method for tracking the implementation and effectiveness of the plan
- Metering Program
    - A master meter(s) to measure and account for the amount of water diverted from the source of supply
- Measures to Determine and Control Unaccounted for Water
    - Measures to determine and control unaccounted-for uses of water (e.g., periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)
- Leak Detection and Repair (a program for leak detection, repair, and water loss accounting for the water storage, delivery, and distribution system in order to control unaccounted-for uses of water)
- Reservoir System Operating Plan
    - Water Rate Structure (should be conservation oriented)

- Program to assist agricultural customers in the development of conservation pollution prevention and abatement plans.
- Program for Reuse and Recycling of Wastewater and Graywater (if not feasible explain why)
- Any other conservation measure which the WWP shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

10. Regional Water Planning and Coordination

11. Authority and Adoption

Means of implementation and enforcement

Model Drought Contingency Plan Template

Utility/Water Supplier

Model Drought Contingency Plan Template (Utility / Water Supplier)
Brief Introduction and Background

Include information such as

- Name of Utility
- Address, City, Zip Code
- CCN#
- PWS #s

Section 1 Declaration of Policy, Purpose, and Intent

In cases of extreme drought, periods of abnormally high usage, system contamination, or extended reduction in ability to supply water due to equipment failure, temporary restrictions may be instituted to limit nonessential water usage. The purpose of the Drought Contingency Plan (Plan) is to encourage customer conservation in order to maintain supply, storage, or pressure or to comply with the requirements of a court, government agency or other authority.

Water uses regulated or prohibited under this Drought Contingency Plan are considered to be non-essential and continuation of such uses during times of water shortage or other emergency water supply condition are deemed to constitute a waste of water which subjects the offender(s) to penalties as defined in *Section 6* of this plan.

(**Please note:** Water restriction is not a legitimate alternative if a water system does not meet the Texas Commission on Environmental Quality (TCEQ) capacity requirements under normal conditions **or** if the utility fails to take all immediate and necessary steps to replace or repair malfunctioning equipment.)

Section 2 Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the _____________ (name of utility/water supplier) by means of __________________ (describe methods used to inform the public about the preparation of the plan and provide opportunities for input; see below for examples)

- *Scheduling and providing public notice of a public meeting to accept input on the Plan*

  The meeting took place at:
  Date: ________________
  Time: _____________
  Location: ___________________________

- *Mailed survey with summary of results* **(attach survey and results*)***
- *Bill insert inviting comment* **(attach bill insert)**
- *Other method* ____

Section 3 Public Education

______________________________ (*name of utility/name of supplier*) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage.

Drought plan information will be provided by:
(Check at least one of the following)

- ❑ *Public meeting*
- ❑ *Press releases*
- ❑ *Utility bill inserts*
- ❑ *Other* ____

Section 4 Coordination with Regional Water Planning Groups

The service area of the ______________________________ (*name of your utility/water supplier*) is located within the Lower Colorado Region. ____________________________ (*name of your utility/water supplier*) has mailed a copy of this Plan to the Lower Colorado Regional Water Planning Group.

Section 5 Notice Requirements

Written notice will be provided to each customer **prior to implementation or termination of each stage of the water restriction program**. Mailed notice must be given to each customer 72 hours prior to the start of water restriction. If notice is hand delivered, the utility cannot enforce the provisions of the plan for 24 hours after notice is provided. The written notice to customers will contain the following information:

the date restrictions will begin,

the circumstances that triggered the restrictions,

the stages of response and explanation of the restrictions to be implemented, and,

an explanation of the consequences for violations.

The utility must notify the TCEQ by telephone at (512) 239-4691, or electronic mail at *watermon@tceq.state.tx.us* prior to implementing Stage III and <u>must notify in writing the Public Drinking Water Section at MC - 155, P.O. Box 13087, Austin, Texas 78711-3087 within five (5) working days</u> of implementation including a copy of the utility's restriction notice. The utility must file a status report of its restriction program with the TCEQ at the initiation and termination of mandatory water use restrictions (i.e., Stages III and IV).

Section 6 Violations

First violation - The customer will be notified by written notice of their specific violation.

Subsequent violations:

After written notice, the utility may install a flow restricting device in the line to limit the amount of water which will pass through the meter in a 24-hour period. The utility may charge the customer for the actual cost of installing and removing the flow restricting device, not to exceed $50.00.

After written notice, the utility may discontinue service at the meter for a period of seven (7) days, or until the end of the calendar month, whichever is LESS. The normal reconnect fee of the utility will apply for restoration of service.

Section 7 Exemptions or Variances

The utility may grant any customer an exemption or variance from the drought contingency plan for good cause **upon written request**. A customer who is refused an exemption or variance may appeal such action of the utility in writing to the Texas Commission on Environmental Quality. The utility will treat all customers equally concerning exemptions and variances, and shall not discriminate in granting exemptions and variances. No exemption or variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section 8 Response Stages

Unless there is an immediate and extreme reduction in water production, or other absolute necessity to declare an emergency or severe condition, the utility will initially declare Stage I restrictions. If, after a reasonable period of time, demand is not reduced enough to alleviate outages, reduce the risk of outages, or comply with restrictions required by a court, government agency or other authority, Stage II may be implemented with Stage III to follow if necessary.

STAGE I - CUSTOMER AWARENESS

Stage I will begin:

Every April 1st, the utility will mail a public announcement to its customers.
No notice to TCEQ required.

Stage I will end:

Every September 30th, the utility will mail a public announcement to its customers.
No notice to TCEQ required.

Utility Measures:

This announcement will be designed to increase customer awareness of water conservation and encourage the most efficient use of water. A copy of the current public announcement on water conservation awareness shall be kept on file available for inspection by the TCEQ.

Voluntary Water Use Restrictions:

Water customers are requested to voluntarily limit the use of water for nonessential purposes and to practice water conservation.

STAGE II - VOLUNTARY WATER CONSERVATION:

Target: Achieve a ______ percent reduction in __________ (example: total water use, daily water demand, etc.)

The water utility will implement Stage II when any one of the selected triggers is reached:

Supply-Based Triggers: (check at least one and fill in the appropriate value)

☐ Well level reaches __________ ft. mean sea level (m.s.l.)

☐ Overnight recovery rate reaches __________ ft.

☐ Reservoir elevation reaches __________ ft. (m.s.l.)

☐ Stream flow reaches __________ cfs at USGS gage # _________

☐ Wholesale supplier's drought Stage II _____________________________________

☐ Annual water use equals _______ % of well permit/Water Right/purchased water contract amount

☐ Other ____

Demand- or Capacity-Based Triggers: (check at least one and fill in the appropriate value)

☐ Drinking water treatment as % of capacity __________ %

☐ Total daily demand as % of pumping capacity __________ %

☐ Total daily demand as % of storage capacity __________ %

☐ Pump hours per day __________ hrs.

☐ Production or distribution limitations

☐ Other ____

Upon initiation and termination of Stage II, the utility will mail a public announcement to its customers. No notice to TCEQ required.

Requirements for Termination:

Stage II of the Plan may end when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage II, Stage I becomes operative.

Utility Measures:

Visually inspect lines and repair leaks on a daily basis. Monthly review of customer use records and follow-up on any that have unusually high usage.

Describe additional measures, if any, to be implemented directly by the utility to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes.

The second water source for ______________________________ (*name of utility*) is:
(check one)

- ☐ Other well
- ☐ Inter-connection with other system
- ☐ Purchased water
- ☐ Other ____

Voluntary Water Use Restrictions:

Restricted Hours: Outside watering is allowed daily, but only during periods specifically described in the customer notice; between 10:00 p.m. and 5:00 a.m. for example;

Restricted Days/Hours: Water customers are requested to voluntarily limit the irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems. Customers are requested to limit outdoor water use to **Mondays for water customers with a street address ending with the numbers 1, 2, or 3, Wednesdays for water customers with a street address ending with the numbers 4, 5, or 6, and Fridays for water customers with a street address ending with the numbers 7, 8, 9, or 0.** Irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet-filled bucket or watering can of five (5) gallons or less, or drip irrigation system; or
Other uses that waste water such as water running down the gutter.

STAGE III - MANDATORY WATER USE RESTRICTIONS:

Target: Achieve a ______ percent reduction in __________ (example: total water use, daily water demand, etc.)

The water utility will implement Stage III when any one of the selected triggers is reached:

Supply-Based Triggers: (check at least one and fill in the appropriate value)

- ☐ Well level reaches __________ ft. (m.s.l.)
- ☐ Overnight recovery rate reaches __________ ft.
- ☐ Reservoir elevation reaches __________ ft. (m.s.l.)
- ☐ Stream flow reaches __________ cfs at USGS gage # _________
- ☐ Wholesale supplier's drought Stage III

  ____
- ☐ Annual water use equals _______ % of well permit/Water Right/purchased water contract amount
- ☐ Other ____

Demand- or Capacity-Based Triggers: (check at least one and fill in the appropriate value)

- ☐ Drinking water treatment as % of capacity __________ %
- ☐ Total daily demand as % of pumping capacity __________ %
- ☐ Total daily demand as % of storage capacity __________ %
- ☐ Pump hours per day __________ hrs.
- ☐ Production or distribution limitations
- ☐ Other ____

Upon initiation and termination of Stage III, the utility will mail a public announcement to its customers. Notice to TCEQ required.

Requirements for Termination:

Stage III of the Plan may end when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage III, Stage II becomes operative.

Utility Measures:

Visually inspect lines and repair leaks on a regular basis. Flushing is prohibited except for dead end mains.

Describe additional measures, if any, to be implemented directly by the utility to manage limited water supplies and/or reduce water demand. Examples include: activation and use of an alternative supply source(s); use of reclaimed water for non-potable purposes; offering low-flow fixtures and water restrictors.

<u>Mandatory Water Use Restrictions</u>:

The following water use restrictions shall apply to all customers.

1. Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems **shall be limited to Mondays for water customers with a street address ending with the numbers 1, 2, or 3, Wednesdays for water customers with a street address ending with the numbers 4, 5, or 6, and Fridays for water customers with a street address ending with the numbers 7, 8, 9, or 0.** Irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet-filled bucket or watering can of five (5) gallons or less, or drip irrigation system.

2. Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight. Such washing, when allowed, shall be done with a hand-held bucket or a hand-held hose equipped with a positive shutoff nozzle for quick rinses. Vehicle washing may be done at any time on the immediate premises of a commercial car wash or commercial service station. Further, such washing may be exempted from these regulations if the health, safety, and welfare of the public are contingent upon frequent vehicle cleansing, such as garbage trucks and vehicles used to transport food and perishables.

3. Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or “jacuzzi” type pool is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight.

4. Operation of any ornamental fountain or pond for aesthetic or scenic purposes is prohibited except where necessary to support aquatic life or where such fountains or ponds are equipped with a recirculation system.

5. Use of water from hydrants or flush valves shall be limited to maintaining public health, safety, and welfare.

6. Use of water for the irrigation of golf courses, parks, and green belt area is prohibited except by hand-held hose and only on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight.

7. The following uses of water are defined as nonessential and are prohibited:

    a. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;

b. use of water to wash down buildings or structures for purposes other than immediate fire protection;

c. use of water for dust control;

d. flushing gutters or permitting water to run or accumulate in any gutter or street;

e. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and

f. any waste of water.

STAGE IV - CRITICAL WATER USE RESTRICTIONS:

Target: Achieve a ______ percent reduction in __________ (example: total water use, daily water demand, etc.)

The water utility will implement Stage IV when any one of the selected triggers is reached:

Supply-Based Triggers: (check at least one and fill in the appropriate value)

☐ Well level reaches __________ ft. (m.s.l.)

☐ Overnight recovery rate reaches __________ ft.

☐ Reservoir elevation reaches __________ ft. (m.s.l.)

☐ Stream flow reaches __________ cfs at USGS gage # _________

☐ Wholesale supplier's drought Stage IV ____

☐ Annual water use equals _______ % of well permit/Water Right/purchased water contract amount

☐ Supply contamination

☐ Other ____

Demand- or Capacity-Based Triggers: (check at least one and fill in the appropriate value)

☐ Drinking water treatment as % of capacity __________ %

☐ Total daily demand as % of pumping capacity __________ %

☐ Total daily demand as % of storage capacity __________ %

☐ Pump hours per day __________ hrs.

☐ Production or distribution limitations

☐ System outage

☐ Other ____

Upon initiation and termination of Stage IV, the utility will mail a public announcement to its customers. Notice to TCEQ required.

Requirements for Termination:

Stage IV of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage IV, Stage III becomes operative.

Operational Measures:

The utility shall visually inspect lines and repair leaks on a daily basis. Flushing is prohibited except for dead end mains and only between the hours of 9:00 p.m. and 3:00 a.m. Emergency interconnects or alternative supply arrangements shall be initiated. All meters shall be read as often as necessary to insure compliance with this program for the benefit of all the customers. *Describe additional measures, if any, to be implemented directly to manage limited water supplies and/or reduce water demand.*

Mandatory Water Use Restrictions: (all outdoor use of water is prohibited)

1. Irrigation of landscaped areas is absolutely prohibited.
2. Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

SYSTEM OUTAGE or SUPPLY CONTAMINATION

Notify TCEQ Regional Office immediately.

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN

RESOLUTION NO. __________

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE ___________________ (name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN.

WHEREAS, the Board recognizes that the amount of water available to the ____________ (name of water supplier) and its water utility customers are limited and subject to depletion during periods of extended drought;

WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes;

WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and

WHEREAS, as authorized under law, and in the best interests of the customers of the _________________ (name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE _________________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as Exhibit "A" and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the ________________ (name of water supplier).

SECTION 2. That the _______________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE _______________, ON THIS __ day of ______________, 20__.

____

President, Board of Directors

ATTESTED TO:

____

Secretary, Board of Directors

Model Drought Contingency Plan Template

Irrigation Uses

Model Drought Contingency Plan Template (Irrigation Uses)

DROUGHT CONTINGENCY PLAN
FOR
(Name of irrigation district)
(Date)

Section 1: Declaration of Policy, Purpose, and Intent
The Board of Directors of the ___________________ (name of irrigation district) deems it to be in the interest of the District to adopt Rules and Regulations governing the equitable and efficient allocation of limited water supplies during times of shortage. These Rules and Regulations constitute the District's drought contingency plan required under Section 11.1272, Texas Water Code, *Vernon's Texas Codes Annotated*, and associated administrative rules of the Texas Commission on Environmental Quality (Title 30, Texas Administrative Code, Chapter 288).

Section 2: User Involvement
Opportunity for users of water from the _________________ (name of irrigation district) was provided by means of ________________ (describe methods used to inform water users about the preparation of the plan and opportunities for input; for example, scheduling and providing notice of a public meeting to accept user input on the plan).

Section 3: User Education
The _____________ (name of irrigation district) will periodically provide water users with information about the Plan, including information about the conditions under which water allocation is to be initiated or terminated and the district's policies and procedures for water allocation. This information will be provided by means of ______________ (e.g. describe methods to be used to provide water users with information about the Plan; for example, by providing copies of the Plan and by posting water allocation rules and regulations on the district's public bulletin board).

Section 4: Authorization
The ______________ (e.g., general manager) is hereby authorized and directed to implement the applicable provision of the Plan upon determination by the Board that such implementation is necessary to ensure the equitable and efficient allocation of limited water supplies during times of shortage.

Section 5: Application

The provisions for the Plan shall apply to all persons utilizing water provided by the _______________ (name of irrigation district). The term "person" as used in the Plan includes individuals, corporations, partnerships, associations, and all other legal entities.

Section 6: Initiation of Water Allocation
The __________ (designated official) shall monitor water supply conditions on a _________ (e.g. weekly, monthly) basis and shall make recommendations to the Board regarding irrigation of water allocation. Upon approval of the Board, water allocation will become effective when _________________ (describe the criteria and the basis for the criteria):
Below are examples of the types of triggering criteria that might be used; singly or in combination, in an irrigation district's drought contingency plan:

Example 1: Water in storage in the ___________ (name of reservoir) is equal to or less than _____________ (acre-feet and/or percentage of storage capacity).

Example 2: Combined storage in the _________________ (name or reservoirs) reservoir system is equal to or less than _____________ (acre-feet and/or percentage of storage capacity).

Example 3: Flows as measured by the U.S. Geological Survey gage on the ______________ (name of reservoir) near ______________, Texas reaches ____ cubic feet per second (cfs).

Example 4: The storage balance in the district's irrigation water rights account reaches ______ acre-feet.

Example 5: The storage balance in the district's irrigation water rights account reaches an amount equivalent to _______ (number) irrigations for each flat rate acre in which all flat rate assessments are paid and current.

Example 6: The ____________ (name of entity supplying water to the irrigation district) notifies the district that water deliveries will be limited to ____________ acre-feet per year (i.e. a level below that required for unrestricted irrigation).

Section 7: Termination of Water Allocation

The district's water allocation policies will remain in effect until the conditions defined in Section IV of the Plan no longer exist and the Board deems that the need to allocate water no longer exists.

Section 8: Notice

Notice of the initiation of water allocation will be given by notice posted on the District's public bulletin board and by mail to each ________ (e.g. landowner, holders of active irrigation accounts, etc.).

Section 9: Water Allocation

(a) In identifying **specific, quantified targets** for water allocation to be achieved during periods of water shortages and drought, each irrigation user shall be allocated _____ irrigations or ________ acre-feet of water each flat rate acre on which all taxes, fees, and charges have been paid. The water allotment in each irrigation account will be expressed in acre-feet of water.

Include explanation of water allocation procedure. For example, in the Lower Rio Grande Valley, an "irrigation" is typically considered to be equivalent to eight (8) inches of water per irrigation acre; consisting of six (6) inches of water per acre applied plus two (2) inches of water lost in transporting the water from the river to the land. Thus, three irrigations would be equal to 24 inches of water per acre or an allocation of 2.0 acre-feet of water measured at the diversion from the river.

(b) As additional water supplies become available to the District in an amount reasonably sufficient for allocation to the District's irrigation users, the additional water made available to the District will be equally distributed, on a pro rata basis, to those irrigation users having ________________.

Example 1: An account balance of less than ______ irrigations for each flat rate acre (i.e. ____ acre-feet_.

Example 2: An account balance of less than _____ acre-feet of water for each flat rate acre.

Example 3: An account balance of less than _____ acre-feet of water.
(c) The amount of water charged against a user's water allocation will be ____ (e.g. eight inches) per irrigation, or one allocation unit, unless water deliveries to the land are metered. Metered water deliveries will be charges based on actual measured use. In order to maintain parity in charging use against a water allocation between non-metered and metered deliveries, a loss factor of ____ percent of the water delivered in a metered situation will be added to the measured use and will be charged against the users water allocation. Any metered use, with the loss factor applied, that is less than eight (8) inches per acre shall be credited back to the allocation unit and will be available to the user. It shall be a violation of the Rules and Regulations for a water user to use water in excess of the amount of water contained in the users irrigation account. (d) Acreage in an irrigation account that has not been irrigated for any reason within the last two (2) consecutive years will be considered inactive and will not be allocated water. Any landowner whose land has not been irrigated within the last two (2) consecutive years, may, upon application to the District expressing intent to irrigate the land, receive future allocations. However, irrigation water allocated shall be applied only upon the acreage to which it was allocated and such water allotment cannot be transferred until there have been two consecutive years of use.

Section 10: Transfers of Allotments

(a) A water allocation in an active irrigation account may be transferred within the boundaries of the District from one irrigation account to another. The transfer of water can only be made by the landowner's agent who is authorized in writing to act on behalf of the landowner in the transfer of all or part of the water allocation from the described land of the landowner covered by the irrigation account.

(b) A water allocation may not be transferred to land owned by a landowner outside the District boundaries. **Or** A water allocation may be transferred to land outside the District's boundaries by paying the current water charge as if the water was actually delivered by the District to the land covered by an irrigation account. The amount of water allowed to be transferred shall be stated in terms of acre-feet and deducted from the landowner's current allocation balance in the irrigation account. Transfers of water outside the District shall not affect the allocation of water under Section VII of these Rules and Regulations.

(c) Water from outside the District may not be transferred by a landowner for use within the District. **Or** Water from outside the District may be transferred by a landowner for use within the District. The District will divert and deliver the water on the same basis as District water is delivered, except that a ___ percent conveyance loss will be charged against the amount of water transferred for use in the District as the water is delivered.

Section 11: Penalties

Any person who willfully opens, closes, changes or interferes with any headgate or uses water in violation of these Rules and Regulations, shall be considered in violation of Section 11.0083, Texas

Water Code, *Vernon's Texas Codes Annotated,* which provides for punishment by fine of not less than $10.00 nor more than $200.00 or by confinement in the county jail for not more than thirty (30) days, or both, for each violation, and these penalties provided by the laws of the State and may by enforced by complaints filed in the appropriate court jurisdiction in ______ County, all in accordance with Section 11.083; and in addition, the District may pursue a civil remedy in the way of damages and/or injunction against the violation of any of the foregoing Rules and Regulations.

Section 12: Severability

It is hereby declared to be the intention of the Board of Directors of the ______________ (name of irrigation district) that the sections, paragraphs, sentences, clauses, and phrases of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the Board without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

Section 13: Authority

The foregoing rules and regulations are adopted pursuant to and in accordance with Sections 11.039, 11.083, 11.1272; Section 49.004; and Section 58.127-130 of the Texas Water Code, *Vernon's Texas Codes Annotated.*

Section 14: Effective Date of Plan

The effective date of this Rule shall be five (5) days following the date of Publication hereof and ignorance of the Rules and Regulations is not a defense for a prosecution for enforcement of the violation of the Rules and Regulations.

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN
RESOLUTION NO. __________

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE ___________________ (Name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN. WHEREAS, the Board recognizes that the amount of water available to the ____________ (name of water supplier) and its water utility customers is limited and subject to depletion during periods of extended drought; WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes; WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; And WHEREAS, as authorized under law, and in the best interests of the customers of the _________________(name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE _________________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as Exhibit AA@ and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the _______________ (name of water supplier).

SECTION 2. That the _______________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.

DULY PASSED BY THE BOARD OF DIRECTORS OF THE _______________, ON THIS __ day of ______________, 20__.

____
President, Board of Directors
ATTESTED TO:

____
Secretary, Board of Directors

Model Drought Contingency Plan Template

Wholesale Water Providers

Model Drought Contingency Plan Template (**Wholesale Public Water Suppliers**)

DROUGHT CONTINGENCY PLAN
FOR THE
(Name of wholesale water supplier)
(Date)

Section 1: Declaration of Policy, Purpose, and Intent
In order to conserve the available water supply and/or to protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, and fire protection, and to protect and preserve public health, welfare, and safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the ____________________ (name of water supplier) adopts the following Drought Contingency Plan (the Plan).

Section 2: Public Involvement
Opportunity for the public and wholesale water customers to provide input into the preparation of the Plan was provided by ______________ (name of water supplier) by means of _______________ (describe methods used to inform the public and wholesale customers about the preparation of the plan and opportunities for input; for example, scheduling and proving public notice of a public meeting to accept input on the Plan).

Section 3: Wholesale Water Customer Education
The _____________ (name of water supplier) will periodically provide wholesale water customers with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of ___________________ (e.g., describe methods to be used to provide customers with information about the Plan; for example, providing a copy of the Plan or periodically including information about the Plan with invoices for water sales).

Section 4: Coordination with Regional Water Planning Groups
The water service area of the _______________ (name of water supplier) is located within the ________________ (name of regional water planning area or areas) and the ______________ (name of water supplier) has provided a copy of the Plan to the _____________ (name of regional water planning group or groups).

Section 5: Authorization
The ____________________ (designated official; for example, the general manager or executive director), or his/her designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The ________________, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section 6: Application
The provisions of this Plan shall apply to all customers utilizing water provided by the ___________________ (name of supplier). The terms "person" and "customer" as used in the plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section 7: Triggering Criteria for Initiation and Termination of Drought Response Stages
The ____________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a (e.g., weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan. Customer notification of the initiation or termination of drought response stages will be made by mail or telephone. The news media will also be informed.

The triggering criteria described below are based on:
____
____ (Provide a brief description of the rationale for the triggering criteria; for example, triggering criteria are based on a statistical analysis of the vulnerability of the water source under drought of record conditions).

(a) Stage 1 - Mild Water Shortage Conditions
Requirements for initiation – The _____________ (name of water supplier) will recognize that a mild water shortage condition exists when______________(describe triggering criteria, see examples below).

Below are examples of the types of triggering criteria that might be used in a wholesale water supplier's drought contingency plan. One or a combination of such criteria may be defined for each drought response stage:

Example 1: Water in storage in the ____________ (name of reservoir) is equal to or less than _______ (acre-feet and/or percentage of storage capacity).

Example 2: When the combined storage in the __________ (name of reservoirs) is equal to or less than ______ (acre-feet and/or percentage of storage capacity).

Example 3: Flows as measured by the U.S. Geological Survey gage on the ________ (name of river) near ________, Texas reaches ___ cubic feet per second (cfs).

Example 4: When total daily water demand equals or exceeds ______ million gallons for ___consecutive days or ____ million gallons on a single day.

Example 5: When total daily water demand equals or exceeds ___ percent of the safe operating capacity of ____________ million gallons per day for ___consecutive days or ___ percent on a single day.

Requirements for termination - Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. The ________ (name of water supplier) will notify its wholesale customers and the media of the termination of Stage 1 in the same manner as the notification of initiation of Stage 1 of the Plan.

(b) Stage 2 - Moderate Water Shortage Conditions
Requirements for initiation – The _____________ (name of water supplier) will recognize that a moderate water shortage condition exists when______________(describe triggering criteria).

Requirements for termination - Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days.

Upon termination of Stage 2, Stage 1 becomes operative. The _________ (name of water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 1 of the Plan.

(c) Stage 3 - Severe Water Shortage Conditions
Requirements for initiation – The _____________ (name of water supplier) will recognize that a severe water shortage condition exists when______________(describe triggering criteria).

Requirements for termination **-** Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days.

Upon termination of Stage 3, Stage 2 becomes operative. The _________ (name of water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 3 of the Plan.

(d) Stage 4 – Emergency Water Shortage Conditions
Requirements for initiation - The _____________ (name of water supplier) will recognize that an emergency water shortage condition exists when______________(describe triggering criteria).

Example 1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; or

Example 2. Natural or man-made contamination of the water supply source(s). Requirements for termination **-** Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. The _________ (name of water supplier) will notify its wholesale customers and the media of the termination of stage 4.

Section 8: Drought Response Stages
The _________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions and, in accordance with the triggering criteria set forth in Section VI, shall determine that mild, moderate, or severe water shortage conditions exist or that an emergency condition exists and shall implement the following actions:

Stage 1 - Mild Water Shortage Conditions

Target: Achieve a voluntary ___ percent reduction in __________ (e.g., total water use, daily water demand, etc.).

Best Management Practices for Supply Management:
Describe measures, if any, to be implemented directly by ____________ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The ________________ (designated official), or his/her designee(s), will contact wholesale water customers to discuss water supply and/or demand conditions and will request that wholesale water customers initiate voluntary measures to reduce water use (e.g., implement Stage 1 of the customer's drought contingency plan).

(b) The _________________ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 2 - Moderate Water Shortage Conditions

Target: Achieve a ___ percent reduction in __________ (e.g., total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe measures, if any, to be implemented directly by ____________ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The ________________ (designated official), or his/her designee(s), will initiate weekly contact with wholesale water customers to discuss water supply and/or demand conditions and the possibility of pro rata curtailment of water diversions and/or deliveries.

(b) The ________________ (designated official), or his/her designee(s), will request wholesale water customers to initiate mandatory measures to reduce non-essential water use (e.g., implement Stage 2 of the customer's drought contingency plan).

(c) The _________________ (designated official), or his/her designee(s), will initiate preparations for the implementation of pro rata curtailment of water diversions and/or deliveries by preparing a monthly water usage allocation baseline for each wholesale customer according to the procedures specified in Section VI of the Plan.

(d) The _________________ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 3 - Severe Water Shortage Conditions

Target: Achieve a ___ percent reduction in __________ (e.g., total water use, daily water demand, etc.).

Best Management Practices for Supply Management:

Describe measures, if any, to be implemented directly by ____________ (designated official), or his/her designee(s), to manage limited water supplies and/or reduce water demand. Examples include modifying reservoir operations procedures, interconnection with another water system, and use of reclaimed water for non-potable purposes.

Water Use Restrictions for Reducing Demand:

(a) The ________________ (designated official), or his/her designee(s), will contact wholesale water customers to discuss water supply and/or demand conditions and will request that wholesale water customers initiate additional mandatory measures to reduce non-essential water use (e.g., implement Stage 2 of the customer's drought contingency plan).

(b) The _________________ (designated official), or his/her designee(s), will initiate pro rata curtailment of water diversions and/or deliveries for each wholesale customer according to the procedures specified in Section VI of the Plan.

(c) The _________________ (designated official), or his/her designee(s), will provide a weekly report to news media with information regarding current water supply and/or demand conditions, projected water supply and demand conditions if drought conditions persist, and consumer information on water conservation measures and practices.

Stage 4 – Emergency Water Shortage Conditions

Whenever emergency water shortage conditions exist as defined in Section VII of the Plan, the _______________ (designated official) shall:

1. Assess the severity of the problem and identify the actions needed and time required to solve the problem.

2. Inform the utility director or other responsible official of each wholesale water customer by telephone or in person and suggest actions, as appropriate, to alleviate problems (e.g., notification of the public to reduce water use until service is restored).

3. If appropriate, notify city, county, and/or state emergency response officials for assistance.

4. Undertake necessary actions, including repairs and/or clean-up as needed.

5. Prepare a post-event assessment report on the incident and critique of emergency response procedures and actions.

Section 9: Pro Rata Water Allocation
In the event that the triggering criteria specified in Section VII of the Plan for Stage 3 – Severe Water Shortage Conditions have been met, the ____________ (designated official) is hereby authorized initiate allocation of water supplies on a pro rata basis in accordance with Texas Water Code Section 11.039.

Section 10: Enforcement
During any period when pro rata allocation of available water supplies is in effect, wholesale customers shall pay the following surcharges on excess water diversions and/or deliveries:

____ Times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation up through 5 percent above the monthly allocation.

____ Times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation from 5 percent through 10 percent above the monthly allocation.

____ Times the normal water charge per acre-foot for water diversions and/or deliveries in excess of the monthly allocation from 10 percent through 15 percent above the monthly allocation.

____ Times the normal water charge per acre-foot for water diversions and/or deliveries more than 15 percent above the monthly allocation.

The above surcharges shall be cumulative.

Section 11: Variances
The ________________ (designated official), or his/her designee, may, in writing, grant a temporary variance to the pro rata water allocation policies provided by this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the public health, welfare, or safety and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use. Persons requesting an exemption from the provisions of this Plan shall file a petition for variance with the _________________ (designated official) within 5 days after pro rata allocation has been invoked.

All petitions for variances shall be reviewed by the __________ (governing body), and shall include the following:

(a) Name and address of the petitioner(s).

(b) Detailed statement with supporting data and information as to how the pro rata allocation of water under the policies and procedures established in the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.

(c) Description of the relief requested.

(d) Period of time for which the variance is sought.

(e) Alternative measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.

(f) Other pertinent information.

Variances granted by the ____________________ (governing body) shall be subject to the following conditions, unless waived or modified by the ____________ (governing body) or its designee: (a) Variances granted shall include a timetable for compliance. (b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements. No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section 12: Severability
It is hereby declared to be the intention of the ________________ (governing body of water supplier) that the sections, paragraphs, sentences, clauses, and phrases of this Plan are severable and, if any

phrase, clause, sentence, paragraph, or section of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the ____________________ (governing body of the water supplier) without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

EXAMPLE ORDINANCE FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN ORDINANCE NO. __________

AN ORDINANCE OF THE CITY OF ____________________, TEXAS, ADOPTING A DROUGHT CONTINGENCY PLAN; ESTABLISHING CRITERIA FOR THE INITIATION AND TERMINATION OF DROUGHT RESPONSE STAGES; ESTABLISHING RESTRICTIONS ON CERTAIN WATER USES; ESTABLISHING PENALTIES FOR THE VIOLATION OF AND PROVISIONS FOR ENFORCEMENT OF THESE RESTRICTIONS; ESTABLISHING PROCEDURES FOR GRANTING VARIANCES; AND PROVIDING SEVERABILITY AND AN EFFECTIVE DATE. WHEREAS, the City of _________________, Texas recognizes that the amount of water available to the City and its water utility customers is limited and subject to depletion during periods of extended drought; WHEREAS, the City recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes; WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and WHEREAS, as authorized under law, and in the best interests of the citizens of_____________, Texas, the ________________ (governing body) deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies;

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF ____________, TEXAS:

SECTION 1. That the City of ____________, Texas Drought Contingency Plan attached hereto as Exhibit "A" and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the City.

SECTION 2. That all ordinances that are in conflict with the provisions of this ordinance are, and the same are hereby, repealed and all other ordinances of the City not in conflict with the provisions of this ordinance shall remain in full force and effect.

SECTION 3. Should any paragraph, sentence, subdivision, clause, phrase, or section of this ordinance be adjudged or held to be unconstitutional, illegal or invalid, the same shall not affect the validity of this ordinance as a whole or any part or provision thereof, other than the part so declared to be invalid, illegal or unconstitutional. SECTION 4. This ordinance shall take effect immediately from and after its passage and the publication of the caption, as the law in such cases provides. DULY PASSED BY THE CITY OF _______________, TEXAS, on the ___________ day of ______________, 20__.

APPROVED:

____
MAYOR

ATTESTED TO:

____
CITY SECRETARY

APPROVED AS TO FORM:

____
CITY ATTORNEY

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN
RESOLUTION NO. __________

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE ___________________ (name of water supplier) ADOPTING A DROUGHT CONTINGENCY PLAN. WHEREAS, the Board recognizes that the amount of water available to the ____________ (name of water supplier) and its water utility customers is limited and subject to depletion during periods of extended drought; WHEREAS, the Board recognizes that natural limitations due to drought conditions and other acts of God cannot guarantee an uninterrupted water supply for all purposes; WHEREAS, Section 11.1272 of the Texas Water Code and applicable rules of the Texas Commission on Environmental Quality require all public water supply systems in Texas to prepare a drought contingency plan; and WHEREAS, as authorized under law, and in the best interests of the customers of the _________________(name of water supply system), the Board deems it expedient and necessary to establish certain rules and policies for the orderly and efficient management of limited water supplies during drought and other water supply emergencies; NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE _________________ (name of water supplier):

SECTION 1. That the Drought Contingency Plan attached hereto as Exhibit AA@ and made part hereof for all purposes be, and the same is hereby, adopted as the official policy of the ________________ (name of water supplier).

SECTION 2. That the _______________ (e.g., general manager) is hereby directed to implement, administer, and enforce the Drought Contingency Plan.

SECTION 3. That this resolution shall take effect immediately upon its passage.
DULY PASSED BY THE BOARD OF DIRECTORS OF THE _______________, ON THIS __ day of ______________, 20__.

____
President, Board of Directors

ATTESTED TO:
____
Secretary, Board of Directors

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CHAPTER 7.0: REGIONAL PLAN CONSISTENCY WITH STATE'S LONG-TERM RESOURCE PROTECTION GOALS

A major goal of the regional water planning process is the protection of the State's water, agricultural, and natural resources. This focus has been considered throughout the planning process by the Lower Colorado Regional Water Planning Group (LCRWPG) when selecting strategies to meet water needs for the future. Conservation has been recommended as a first strategy for meeting shortages. Impacts on the State's resources have been thoroughly considered before recommending other strategies.

The effects of the recommended water management strategies on specific resources are discussed in further detail within this chapter.

7.1 WATER RESOURCES WITHIN THE LOWER COLORADO REGIONAL WATER PLANNING AREA (LCRWPA)

Water resources available by basin within the LCRWPA are discussed in further detail below.

7.1.1 Brazos River Basin

Portions of Bastrop, Burnet, Fayette, Mills, Travis, and Williamson Counties are within the Brazos River Basin. Local supplies are the only surface water sources originating from the Brazos River Basin in the LCRWPA. The portion of Williamson County within the LCRWPA is within the service boundary of the City of Austin (COA) and the Lower Colorado River Authority and is served by their water supplies in the Colorado River Basin. Groundwater supplies in the Brazos River Basin are obtained primarily from the Carrizo-Wilcox, Hickory, and Trinity aquifers. Groundwater is also available in lesser quantities from the Edwards-Balcones Fault Zone (BFZ), Ellenburger-San Saba, Gulf Coast, Marble Falls, Queen City, Sparta, Yegua-Jackson, and other unnamed aquifers.

Municipal conservation measures recommended by the Plan may have the effect of elevating the level of contaminants introduced to streams in the Brazos River Basin from wastewater treatment facilities if treatment standards are insufficient to meet total maximum daily loading limitations. Areas that are supplied from groundwater in the Brazos River Basin would be expected to discharge less water from treatment plants after implementing conservation measures. As wastewater effluent is often an important portion of instream flows, especially during dry periods, conservation measures may result in reduced streamflows. Expanding the use of groundwater will generally increase the amount of return flows to streams, though the possibility of introducing low quality groundwater, particularly from the Hickory aquifer, to surface systems may have an unfavorable effect on surface water quality. The implementation of House Bill (HB) 1437 may somewhat increase the instream flows in the Brazos River Basin absent significant reuse. However, with this additional supply comes additional usage and resulting contaminants that may pose water quality concerns unless treated to appropriate water quality standards.

7.1.2 Brazos-Colorado Coastal River Basin

The Brazos-Colorado Coastal River Basin includes portions of Colorado, Matagorda, and Wharton Counties. The only surface water source for this basin in the LCRWPA that is not a local supply is a run-of-river (ROR) right from the San Bernard River. However, large amounts of surface water originating in the Colorado River Basin are transferred to the Brazos-Colorado Coastal River Basin for agricultural use and are subsequently released to streams in the process of rice production. The entirety of the Brazos-Colorado River Basin within the LCRWPA is served by the Gulf Coast aquifer.

As in the other basins of the LCRWPA, increased groundwater usage may have potential impacts on water quantity in stream channels but possible adverse effects on water quality in some cases. Conservation programs implemented through the Lower Colorado River Authority-San Antonio Water System (LCRA-SAWS) Water Project may decrease streamflows during dry periods and introduce less water from the Colorado River Basin for irrigation use. Conjunctive use of groundwater and surface water supplies will decrease aquifer levels.

7.1.3 Colorado River Basin

Because the LCRWPA is centered on the Colorado River Basin, nearly every recommended management strategy has the potential to impact water quantity and quality in the basin.

The Colorado River Basin constitutes the largest portion of the LCRWPA as well as the single largest source of water for the region. The Highland Lakes System, operated by the Lower Colorado River Authority (LCRA), provides firm surface water supplies throughout the basin. An even larger amount of water is available from ROR supplies in the basin. Other reservoirs in the system provide small yields or receive their water through the Highland Lakes System or a ROR right. The largest amounts of groundwater in the Colorado River Basin are available from the Gulf Coast, Carrizo-Wilcox, Hickory, and Ellenburger-San Saba aquifers. These four aquifers represent approximately 60 percent of the available groundwater supply with various other aquifers providing the remaining 40 percent.

Currently, the use of COA effluent discharges downstream to increase the reliability of existing diversion rights maintains flow rates from Austin to the downstream point of diversion until COA reuse becomes comprehensive enough to reduce these total flows considerably in later decades. New contracts, reallocation of surplus supplies, and contract increases may also decrease total flow and concentrate chemical constituents in certain areas during low flow periods.

The direct transfer of raw water from the Guadalupe River to the Colorado River may result in issues arising from the mixing of water from two sources.

Construction of an instream channel dam at Goldthwaite will slightly reduce instream flows by capturing interruptible flows under normal conditions. During drought, the reservoirs would allow water to pass downstream to provide water to firm right holders. Water quality will benefit from the settling action behind the dam that will allow suspended materials to settle out.

Operation of the Highland Lakes System to allow interruptible water supplies to be supplemented with available firm water during drought periods will be beneficial to instream flows during these periods, although the use of these stored water supplies will reduce the amount of water available in the Highland Lakes. Conservation practices implemented as part of the LCRA-SAWS Water Project will result in reduced streamflow, although sediment and nutrient loads from irrigation tail water would be reduced, as well. As noted above, conjunctive use of groundwater and surface water will decrease aquifer levels in the Colorado-Lavaca Coastal River Basin.

Portions of Matagorda and Wharton Counties are within the Colorado-Lavaca Coastal River Basin. All surface water sources in these areas are associated with local supplies. However, as in the Brazos-

Colorado Coastal River Basin, water from the Colorado River Basin is discharged into streams following its use in rice production, and all groundwater supplies are obtained from the Gulf Coast aquifer.

As in the other basins of the LCRWPA, increased groundwater usage may have potential positive impacts on water quantity in stream channels but possible adverse effects on water quality in some cases. Again, conservation programs implemented through the LCRA-SAWS Water Project may decrease streamflows during dry periods and introduce less water from the Colorado River Basin for irrigation use.

7.1.4 Lavaca River Basin

The western portions of Colorado and Fayette Counties are located in the Lavaca River Basin. There are no firm surface water rights available from the Lavaca River Basin within these two counties. Additionally, the only reservoir in this basin, Lake Texana, is not located in the LCRWPA, and no surface water contracts serve water user groups (WUGs) in the region from Lavaca River Basin supplies. All surface water supplies in the basin are obtained from local supplies. The primary source of groundwater for the Lavaca River Basin in the LCRWPA is the Gulf Coast aquifer.

As in the Brazos and Colorado River Basins, municipal conservation could possibly impair water quality. However, areas served by groundwater would experience some benefit from increased streamflows from additional pumpage, although groundwater quality issues may introduce additional problems to stream water quality in certain instances. As in the other basins expected to benefit from the LCRA-SAWS Water Project, conservation programs implemented through the program may decrease streamflows during dry periods and introduce less water from the Colorado River Basin for irrigation use. As in the other basins subject to the LCRA-SAWS Water Project, conjunctive use of groundwater and surface water supplies will sustain aquifer levels when irrigators use available surface supplies rather than groundwater.

7.1.5 Guadalupe River Basin

The Guadalupe River Basin includes portions of Bastrop, Blanco, Fayette, Hays, and Travis Counties within the LCRWPA. No major reservoirs exist within the LCRWPA section of the Guadalupe River Basin, and the only firm surface water source is provided by two minor reservoirs operated by the City of Blanco. Other surface water sources are obtained from local supplies. The Carrizo-Wilcox and Ellenburger-San Saba aquifers are the major groundwater sources for the Guadalupe River Basin. Other smaller groundwater sources include the Edwards-BFZ, Edwards-Trinity, Gulf Coast, Queen City, Sparta, Trinity, and Yegua-Jackson aquifers.

As in the other basins, expanded groundwater usage is expected to increase streamflows with a possibility of negatively impacting water quality from additional discharges and groundwater quality issues.

7.2 AGRICULTURAL RESOURCES WITHIN THE LCRWPA

Rice production in the lower counties of the LCRWPA is the agricultural resource most dependent upon a reliable, extensive water supply. Water rights in these counties used for rice farming are some of the most senior rights within the entire Colorado River Basin. However, as a result of certain Region K Cutoff Model assumptions related to the Upper Colorado River Basin made when determining supplies within the Colorado River, these users do not have a sufficiently reliable supply of water under drought-of-record (DOR) conditions without the implementation of one or more future water management strategies.

The management strategies introduced in Chapter 4 of this Plan were created to meet the needs of all WUGs including agricultural needs. Primarily, the unmet agricultural needs in the LCRWPA are related to rice irrigation in the lower counties of Colorado, Wharton, and Matagorda. These needs have been met with sufficient new strategies to overcome the predicted shortages, including strategies to convert agricultural rights to firm water rights for municipal or other demands. The use of interruptible water supplies and return flows from the COA in the near future will eventually give way to conservation programs through an LCRA-SAWS agreement to reduce overall irrigation demands with on-farm conservation, conveyance improvements, conjunctive use of groundwater, and the development of more efficient rice varieties.

7.3 NATURAL RESOURCES WITHIN THE LCRWPA

The water management strategies recommended for the LCRWPA in this Plan are intended to protect natural resources while still meeting the projected water needs of the region. The impacts of recommended strategies on specific resources are discussed below.

7.3.1 Threatened and Endangered Species

The LCRWPA contains an array of habitats for a variety of wildlife species. A number of these species are listed as threatened or endangered by federal or state authorities, proposed as candidates to be listed, or are otherwise rare but unlisted species. A comprehensive list of these species can be found in *Appendix 1A* of this Plan.

The quantitative environmental impacts of the individual water management strategies discussed in Chapter 4 varied from positive impact to minimal or no impact to negative impact. A discussion of the individual environmental impacts can be found in Chapter 4 and a discussion of the comprehensive impacts is in *Section 7.3.3* of this chapter. The potential impacts to threatened and endangered species are expected to be limited. The construction of infrastructure related to these strategies may potentially impact one or more of the species identified in *Appendix 1A.*

7.3.2 Parks and Public Lands

As described in Chapter 1, over 28,000 acres of state parks are within the boundaries of the LCRWPA. These 14 state facilities host a variety of outdoor recreational opportunities for visitors from around the state of Texas. None of the recommended water management strategies are expected to have impacts on public lands. In addition, there are no foreseen impacts to stream segments traversing public lands. Additional information concerning impacts from each strategy can be found in Chapter 4.

7.3.3 Impacts of Water Management Strategies on Matagorda Bay System

The Matagorda Bay system represents a significant ecological resource to the LCRWPA and provides habitat for a number of species while supporting recreation and industry. As the second largest estuary system in Texas, it represents a major priority in protecting the state's natural resources.

Matagorda Bay receives inflows from the Colorado and Lavaca Rivers as well as a coastal contributing area. The target and critical freshwater inflow needs were estimated in a study conducted in 1997 by the LCRA, TNRCC, TWDB, and TPWD and for the Matagorda Bay system from the Colorado River Basin are included in the *Water Management Plan for the Lower Colorado River Basin* (1999) *Table 7.1*. The target inflow is described as the necessary long-term inflows that produce 98 percent of the maximum normalized population biomass for nine key estuarine species while maintaining certain criteria for salinity, population density, and nutrient inflow. The minimum inflow for critical needs represents the amount of water required for bay and estuary inflows to keep salinity at the mouth of the Colorado River to a level of 25 parts per thousand or less. This condition is expected to provide for fish habitat during extreme drought conditions without impacting the long-term ecology of Matagorda Bay.

A revision of the Freshwater Inflow Needs Study (FINS) was completed in 2006. The results of this study showed increased target and critical needs for Matagorda Bay. The 2006 FINS critical and target flows were used in this round of planning when determining the quantitative environmental impacts of the water management strategies. *Table 7.1* also shows the increased required monthly flows from the Colorado River as shown in the 2006 Freshwater Inflow Needs Study. The critical needs from the 2006 Study are approximately 150 percent higher than the 1997 Study, while the target needs from the 2006 Study are approximately 40 percent higher.

Table 7.1 Target and Critical Freshwater Inflow Needs for the Matagorda Bay System From the Colorado River

Month	1997 FINS Freshwater Inflows (1,000 ac-ft)[1]		2006 FINS Freshwater Inflows (1,000 ac-ft)[1]	
	Critical	Target	Critical	Target
January	14.26	44.1	36	205.6
February	14.26	45.3	36	194.5
March	14.26	129.1	36	63.2
April	14.26	150.7	36	60.4
May	14.26	162.2	36	255.4
June	14.26	159.3	36	210.5
July	14.26	107.0	36	108.4
August	14.26	59.4	36	62.0
September	14.26	38.8	36	61.9
October	14.26	47.4	36	71.3
November	14.26	44.4	36	66.5
December	14.26	45.2	36	68.0
Annual Totals	171	1,033	432	1,428

[1] Schedule of flows is designed to optimize biodiversity/productivity under normal rainfall. Under drought conditions, target flows should be curtailed in accordance to the severity of the drought and flows should be maintained at or above critical levels based on water quality considerations.

The freshwater inflow values presented in *Table 7.1* were developed following the methodology presented in "Characteristics of an Ecologically Sound Environment for the Guadalupe Estuary" by Boyd and Green, presented in *Freshwater Inflows to Texas Bays and Estuaries: Ecological Relationships and Methods for Determination of Needs* by TPWD, dated 1994. The process of determining freshwater inflow needs was carried out in three distinct phases:

Phase 1: Develop statistical relationships between freshwater inflows and key indicators such as salinity, species productivity, and nutrient inflows.

Phase 2: Use the developed statistical functions to compute optimal monthly and seasonal freshwater needs using the Texas Estuarine Mathematical Programming (TXEMP) Model developed by TWDB.

Phase 3: Simulate salinity conditions throughout the estuary using the TxBLEND model developed by TWDB and LCRA.

Phases 2 and 3 were carried out in an iterative process that compared simulated and desired salinity levels throughout the estuary. If the modeled salinity levels were outside of the ranges desired, the TXEMP model was adjusted accordingly. Additional information concerning the development of the target and critical freshwater inflows to the Matagorda Bay system can be found in *Freshwater Inflow Needs of the Matagorda Bay System* (LCRA 1997).

Additional data collection after the development of the 1997 inflows in *Table 7.1* showed that trends in salinity levels in Matagorda Bay did not corresponded to the projections made by the model, and changes were made to the target and critical inflows to better reflect the collected data. The results of the revised modeling are presented in *Table 7.1* as the 2006 FINS.

Additional studies were performed as part of the LSWP analysis. The Matagorda Bay Health Evaluation Study was completed in 2008, and recommended inflow criteria from the Colorado River that covered a wide range of inflow conditions to Matagorda Bay. Low-flow (threshold), long-term average, and four additional volumes of flow with associated percentages of time they should be met were part of the recommendations. The criteria from this study were used by the LCRWPG as a benchmark for evaluating the environmental impacts of the new and changed condition water management strategies in this round of planning. The use of the criteria as a benchmark does not imply that the LCRWPG endorses the results of the study at this time, but rather it is the most up-to-date scientific data available. For further detail, please see the study results at http://www.lcra.org/lswp/about/study/matagorda_bay.html.

The impacts of individual water management strategies on Colorado River instream flows and bay and estuary freshwater inflows were modeled in Chapter 4. A comprehensive model containing all of the water management strategies was also run to determine what the overall impacts would be to the Colorado River and Matagorda Bay. The results were compared to a base model without any of the strategies incorporated. The results were evaluated using the recommended guidelines from the Matagorda Bay Health Evaluation Study and Colorado River Instream Flow Guidelines Study done as part of the LSWP studies. More discussion of these studies and their recommended guidelines is available in *Section 4.17*.

The tabular results of the comprehensive strategy model comparison can be found in *Appendix 7A*. The following is a list of all the strategies incorporated into the model:

- LCRA New Contracts and Contract Amendments
- Construct Goldthwaite Channel Dam
- HB 1437
- LCRA-SAWS Water Sharing Project (LSWP)
- City of Austin Return Flows and Reuse
- LCRA Excess Flows Permit and Off-Channel Storage

- LCRA Aquifer Storage and Recovery (ASR)
- STPNOC Water Right Permit Amendment
- Groundwater Importation

Overall, the comprehensive strategy model results showed positive impacts to the Instream Flows and Freshwater Inflows to Matagorda Bay. For the Bay and Estuary Freshwater Inflows comparison, with the strategies, the percentage of time the Threshold level of 15,000 ac-ft/month was met an additional 10% of the time. There were negative impacts at the highest criteria level (MBHE 4) for two out of the three seasons, where the target volume of water was met three percent less of the time as compared to the base model with no strategies.

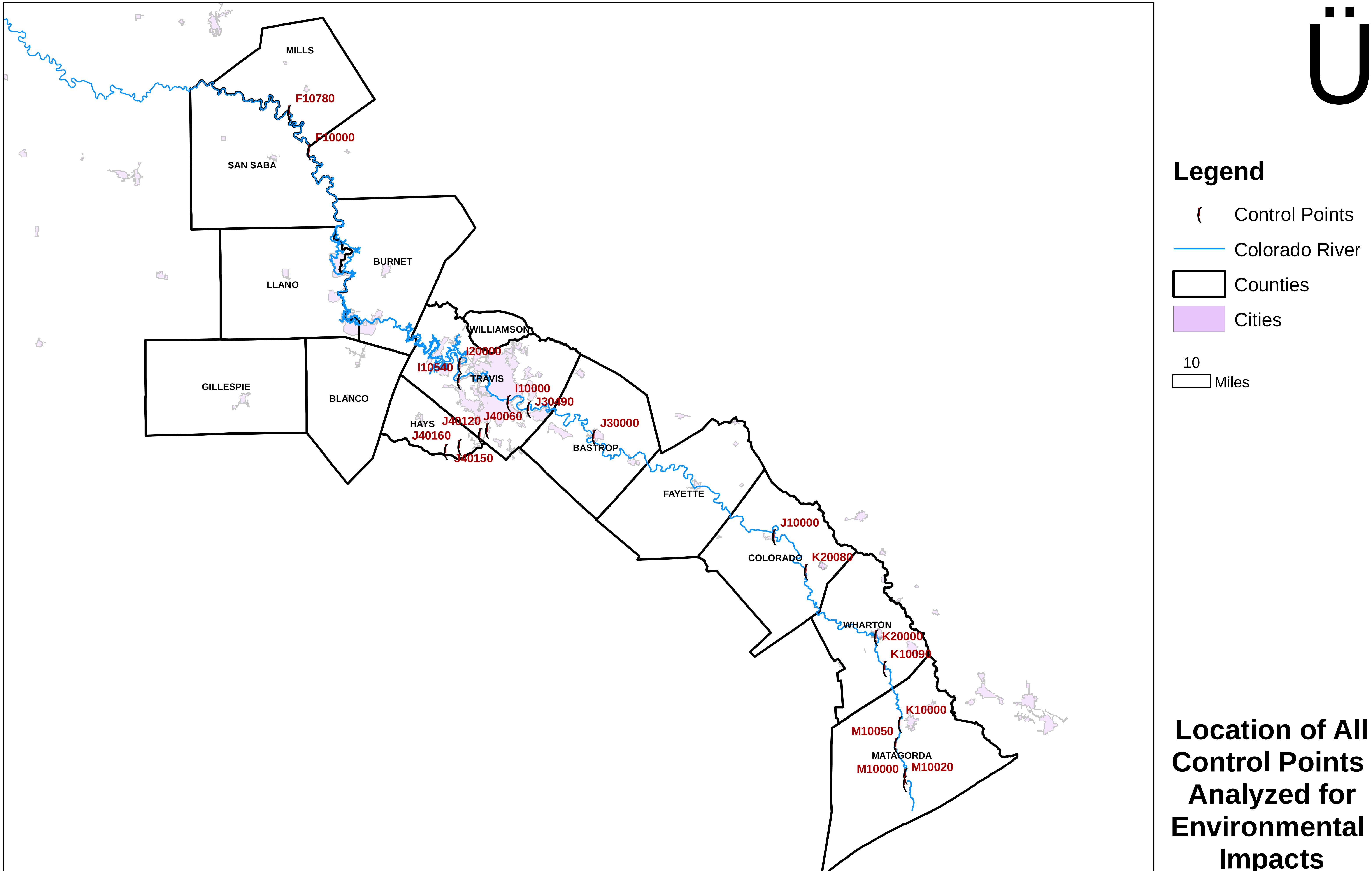
For the Colorado River instream flows comparison, with the strategies, the impacts were nearly all positive, especially in the lower Wharton reach of the river. The Bastrop and Columbus reaches each showed a few months with negative impacts of eight percent or less under Base Flow conditions, but no negative impacts to the Subsisentence Flows.

The transfer of water anticipated under HB 1437 would constitute an inter-basin transfer to the Brazos River Basin. With this distinction comes the potential for environmental impacts from the introduction of invasive species and issues resulting from mixing water supplies from multiple sources. The greatest potential impacts on the Colorado River Basin would result from the reduced streamflow resulting from the transfer. However, LCRA will continue to meet the environmental flow requirements as specified in its WMP.

Overall, based upon the modeling assumptions developed as a part of the First Biennium Studies, the individual water management strategies evaluated appear reasonable and consistent with the long-term protection of the state's water resources, natural resources, and agricultural resources. Likewise, the cumulative impacts of all of these strategies are generally within expected ranges. The LCRWPG will continue to consider all of these strategies in further detail during future regional water planning updates, as well as examine potential alternative strategies for selected areas and for changed conditions.

APPENDIX 7A

ENVIRONMENTAL IMPACTS OF THE COMPREHENSIVE WATER MANAGEMENT STRATEGIES



Location of All Control Points Analyzed for Environmental Impacts

2060 Freshwater Inflows to Matagorda Bay

SPRINGTIME ONSET FLOW CRITERIA MET						
CRITERIA	**TARGET**	**BASE**		**STRATEGY**		**DIFFERENCE**
	(AC-FT)	# OF YEARS	%	# OF YEARS	%	%
MBHE 1	114,000	48	81.4%	50	84.7%	3.4%
MBHE 2	168,700	39	66.1%	42	71.2%	5.1%
MBHE 3	246,200	35	59.3%	35	59.3%	0.0%
MBHE 4	433,200	22	37.3%	20	33.9%	-3.4%

FALL ONSET FLOW CRITERIA MET						
CRITERIA	**TARGET**	**BASE**		**STRATEGY**		**DIFFERENCE**
	(AC-FT)	# OF YEARS	%	# OF YEARS	%	%
MBHE 1	81,000	38	64.4%	47	79.7%	15.3%
MBHE 2	119,900	31	52.5%	34	57.6%	5.1%
MBHE 3	175,000	19	32.2%	21	35.6%	3.4%
MBHE 4	307,800	11	18.6%	11	18.6%	0.0%

INTERVENING SIX MONTHS FLOW CRITERIA MET						
CRITERIA	**TARGET**	**BASE**		**STRATEGY**		**DIFFERENCE**
	(AC-FT)	# OF YEARS	%	# OF YEARS	%	%
MBHE 1	105,000	53	89.8%	58	98.3%	8.5%
MBHE 2	155,400	46	78.0%	50	84.7%	6.8%
MBHE 3	226,800	39	66.1%	41	69.5%	3.4%
MBHE 4	399,000	32	54.2%	30	50.8%	-3.4%

Note: Intervening six months includes June, July, November, December, and the remaining Springtime Onset months that are not used for the 3 consecutive month calculation.

NUMBER OF MONTHS THAT THRESHOLD LEVEL IS MET						
CRITERIA	**TARGET**	**BASE**		**STRATEGY**		**DIFFERENCE**
	(AC-FT/mo)	# OF MONTHS	%	# OF MONTHS	%	%
THRESHOLD	15,000	540	76.3%	610	86.2%	9.9%

2060 Colorado River Instream Flow Analysis

2060 CP K10000 Matagorda Co.

MONTH	SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %
JAN	19,369	86.4%	100.0%	13.6%	30,252	78.0%	91.5%	13.6%	51,527	64.4%	67.8%	3.4%
FEB	16,828	91.5%	100.0%	8.5%	33,156	81.4%	91.5%	10.2%	50,317	67.8%	76.3%	8.5%
MAR	12,543	98.3%	100.0%	1.7%	32,650	89.8%	88.1%	-1.7%	63,701	44.1%	49.2%	5.1%
APR	16,066	86.4%	100.0%	13.6%	33,382	66.1%	71.2%	5.1%	60,159	44.1%	54.2%	10.2%
MAY	18,692	81.4%	93.2%	11.9%	60,565	54.2%	62.7%	8.5%	85,898	47.5%	54.2%	6.8%
JUN	22,076	71.2%	79.7%	8.5%	58,552	47.5%	52.5%	5.1%	89,970	39.0%	42.4%	3.4%
JUL	13,035	52.5%	86.4%	33.9%	35,478	39.0%	42.4%	3.4%	55,708	28.8%	35.6%	6.8%
AUG	6,579	72.9%	100.0%	27.1%	19,307	39.0%	50.8%	11.9%	32,097	27.1%	28.8%	1.7%
SEP	11,187	71.2%	100.0%	28.8%	24,397	61.0%	91.5%	30.5%	36,714	59.3%	78.0%	18.6%
OCT	9,039	89.8%	100.0%	10.2%	22,136	76.3%	94.9%	18.6%	46,054	55.9%	71.2%	15.3%
NOV	10,294	96.6%	100.0%	3.4%	28,919	78.0%	89.8%	11.9%	45,461	64.4%	71.2%	6.8%
DEC	12,420	100.0%	100.0%	0.0%	28,899	83.1%	93.2%	10.2%	45,870	62.7%	72.9%	10.2%

2060 CP K20000 Wharton Co.

MONTH	SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %	FLOW (AC-FT/MO)	BASE % TIME MET	STRATEGY % TIME MET	DIFFERENCE %
JAN	19,369	84.7%	100.0%	15.3%	30,252	78.0%	93.2%	15.3%	51,527	54.2%	59.3%	5.1%
FEB	16,828	89.8%	100.0%	10.2%	33,156	76.3%	91.5%	15.3%	50,317	59.3%	66.1%	6.8%
MAR	12,543	98.3%	100.0%	1.7%	32,650	93.2%	88.1%	-5.1%	63,701	44.1%	49.2%	5.1%
APR	16,066	96.6%	96.6%	0.0%	33,382	71.2%	78.0%	6.8%	60,159	47.5%	54.2%	6.8%
MAY	18,692	93.2%	98.3%	5.1%	60,565	59.3%	71.2%	11.9%	85,898	49.2%	52.5%	3.4%
JUN	22,076	88.1%	88.1%	0.0%	58,552	57.6%	61.0%	3.4%	89,970	40.7%	45.8%	5.1%
JUL	13,035	94.9%	98.3%	3.4%	35,478	40.7%	45.8%	5.1%	55,708	30.5%	35.6%	5.1%
AUG	6,579	96.6%	100.0%	3.4%	19,307	64.4%	84.7%	20.3%	32,097	32.2%	37.3%	5.1%
SEP	11,187	91.5%	100.0%	8.5%	24,397	62.7%	89.8%	27.1%	36,714	57.6%	74.6%	16.9%
OCT	9,039	91.5%	100.0%	8.5%	22,136	76.3%	91.5%	15.3%	46,054	54.2%	64.4%	10.2%
NOV	10,294	96.6%	100.0%	3.4%	28,919	76.3%	89.8%	13.6%	45,461	54.2%	66.1%	11.9%
DEC	12,420	96.6%	100.0%	3.4%	28,899	81.4%	93.2%	11.9%	45,870	59.3%	67.8%	8.5%

2060 Colorado River Instream Flow Analysis

2060 CP J10000 Colorado Co.

MONTH	SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
	FLOW	BASE	STRATEGY	DIFFERENCE	FLOW	BASE	STRATEGY	DIFFERENCE	FLOW	BASE	STRATEGY	DIFFERENCE
	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%
JAN	20,906	81.4%	100.0%	18.6%	29,944	72.9%	88.1%	15.3%	50,912	44.1%	57.6%	13.6%
FEB	20,826	83.1%	100.0%	16.9%	32,767	74.6%	88.1%	13.6%	49,706	54.2%	66.1%	11.9%
MAR	23,058	98.3%	100.0%	1.7%	32,281	88.1%	94.9%	6.8%	62,717	42.4%	42.4%	0.0%
APR	17,792	100.0%	100.0%	0.0%	32,965	76.3%	88.1%	11.9%	58,136	49.2%	54.2%	5.1%
MAY	26,132	100.0%	100.0%	0.0%	59,397	78.0%	88.1%	10.2%	80,918	57.6%	72.9%	15.3%
JUN	31,775	98.3%	100.0%	1.7%	57,540	83.1%	86.4%	3.4%	85,686	57.6%	62.7%	5.1%
JUL	21,029	98.3%	100.0%	1.7%	35,048	91.5%	83.1%	-8.5%	55,031	50.8%	50.8%	0.0%
AUG	11,683	98.3%	100.0%	1.7%	19,061	98.3%	98.3%	0.0%	31,728	83.1%	76.3%	-6.8%
SEP	16,602	98.3%	100.0%	1.7%	24,099	94.9%	94.9%	0.0%	36,298	74.6%	66.1%	-8.5%
OCT	11,683	98.3%	100.0%	1.7%	21,890	76.3%	93.2%	16.9%	45,562	61.0%	59.3%	-1.7%
NOV	12,020	89.8%	100.0%	10.2%	28,562	61.0%	86.4%	25.4%	44,926	47.5%	57.6%	10.2%
DEC	18,508	84.7%	100.0%	15.3%	28,530	76.3%	98.3%	22.0%	45,316	49.2%	61.0%	11.9%

2060 CP J30000 Bastrop Co.

MONTH	SUBSISTENCE FLOWS				BASE FLOWS - DRY CONDITIONS				BASE FLOWS - AVERAGE CONDITIONS			
	FLOW	BASE	STRATEGY	DIFFERENCE	FLOW	BASE	STRATEGY	DIFFERENCE	FLOW	BASE	STRATEGY	DIFFERENCE
	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%	(AC-FT/MO)	% TIME MET	% TIME MET	%
JAN	12,789	84.7%	100.0%	15.3%	19,246	69.5%	89.8%	20.3%	26,624	52.5%	81.4%	28.8%
FEB	15,217	84.7%	100.0%	15.3%	17,605	78.0%	98.3%	20.3%	27,602	62.7%	89.8%	27.1%
MAR	16,848	98.3%	100.0%	1.7%	16,848	98.3%	100.0%	1.7%	30,559	81.4%	89.8%	8.5%
APR	11,127	100.0%	100.0%	0.0%	17,078	100.0%	98.3%	-1.7%	37,785	57.6%	79.7%	22.0%
MAY	16,909	100.0%	100.0%	0.0%	35,601	91.5%	91.5%	0.0%	50,666	81.4%	84.7%	3.4%
JUN	12,020	100.0%	100.0%	0.0%	24,873	100.0%	100.0%	0.0%	43,617	89.8%	89.8%	0.0%
JUL	8,424	100.0%	100.0%	0.0%	21,336	94.9%	94.9%	0.0%	37,507	79.7%	76.3%	-3.4%
AUG	7,563	100.0%	100.0%	0.0%	11,929	98.3%	100.0%	1.7%	23,427	98.3%	96.6%	-1.7%
SEP	7,319	100.0%	100.0%	0.0%	14,043	96.6%	96.6%	0.0%	25,170	81.4%	83.1%	1.7%
OCT	7,809	100.0%	100.0%	0.0%	15,064	89.8%	100.0%	10.2%	26,624	66.1%	88.1%	22.0%
NOV	10,711	89.8%	100.0%	10.2%	16,840	69.5%	98.3%	28.8%	25,230	50.8%	88.1%	37.3%
DEC	11,437	91.5%	100.0%	8.5%	19,123	74.6%	98.3%	23.7%	27,669	52.5%	91.5%	39.0%

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APPENDICES

CHAPTER 8.0: ADDITIONAL RECOMMENDATIONS (INCLUDING UNIQUE ECOLOGICAL STREAM SEGMENTS AND RESERVOIR SITES, LEGISLATIVE ISSUES, AND REGIONAL POLICY ISSUES)

8.1 SUMMARY OF TWDB RULES

8.1.1 Policy Recommendation Rules

Texas Water Development Board (TWDB) rules for SB 1 regional water planning [31 TAC Chapter 357.7(a) (9)] provide that the regional water planning groups (RWPG) may include in their regional water plans:

> …regulatory, administrative, or legislative recommendations the regional water planning group believes are needed and desirable to: facilitate the orderly development, management, and conservation of water resources and preparation for and response to drought conditions in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the state and regional water planning area. The regional water planning group may develop information as to the potential impact once proposed changes in law are enacted.

The 77th Texas Legislature clarified that the designation of unique stream segments (USS) solely means that a state agency or political subdivision of the State may not finance the actual construction of a reservoir in a designated stream segment of unique ecological value. It does not affect the analysis to be made by RWPGs. To recommend all or parts of stream segments of unique ecological value to the Legislature, RWPG is required to develop a recommendation package that includes a physical description of the location, maps, photographs, and site characterization documented by supporting literature and data.

The approved scope-of-work for the development of the SB 1 water plan for the Lower Colorado Region included a subtask to "prepare possible legislative, regulatory, and administrative recommendations." In this regard, the Lower Colorado Regional Water Planning Group (LCRWPG) established a Policy Committee and charged it with the responsibility for coordinating a three-step process to:

1. Identify, define, and screen policy issues
2. Evaluate issues and policy options
3. Develop recommendations for consideration by the LCRWPG

During the current planning cycle, the recommendation process has been applied to the following eleven water policy issue areas:

- Management of surface water resources
- Environmental Flows – instream flows and freshwater inflows to bays and estuaries
- Environmental – sustainable growth, including impacts of growth
- Groundwater
- Protection of agricultural and rural water supplies
- Agricultural water conservation
- Municipal and industrial conservation

- Reuse
- Public involvement
- Education; and
- Brush control

In addition, the LCRWPG has adopted policy recommendations on various issues either by resolution or motion. These recommendations are incorporated into the policy issue briefs or otherwise included below. Finally, the LCRWPG has identified a number of areas in which the regional water planning process might be improved for subsequent regional water plan updates. These recommendations are also presented.

8.1.2 Unique Ecological Stream Segment Recommendation Rules

In accordance with the Texas Administrative Code 31 §357.8, RWPGs:

> …may include in adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the regional water planning area by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment, and a site characterization of the stream segment documented by supporting literature and data.

The following criteria are to be used when identifying a river or stream segment as being of unique ecological value:

- <u>Biological Function:</u> Segments that display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats
- <u>Hydrologic Function:</u> Segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge
- <u>Riparian Conservation Areas:</u> Segments that are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes under a governmentally approved conservation plan
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value:</u> Segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality
- <u>Threatened or Endangered Species/Unique Communities:</u> Sites along segments where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species, and sites along segments that are significant due to the presence of unique, exemplary, or unusually extensive natural communities

If a RWPG decides to recommend a stream segment for designation as ecologically unique, TAC §357.8 (a) directs that the recommendation package be forwarded to the Texas Parks and Wildlife Department (TPWD) for review. The TPWD has 30 days to complete a written evaluation of the recommendation. The adopted regional water plan shall include, if available, TPWD's written evaluation. Based on the regional water plans, the State Water Plan shall identify ecologically unique stream segments that the TWDB recommends for protection under Texas Water Code §16.051. Ultimately, the Legislature has the authority to designate a river or stream segment of unique ecological value. As per TWC §16.051 (f), this designation solely means that a state agency or political subdivision of the state may not finance the actual construction of a reservoir in a specific river or stream segment designated by the legislature as ecologically unique.

8.1.3 Unique Reservoir Site Selection Rules

In accordance with the Texas Administrative Code 31 §357.9, RWPGs:

> …may recommend sites of unique value for construction of reservoirs by including descriptions of the sites, reasons for the unique designation, and expected beneficiaries of the water supply to be developed at the site.

The following criteria are to be used when identifying a site that is unique for reservoir construction:

- The site-specific reservoir development is recommended as a specific water management strategy or in an alternative long-term scenario in an adopted regional water plan
- The location, hydrologic, geologic, topographic, water availability, water quality, environmental, cultural, and current development characteristics, or other pertinent factors make the site uniquely suited for a reservoir development
    - to provide water supply for the current planning period
    - that might reasonably be needed to meet water supply needs beyond the 50-year planning period.

8.2 SUMMARY OF POLICY RECOMMENDATIONS

The following recommendations are offered by the Lower Colorado Regional Water Planning Group (LCRWPG) for consideration by the Texas Legislature, TWDB, TCEQ, other water planning regions and all stakeholders and participants in Texas' regional and state water planning efforts. Each policy includes background information, policy statement(s), and action(s) the LCRWPG recommends.

The LCRWPG utilized a three-year long intensive policy development process in the first planning cycle, and a comprehensive review in each subsequent planning cycle to produce these results. Only policies that have met with the unanimous approval of the LCRWPG's diverse voting membership are recommended by the LCRWPG. These policies have undergone a multi-level development process with extensive peer review.

It is the hope of the many contributors to this process that these recommendations will lead to public policies and processes that improve upon the already impressive methods Texas uses to accomplish water planning.

8.2.1 Management of Surface Water Resources: Inter-Basin Transfers, Model Linking, Conjunctive Use, and Electric Generation Planning

8.2.1.1 Background Information

As water marketing pressures intensify to meet demands in more arid portions of the State, the potential increases for harm to the environment and the economies in areas from which water is extracted.

Proposed inter-basin transfers (IBTs), including the LCRA-SAWS Project, and other water uses external to a basin must be managed carefully relative to impairment of existing water rights, consistency with the public welfare including the need for water, consistency with state and regional water supply planning, and environmental and water quality issues.

Multiple major water right permit applications are currently pending in the Colorado River Basin, which result in competing interests within and external to the basin. For permits related to inter-basin transfers, the inclusion of special provisions to ensure the protection of the economic and public welfare interests in the basin of origin is imperative. Business, industry, agriculture and other economically important water users developed originally as a result of water availability. Without some means of protecting these users, water transfers could leave them priced out of the market, adversely affecting the economy of the entire region in order to benefit another area of the State.

Some identified strategies for dealing with water supply shortages may impact sustainability of groundwater, when development of surface water supplies could be utilized instead. This approach could result in long-term adverse consequences for the region.

Subsequent to the completion of the first planning cycle, LCRA and SAWS entered into a long-term water supply contract, which includes a potential inter-basin transfer (IBT) of up to 150,000 ac-ft/yr of water from the Colorado River Basin. A feasibility study is underway to determine whether the long-term water needs of the Lower Colorado Regional Water Planning Area can be met by water conservation and development strategies in the Lower Colorado River Basin. This study is funded by entities in the South Central Texas Regional Water Planning Group (SCTRWPG) in exchange for the IBT of water to the South Central Region consistent with the restrictions imposed by HB 1629 (2001).

Water is also an essential component in electricity production. Most electric generation facilities conjunctively use both surface and groundwater to generate electricity. The availability of these resources should be considered when locating and developing new electric generating facilities.

8.2.1.2 Policy Statements

8.2.1.2.1 Inter-Basin Transfers

It is essential that current water supplies for agricultural, industrial, municipal, and environmental uses be protected and preserved even in the midst of developing new supplies for growing industries and populations in urban areas. Inter-basin transfers (IBTs) should follow principles established by LCRWPG in the first planning cycle, and revised in each subsequent planning cycle, for transporting water outside of the region:

The LCRWPG has adopted a resolution (*Appendix 8A*) supporting the following nine-point policy that identifies the conceptual elements and guidelines for transporting water outside of the Lower Colorado River Basin:

1. A cooperative regional water solution shall benefit each region.
2. Lower Colorado Regional Water Planning Area's (LCRWPA) water shortages shall be substantially reduced if there is an exchange for an equitable contribution from LCRWPA to meet the municipal water shortages in the South Central Texas Region (or similar transfers to other regions of the State).
3. Proposed actions for inter-regional water transfers shall have minimal detrimental water quality, environmental, social, economic, and cultural impacts.
4. Regional water plans with exports of significant water resources shall provide for the improvement of lake recreation and tourism in the Colorado River Basin over what would occur without water exports.
5. Each region shall determine its own water management strategies to meet internal water shortages when those strategies involve internal water supplies and/or water demand management.
6. Cooperative regional solutions shall include consideration of alternatives to resolve conflicts over groundwater availability.
7. Any water export from the Colorado River would not be guaranteed on a permanent basis.
8. Any water export from the Colorado River shall make maximum use of flood or excess inflows below Austin, but only after in-basin demands are met in the lower basin. Provisions and supporting technical reviews included in a draft permit to support this principle shall be reviewed by the Regional Water Planning Group to assure consistency with the planning process.
9. Any water export from the Colorado River shall comply with the LCRA's inter-basin water transfer policy.

These nine elements are fundamental considerations for any out-of-basin transfers. This policy specifically addresses potential transfers to the SCTRWPG, but would be similarly applied to any request made for a transfer to any other region of the State.

8.2.1.2.2 Linking Groundwater and Surface Water Models (Also See Groundwater)

Future groundwater and surface water modeling development by the state's water permitting and planning agencies should include the ability to link such models to better integrate the effects of changes in the uses or availability of either groundwater or surface water on each other in varying conditions such as flood or drought. Such linking of models may be more appropriate for specific areas where groundwater and surface water closely relate and interact, such as concentrations of base-flow springs or stream-based recharge. Develop the methodology to utilize available empirical data from public and private sectors to calibrate both groundwater and surface water models.

8.2.1.2.3 Conjunctive Use of Groundwater and Surface Water (Also See Groundwater)

Surface water resources should be managed to minimize the need for pumping of groundwater, if such pumping results in degradation of the aquifer capacity or quality. Aquifers should be managed for sustainability when surface water is available. Strategies which increase surface water availability to offset shortages in a region should receive higher priority than strategies which reduce the long-term sustainability of groundwater. The use of multiple sources of water that are available to meet local and/or regional needs is supported by LCRWPG.

LCRWPG further supports conjunctive use within LCRWPG to promote long-term sustainability and to meet the identified needs of the regional water plan. Conjunctive use of water is defined as the use of multiple sources of water that are available to meet local and/or regional needs.

8.2.1.2.4 Use of Water for Electrical Generation

Surface and groundwater should be managed to optimize use of water for electrical generation while balancing other water needs in the region. New generation facilities should provide reasonable assurance that surface and groundwater are available, can be developed, or can be obtained during the facility planning and permitting process.

8.2.1.3 Actions Needed

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Maintain and strengthen water policies designed to protect basins of origin in the event of inter-basin transfers. These policies should consider the nine points presented above.
2. Support State funding for linking groundwater and surface water models by the TWDB during the development of the next generation of Groundwater Availability Models/Water Availability Models (GAMs/WAMs) with a priority for specific areas where groundwater and surface water closely relate and interact, such as concentrations of base-flow springs or stream-based recharge. Encourage the validation and calibration of models with data and technical reviews available from the public and private sectors.
3. Strengthen water policies to encourage and prioritize strategies which increase surface water availability to offset shortages in a region in lieu of strategies which could negatively impact the sustainability of groundwater.
4. Continue to recognize the relationship between water supply and electric generation and establish measures to ensure that future electric generation facilities; 1) utilize the most efficient technologies and practices to conserve water supplies; and 2) can develop or obtain sufficient amounts of water for use in operation of new electric generating facilities.

Texas Commission on Environmental Quality (TCEQ) – The LCRWPG encourages TCEQ to:

1. Include provisions in water right permits related to inter-basin transfers that protect the basin of origin. Obtain concurrence that draft permits are consistent with the regional water planning process.
2. Provide the Regional Water Planning Groups with technical review summaries including WAM runs for pending permits affecting the region to ensure consistency with the regional planning process.

Lower Colorado River Authority – Diligently complete the LCRA-SAWS Study and Implementation Plans in such a way as to demonstrate the degree to which each of the points in the LCRWPG's nine-point guidelines for transporting water out of the basin are met.

8.2.2 Environmental Flows – Instream Flows and Freshwater Inflows to Bays and Estuaries

8.2.2.1 Background Information

Texas' myriad of fish and wildlife resources and outdoor recreational opportunities deserve preservation and, in some cases, restoration. Fortunately, a large percentage of surface water rights in Texas are currently underutilized, thereby resulting in sufficient natural flows to provide for critical environmental needs during drought conditions. However, increasing utilization of existing water rights coupled with new water rights potentially threaten the availability of these critical environmental flows.

Total authorizations for consumptive use are approximately 22 million acre-feet of water per year and the vast majority of those authorizations were issued prior to 1985 without conditions to protect environmental flows. The total amount of surface water available on a reliable basis during drought conditions is estimated at 13.3 million acre-feet per year (Vol. 2, *2007 State Water Plan*, p. 138). As of 2003, surface water use was estimated at slightly more than 6 million acre-feet per year (Vol. 2, *2007 State Water Plan*, p. 138).

8.2.2.2 Policy Statement

The LCRWPG supports the protection of instream flows and bay and estuary inflows at levels sufficient to protect native species throughout extended periods of drought at population levels that would enable the species to fully recover upon the return of normal weather conditions. During normal weather conditions, target flows sufficient to ensure a healthy habitat for fish and wildlife should be assured. This requires addressing the specific water quality, flow rates and timing that are required to sustain a healthy and productive riparian and estuarine ecosystem as well as the physical form of the river such as deep pools, riffles, bluffs, terraces, and its vegetation, springs, and tributaries.

The LCRWPG recommends that the Legislature accomplish environmental flow protection through the surface water permitting process by:

1. In areas where permitting additional quantities of water could threaten the adequacy of environmental flows, permits for additional quantities of water should include environmental flow conditions and mitigation plans consistent with the environmental flow standards that are adopted by TCEQ. Prior to adoption of environmental flow standards, new permits for additional quantities of water should include environmental flow conditions and mitigation plans that assure the maintenance of ecological productivity on a long-term basis, to the extent reasonably practicable after considering the factors identified in Texas Water Code 11.147. In addition, the state should aggressively seek the conversion of existing water rights to environmental uses through programs such as the voluntary sale or lease of under-utilized water rights back to the state as a means of regaining adequate flow conditions. These water rights should then be set aside to provide for environmental flow protection.

2. Where unpermitted surface water is available, the state should set aside quantities sufficient to assure needed environmental flows and include provisions in all new permits that would further protect these flows, consistent with the environmental flow standards adopted by TCEQ.

It is critical that the issue of environmental flow protection be addressed in a responsible, comprehensive way as expediently as possible. Where sufficient scientific data are unavailable to make adequately informed judgments, interim data should be extrapolated from similar watersheds and appropriate studies undertaken to gain adequate site-specific data. Lack of data should not lead to the over-appropriation of rivers and streams.

8.2.2.3 Actions Needed

Texas Legislature – Monitor the Environmental Flows Allocation Process set up by the 80th Texas Legislature through Senate Bill 3. Monitor and provide adequate funding for environmental flows.

Colorado and Lavaca Basin and Bays Stakeholder Group – Consider the above recommendations when developing final recommendations to TCEQ.

TCEQ – Consider the above recommendations during the SB3 environmental flows rulemaking process.

8.2.2.4 Timing and/or Conflicts

The SB3 process has been set in motion for the Lavaca and Colorado basin and bays and the resulting TCEQ rulemaking should begin sometime in 2011.

8.2.3 Environmental – Sustainable Growth, Including Impacts of Growth

8.2.3.1 Background Information

Sacrifices and trade-offs are often seen as necessary to meet a greater common good, and this seems particularly true of water planning. With finite water resources available, such sacrifices are inevitable. Water planning in this state has always assumed that certain demands can and should be met.

The State of Texas has yet to take a comprehensive look at whether meeting predicted water demands would simply and inevitably generate even higher demands in the future. Will these current planning efforts embrace water supply strategies that cannot be sustained? How many sacrifices should be made to support unsustainable growth in a particular region or to provide for unsustainable growth in another region? If aquifers are mined and the viability of the region’s ecosystems are reduced to minimal survival levels, how can assurance be given that the next step will not be destruction of those ecosystems in order to simply support a little more growth?

Business, industry, agriculture, and other economically important water users developed originally as a result of water availability and its likely sustainability. Without some means of protecting these users, water transfers could leave them priced out of the market, adversely affecting the economy of the entire region in order to benefit another area of the State.

8.2.3.2 Policy Statement

The LCRWPG recognizes the complexities and the seemingly insurmountable political obstacles that prevent the adoption of growth management plans. Therefore, it is the LCRWPG’s recommendation that the issue of sustainable growth be addressed primarily through educational efforts. The LCRWPG strongly supports the proposed state-wide Water IQ public education campaign and encourages that this campaign be saturated with information regarding the finite nature of water resources and the inescapable trade-offs that inevitably must occur when water use in a given geographic area or economic sector increases. Care must be taken in such a program to highlight the need for a balance to be sought among competing water uses that would ensure the maintenance of:

- Healthy riparian, riverine, estuarine, and hardwood bottomland ecosystems
- Historic cultural resources
- Regional economic opportunities
- Agricultural development
- Preservation of rural communities

8.2.3.3 Actions Needed

Texas Legislature – The LCRWPG encourages the Legislature to fully fund the Water IQ public education program directing its administering staff to include educational efforts regarding sustainability as presented in the above policy statement.

8.2.3.4 Timing and/or Conflicts

This is for immediate action by the Texas Legislature.

8.2.4 Groundwater

8.2.4.1 Background Information

Groundwater resources vary greatly across the state and regions, both in quantity and quality. The difficulties and problems inherent in managing these diverse resources have been delegated by the State of Texas to locally organized Groundwater Conservation Districts (GCDs). These local governmental entities are responsible for management, conservation, preservation, protection, and enhancement of groundwater resources in their individual jurisdictions. GCDs vary from small, one or two person offices in single county districts to larger agencies covering multiple counties and employing a staff of twenty or more.

GCDs have been an integral part of the regional planning process and have provided valuable input on local aquifer characteristics, usage, and availability. This input has resulted in a clearer picture of the importance of groundwater in the State's future.

Groundwater is a major source of water in large portions of Texas. Planning efforts must ensure that this water supply will remain a long-term, viable option for consumption by local residents, agriculture, commercial, and other users. Parts of Texas where demand for water exceeds, or is expected to exceed, its local supply, are increasingly looking to strategies that include importing water from less populated areas.

While local growth may result in site-specific water quantity or quality concerns, such growth is generally not of any major consequence. Private business ventures have begun buying and leasing groundwater resources in areas of plenty as well as in areas where availability may be questionable. Such ventures have sought to market the resource in urban and suburban areas where demand is high. Such proposals have been very controversial and have underscored the need for more inclusive and coordinated planning efforts on the State, regional, and local levels in order to avoid long-term adverse consequences at either end of the supply line.

In HB 1763 (2005) the Legislature set forth a vehicle for accomplishing aquifer-wide management of the resource through Groundwater Management Area (GMA) adoption of Desired Future Conditions (DFCs) for each aquifer and portion of an aquifer underlying the GMA. These DFCs are to be provided to the TWDB by September 1, 2010 and every five years thereafter. The TWDB then is to use the DFCs to provide the GCDs within the GMA with the managed available groundwater (MAG) for each aquifer or portion of an aquifer underlying the GMA. This process is currently underway and in most cases will be completed too late for the availability numbers to be utilized in the current round of regional planning. Region K has reviewed a variety of groundwater policy issues. Some have been incorporated into other sections of this policy document. Seven issues and corresponding policy statements are discussed below.

8.2.4.2 Policy Statements

8.2.4.2.1 The Rule of Capture

Texas groundwater law is based on the Rule of Capture. The Rule of Capture allows the owner of the overlying property to pump or capture any amount he can put to beneficial use. GCDs may modify the Rule of Capture by means of rule-making authority described in Texas Water Code Chapter 36. Region K policy is to continue its support of GCDs and their ability to modify the Rule of Capture when and where appropriate.

Region K supports the continued use of the Rule of Capture in areas where no GCD has been established.

8.2.4.2.2 Groundwater Ownership in Place Not a Vested Property Right

There are current attempts by various groups seeking to achieve legal recognition of groundwater ownership in place as a vested right of the surface property owner. It is Region K's position that the success of such attempts could greatly hamper GCDs reasonable attempts to regulate the resource for sustainability.

8.2.4.2.3 Groundwater Management by GCDs

Region K supports local management of groundwater by GCDs as well as aquifer-wide cooperation between GCDs within GMAs. GCDs, be they partial, single, or multi-county, have been managing and regulating groundwater since the early 1950's and should be maintained as the State's preferred method of groundwater management and regulation.

For areas absent a GCD, Region K supports the creation of a GCD, partial, single, or multi-county, whichever is determined locally to be reasonable, practical, effective, and achievable. New GCDs should continue to be delineated, established, and confirmed by local confirmation elections.

Region K notes that GCDs are local governments that are confirmed by local elections, and it is Region Ks policy that any attempts or proposals of dissolution, annexation, consolidation, or other reorganization of GCDs must be referred to the local election process for validation or rejection.

8.2.4.2.4 DFCs and MAGs

Region K supports GMA-wide cooperation in management of groundwater resources, while also recommending certain improvements to the process provided by HB 1763 of the 79th Legislature. Region K recommends that GCDs be required to manage the resource as necessary for meeting the DFCs set forth in their management plans and ratified through the GMA MAG process rather than using the MAG as an absolute cap on groundwater permitting. Current statutory language appears to require GCDs to only issue permits up to the MAG amount. It is Region K's position that the MAG should be used only as a guide to inform such management by the GCD, while aquifer monitoring and the actual condition of the aquifer should be utilized as the true measure of the effectiveness of a GCD's management policies in meeting DFCs.

Region K supports the use of GMA-wide average DFCs in conjunction with GMA-established pumping patterns as a means of expediting the establishment of MAG numbers. However Region K also understands that an aquifer can vary within a GMA and may require different DFCs to effectively manage the aquifer.

8.2.4.2.5 Sustainability

Region K supports a sustainable approach to groundwater management in areas where such an approach is reasonably achievable. Sustainability is defined as balancing groundwater withdrawals with natural recharge and replenishment to maintain long-term stability in regional or local groundwater supplies. It is Region K policy to look to GCDs within a given GMA to cooperate in determining the degree to which sustainability can be achieved.

8.2.4.2.6 Water Marketing (e.g. Water Rights Leases, Sales, Transfers)

Region K policy is to establish coordination between water marketing proposals with local GCDs and RWPGs and to require that state agencies and private interests comply with all local GCD rules, state-certified groundwater management plans, and state and regional water plans.

8.2.4.2.7 Improving Groundwater Availability Data

Region K policy is to encourage new funding sources for GCDs specific to data collection and storage methods that emphasize ease of public accessibility. Region K policy is to support the funding needs of the TWDB for the maintenance and expansion of state-wide groundwater databases.

8.2.4.3 Actions Needed

Texas Legislature – The LCRWPG encourages the Texas Legislature to:

1. Sufficiently fund TWDB programs specifically related to groundwater conservation, protection, enhancement, groundwater availability modeling (including development/ review/ updating/ recalibration), and database management and accessibility; and
2. Make changes to Chapter 36 of the Water Code as necessary to provide that GCDs have the option to either manage and monitor the groundwater resources under their jurisdiction as necessary to achieve GMA-approved desired future conditions, or use the TWDB-provided managed available groundwater amounts to restrict permitting.

Texas Water Development Board – The LCRWPG encourages TWDB to:

1. Seek adequate funding for groundwater related programs and GAM needs; and
2. Continue assisting GCDs in their management planning, groundwater quantity and quality research, water conservation programs, and inter-agency cooperative database management efforts (such as the Texas Water Information Network).

Groundwater Conservation Districts – The LCRWPG encourages GCDs to:

1. Work cooperatively with GMA and regional planning efforts; and
2. Continue to expand or develop groundwater research and database efforts in order to be the primary resource for groundwater data in their jurisdiction.

8.2.4.4 Timing and/or Conflicts

The 82nd Session of the Texas Legislature will occur in 2011 and will be setting the budget for the following biennium which will have direct impacts on funding programs needed by the TWDB, GCDs, and RWPGs.

The GMA MAG process will have run its initial course, and the process would therefore be ripe for making the Region K- suggested legislative change to Chapter 36 of the Water Code to require GCDs to monitor and manage for achieving DFCs as a logical next step in that process while using the MAGs as beginning points rather than as groundwater development caps.

8.2.5 Protection of Agricultural and Rural Water Supplies

8.2.5.1 Background Information

The potential for harm to rural economies and rural culture grows along with the growing development of water marketing and the planned transfers of water from rural areas to urban population centers. As former Texas Agriculture Commissioner Susan Combs once said, "We can't afford to dewater or leave behind rural Texas."

Those who would oversimplify solutions to the State's water woes would have the citizenry believe that water marketing is the solution. Water marketing facilitates the movement of water based on the ability to pay. Unfettered water marketing would result in those segments of our culture and our economy least able to pay being left behind.

In the case of agriculture, irrigators are often third party users of water rights that are subject to being bought and sold by an entity beyond their control. If availability of water to these users is not protected by some means, the resource will go to a higher bidder and agriculture may cease to exist in these areas.

Rural communities find themselves in similar situations where both groundwater aquifers over which they lie and surface waters that flow in nearby streams are threatened by water transfers to entities with the financial and political backing sufficient to make them happen.

Without some means of protecting rural and agricultural water uses, water transfers could leave these users priced out of the market. There has already been a move by some regions to leave future needs for agriculture partially unmet and to recommend water transfers from rural Texas with no plan for mitigating adverse consequences. Since agriculture and rural Texas cannot afford water at the prices that cities and industry will pay, some vehicle must be established to provide parity in water markets for these users.

8.2.5.2 Policy Statement

It is essential that current water supplies for agriculture and rural communities be protected and preserved to some reasonable extent even in the midst of developing new supplies for growing industries and populations in urban areas. Care must be taken that water transfers of either surface or groundwater be undertaken only after sufficient study and care have been utilized in protecting and preserving any local rural supplies that could be adversely affected. Care must be taken to sustain present and future income, employment, and population growth potential for all water donor areas. The LCRWPG is concerned that unfettered market-driven water transfers could have dire, long-term consequences for unprotected donor areas.

8.2.5.3 Actions Needed

Texas Legislature – The LCRWPG encourages the Legislature to:

1. Strengthen GCDs' abilities to protect and preserve groundwater supplies for both present and future uses local to their districts.

2. Develop water policy that enables agriculture and rural Texas to achieve parity with other water users in the water market and water planning arenas.

3. Maintain and strengthen water policies designed to protect basins of origin in the event of inter-basin transfers.

4. Require that the TCEQ provide pertinent technical reviews and draft surface water permits to impacted regional water planning groups for confirmation of consistency with regional water plans.

Texas Commission on Environmental Quality – The LCRWPG encourages the TCEQ to provide pertinent technical reviews and draft surface water permits to impacted regional water planning groups for confirmation of consistency with regional water plans.

8.2.5.4 Timing and/or Conflicts

These recommendations should be implemented during the 82nd Legislative session.

8.2.6 Agricultural Water Conservation

8.2.6.1 Background Information

With finite water resources available to a growing Texas populace, it is necessary that all possible means of stretching those finite resources be explored and implemented. Agriculture, being the single largest water user group, represents the area where conservation may offer the most hope for freeing up substantial water supplies.

The economy of irrigated agriculture seldom is such that it would allow producers to invest in major water conservation measures. The Natural Resources Conservation Service (NRCS) of the United States

Department of Agriculture administers a number of conservation programs that could be utilized and further optimized to enhance the likelihood of irrigators implementing water conserving practices.

The NRCS Environmental Quality Incentives Program (EQIP) is the NRCS' most likely platform for encouraging water conservation. Water quantity is a national priority of EQIP. The Texas State Conservationist, Dr. Larry Butler and the Texas State Technical Committee have also recognized the high priority that water conservation deserves in the allocation of Texas' share of EQIP funding. However, EQIP funding is continually subject to Congressional appropriations that determine the program's viability on an annual basis. In addition, the cost sharing incentives are generally limited to 50 percent of total project costs, still falling short of what would be required to assure widespread implementation of some of the more costly, more effective water conservation practices.

The LCRA-SAWS Water Project (LSWP) offers a responsible template for attaining agricultural water conservation while using conserved water to meet growing metropolitan demands. The plan calls for major agricultural water conservation practices to be funded by metropolitan users in exchange for metropolitan users reaping the benefit of a portion of the conserved water.

8.2.6.2 Policy Statement

The LCRWPG encourages agricultural water conservation as a method of stretching existing supplies by reducing agricultural demands in order to increase water availability to meet new and existing water demands. The LCRWPG further recognizes the need for public and private partnerships with irrigators to fund existing, proven water conservation technology and to develop new, innovative water conservation technology.

8.2.6.3 Actions Needed

United States Congress – The LCRWPG encourages that Congress sufficiently fund NRCS programs aimed at implementing known water conservation technology and at developing promising, new technology for water conservation.

Texas Water Development Board – The LCRWPG encourages TWDB to aid the NRCS State Conservationist in targeting water conservation program funding to projects that offer the most water conservation benefit for the state. The TWDB should also offer expert testimony to the Agriculture Committees of both the Senate and the House regarding the need and effectiveness of water conservation accomplished through EQIP in order to highlight the ongoing need for adequate EQIP funding.

Regional Planning Groups – The LCRWPG encourages all planning groups to adopt water plans that capitalize on the potential for partnering between water user groups to accomplish much needed water conservation in ways that share both the burdens and the benefits between water user groups.

8.2.6.4 Timing and/or Conflicts

Creative funding and implementation of water conservation is an ongoing responsibility for all water users groups and their constituents.

8.2.7 Municipal/ Industrial Conservation

8.2.7.1 Consistent GPCD Methodology

8.2.7.1.1 Background Information

In its December 2008 report to the 81st Texas Legislature, the TWCAC cautioned:

"The tendency of the media or individuals to use gallons per capita per day as a way to compare conservation efforts of communities is also problematic when the metric is not uniformly defined. Therefore, the Council has determined that it should be a priority to develop standard methodologies for water use metrics and water conservation metrics and definitions."

While GPCD can be a good measure for internal year-to-year comparisons within one water system, there is no standard accepted methodology for calculating GPCD by Texas water providers. The TWCAC has a working group to make recommendations for standardizing GPCD reporting, including reporting in more detailed categories such as residential GPCD, agricultural and industrial water use, as well as recommendations for calculating population.

8.2.7.1.2 Policy Statement

The LCRWPG supports the development of a consistent methodology for calculating gallons per capita per day (GPCD), by the Texas Water Conservation Advisory Council (TWCAC).

8.2.7.1.3 Actions Needed

Texas Legislature and TWDB – The LCRWPG encourages the continued support for efforts by the TWCAC to develop consistent methodology for calculating GPCD or any other measurement that can successfully track water use and water savings over time.

8.2.7.2 Consistent Water Savings Metrics

8.2.7.2.1 Background Information

The 2004 TWDB Report 362, Water Conservation Best Management Practices Guide evaluated and recommended water use efficiency measures and provided guidance on how to determine water savings. Measures ranged from toilet and washing machine incentives to water loss reduction programs. Additional conservation strategies such as irrigation standard requirements, mandatory watering schedules, soil depth requirements, irrigation efficiency upgrades and other strategies have not been studied extensively to evaluate effective water savings.

8.2.7.2.2 Policy Statement

The LCRWPG supports the development of consistent metrics to assess the amount of water saved per conservation measure or technique in order to track the success of conservation strategies.

8.2.7.2.3 Actions Needed

Texas Legislature and TWDB – The LCRWPG encourages the funding of research efforts to determine water savings and incorporate the information into an update of the 2004 Best Management Practices guide. This information should be aimed at providing water suppliers with useful information for developing and implementing conservation goals and successful management strategies.

8.2.7.3 Additional Financial Assistance to Reduce Water Loss

8.2.7.3.1 Background Information

The 78th Texas Legislature passed House Bill 3338, which required public utilities to perform and file with the TWDB a water audit computing the utility's most recent annual system water loss every 5 years. Approximately half of retail utilities in Texas, representing over 80% of the population, reported water loss data to the TWDB in 1986. These reporting utilities reported total water loss of 212,221 to 464,219 acre-feet per year, or 5.6 to 12.3% of all water used by these utilities. Based on the 2004 statewide average municipal use of 150 gallons per capita per day, equivalent water volumes could supply between 1.3 and 2.7 million Texans. When extrapolated to all retail public utilities in Texas, the statewide value of total water loss is estimated to be between $152 million and $513 million per year. (Source: TWDB. 2007. Analysis of Water Loss).

Decreasing utility system water loss can be expensive, and many utilities do not have the revenues available to embark on large pipe or meter replacement projects. The TWDB does offer some limited financial assistance to help utilities decrease water loss, but much more is needed.

8.2.7.3.2 Policy Statement

The LCRWPG supports the continuation and expansion of TWDB funding for retail utility water loss projects.

8.2.7.3.3 Actions Needed

Texas Legislature and TWDB - should provide additional funding in the form of low-interest loans and grants to assist water providers in reducing system water loss. The additional resources would be used to replace aging or deteriorated pipe, to replace inaccurate or incorrectly sized water meters, to enhance leak detection efforts, or to implement a pressure reduction strategy if warranted.

8.2.7.4 Conservation Coordinators

8.2.7.4.1 Background Information

The conservation plans required of water suppliers by the state of Texas often do little more than collect dust due largely to the lack of responsibility for implementation. With the current state water plan depending so heavily on conservation to meet future water needs, it is essential that water conservation plans result in real water conservation. To that end requiring a designated water conservation coordinator would increase accountability for the implementation of water conservation measures and the tracking of water savings.

8.2.7.4.2 Policy Statement

The LCRWPG supports the required use of a conservation coordinator by all public water suppliers with the responsibility for the implementation and monitoring of the conservation plan, tracking and reporting water savings to the state, and recommending further improvements to the plan. Responsibility could be assigned to a newly created position for this purpose, an existing position or employee of the water provider, or a shared water conservation coordinator contracted through several small water providers.

8.2.7.4.3 Actions Needed

TCEQ - The LCRWPG encourages the TCEQ to amend Title 30, Texas Administrative Code (TAC) Chapter 288, so that all public water suppliers required to have a conservation plan also be required to have a designated water conservation coordinator with the duties before mentioned.

8.2.7.5 Conservation Messaging Coordination

8.2.7.5.1 Background Information

Water suppliers may be reluctant individually to take on the burden of conservation messaging efforts. Coordination and pooling of resources for the purpose of developing public awareness messages with a regional emphasis, particularly for communities reliant on the same water supply source, would help water providers reach a greater audience while resulting in less confusion for the end-user. Such coordination and pooling would enable small to medium sized water suppliers to participate in efforts that would otherwise not take place.

8.2.7.5.2 Policy Statement

The LCRWPG supports the regional coordination and pooling of resources for uniform conservation messaging.

8.2.7.5.3 Actions Needed

TWDB – The LCRWPG encourages the TWDB to aid communities in adjacent media areas to coordinate their messaging for clarity and ease of understanding by customers.

8.2.7.6 Property Owners' Associations' Outdoor Water Use Policies

8.2.7.6.1 Background Information

House Bill 645 allows property owners' associations to restrict the type of turf used by a property owner to require water-conserving varieties. The bill also restricts property owners' associations from regulating rainwater harvesting devices and prohibits the regulation of efficient irrigation system installation. While these policies are beneficial, additional legislation could be developed that would limit the ability of property owners' associations to restrict water saving landscape and irrigation practices while also providing associations additional tools to further adoption of conservation practices by association members.

8.2.7.6.2 Policy Statement

The LCRWPG encourages the legal enablement of property owners' associations to promote or require the use of drought tolerant plants and turf grasses and to adopt restrictive covenants that are consistent with their water providers' drought restrictions and conservation recommendations.

8.2.7.6.3 Actions Needed

Texas Legislature – The LCRWPG encourages the Legislature to adopt the necessary measures to:

enable property owners' associations to promote or require the use of drought tolerant plants and turf grasses and to adopt restrictive covenants that are consistent with their water providers' drought restrictions and conservation recommendations and

prevent property owners' associations from requiring irrigation systems, minimum turf areas and other landscaping requirements that impede low-water use landscaping practices.

8.2.7.7 Dedicated Conservation Funding

8.2.7.7.1 Background Information

Water conservation programs offered by water providers are typically funded on an annual basis from revenues received from water use. Unfortunately, the funding can vary yearly because water use is impacted by the volatility of the weather from year-to-year. In particular, some providers have historically cut program funding during non-drought years, assuming that conservation is only needed for droughts. However, if conservation is to provide a significant new source of water supply for Texas in the future, a reliable fund must be available to sustain and grow conservation programs.

Having a dedicated conservation fund would help water providers plan for multi-year conservation programs and pursue research opportunities to help further water conservation efforts. Dedicated financial support for conservation could be achieved by assessing a meter or account conservation fee, or through a set-aside of a certain percentage of the annual revenues, as seen with a number of water providers throughout Texas.

8.2.7.7.2 Policy Statement

LCRWPG supports water providers having the ability to have a dedicated yearly funding source for water conservation programs and projects.

8.2.7.7.3 Actions Needed

Encourage the state to adopt legislation that would allow water providers to have a dedicated funding source for water conservation that is in place for multiple years.

8.2.8 Reuse (including basin-specific assessment of reuse potential and impacts)

8.2.8.1 Background Information

Water reuse typically can be divided into two types, direct and indirect. Direct reuse is when reclaimed water or treated effluent is pumped directly from a wastewater treatment plant to a place of use. The TCEQ administers water quality requirements for direct reuse through its Chapter 210 rules. Indirect reuse is a method by which discharged effluent is conveyed to a downstream point of use via the bed and banks of a watercourse.

Under most surface water rights, the full amount of water may be used and reused for the purposes and location of use provided for in the underlying water right without additional authorization. However, once this water is discharged to a stream, it becomes waters of the state, available for appropriation by others. Specific authorization for indirect reuse must be obtained to convey discharged effluent for reuse at a downstream point of use.

In addition to the traditional protections against carriage losses, indirect reuse authorizations are subject to special conditions to protect downstream water rights that may have been granted in reliance on the flows remaining in the watercourse or to protect the environment.

Water reuse is an important water management strategy. There is considerable debate and disagreement, however, over which entities should have the right to reuse water and to what extent.

A TCEQ staff memorandum to the Commission, dated February 25, 2005, summarizes the status of these reuse issues as follows:

> "As municipalities have increasingly looked to their effluent as an additional water resource, the Commission and the Legislature have endeavored to specify and interpret the law related to reuse. Challenges arise, in part, because in the past the Commission has issued some permits based on the existence of return flows being in the river. In the adjudication process, some claims were established based on return flows being in the stream. Also in the past, some bed and banks authorizations (to allow use of the river to transport water for reuse) were issued with a priority date and some were not.
>
> In 1997, the Legislature enacted Senate Bill 1, which amended Section 11.042 and Section 11.046 of the Texas Water Code. These amendments resolved some issues, such as providing for the Commission to protect existing water rights and the environment in permitting reuse. However, not all issues were resolved. Since the passage of SB 1, new issues have developed related to how the Commission should permit the use of a watercourse to transport water for reuse.
>
> A major issue is the conflict between Tex. Water Code §§ 11.042 and 11.046. Section 11.046(c) states that once surface water diverted under a permit is returned to the stream, absent any provisions in a water right to the contrary, it becomes state water again subject to appropriation by others. However, Section 11.042(b) and (c), allow the owner of the groundwater-based return flows, or the water right holder or discharger of surface-water-based return flows, to obtain a bed and banks permit to transport this water to a place of reuse.

Thus conflicts between appropriators and those who wish to indirectly reuse effluent are inevitable."

8.2.8.2 Policy Statement

LCRWPG supports reuse as a water management strategy, in accordance with State Law and SB 1. The Group recognizes that there are potentially complex issues associated with reuse. Therefore, LCRWPG will continue to examine reuse as a water management strategy in an effort to better understand potential long-term impacts. LCRWPG will continue to monitor legislative developments regarding reuse, and will incorporate those developments into its deliberations and planning.

8.2.8.3 Actions Needed

Texas Commission on Environmental Quality – LCRWPG encourages TCEQ to continue its thorough review and approval processes for indirect reuse applications. It is through this application process that potential impacts, including environmental and water rights impacts, should be addressed.

8.2.8.4 Timing and/or Conflicts

Consideration of reuse should be an integral part of the ongoing regional water planning process.

8.2.9 Brush Control

The LCRWPG adopted the following motion regarding the potential water supply benefits of brush management for the purpose of enhancing water supplies:

> The LCRWPG recommends and endorses ***studies of brush control projects on a voluntary basis for the Lower Colorado Region, especially west of Interstate Highway 35, and recommends that state and/or federal funds be made available for landowner assistance on a pro-rata basis as needed or requested.***

8.2.10 Recommended Improvements to the Regional Planning Process (SB 1 - 75th Legislature)

The following six recommendations have been developed by the LCRWPG in order to improve the ongoing regional water planning process:

1. ***The LCRWPG continues to support action by the State to provide for the integration of water quantity (supply) and water quality planning. The TWDB, and the TCEQ should work to coordinate the regional planning process with the Texas Clean Rivers Program, which is a partnership that uses a watershed management approach to identify and evaluate water quality issues. The RWPGs are considering water quality issues during this revision to the plan and continued coordination with the Texas Clean Rivers Program is desirable.***

2. ***The LCRWPG supports action by the State to continue to fund programs for the collection of water data and groundwater availability information, which remains a critical need in the planning process. The State should provide adequate, continuous funding in order to improve the collection, development, monitoring, and dissemination of such water data.***

3. ***The LCRWPG continues to support action by the State to provide assistance to the RWPGs with public information materials and administrative support.***

4. ***The LCRWPG continues to support action by the State to provide for the opportunity to have improved representation of women and minorities on the RWPGs to ensure a true diversity of interests.***

5. ***The LCRWPG supports action by the State to structure the planning process to include environmental needs in order to get a clear picture of the amount of available water resources for all users. Environmental needs and water supply strategies should be planned for just like Agricultural, Municipal, Industrial and other uses in the state.***

6. ***The LCRWPG supports adequate and timely state funding for the regional water planning process. This funding is critical for the development of long-term, sustainable, environmentally protective and conservation-effective water management strategies as well as the collection of water data and groundwater availability information, including the refinement of modeling data, public information materials, and administrative assistance.***

8.2.11 Other Policy Recommendations

8.2.11.1 Radionuclides in the Hickory and Marble Falls Aquifers

The ***Region "K" Water Supply Plan for the Lower Colorado Regional Water Planning Group, Volume I, December 2000*** provided background information and a policy recommendation on the issues surrounding radionuclides in the Hickory and Marble Falls aquifers. This is an update of the issues and policy recommendation.

EPA (U.S. Environmental Protection Agency) revised the federal radionuclides regulations, which had been in effect since 1977, effective in 2003. Radionuclides emit ionizing radiation, which can cause various kinds of cancers, depending on the type and concentration of radionuclide a person is exposed to via drinking water. These rules cover man-made and naturally occurring radionuclides in drinking water and include a first-time standard for uranium. EPA revised this regulation in accordance with the requirements of the 1986 Amendments to the SDWA (Safe Drinking Water Act) and the 1996 Amendments to SDWA. The statute calls for regulation of radionuclides and a review of regulations every six years. Additionally, according to the SDWA Amendments, the EPA must maintain or provide for greater protection of the health of persons when revising regulations. The EPA reviewed the most current health, occurrence, treatment, and analytical methods in revising these regulations to ensure that safe drinking water is protective of public health.

The TCEQ received an extension from EPA and then adopted the provisions of the Radionuclides Rule into the Texas Administrative Code in December 2004.

The concentration of radionuclide contaminants in the water entering the distribution system shall not exceed the following maximum contaminant levels: combined radium (radium isotopes No. 226 and No. 228) cannot exceed 5 picoCuries/liter (pCI/l); gross alpha-radiation emitters cannot exceed 15 pCI/l (not including radon and uranium); and effective December 8, 2003, 30 micrograms per liter (g/L) for uranium. The Texas rules states that MCLs (maximum contaminant levels) for beta particle and photon radioactivity from man-made radionuclides in drinking water in community water systems are equivalent to the MCLs under 40 Code of Federal Regulations (CFR) §141.66(d) as amended and adopted in the CFR through December 7, 2000, which was adopted by reference. The Texas Rule contains applicability, monitoring, reporting, and public notification requirements, and analytical requirements for radionuclide contaminants and compliance determination.

There are several water utilities currently providing water to the public from the Hickory and Marble Falls aquifers where radionuclide contaminates occur. These include San Saba County, within the Lower Colorado Region, as well as seven counties in Region F, Mason, Brown, Coleman, Concho, McCulloch, Menard, and Kimble. Safe drinking water is a concern of these utilities. With Commission approval, utilities may be able to continue to use the water and/or bottled water on a temporary basis while they seek a long-term solution. Efforts are underway to investigate the development of alternative water sources or effective treatment and radioactive waste disposal. These small towns and water utilities have limited financial resources with which to treat the groundwater for municipal uses.

The LCRWPG recommends ***the State should provide adequate funding for water treatment and radioactive waste disposal for those rural communities that may lose their water supply if such financial support is lacking. In addition, State agencies should develop disposal procedures to provide for the safe handling of the radioactive wastes derived from the treatment processes.***

8.3 SUMMARY OF UNIQUE STREAM SEGMENT RECOMMENDATIONS

No new unique ecological stream segments are recommended by the LCRWPG for this planning cycle. The unique stream segment recommendations from the 2006 Region K Plan can be found in *Appendix 8E*.

8.4 SUMMARY OF POTENTIAL SITES UNIQUELY SUITED FOR RESERVOIRS

No new potential reservoir sites are recommended by the LCRWPG for this planning cycle. Descriptions of potential reservoir sites from the 2006 Region K Plan can be found in *Appendix 8F*.

8.5 UNRESOLVED ISSUES

While the LCRWPG has been able to reach consensus on a number of strategies and related issues regarding future water supplies for the Lower Colorado Region (Region K), not all issues have been able to be resolved. Other issues have certainly not yet been identified and many more cannot be identified, which are all expected occurrences at this stage of the planning process. Many new issues will come to light during the planning, permitting, construction, and operational phases of the identified water management strategies and resulting projects for Region K. Most of these issues will need to be resolved between the various parties responsible for the development and implementation of selected strategies and affected interests.

The following have been identified as unresolved issues by the LCRWPG:

- The LCRWPG has met with the TWDB staff and Region L to resolve the potential interregional conflict regarding the over-allocation of the Carrizo-Wilcox Aquifer in Bastrop County. During this planning round, the LCRWPG worked diligently to avoid over-allocation of this water source within Region K. In fact, there is not sufficient availability of the Carrizo-Wilcox Aquifer supplies to meet all of the projected demands for those WUGS which currently rely on this aquifer for their municipal supplies; consequently, additional water management strategies in addition to expansion and development of groundwater supplies have been recommended during the latter decades of the plan to meet those needs. Bastrop County is an area of Region K that is growing very rapidly with growth rates exceeding previous projections. As a result, the 2011 Region K Water Plan includes significantly revised population and water demand numbers for this round of planning which reflect that projected high growth rate. Many of the municipal WUGs in Bastrop County currently rely on the Carrizo-Wilcox Aquifer as their sole or primary water source. In addition, these WUGs already have existing groundwater permits that currently meet or exceed the annual amount of water identified as needed for their future system demands within the fifty-year planning period of the 2011 Region K Water Plan. Unfortunately, the amount of Carrizo-Wilcox Aquifer water currently permitted to WUGs in Bastrop County by the Lost Pines GCD is 43,486 ac-ft/yr, which is already greater than the 28,000 ac-ft/yr that is currently estimated to be the maximum availability of this source. Because these WUGs in Bastrop County already have existing permits that meet or exceed the quantities of water shown as water management strategies in the 2011 Region K Water Plan, and because Region K itself has not over-allocated the Carrizo-Wilcox Aquifer in Bastrop County, it does not appear reasonable to propose plans for these WUGs to develop new water management strategies in order to accommodate export of the groundwater supplies to another County and planning region of the state.

- Region G included a demand of 16,000 acre-feet for Williamson County from Region K in the 2001 Region G Regional Plan. According to HB 1437 of the 76th Texas Legislative Session, no transfer of water may occur unless there is “no net loss” of water to the Colorado River Basin. If Region L fully implements Region K’s regional cooperation plan, all of the available savings from conservation of water in rice irrigation will be allocated to the Region L project. Therefore, to the extent that the “no net loss” is satisfied through conservation of water in the rice irrigation districts, alternative means for satisfying this “no net loss” requirement will need to be identified since the conservation savings will no longer be available for the Region G project. Further work is needed to resolve this potential deficit.

- Much emphasis has been placed on groundwater modeling as the source for reliable data on groundwater availability in the next few years. However, the models have suffered from significant delays and some level of inaccuracy that is being attended to currently. In any event, it will require significant additional effort over a period of years to refine the models and strengthen their capability for evaluating local area issues. Many of the issues identified are of concern on a more local basis, and the localized impacts of groundwater pumpage on existing wells from future production are undeterminable at this time.

- The Regional Planning Group is generally concerned that the requirement of a Run 3 WAM is unreasonably restrictive in a 50-year water planning context. Use of this version of model requires full and simultaneous exercise of all water rights in the basin and zero return flows, creating an artificial picture of the anticipated condition of the river basin over the planning period, in particular in the early decades when we know that water rights are not likely to be fully exercised and that return flows will continue to be discharged to the river in significant quantities. This approach then results in artificial shortages for water users and the environment to be identified in the process for which water supply strategies then have to be developed.

  In addition, the complexity of the WAM model is such that it can only be understood by experienced hydrologists and others with a strong technical background related to modeling. Generally, the model does not provide an output format that can be easily understood or visualized by the average regional water planning group member. No calibration curves or other standard hydrology modeling techniques to verify accuracy were provided to the Planning Group to improve confidence. In essence, the strict application of the WAM and the complex nature of its code necessarily require a heavy reliance by the members of the planning group on technical consultants and others with water rights expertise. This has frustrated some planning members who do not feel well enough equipped to challenge the veracity of the technical analysis provided.

- The planning process as it is currently structured does not have a mechanism to plan for and provide water for environmental uses/needs. Healthy bays and flowing rivers are important components of Texas’ natural heritage and economy. We should plan for environmental water needs just as we do for municipal, agricultural, industrial and other needs in our state.

- The environmental impacts that developing additional new Colorado River water supplies in the basin will have on the reductions of instream flows and freshwater inflows to the bays and estuaries may be significant. Methods for mitigating and avoiding these impacts on the estuarine and riparian habitats within the Lower Colorado River Basin will be a fundamental consideration for determining the feasibility of such projects prior to their development and implementation.

- Another unknown that could potentially add balance to the impacts on the bay and estuarine is the contribution of rice irrigation flood-culture runoff to freshwater inflows to the bay and estuary system. This concept needs additional work and quantification with at least three components to be considered: (1) runoff from flooded fields during rain events, (2) irrigation water drained from flooded fields prior to harvest, and (3) leakage from irrigation delivery systems.

- Concerns have also been expressed regarding the Plan's dependency on conservation to make up much of the available supplies in the future. Region K is dependent upon the success of the implementation of many of the conservation activities that are, in turn, dependent upon funds being made available from the sale of the developed new water supplies. These funds would be used to pay for implementation of additional on-farm and canal system improvements and water-use efficiencies, as well as research aimed at developing rice varieties that use less water and improve yield relative to water use.
- The Trinity Aquifer in Hays County is not shown in the plan as a source of supply for County-Other. Concerns have been raised that the aquifer is a source of supply for residential users in western Hays County. Concerns have also been raised that the water management strategies recommended for Hays County-Other would not be practical for providing water to western Hays County, and that the Trinity Aquifer would be a better option. Hays County is currently developing a facilities planning study, which will be finalized prior to the next round of planning. This study will be reviewed during the next planning cycle to determine if any changes related to the study should be made to the plan.

APPENDIX 8A

ADOPTED RESOLUTIONS

APPENDIX 8B

INFORMATION PROVIDED BY THE TPWD, LCRA, BCEN, AND REGION G FOR THE IDENTIFICATION OF ECOLOGICALLY UNIQUE STREAM SEGMENTS IN THE LOWER COLORADO REGIONAL WATER PLANNING AREA

APPENDIX 8C

SOURCE DOCUMENTS FOR THE 2006 REGION K PLAN UNIQUE STREAM SEGMENT RECOMMENDATIONS

APPENDIX 8D

TPWD SUPPLEMENTAL INFORMATION RESOURCES FOR THE 2006 REGION K PLAN UNIQUE STREAM SEGMENT RECOMMENDATIONS

APPENDIX 8E

UNIQUE STREAM SEGMENT RECOMMENDATIONS FROM THE 2006 REGION K PLAN

APPENDIX 8F

DESCRIPTIONS OF POTENTIAL RESERVOIR SITES FROM THE 2006 REGION K PLAN

RESOLUTIONS ADOPTED BY THE LCRWPG FOR THE 2011 PLAN

Resolution by the Lower Colorado Regional Water Planning Group
Regarding Population Projections for the 2011 Regional Water Planning Cycle
Adopted June 10, 2009

WHEREAS, the Lower Colorado Regional Water Planning Group (Region K) is charged with developing and adopting, with broad public input, a regional water plan every five years; and

WHEREAS, Region K received guidance from the Texas Water Development Board (TWDB) in a letter dated December 2, 2008 that indicated with the exception of steam-electric water demands, the TWDB (also referred to as the Board) is not generating new 2011 plan projections for approval by the Board; and

WHEREAS, TWDB indicated that planning groups may request that the Board consider revisions to 2006 Regional Water Plan and 2007 State Water Plan population and water demand projections if conditions in a given planning area have changed sufficiently to warrant revisions. The TWDB further indicated:

- The January 2007 population estimates from the Texas State Data Center will be used as the primary standard to determine if changed conditions warrant any revisions to population projections, both at the local and regional level; and
- The Texas State Data Center estimates indicate that current population growth is exceeding projected growth rates for Region K as a whole. Increased regional totals, commensurate with growth which has occurred, are likely justified for this region, subject to TWDB approval; and

WHEREAS, Region K formed a Population and Water Demands Committee to develop population and water demand projections for the 2011 Regional Water Plan process; and

WHEREAS, the Population and Water Demands Committee in conjunction with its consultant, AECOM, reviewed available data and information from various sources, including the Texas State Data Center, Capitol Area Council of Governments, Harris-Galveston Area Council, U. S. Census Bureau, LCRA's population and water demand projections, and input from various regional water planning group members; and

WHEREAS, the Population and Water Demands Committee developed a set of recommended population and water demands projections for each county in Region K and then dispersed those projections to the Water User Group (WUG) level for the regional planning group members to review and provide comments; and

WHEREAS, at a regularly scheduled meeting on March 11, 2009 in Bastrop, Region K unanimously adopted these projections as its initially prepared projections for WUGs, TWDB and the public to review and comment on (also referred to as the March 2009 projection - see Attachment 1 to this resolution); and

WHEREAS, Region K conducted two public input meetings on March 19, 2009 and April 1, 2009 to receive comments from the public and WUGs; and

WHEREAS, on March 26, 2009, the TWDB sent an e-mail to Region K's consultant indicating generally that:

- Blanco, Matagorda, San Saba, and Wharton Counties are currently considered "over-projected" and the TWDB recommended that these counties be kept at their 2006 Region K Plan projection totals;
- For the remaining counties in the planning area where Region K suggested revisions, the TWDB recommended revising the city population projections only. Any non-city WUGs, including County-Other, were recommended to be kept at the 2006 Region K Plan projection levels; and

The TWDB only offered comments on the population projections and offered no comments on any of the increased water demand projections in other categories; and

WHEREAS, the Population and Water Demands Committee, in its research of 2006 Region K Plan data and its planning group members' experience indicated that the area of higher growth rates in most counties in Region K, with the exception of Travis County, was in the non-city WUG category, not the city WUG category; and

WHEREAS, members of the Region K Population and Water Demands Committee and the Region K consultant, AECOM, met with TWDB staff to discuss their response to Region K's prepared projections. In that discussion, TWDB demographers indicated that the overall projections of State population and State growth rate was a prime motivator for the TWDB staff limiting the population projections for Region K to about one-half of the overall proposed increase in the Region K's initially prepared population projections (March 2009); and

WHEREAS, after considerable debate, discussion and some dissention, among the group at its regular meeting on April 8, 2009 in Burnet, Region K gave guidance to its Population and Water Demand Committee to use the TWDB recommended population projections as a guide for developing new population and water demand projections for the 2011 planning process. During this discussion, planning group members expressed their concern that to continue forward and challenge the TWDB's staff recommendation on population projections for Region K may not be successful, but most importantly would put at risk the ability to develop a regional plan within the deadlines established by the TWDB; and

WHEREAS, the Population and Water Demand Committee and Region K's consultant, AECOM, redistributed the TWDB recommended population projections and developed an amended set of water demand projections and provided such to the full Region K planning group at its regular meeting on May 5, 2009 in Bastrop. Region K adopted these revised population and water demand projections at the meeting (allowing for the additional 14 day requisite public comment period to follow). A county-level comparison summary of differences between the March 2009 projections and the May 2009 projections is attached (Attachment 2); and

WHEREAS, Region K appointed a committee of planning group members to draft a resolution for its consideration at its June 10, 2009 meeting as a method to express and document its concerns regarding the use of the TWDB recommended population projections for the 2011 plan. The planning group has expressed concerns that the adopted revised TWDB recommended population projections do not reflect the actual growth that it is seeing in its planning region over the recent past and expects to experience in the near future;

THEREFORE BE IT RESOLVED that:

(1) Region K desires to express its appreciation to the TWDB for recognizing that this region is seeing increased demands for water and has experienced significant population growth at a rate greater than expected in the approved 2006 Region K Plan. However, the planning group does not believe that the TWDB recommended population projections for the 2011 planning process for Region K captures all of the population growth that is begin experienced in the planning area and what is expected to be seen in the near future.

(2) Region K's data review has shown that there are areas within the region that are currently experiencing growth beyond what is projected in the TWDB's recommended population projections for the 2011 planning process for Region K.

(3) Given the tight plan development timeline requirements, Region K decided to move forward with adopting the TWDB's recommended population projections for the 2011 planning process in order to assure that Region K could develop and approve a regional plan that would meet the required TWDB planning process deadlines.

(4) Region K urges the TWDB to consider starting the 2016 planning cycle population and water demand projection development as early as possible in order to provide additional time to consider new information at that time, including 2010 census data.

6-15-09

JOHN BURKE, P.E., CHAIRMAN DATE
Lower Colorado Regional Water Planning Group

ATTEST:

6/18/09

Secretary

RESOLUTIONS ADOPTED BY THE LCRWPG FOR THE 2001 PLAN

These resolutions are included for historical reference.

LOWER COLORADO REGIONAL PLANNING GROUP
RESOLUTION
September 22, 1999

WHEREAS, Senate Bill 1 provides, in part: "Nothing in the initial planning effort shall prevent development of a management plan or project where local or regional needs require action prior to completion of the initial regional plan...";

WHEREAS, many local communities, cities, and utilities have planned for their local water needs for up to a 50-year period and in a manner consistent with accepted water-planning criteria;

WHEREAS, local communities should move forward with meeting and supplying their future water supply needs consistent with the goals of Senate Bill 1;

WHEREAS, local water planning efforts are to be applauded and encouraged by the regional planning group;

BE IT RESOLVED, THEREFORE, that the Lower Colorado Regional Water Planning Group (LCRWPG) confirms that the City of Austin and any other local community should be commended for its planning efforts in securing future water supplies for at least 50 years, and such planning is consistent with the goals of the Senate Bill 1 regional planning process in that local communities are encouraged to plan ahead for their water needs.

9-27-99

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

**A RESOLUTION OF THE
LOWER COLORADO REGIONAL WATER PLANNING GROUP
REGARDING MINING OF GROUNDWATER**

WHEREAS, the Lower Colorado Regional Water Planning Group (hereinafter referred to as "LCRWPG") was appointed and recognized by the Texas Water Development Board in February and March of 1998 as part of the implementation of Senate Bill 1 passed by the Legislature in 1997;

WHEREAS, the LCRWPG is concerned with water resources in the Lower Colorado Region which consists of all or part of fourteen counties in central and south central Texas; and

WHEREAS, resource sustainability is a major concern of the LCRWPG and resource sustainability is also a key factor in the LCRWPG's selection of appropriate water supply strategies; and

WHEREAS, the LCRWPG is concerned regarding the over-utilization of groundwater within its region at rates which could lead to eventual harm in the possible forms of subsidence, drying up of wells, saltwater encroachment, instream flow losses to alluvial aquifers, and cessation of springflows; and

WHEREAS, the LCRWPG has determined that it will not support the over-utilization of groundwater within its region at rates which could lead to eventual harm as discussed above; and

WHEREAS, the LCRWPG has determined that one form of over-utilization which it will not support is the mining of groundwater except during limited periods of extreme drought conditions; and

WHEREAS, for purposes of this Resolution, mining of groundwater is defined as the withdrawal of groundwater from within each aquifer in Region K at an annualized rate exceeding the annualized average recharge rates for each aquifer where the recharge rate can be scientifically derived with reasonable accuracy; and

WHEREAS, the LCRWPG has determined that establishing its position on the mining of groundwater is in the best interest of the LCRWPG; and

NOW THEREFORE, BE IT RESOLVED BY THE LOWER COLORADO REGIONAL WATER PLANNING GROUP THAT:

The above recitals are true and correct; and

The LCRWPG and its consultants will henceforth pursue only those water supply strategies that are consistent with the above recitals thus promoting resource sustainability and the minimization of the mining of groundwater.

PASSED AND APPROVED this 9th day of February, 2000.

John E. Burke, Chairman

ATTEST:

Randy Goss, Secretary

LCRWPG BRUSH CONTROL SUPPORT RESOLUTION

The LCRWPG recommends and endorses studies of brush control projects on a voluntary basis especially west of Interstate 35 for Region "K"; and recommends that State/Federal funds be available for landowner assistance on a pro-rata basis as needed or requested.

Resolution for Lower Colorado Regional Water Planning Group Regarding Local Groundwater Conservation Districts

Whereas, projected population growth in our region indicates that all water resources will need to be efficiently and effectively utilized to provide for the projected demands; and

Whereas, projections of future water supplies from our rivers and lakes can be fairly accurately predicted, but only approximate estimates are available on potential groundwater supplies; and

Whereas, current efforts are being made to investigate potential groundwater supplies, including rates of recharge, effects of mining on the depth of the water table, potential for subsidence, economic consequences of withdrawals and other impacts of exploitation of groundwater supplies; and

Whereas, the full results of these investigations and their validity will not be available in the near term even though they might be useful in the planning process, and while there must be provisions to immediately begin the process of conserving our precious groundwater supplies that are both fair and equitable to all parties; and,

Whereas, the policy of the State of Texas as indicated in previous State Water Plans and reiterated in Senate Bill 1, as well as incorporated into the Texas Water Code, states that local Groundwater Conservation Districts are "... the preferred method of groundwater management."

Whereas, the creation and confirmation of Groundwater Conservation Districts effectively modifies the Rule of Capture Doctrine in Groundwater Conservation Districts and more clearly defines the rights of landowners and production rights of groundwater as a private property right while fostering good stewardship of groundwater resources;

Therefore, the Lower Colorado Regional Water Planning Group resolves to recommend the creation of Groundwater Conservation Districts as soon as possible giving consideration to developing multi county districts, or single county districts with shared management and costs and with consideration to adjacent hydrological impacts, consistent with local control and local political considerations in order that they may provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater and to prevent and control subsidence in their areas of the State consistent with the objectives of Section 59, Article XVI, Texas Constitution, or single county districts with shared management and with consideration to adjacent hydrological impacts.

PASSED AND APPROVED this 9 day of February, 2000.

John Burke, Chairman

Randy Goss, Secretary

Resolution for The Lower Colorado Regional Water Planning Group Regarding Construction of Dams and Reservoirs Upstream from the Highland Lakes (Mills County Resolution)

WHEREAS, water is essential to the residents of Mills County to sustain life, agriculture, and enable economic development.

WHEREAS, this water is not presently available to residents, it is the opinion and belief that surface water collected in the streams from run-off from pastures and fields in Mills County should be detained and stored behind dams in reservoirs built on said streams in Mills County

WHEREAS, the residents of Mills County in their water planning and efforts to provide adequate water for the present and future have determined that ground water is not available or only available in small quantities in a large portion of the county, and whereas several streams and tributaries are located in Mills County, in the Colorado River basin, and with construction of reservoirs and dams, would provide adequate storage of water and economic development for the county and flood control for areas downstream.

WHEREAS, the Lower Colorado Regional Water Planning Group of Senate Bill I, of the 75th Legislature is equally concerned that residents of Mills County and the surrounding area make adequate efforts to extend the life of their own water supplies by construction of dams on streams and creating reservoirs to meet their water supply needs;

Be it resolved by the Lower Colorado Regional Water Planning Group, that this resolution be considered in developing the final water plan for this region and that the Lower Colorado Regional Water Planning Group supports the efforts of the residents of Mills County and adjoining areas to construct water supply projects involving dams and reservoirs for water supply and the construction of pipelines and other facilities related thereto:

PASSED AND APPROVED this 9 day of Feb 2000, by the Lower Colorado Regional Water Planning Group.

John Burke, Chairman

Randy Goss, Secretary

A RESOLUTION of the Lower Colorado Regional Water Planning Group supporting the water appropriation application of the Lower Colorado River Authority to appropriate water of the Colorado River

WHEREAS, the Lower Colorado River Authority has applied to the Texas Natural Resource Conservation Commission for a permit to appropriate any remaining unappropriated flows ("excess flows") of the Lower Colorado River;

WHEREAS, the Lower Colorado River Authority has applied to the Texas Natural Resource Conservation Commission for rights to all unappropriated flood flows of the Lower Colorado River;

WHEREAS, the water appropriated to Lower Colorado River Authority should be designated for use in the Lower Colorado River Authority service area;

WHEREAS, indications are that water supplies in Region K are insufficient to meet all the projected water supply needs of the area;

WHEREAS, the water sought to be appropriated by Lower Colorado River Authority should be available for use in the Lower Colorado River Authority service area to meet those projected needs;

NOW, THEREFORE, BE IT RESOLVED BY THE LOWER COLORADO REGIONAL WATER PLANNING GROUP that:

the Lower Colorado Regional Water Planning Group supports the "excess flows" permit application of the Lower Colorado River Authority;

urges that the Texas Natural Resource Conservation Commission grant the application; and,

the water be designated for use in the Lower Colorado River Authority service area.

PASSED AND APPROVED this 20th day of MARCH, 2000.

LOWER COLORADO REGIONAL WATER PLANNING GROUP

John Burke, Chairman

ATTEST:

Secretary

A RESOLUTION of the Lower Colorado Regional Water Planning Group identifying the guidelines for potential cooperation agreements with the South Central Regional Water Planning Group to provide mutually beneficial solutions to regional water problems

WHEREAS, the Lower Colorado Regional Water Planning Group has identified significant future water shortages within our region,

WHEREAS, it may not be economically feasible for present water users within the region to eliminate the projected future water shortages,

WHEREAS, the South Central Regional Water Planning Group has expressed interest in water supplies from the Lower Colorado Region,

WHEREAS, a cooperative water plan between the Lower Colorado and South Central regions may be beneficial to the citizens of both regions,

WHEREAS, the Lower Colorado and South Central regions have agreed to explore possible cooperative regional water solutions,

NOW, THEREFORE, BE IT RESOLVED BY THE LOWER COLORADO REGIONAL WATER PLANNING GROUP that:

the Lower Colorado Regional Water Planning Group adopts the attached nine conceptual elements as the minimum basis for negotiations with the South Central Regional Water Planning Group concerning potential cooperation agreements to provide mutually beneficial solutions to regional water problems.

PASSED AND APPROVED this the 12th day of April, 2000.

Lower Colorado Regional Water Planning Group

John E. Burke, Chairman

CONCEPTUAL ELEMENTS OF A REGIONAL WATER SOLUTION WITH THE SOUTH CENTRAL REGIONAL WATER PLANNING GROUP

4/12/00

The items noted below are fundamental considerations in any cooperative arrangement between the Lower Colorado Regional Water Planning Group (LCRWPG) and the South Central Regional Water Planning Group (SCRWPG).

I. A cooperative regional water solution shall benefit each region.

Whatever plan is developed for multi-regional cooperation must be more beneficial to each region than would have been the solutions determined independently by each regional planning group for its own region. However, the LCRWPG's first priority is to protect the water resources of the Lower Colorado Regional Planning Area (LCRPA).

II. Lower Colorado Regional Planning Area's (LCRPA) water shortages shall be substantially reduced in exchange for an equitable contribution from the LCRPA to meet the municipal water shortages in the South Central Region.

Sufficient water demand reduction and/or water supply strategies shall be provided to substantially reduce water shortages in the LCRPA. The LCRPA shall make a reasonable contribution toward meeting the South Central Region's municipal water shortages.

III. Proposed actions for interregional water transfers shall have minimal detrimental environmental, social, economic and cultural impacts.

The elements in each regional plan involving export to another region shall have minimal detrimental environmental, social, economic and cultural impacts on both regions. Major on-channel or tributary reservoirs used for export would be considered major detrimental environmental impacts.

IV. Regional water plans with exports of significant water resources shall provide for the improvement of lake recreation and tourism in the Colorado River basin over what would occur without water exports.

Although not a water demand in the regional water plan, lake recreation and tourism is an important economic water use within the LCRPA. If a cooperative multi-regional water plan is developed, it shall result in improved lake recreation and tourism conditions over what would have occurred without water exports to other regions.

V. Each region shall determine its own water management strategies to meet internal water shortages when those strategies involve internal water supplies and/or water demand management.

In any cooperative multiple regional plan, each region shall determine its own combination of water strategies from internal regional sources and/or conservation to meet projected internal water shortages. The decision of what internal resources to use or conservation practices to impose would not be subject to approval by other regions that may be either exporting or importing water from that region.

For example, assume the SCRWPG agreed to recommend a regional water plan that funds strategies for solving irrigation water shortages in order to receive surface water from the Colorado River. It would be at the sole discretion of the LCRWPG to recommend management strategies in the Lower Colorado Regional plan to meet those water shortages. Of course, the LCRWPG decision would be known to the SCRWPG prior to finalizing any cooperative agreement.

VI. Cooperative regional solutions shall include consideration of alternatives to resolve conflicts over groundwater availability.

The LCRWPG has adopted the policy that groundwater availability is limited in Region K to the average annual recharge except either during periods of extreme drought when mining may be allowed or when that recharge cannot be accurately measured. Where recharge is not accurately measured, the LCRWPG has determined that groundwater availability is limited to the maximum projected future local water needs.

In conflict with that policy, the San Antonio Water System (SAWS) has entered into a contract with Alcoa to receive up to 30,000 acre-feet annually from the Simsboro aquifer in Bastrop County. The LCRWPG has determined there is not sufficient groundwater availability to meet Bastrop County year 2050 water needs and the maximum contract amount specified in the SAWS-Alcoa contract.

Several additional considerations complicate the resolution of this conflict. The TWDB rules require all regional plans to comply with water contracts (Section 357.5 (e)(3)). However, hydrogeologic studies indicate that there would be dramatic declines in the local water table if the full 30,000 acre-feet annually is taken from the Bastrop County mine site over the life of the SAWS-Alcoa contract. Recently, SAWS reported that 15,000 acre-feet annually may be a more reasonable amount to withdraw from the CPS site. This amount appears to be more than the annual recharge to the Simsboro Formation used in the Bureau of Economic Geology Report of Investigations No. 256 published in 1999.

This area of conflict needs to be discussed to determine if some agreement is possible that is mutually beneficial to both regional groups. For example, it may be economically feasible to combine the groundwater development in Bastrop County with a larger regional water solution involving surface water. If this occurs then the possibility is open to conjunctively use the groundwater with Colorado River water so that overdrafting of groundwater would occur only during drought years. Such management might still provide the total water needed in the San Antonio region but do so in a manner consistent with the policy adopted by the LCRWPG.

VII. Any water from the Colorado River would not be guaranteed on a permanent basis.

There shall be no permanent sale of Colorado River water outside the basin, including the sale of surface water rights. Potential interbasin surface water transfers from the Colorado River shall be limited to a finite contractual period. Presently the LCRA standard water sale contracts are for 30 years. These contracts may be renewed upon agreement by both parties. Special agreements, such as the recent LCRA-City of Austin water sale, may be for longer periods with renewal options. However, LCRA does not grant permanent water sales to any party. There would be no guarantee that LCRA water would be permanently available to the South Central Region.

Water not provided by the LCRA could be committed for purposes of the LCRWPG regional plan for a period up to the 50 year planning horizon.

VIII. Any water from the Colorado River shall make maximum use of inflows below Austin.

Under current water rights, the LCRA must make maximum use of inflows downstream of the Highland Lakes prior to using stored water from the Lakes. Similarly, any diversion of Colorado River waters should be done as close to the mouth of the river as possible to maximize the use of uncontrolled flood flows. Using these flood flows will minimize use of stored water. Stored water, in the long-term, is needed to meet the future municipal and industrial water demands in the basin, particularly in the Austin area and the Highland Lakes region.

IX. Any water export from the Colorado River shall comply with the LCRA interbasin water transfer policy.

The LCRA Board of Directors has adopted a policy on interbasin water transfers (Policy 501 - Water Resources Management, Section 501.40). This section reads:

501.40 INTERBASIN TRANSFERS

The LCRA opposes any sale of surface water rights for use outside LCRA's water service area. In addition, the LCRA opposes any interbasin transfer of surface water outside the Colorado River basin, unless:

3

(a) the interbasin transfer is within LCRA's water service area; or

(b) it is demonstrated to the satisfaction of the Board that: (i) the interbasin transfer will not detrimentally affect the public welfare or the interests of LCRA's water service area; (ii) the receiving basin is prudently using and conserving its existing water resources and has aggressively planned and attempted to develop local sources of supply to meet current and future demand with no success; and (iii) the interbasin transfer is not permanent, but is made through a temporary water sales agreement.

The determination of whether an interbasin transfer will detrimentally affect the public welfare or the interests of LCRA's water service area must include, but need not be limited to, consideration of the direct and indirect impacts of the interbasin transfer on the following, both at the time the interbasin transfer is initiated and in the future:

(a) existing water rights and obligations.

(b) LCRA's contractual commitments.

(c) water supplies for environmental purposes and economic activities, including instream flows, inflows to the bays and estuaries, municipal and industrial uses, irrigation, recreation, and tourism.

(d) water quality and aquatic ecosystems in the Highland Lakes, the lower Colorado River basin and associated bays and estuaries, and LCRA's water service area.

Wastewater originating as surface water diverted from the Colorado River basin pursuant to an LCRA water right shall not be reused outside of the Colorado River basin except pursuant to an interbasin transfer permit that expressly authorizes such reuse outside the Colorado River basin.

The LCRWPG is charged with preparing the regional water plan. However, that plan does not obligate political subdivisions to implement its provisions. In fact, Section 357.7(b) of the TWDB rules for SB1 planning prohibits the LCRWPG from recommending water management strategies for political subdivisions if those subdivisions object to the strategies. Any cooperative agreement between LCRWPG and SCRWPG shall recognize that potential cooperation by the LCRA will be contingent on meeting the LCRA interbasin transfer policy.

Resolution by the Lower Colorado Regional Water Planning Group Acknowledging Austin's Right to Reuse 100 Percent of its Effluent May 10, 2000

Whereas, the City of Austin was granted rights to use water from the Colorado River for municipal purposes, and those rights do not require the City to return any flow to the River;

Whereas, the City of Austin has developed an integrated water supply plan that depends heavily on increased conservation and use of reclaimed wastewater, and is therefore expanding its Water Reuse Program to help meet projected needs;

Whereas, the Texas Natural Resource Conservation Commission has required the City to engage in water conservation measures including increasing the recycling and reuse of water so that a water supply is made available for future or alternative uses;

Whereas, the Lower Colorado Regional Water Planning Group (LCRWPG) is required to update the Lower Colorado Regional Water Plan every five years and can make appropriate adjustments to Austin's return flow percentage and demand projection accordingly to align the regional plan with local plans;

Whereas, for the purposes of determining the amount of interruptible water available downstream of Austin, the LCRWPG is using the results of the Lower Colorado River Authority's (LCRA's) Response model in which a water balance approach matching water supply and demand is used over a 50-year period;

Be it resolved that the Lower Colorado Regional Water Planning Group acknowledges:

(1) That the assumptions and results of the LCRA's Response Model as used in the Lower Colorado Regional Water Plan are intended for the purposes of projecting interruptible water downstream during the time period of the plan;
(2) That the Model and Plan are not intended to define the water rights of any holder of a certificate of adjudication;
(3) That the model used in the Lower Colorado Regional Water Plan is a dynamic model, and as the City's uses change in the future, the model should reflect the changes in return flow to the Colorado River;
(4) That the Lower Colorado Regional Water Plan and the Response Model reflect the fact that the City of Austin's right to use its full municipal water rights under certificate of adjudication 14-5471A does not require the City to return any amount of water to the Colorado River as long as it is beneficially using that water.

5/10/00

JOHN BURKE, P.E., CHAIRMAN DATE
Lower Colorado Regional Water Planning Group

ATTEST:

Secretary

RESOLUTION

A RESOLUTION of the Lower Colorado Regional Water Planning Group, Region K, stating support for funding for study and evaluation of a proposed desalination project by the Lavaca Regional Water Planning Group, Region P

Whereas, Senate Bill 1 mandates that regional water planning efforts determine the water demands and supplies of each region for the next thirty and fifty years, and develop strategies to address any indicated shortages, and

Whereas, Region L has listed possible sources of needed water supplies in Region K to make up for their anticipated shortage, and

Whereas, Projections for Region K do not indicate surplus future water supplies, and

Whereas, Water from a proposed desalination project in Region P should greatly alleviate the anticipated water shortage in Region L without adversely affecting current water supplies in other regions, Now

Therefore, Be it resolved by the Lower Colorado Regional Water Planning Group that support be indicated for funding by the Texas Water Development Board for a study and evaluation of the proposed Joslin Power Plant to determine the feasibility of providing quantities of desalinated water to San Antonio and/or Corpus Christi.

John Burke, Chairman

Attest: Teresa Lutes, Secretary

<u>The Lower Colorado Regional Water Planning Group adopts the following language in the Regional Water Plan:</u>

The proposed four off-channel reservoirs are projected to supply at least 150,000 acre-feet annually when operated under existing, under-utilized LCRA irrigation water rights. This water supply is reduced to 131,000 acre-feet when the diversion restrictions from the Consensus Water Planning Environmental Criteria are applied. It is uncertain whether either of these annual volumes will ultimately be available until permits for the use of these reservoirs can be obtained. Only then will it be known to what extent the use of LCRA's existing under-utilized water rights will be allowed, how much water can be obtained, and to what extent additional mitigation and environmental protection will impact the annual volume of water, which can be made available, if at all.

LCRA has applied to TNRCC for a permit for all remaining unappropriated flows in the lower Colorado River. If LCRA is successful in obtaining a permit for additional, unappropriated water from the lower Colorado River, this water may become part of the supply offered to Region L. Any such new permit would also be subject to mitigation and environmental protection requirements.

The LCRWPG takes the position that any adverse environmental impacts should be identified and mitigated to the extent practicable. To that end, the LCRA and Texas Parks and Wildlife Department are cooperating to determine environmental flow requirements for the lower Colorado and the extent that those requirements can be satisfied through: (1) modification of the LCRA Water Management Plan, (2) special conditions in any new permit obtained, (3) construction and operation of mitigation projects, or (4) by other methods. Further evaluations will be needed to determine appropriate mitigation for the four off-channel reservoirs.

The LCRWPG approves water transfers of up to 150,000 acre-feet to Region L, subject to the supply ultimately determined to be available as a result of developing the four off-channel reservoirs, as well as other permitting, mitigation, and environmental protection requirements yet to be determined.

[This language was adopted by the LCRWPG at the December 13, 2000 board meeting]

RESOLUTIONS ADOPTED BY OTHER ENTITIES FOR THE 2001 PLAN

These resolutions are included for historical reference.

RESOLUTION

WHEREAS, water is a precious commodity; and

WHEREAS, the people of Fayette County have always conserved, managed and protected water with a great deal of respect and feel that conservation of water should be the primary scope of any water plan; and

WHEREAS, the Commissioners Court of Fayette County is opposed of transferring water from Fayette County; and

WHEREAS, we are greatly concerned about the possibility of San Antonio and other cities coming into our region to obtain water or water rights; and

WHEREAS, we are equally appalled by any municipality building a dam or reservoir in Fayette County; and

WHEREAS, the building of such a reservoir would displace many people, decrease the quality of life and diminish our tax base; and

WHEREAS, the people of Fayette County are known for their generosity, but also feel that cities should conserve and look at other areas of water supplies in their own regions before coming to Fayette County; and

WHEREAS, the Commissioners Court is asking the Lower Colorado Regional Water Planning Group to kindly consider this resolution when creating your final water plan for this region.

Passed and approved this 30th day of November, 1999.

Edward F. Janecka, County Judge

Lawrence Adamcik,
Commissioner, Precinct 1

Wilbert Gross
Commissioner, Precinct 3

Gary Weishuhn
Commissioner, Precinct 2

Tom Muras
Commissioner, Precinct 4

ATTEST:

Carolyn Kubos Roberts
Fayette County Clerk

HARLEN BARKER
COUNTY JUDGE

KIM WELLS
DISTRICT AND COUNTY CLERK

ROGER CROCKETT
COMMISSIONER PRECINCT 1

RICKEY LUSTY
COMMISSIONER PRECINCT 2

WAYLAND PERRY
COMMISSIONER PRECINCT 3

ROGER McGEHEE
COMMISSIONER PRECINCT 4

JOHN BENNER
SHERIFF TAX ASSESSOR-COLLECTOR

[illegible] WILLIAMS
[illegible]Y ATTORNEY

COUNTY OF SAN SABA
SAN SABA, TEXAS 76877

GAYLA HAWKINS
COUNTY TREASURER

ROY WALSTON
COUNTY AGENT

CAROLYN McDOWELL
FAMILY & CONSUMER SCIENC

TOM DEAN
JUSTICE OF THE PEACE

GUILFORD L. JONES III
DISTRICT JUDGE

SAM OATMAN
DISTRICT ATTORNEY

JOHN EARL McPHERSON
VETERANS SERVICE OFFICE

RESOLUTION

WHEREAS, water is a precious commodity, the means to sustain life and to enable economic development; and

WHEREAS, the waters of the Colorado River Basin have always been carefully conserved, managed, and protected by the inhabitants of the basin, who have strong opinion and belief that conservation of water should be the primary scope of any water plan; and

WHEREAS, the undersigned Commissioners' Court of San Saba County, which is one of the counties in the Colorado River Basin, is opposed to transferring water from the counties to areas outside of the basin, which effectively transfers our economic opportunity to others; and

WHEREAS, the said Commissioners' Court is concerned about major municipalities outside of the basin coming into the Colorado River Basin to obtain surface and groundwater to the detriment of the inhabitants of the basin when those municipalities have made inadequate efforts to institute water conservation practices to extend the life of their own water supplies or resorted to water projects in their own areas to meet their water needs; and

WHEREAS, the said Commissioners' Court is equally concerned about major outside basin municipalities coming into the Colorado River Basin to construct dams and creating reservoirs to meet their water supply needs; and

WHEREAS, the said Commissioners' Court is concerned about dam and reservoir projects, the construction of which would displace our population, decrease our quality of life, diminish our tax bases, and reduce our economic opportunity, all to the detriment of the citizens of this basin, unless said dams and reservoir projects are done with the support and concurrence of the respective Commissioners' Court; and

BE IT RESOLVED BY THE UNDERSIGNED COMMISSIONERS' COURT that the Lower Colorado Regional Water Planning Group consider this resolution when creating a final water plan for this region, consider the effect of activities that would impact our populations and tax bases, and oppose the construction of water supply projects involving dams and reservoirs for water supply of distant municipalities outside of the basin.

PASSED AND APPROVED this the 10th day of January, 2000.

Harlen Barker, County Judge

Roger Crockett
Commissioner, Precinct #1

Wayland Perry
Commissioner, Precinct #3

Rickey Lusty
Commissioner, Precinct #2

Roger McGehee
Commissioner, Precinct #4

Attest: ____________
Kim Wells, County Clerk

MILLS COUNTY
JUDGE RANDY WRIGHT
GOLDTHWAITE, TEXAS
PHONE: 915-648-2222
FAX: 915-648-2806

MILLS COUNTY RESOLUTION

WHEREAS, WATER IS A PRECIOUS COMMODITY, THE MEANS TO SUSTAIN LIFE AND TO ENABLE ECONOMIC DEVELOPMENT;

WHEREAS, THE WATERS OF THE COLORADO RIVER BASIN HAVE ALWAYS BEEN CAREFULLY CONSERVED, MANAGED AND PROTECTED BY THE INHABITANTS OF THE BASIN, WHO HAVE STRONG OPINION AND BELIEF THAT CONSERVATION OF WATER SHOULD BE THE PRIMARY SCOPE OF ANY WATER PLAN;

WHEREAS, THE UNDERSIGNED COMMISSIONERS' COURT OF COUNTIES IN THE COLORADO RIVER BASIN ARE OPPOSED TO TRANSFERRING WATER FROM THE COUNTIES TO AREAS OUTSIDE OF THE BASIN, WHICH EFFECTIVELY TRANSFERS OUR ECONOMIC OPPORTUNITY TO OTHERS;

WHEREAS; THE SAID COMMISSIONERS' COURT ARE CONCERNED ABOUT MAJOR MUNICIPALITIES OUTSIDE OF THE BASIN COMING INTO THE COLORADO RIVER BASIN TO OBTAIN SURFACE AND GROUNDWATER TO THE DETRIMENT OF THE INHABITANTS OF THE BASIN WHEN THOSE MUNICIPALITIES HAVE MADE INADEQUATE EFFORTS TO INSTITUTE WATER CONSERVATION PRACTICES TO EXTEND THE LIFE OF THEIR OWN WATER SUPPLIES OF RESORTED TO WATER PROJECTS IN THEIR OWN AREAS TO MEET THEIR WATER NEEDS;

WHEREAS, THE SAID COMMISSIONERS' COURT ARE EQUALLY CONCERNED ABOUT MAJOR OUTSIDE BASIN MUNICIPALITIES COMING INTO THE COLORADO RIVER BASIN TO CONSTRUCT DAMS AND CREATING RESERVOIRS TO MEET THEIR WATER SUPPLY NEEDS;

WHEREAS; THE SAID COMMISSIONERS' COURT ARE CONCERNED ABOUT DAM AND RESERVOIR PROJECTS, THE CONSTRUCTION OF WHICH WOULD DISPLACE OUR POPULATION, DECREASE OUR QUALITY OF LIFE, DIMINISH OUR TAX BASES, AND REDUCE OUR ECONOMIC OPPORTUNITY, ALL TO THE DETRIMENT OF THE CITIZENS OF THIS BASIN, UNLESS SAID DAMS AND RESERVOIR PROJECTS ARE DONE WITH THE SUPPORT AND CONCURRENCE OF THE RESPECTIVE COMMISSIONERS' COURT;

BE IT RESOLVED BT THE UNDERSIGNED COMMISSIONERS' COURTS THAT THE LOWER COLORADO REGIONAL WATER PLANNING GROUP CONSIDER THIS RESOLUTION WHEN CREATING A FINAL WATER PLAN FOR THIS REGION, CONSIDER THE EFFECT OF ACTIVITIES THAT WOULD IMPACT OUR POPULATIONS AND TAX BASES, AND OPPOSE THE CONSTRUCTION OF WATER SUPPLY PROJECTS INVOLVING DAMS AND RESERVOIRS FOR WATER SUPPLY OF DISTANT MUNICIPALITIES OUTSIDE OF THE BASIN.

PASSED AND APPROVED this 10 day of January 2000, by the Commissioners' Court of Mills, Goldthwaite. Beulah Roberts, Mills County Clerk Beulah L Roberts

COMMISSIONERS COURT MILLS COUNTY

Mills County Judge
RANDY WRIGHT
Randy Wright

Commissioner Precinct 1
JOE KARNES
Joe Karnes

Commissioner Precinct 2
CARROLL BUNTING
Carroll Bunting

Commissioner Precinct 3
Dale Henry
Dale Henry

Commissioner Precinct 4
James Miller
James R Miller

RESOLUTION

WHEREAS,water is a precious commodity, the means to sustain life and to enable economic deveolpment; and

WHEREAS, the waters of the Colorado River Basin have always been carefully conserved, managed and protected by the inhabitants of the basin, who have strong opinion and belief that conservation of water should be the primary scope of any water plan; and

WHEREAS, the Burnet County Commissioners' Court is opposed to transferring water from the counties to areas outside of the basin, which effectively transfers our economic opportunity to others; and

WHEREAS, Burnet County is concerned about major municipalities outside of the basin coming into the Colorado River Basin to obtain surface and ground-water to the detriment of the inhabitants of the basin when those municipalities have made inadequate efforts to institute water conservation practices to extend the life of their own water supplies or resorted to water projects in their own areas to meet their water needs; and

WHEREAS, THE Burnet County Commissioners' Court is equally concerned about major municipalities outside of the basin coming into the Colorado River Basin to construct dams and creating reservoirs to meet their water supply needs; and

WHEREAS, the said Burnet County Commissioners; Court is concerned about dam and reservoir projects, the construction of which would displace our population, decrease our quality of life, diminish our tax bases, and reduce our economic opportunity, all to the detriment of the citizens of this basin.

BE IT RESOLVED BY THE BURNET COUNTY COMMISSIONERS' COURT that the Lower Colorado Regional Water Planning Group consider this resolution when creating a final water plan for this region, consider the effect of activities that would impact our populations and tax bases, and oppose the construction of water supply projects involving dams and reservoirs for water supply of distant municipalities outside of the basin.

PASSED AND APPROVED this 24th day of January, 2000, by the Burnet County Commissioners' Court.

Martin McLean

Martin McLean
Burnet County Judge

James Holbrook

James Holbrook
Commissioner, Precinct 1

Homer Feild

Homer (Buddy) Feild
Commissioner, Precinct 2

George DeSpain

George DeSpain
Commissioner, Precinct 3

James Oakley

James Oakley
Commissioner, Precinct 4

ATTEST:

Janet Parker

Janet Parker
Burnet County Clerk

City of Goldthwaite Utilities

1218 FISHER STREET – P. O. BOX 450
GOLDTHWAITE, TEXAS 76844
915-648-3186
Electric — Water — Wastewater

City of Goldthwaite Resolution

Whereas, water is a precious commodity, the means to sustain life and to enable economic development;

Whereas, the waters of the Colorado River Basin have always been carefully conserved, managed and protected by the inhabitants of the basin, who have strong opinion and belief that conservation of water should be the primary scope of any water plan;

Whereas, the undersigned City Council of the City of Goldthwaite in the Colorado River Basin are opposed to transferring water from the counties to areas outside of the basin, which effectively transfers our economic opportunity to others;

Whereas, the said City of Goldthwaite/City Council are concerned about major municipalities outside of the basin coming into the Colorado River Basin to obtain surface and groundwater to the detriment of the inhabitants of the basin when those municipalities have made inadequate efforts to institute water conservation practices to extend the life of their own water supplies or resorted to water projects in their own areas to meet their water needs;

Whereas, the said City of Goldthwaite/City Council are equally concerned about major outside basin municipalities coming into the Colorado River Basin to construct dams and creating reservoirs to meet their water supply needs;

Whereas, the said City of Goldthwaite/City Council are concerned about dam and reservoir projects, the construction of which would displace our population, decrease our quality of life, diminish our tax bases, and reduce our economic opportunity, all to the detriment of the citizens of this basin, unless said dams and reservoir projects are done with the support and concurrence of the respective City of Goldthwaite/City Council.

Be it resolved by the undersigned City of Goldthwaite/City Council that the Lower Colorado Regional Water Planning Group consider the resolution when creating a final water plan for this region, consider the effects of activities that would impact our populations and tax bases, and oppose the construction of water supply projects involving dams and reservoirs for water supply of distant municipalities outside of the basin.

PASSED AND APPROVED this 3rd day of February, 2000, by the City Council of the City of Goldthwaite, Richard Poss, Mayor

Mayor Richard Poss Richard Poss	Alderperson Judy Beavers Judy P Beavers	Alderperson Ramona Flores Ramona Flores	Alderperson Jim Landry Jim Landry
	Alderperson Craig Smith Craig Smith	Alderperson Darrell Wilson Darrell	

CITY OF GOLDTHWAITE

RESOLUTION

WHEREAS, the City Council of the City of Goldthwaite desires to be included in the State of Texas Fifty-Year Water Plan, as mandated by Senate Bill 1, and

WHEREAS, the City Council of the City of Goldthwaite recognizes the need for a long-term water plan, statewide, as well as locally, to address future water needs, and

WHEREAS, the City Council of the City of Goldthwaite has reviewed and deliberated the City of Goldthwaite Fifty-Year Water Plan, as prepared by the City Administration, and

WHEREAS, the City of Goldthwaite Fifty-Year Water Plan focuses on the City's needs; it also considers the interests of the Mills County residents, and

WHEREAS, the City Council of the City of Goldthwaite approves and supports the City of Goldthwaite Fifty-Year Water Plan.

THEREFORE, BE IT RESOLVED that the City Council of the City of Goldthwaite does hereby request the City of Goldthwaite Fifty-Year Water Plan be approved by the Lower Colorado Regional Planning Group, Region K, and be submitted as a part of its final water plan recommendation for this region.

PASSED AND APPROVED this 6th day of July, 2000, by the City Council of the City of Goldthwaite, Richard Poss, Mayor.

Richard Poss	Judy Beavers	
Mayor, Richard Poss	Alderperson, Judy Beavers	Alderperson, Frank Bridges
Ramona Flores	Jim Landry	
Alderperson, Ramona Flores	Alderperson, Jim Landry	Alderperson, Darrell Wilson

STATE OF TEXTS

§
§ **RESOLUTION #071300-01**
§

COUNTY OF TRAVIS

BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT RESOLUTION ADDRESSING MANAGEMENT STRATEGIES FOR INCLUSION IN THE LOWER COLORADO REGIONAL WATER PLAN

WHEREAS, the Lower Colorado Regional Water Planning Group's (Region K) planning area includes those portions of Travis and Hays Counties within the Colorado River basin; and,

WHEREAS, Region K has the responsibility to identify water management strategies in the Regional Water Plan to address unmet water needs within their planning area through the 50-year Senate Bill 1 planning horizon until the year 2050; and,

WHEREAS, Region K has identified a 3,594 acre-foot deficit for that portion of Hays County in the rural areas outside of Buda and Dripping Springs' jurisdiction within the Colorado River basin; and,

WHEREAS, that portion of rural Hays County includes the watershed basins of Barton and Onion Creeks which comprise the Contributing Zone and Recharge Zone of the Barton Springs segment of the Edwards Aquifer (BSEA) and portions of the Extended Service Area of the Barton Springs/Edwards Aquifer Conservation District (District); and,

WHEREAS, the District's mandate is to conserve, protect, and enhance the groundwater resources of the BSEA and other groundwater resources located within the District's boundaries and to prevent the waste of groundwater; and,

WHEREAS, the District has the statutory authority to protect rights of owners of interest in groundwater and for the sustainability of this resource as the sole source of drinking water for about 45,000 people, as well as water for agriculture, industry, commerce, and recreation and for the habitat of endangered species; and,

WHEREAS, the District does not support mining of the BSEA. Groundwater models have indicated that current levels of total pumpage can result in dewatering of some areas currently reliant on groundwater and drying of Barton Springs during periods of drought. The District will establish the methodology to be used to determine the carrying capacity and sustainable yield of the BSEA to set a cap on the amount of groundwater that will be permitted to be withdrawn in the future. The District will not permit any additional regulated pumpage withdrawals from the BSEA that when combined with the existing permitted non-exempt pumpage, the estimated withdrawals from exempt pumpage, and the minimum historic springflow that would exceed these pumpage limits; and,

WHEREAS, the BSEA has long been recognized as the Texas drinking water aquifer that is the most vulnerable to contamination. The health of the BSEA depends on the quantity and quality of the water that recharges it, most of which falls inside the Contributing Zone, outside the District boundaries. While the District has no authority over zoning or the subdivision or use of land, inside or outside of its jurisdiction, the District will defend the aquifer against any actions or conditions that might imperil its continued use for these purposes -- including development that occurs in the Contributing and Recharge Zones; and,

WHEREAS, recent scientific studies have confirmed that the aquifer is susceptible to depletion due to drought or overpumping. The District recognizes the adverse impact this may have on exempt and non-exempt well owners, on the base flow of the Colorado River, on the movement of the bad water zone, and on springflow. The District will implement all available management strategies in an effort to preserve groundwater to meet the needs of the well owners and to preserve at least the historic minimum springflow at Barton Springs to retain local control of the groundwater resource and avoid state or federal intervention to enforce the Endangered Species Act. The District also realizes that in times of extreme drought there may be a cessation of springflow even under current accepted management practices. In cases of such extreme nature, groundwater from the aquifer may be used when and to the extent it is necessary to prevent danger to public health, safety, or welfare, and to maintain a subsistence level of water use for agriculture, industry, and commerce utilizing management concepts such as interruptible supply and the prioritization of beneficial groundwater use; and,

NOW THEREFORE, WE, the Board of Directors of the District do hereby resolve that Region K should include the following recommendations as management strategies to meet the identified water shortages in northern Hays County in order to be prepared for drought and to avoid depleting the BSEA, with consideration given to their proactive approach, ease of implementation, and economic feasibility:

1. The District will work cooperatively with the providers of surface water in northern Hays County to make conjunctive sources of water available to those who are otherwise dependent on groundwater. But, the District will oppose extending surface water into sensitive areas where development fostered by this service provision could threaten the continued use of the BSEA as a drinking water source without development controls being established that will cause no measurable or predicted degradation of the water quality from the harmful effects of urban and suburban growth and other land use practices. In general, development east of the Recharge Zone would not be likely to degrade the quality of the BSEA.

   The District supports the Guadalupe-Blanco River Authority I-35 water line from the San Marcos treatment plant to serve areas within northern Hays County east of the Recharge Zone. If this surface water were to be extended onto the Contributing or Recharge Zones, the District would require development controls.

   The District acknowledges the Lower Colorado River Authority's intentions to serve the existing population in those areas of northern Hays County in Dripping Springs currently dependent upon the Trinity aquifer. The District will not support the provision of additional surface water to new developments in the Recharge and Contributing Zones until nondegredation development controls are established following the completion of an Environmental Impact Statement that accurately identifies potential degradation and conservatively evaluates all potential means to mitigate or eliminate potential water quality and source water problems.

Both of these projects are discussed in the District's 1997 Alternative Regional Water Supply Plan.

2. The District supports the increase of recharge of the BSEA in an environmentally and fiscally sound manner. Recharge enhancement projects should be investigated on all of the recharge creeks within the BSEA. Projects on Onion Creek have been studied in the past. These projects can be designed to provide flood mitigation of downstream landowners, could make surface water available in the Contributing Zone and on the western edge of the Recharge Zone -- including the Dripping Springs area, and provide for the increase in the amount of groundwater recharged into the BSEA. Similar development controls would be required by the District for use of any combination surface water/recharge supply project to provide water to new development on the Contributing and Recharge Zones.

   The opportunity exists to create partnerships with private entities and local, state and federal governments to accomplish these projects. Prior to choosing project sites and implementing any recharge enhancement structures, sufficient site assessment must be completed to ensure that the dynamics of the BSEA are understood on that particular site -- prior to the construction of these projects. Flow loss measurements must be determined to calculate the recharge characteristics of the site and groundwater tracing must be done to determine the travel time and direction of enhanced recharge.

   The District supports the study of the feasibility of the proposed Driftwood Dam and Reservoir, or some variation thereof resulting from additional research efforts. Specifically, with the recent acquisition of the Sky Ranch by the City of Austin, the possibility exists to pursue this project in partnership with other interested parties. This project would be constructed west of the Recharge Zone and could serve the multiple purposes described above – flood mitigation, surface water reservoir and recharge enhancement.

   Additionally, the District supports the development of a series of check dams on Onion Creek. These structures would be low profile dams and would be designed to capture storm flows on the Recharge Zone; thereby providing direct recharge into the BSEA.

   Both of these projects were studied in some detail in the District's 1990 Regional Water Plan.

3. The District supports the pursuit of aggressive Education, Conservation, and Planning programs. The District currently has an excellent Education program that explores a variety of outlets to inform the public of vital issues. Avenues including, but not limited to, publications, presentations, community events, and school programs provide meaningful outlets for the District's messages, though the accumulated benefits of these activities are difficult to quantify. This program should be supported to continue its current activities and encouraged to expand into conservation and planning programs. Planning programs seek to establish two-way communication between the District and the community in order to more effectively allocate District resources towards the best management of the resource. Conservation programs seek to implement activities that produce more immediately quantifiable results including, but not limited to, rebates for plumbing retrofits, incentives for drought-tolerant landscaping, and commercial, municipal, and domestic water use audits.

District resources towards the best management of the resource. Conservation programs seek to implement activities that produce more immediately quantifiable results including, but not limited to, rebates for plumbing retrofits, incentives for drought-tolerant landscaping, and commercial, municipal, and domestic water use audits.

4. The District supports the pursuit of the reuse of treated wastewater, if proven safe, to replace the dependency on potable groundwater. The District's primary consideration is that groundwater quality would be protected as treated effluent was used in environmentally sensitive areas. Treated effluent standards identified and recommended by the District -- especially pertaining to inherent viruses, bacteria, nutrients, organic constituents from household chemicals, chlorides, sulfates, dissolved oxygen and the accumulation of heavy metals must be developed. The District should pursue research studies that are designed to develop a true understanding of the ramifications and potential problems associated with treated wastewater reuse. During specific project development, the District would provide expertise and on-site hydrogeologic assessments to ensure that critical recharge features were identified and protected during construction, and in the long-term maintenance of the reuse project. The developer would be encouraged to contribute funding and other in-kind services for the research. Specific research should include timely analysis of the quality of the treated effluent, dye trace studies injected on the site of the project and the collection of baseline water quality data from nearby wells to the reuse site that may potentially be impacted by the project.

5. The District supports the further study of the recirculation of groundwater that was originally examined in the 1997 Alternative Regional Water Supply Plan.

6. The District supports the initiation of a study to examine the feasibility of springflow augmentation as a management strategy to be implemented to preserve minimum springflow during times of extreme drought.

The motion passed with 3 ayes, 0 nays, and 1 abstentions.

PASSED AND APPROVED THIS 13th DAY OF July, 2000.

Craig Smith

Craig Smith, President

ATTESTED BY:

Don Turner

Don Turner, Secretary

AUG 10 2000 15:25 PAGE.05

DEC-11-2000 MON 05:02 PM ALAN PLUMMER ASSOCIATES FAX NO. 5124522325 P. 02

Aug-03-00 09:05A City of Pflugerville 51 31 8525 P.02

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PFLUGERVILLE, TEXAS SUPPORTING PROPOSED LONG-TERM WATER PROJECTS

WHEREAS, The Lower Colorado River Water Planning Group (LCRWPG) is responsible for preparing the regional water plan for Region K as required by Senate Bill 1 of the 1997 Texas Legislature; and

WHEREAS, the LCRWPG requests input from all water providers in the region regarding the providers' long-term water plans; and

WHEREAS, the City of Pflugerville has previously and is currently studying several options to provide water to the households and businesses on the City of Pflugerville water system; NOW THEREFORE

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PFLUGERVILLE, TEXAS:

That the City Council hereby requests that the following projects being studied are included in the Region K Water Plan.

- Transmitting groundwater from the Carizzo –Wilcox Aquifer,
- Purchasing treated water, off-peak, from the City of Austin and storing it in an aquifer storage and recovery system before distribution, and
- Purchasing surface water from the Colorado River, transmitting it, storing it, and treating it.

APPROVED this 25th of July, 2000

CITY OF PFLUGERVILLE, TEXAS

By: [signature]
DOYLE BRIDGEFARMER, MAYOR

ATTEST:

Karen Thompson
KAREN THOMPSON, CITY SECRETARY

07/20/00

RESOLUTION 2000-08-01

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LLANO, TEXAS ADOPTING THE FUTURE WATER COMMITTEE REPORT OF AUGUST 7, 2000 AND THANKING THE COMMITTEE FOR THEIR COMMITMENT TO THIS PROJECT.

NOW, THEREFORE BE IT RESOLVED by the City Council of the City of Llano:

WHEREAS, the future water committee was appointed by the Llano City Council in February of 2000, to explore the facts in order to determine the future water needs of the city; and

WHEREAS, the committee met numerous times to confer with experts to discuss the relevant issues and to produce a report to City Council; and

WHEREAS, this three (3) part report give the City Council and the Regional water Planning Group insight into our local water needs;

NOW THEREFOR BE IT RESOLVED BY THE LLANO CITY COUNCIL that the "Water for the Future Committee Report" of August 7, 2000 is hereby adopted for future reference and that the committee of Richard Arellano, Henry Buttery, Roger Pinckney, Bill Stewart, Taylor Virdell, Sr. and Mark Virdell are heartily thanked for their service to the City. The City Council also acknowledges the assistance of Mike Reagor, Philip Cook and Mark Sherley in developing the report.

PASSED AND APPROVED this the 21st day of August, 2000

T. Hutto
Terry Hutto, Mayor

ATTEST:

Martha Box
Martha Box, City Secretary

RESOLUTION NO. 2000-17

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a Regional Plan that would become pan of a comprehensive Texas Water Plan; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, the Lower Colorado Regional Water Planning Group (LCRWPG) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, after almost three years of research and study, the LCPWPG adopted those strategies so as to provide for the region's future water and will forward their Regional Water Plan to the Texas Water Development Board for consideration to be included in the Texas Water Plan;

Now Therefore, be it resolved by the City Council of the City of Burnet, Texas, approves this plan which has been designed to fairly and equitably provide for the future water needs of our area and of the region, and that we support acceptance of the Regional Water Plan by the Texas Water Development Board.

PASSED AND APPROVED this the 28th day of September, 2000.

CITY OF BURNET TEXAS

Howard R. Benton

Howard R. Benton, Mayor

ATTEST:

Joyce Laudenschlager

Joyce Laudenschlager, City Secretary

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

WHEREAS, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

WHEREAS, Region K was designated as one of the sixteen regions mandated to create a Regional Plan that would become part of a comprehensive Texas Water Plan; and,

WHEREAS, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

WHEREAS, the Lower Colorado Regional Water Planning Group (LCRWPG) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

WHEREAS, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their Regional Water Plan to the Texas Water Development Board for consideration to be included in the Texas Water Plan;

NOW, THEREFORE, be it resolved by the Commissioners Court of Fayette County that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the Regional Water Plan by the Texas Water Development Board.

Adopted this 29th day of September, 2000.

Edward F. Janecka
Fayette County Judge

ABSENT
Lawrence Adamcik
Commissioner, Precinct 1

Wilbert Gross
Wilbert Gross
Commissioner, Precinct 3

Gary Weishuhn
Commissioner, Precinct 2

Tom Muras
Commissioner, Precinct 4

**RESOLUTION IN SUPPORT OF THE
LOWER COLORADO REGIONAL WATER PLAN**

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, The **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Whereas, the LCRWPG conclusions with regard to export of water from the basin, particularly the 5,450 acre-feet per year of groundwater from Bastrop County, are just and reasonable, and supported by technical data;

Now Therefore, be it resolved by the Commissioners' Court of the County of Bastrop that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED AND APPROVED this 23rd day of October, 2000, by the Commissioners' Court of the County of Bastrop.

Ronnie McDonald
Ronnie McDonald
Bastrop County Judge

John A. Sanders
John A. Sanders, Commissioner Pct. 1

Charles McKeown, Commissioner Pct. 2

G. L. Hanna
G. L. Hanna, Commissioner Pct. 3

Lee Dildy, Commissioner Pct. 4

ATTEST:

Shirley Wilhelm
Shirley Wilhelm
County Clerk

RESOLUTION NO. 2000-11-02

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan;** and

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Whereas, the LCRWPG conclusions with regard to export of water from the basin, particularly the 5,450 acre-feet per year of groundwater from Bastrop County, are just and reasonable, and supported by technical data;

Now Therefore, be it resolved by the City Council of the City of Elgin that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED and APPROVED this 7th day of November, 2000, by the City Council of the City of Elgin, Texas.

Eric W. Carlson

ERIC W. CARLSON, MAYOR
City of Elgin, Texas

ATTEST:

Shirley Garvel

SHIRLEY GARVEL, City Secretary

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th Legislature passed Senate Bill I in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan; and,**

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Group and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Water Development Board for consideration to be included in the **Texas Water Plan**;

Now Therefore, be it resolved by the Commissioners Court of Mills County, Texas, that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED AND APPROVED this 10th day of October 2000, by the Mills County Commissioners' Court.

Randy Wright

Randy Wright, Mills County Judge

FILED FOR RECORD
At 11 O'clock A M
OCT 10 2000 BLR
BUELAH L. ROBERTS
County and District Clerk
Mills County, Texas
By__________Deputy

Carroll Bunting

Joe Karnes, Commissioner Precinct 1

Carroll Bunting, Commissioner Precinct 2

Dale Henry

James R Miller

Dale Henry, Commissioner Precinct 3

James Miller, Commissioner Precinct 4

STATE OF TEXAS §
§ **RESOLUTION #111600-01**
COUNTY OF TRAVIS §

BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICTS RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Now therefore, be it resolved by the Barton Springs/Edwards Aquifer Conservation District, whose jurisdiction includes parts of Travis, Hays, Bastrop and Caldwell Counties, that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board. The District recommends that Region K consider sustainability as the driving criteria for preparing future water plans for Region K.

The motion passed with 4 ayes, and 0 nays.

PASSED AND APPROVED THIS 16th DAY OF Nov ,2000.

CRAIG SMITH, President

ATTESTED BY:

DON TURNER, Secretary

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

WHEREAS, the 75th Legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

WHEREAS, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

WHEREAS, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and

WHEREAS, the **Lower Colorado Regional Water Planning Group** (**LCRWPG**) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

WHEREAS, after almost three years of research and study, the **LCRWPG** adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan**;

NOW THEREFORE, be it resolved by the Commissioners Court of Colorado County that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

A. G. Jamison

A. G. Jamison, County Judge

Richard Seifert

Richard Seifert, Prct. No. 1

Herbie Helmcamp

Herbie Helmcamp, Prct. No. 2

Tommy Hahn

Tommy Hahn, Prct. No. 3

Darrell Gertson

Darrell Gertson, Prct. No. 4

ATTEST:

Darlene Hayek

Darlene Hayek, County Clerk

AARO

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

WHEREAS, the Austin Area Research Organization (AARO) believes that the region needs a long-term adequate affordable water supply to satisfy municipal, farming and ranching, mining, manufacturing and steam electric demands; and,

WHEREAS, satisfaction of the region's water needs should not deteriorate, but possibly improve the region's ecology; and,

WHEREAS, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

WHEREAS, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

WHEREAS, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

WHEREAS, the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

WHEREAS, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan**;

NOW THEREFORE, be it resolved by the Austin Area Research Organization, that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that the members of AARO support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED AND APPROVED this 13th day of November 2000, by the Austin Area Research Organization.

W. Neal Kocurek

W. Neal Kocurek
President
AARO

AUSTIN AREA RESEARCH ORGANIZATION, INC.
221 WEST SIXTH STREET SUITE 1240, AUSTIN, TEXAS 78701 TELEPHONE 477-4000 FAX 477-5366

11/14/2000 15:41 5122677070 CITY OF LAGO VISTA PAGE 02

CITY OF LAGO VISTA, TEXAS

RESOLUTION 00-975

A RESOLUTION BY THE CITY COUNCIL OF THE CITY OF LAGO VISTA SUPPORTING THE LOWER COLORADO REGIONAL WATER PLAN.

WHEREAS, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years, and,

WHEREAS, Region K was designated as one of the sixteen regions mandated to create a Regional Plan that would become part of a comprehensive Texas Water Plan, and,

WHEREAS, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the lower Colorado River basin, and,

WHEREAS, the Lower Colorado Regional Water Planning Group (LCRWPG) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply, and,

WHEREAS, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their Regional Water Plan to the Texas Water Department Board for consideration to be included in the Texas Water Plan.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LAGO VISTA, TEXAS:

THAT, the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that the City Council the City of Lago Vista, Texas supports acceptance of the Regional Water Plan by the Texas Water Development Board.

AND, IT IS SO RESOLVED.

On a motion by Alderman Fred Marlow, second by Alderman Jo Anne Malloy the above and foregoing resolution was passed and approved this 9th day of November 2000.

Dennis Jones

Dennis Jones, Mayor

ATTEST:

Joyce W. Stapleton

Joyce W. Stapleton, City Secretary

City of Lakeway
Resolution No. 2000-10-16-2

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LAKEWAY SUPPORTING THE LOWER COLORADO REGIONAL WATER PLAN BY THE TEXAS WATER DEVELOPMENT BOARD

WHEREAS, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years, and;

WHEREAS, Region K was designated as one of the sixteen regions mandated to create a Regional Plan that would become part of a comprehensive Texas Water Plan; and

WHEREAS, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the lower Colorado River basin; and

WHEREAS, the Lower Colorado Regional Water Planning Group (LCRWPG) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and

WHEREAS, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their Regional Water Plan to the Texas Water Development Board for consideration to be included in the Texas Water Plan.

NOW THEREFORE BE IT RESOLVED by the City Council of the City of Lakeway, Travis County, Texas, that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the Regional Water Plan by the Texas Water Development Board.

APPROVED THIS 16TH day of OCTOBER, 2000.

Charles A. Edwards, Mayor

CITY OF LAKEWAY SEAL STATE OF TEXAS

Attest:

Cynthia A. Evans

Cynthia A. Evans, City Secretary

NO. R-2000-30

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, The **Lower Colorado Regional Water Planning Group (LCRWPG)**sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Whereas, the LCRWPG conclusions with regard to export of water from the basin, particularly the 5,450 acre-feet per year of groundwater from Bastrop County, are just and reasonable, and supported by technical data;

Now Therefore, be it resolved by the City Council of the City of Bastrop that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED AND APPROVED this 14th day of Nov., 2000, by the City Council of the City of Bastrop Texas.

Tom Scott

Tom Scott
Mayor of Bastrop

ATTEST:

Teresa Miertschin

Teresa Miertschin
Secretary

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, *the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and*

Whereas, *Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and*

Whereas, *Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and*

Whereas, *the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and*

Whereas, *After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;***

Now therefore be it resolved by the Commissioners' Court of Matagorda County *that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board, provided that environmental concerns (i.e.: fresh water inflows into Matagorda Bay are maintained).*

Attest:

Gail Denn, County Clerk

Approved:

Greg B. Westmoreland, County Judge

Mike Pruett, Commissioner Pct. #1

George Deshotels, Commissioner Pct. #2

Leonard Lamar, Commissioner Pct. #3

Percy Carroll, Commissioner Pct. #4

THE COUNTY OF LLANO
LLANO, TEXAS

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, the **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Now Therefore, be it resolved by the Commissioners Court of Llano County, Texas, that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned

PASSED AND APPROVED this 13th day of November, 2000, by the Llano County Commissioners' Court.

J.P. Dodgen, Llano County Judge

Bill Kinney, Commissioner, Precinct 1

Keith Faulkner, Commissioner, Precinct 2

Duane Stueven, Commissioner, Precinct 3

Leon Tucker, Commissioner, Precinct 4

ATTEST:

Bette Sue Hoy, Llano County Clerk

RESOLUTION IN SUPPORT OF THE LOWER COLORADO REGION WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and

Whereas, the Lower Colorado Regional Water Planning Group (LCRWPG) sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, after almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan**;

Now Therefore, be it resolved by the Wharton County Commissioners Court of Wharton County that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board..

Signed this 23rd day of October, 2000.

Lawrence E. Naiser
County Judge

Mickey Reynolds
Commissioner, Precinct 1

Philip Miller
Commissioner, Precinct 3

D. C. "Chris" King
Commissioner, Precinct 2

James Kainer
Commissioner, Precinct 4

ATTEST:

Sandra K. Sanders

RESOLUTION IN SUPPORT OF THE
LOWER COLORADO REGIONAL WATER PLAN

Whereas, the 75th legislature passed Senate Bill 1 in 1997 to address the water needs for Texas for the next 50 years; and,

Whereas, Region K was designated as one of the sixteen regions mandated to create a **Regional Plan** that would become part of a comprehensive **Texas Water Plan**; and,

Whereas, Region K was subsequently titled the Lower Colorado Regional Water Planning Area and encompasses all or portions of fourteen counties in the Colorado River Basin; and,

Whereas, The **Lower Colorado Regional Water Planning Group (LCRWPG)** sought and retained expert counsel and authorities to determine the future water needs of the region and to recommend strategies to address possible deficiencies in the water supply; and,

Whereas, After almost three years of research and study, the LCRWPG adopted those strategies so as to provide for the region's future water needs and will forward their **Regional Water Plan** to the Texas Water Development Board for consideration to be included in the **Texas Water Plan;**

Whereas, the LCRWPG conclusions with regard to export of water from the basin, particularly the 5,450 acre-feet per year of groundwater from Bastrop County, are just and reasonable, and supported by technical data;

Now Therefore, be it resolved by the City Council of the City of Smithville that the Plan is designed to fairly and equitably provide for the future water needs of our area and of the region and that we the undersigned support acceptance of the **Regional Water Plan** by the Texas Water Development Board.

PASSED AND APPROVED this 13th day of November, 2000, by the City Council of the City of Smithville, Texas.

Renee D Blaschke
Renee Blaschke
Mayor of Smithville

ATTEST:
Brenda C. Page
Brenda C. Page
Secretary

APPENDIX 8B

INFORMATION PROVIDED BY THE TPWD, LCRA, BCEN, AND REGION G FOR THE IDENTIFICATION OF ECOLOGICALLY UNIQUE STREAM SEGMENTS IN THE LOWER COLORADO REGIONAL WATER PLANNING AREA

TPWD List of Ecologically Significant Stream Segments

Lower Colorado Regional Water Planning Area (Region K)

Ecologically Unique River and Stream Segments

As a result of the passage of Senate Bill 1 in 1997, water planning in Texas became the domain of regional planning groups rather than the Texas Water Development Board (TWDB). For the Lower Colorado River basin, which extends from Mills County to Matagorda County, the Lower Colorado Regional Water Planning Group (LCRWPG) was established to plan for the next 50 years of water needs within the region. As a part of the planning process, the LCRWPG may include in the adopted regional water plan recommendations for the designation of ecologically unique river and stream segments within the region. In accordance with the TWDB's rules, the following criteria are to be used when recommending a river or stream segment as being of unique ecological value:

- Biological Function: Segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats.

- Hydrologic Function: Segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge;

- Riparian Conservation Areas: Segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes under a governmentally approved conservation plan;

- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: Segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality; or

- Threatened or Endangered Species/Unique Communities: Sites along segments where water development projects would have significant detrimental effects on state or federally listed threatened and endangered species, and sites along segments that are significant due to the presence of unique, exemplary, or unusually extensive natural communities.

The Texas legislature can officially designate stream segments as being of unique ecological value following nomination of stream segment by a regional planning group. By so doing, a state agency or political subdivision may not obtain a fee title or an easement that would destroy the unique ecological value of a designated stream. It should be noted that these stream segments do not have to correspond to classified water quality segments.

The Texas Parks and Wildlife Department identified several river and stream segments within the Lower Colorado River basin that are ecologically significant based upon the aforementioned criteria. The following list and tables are streams that satisfy at least one of the criteria defined in Senate Bill 1 (1997) for ecologically unique river and stream segments. An * indicates those segments considered of highest importance by TPWD biologists.

Ecologically Significant River and Stream Segments in the Lower Colorado Regional Water Planning Area

***Barton Creek** - From the confluence with Town Lake in Austin in Travis County upstream to FM 12 in Hays County (TNRCC stream segment 1430)
R. Cons. Area: Zilker Park
Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
End/Threat: Only known location of Barton Springs salamander[14,17]

Blanco River - From the Blanco/Hays County line to the Blanco/Kendall County line (within TNRCC stream segment 1813)
R. Cons. Area: Blanco State Park
Aq. Life: Overall use[4]

***Bull Creek** - From the confluence with Lake Austin in Austin in Travis County upstream to its headwaters west of Jollyville in north central Travis County
Biol. Function: Nearly pristine stream with a largely intact riparian area
Hydr. Function: Largely intact riparian area functions to reduce downstream flooding
R. Cons. Area: Bull Creek Preserve
Aq. Life: Overall pristine nature lends it a particularly high aesthetic value; Benthic macroinvertebrates[19]; Amphibians[19]
End/Threat: Jollyville Plateau salamander[19]

Cedar Lake Creek (Matagorda County)
R. Cons. Area: San Bernard National Wildlife Refuge; Part of the Great Texas Coastal Birding Trail
End/Threat: Reddish egret, Wood stork, Brown pelican, White-faced ibis[36]

Colorado River - From the Lampasas/San Saba/Mills County line upstream to the Brown/Mills/San Saba County line (within TNRCC stream segments 1409 and 1410)
Biol. Function: Texas Natural Rivers System nominee[10]; White bass spawning area[14]
R. Cons. Area: Colorado Bend State Park
Aq. Life: Exceptional aesthetic value[10]
End/Threat: Concho water snake[13]; Very rare, endemic Texas fawnfoot and one of only four known remaining populations of endemic Texas pimpleback [41]

***Colorado River** - From La Grange in Fayette County upstream to Longhorn Dam in Travis County (TNRCC stream segments 1434 and 1428)
Aq. Life: Overall use[4]
End/Threat: Blue sucker[16]

Colorado River - From a point 1.3 miles downstream of the Missouri-Pacific Railroad in Matagorda County upstream to La Grange in Fayette County (TNRCC stream segment 1402)
End/Threat: Blue sucker[16]

Colorado River - From the confluence with the Gulf of Mexico in Matagorda County to a point 1 3 miles downstream of the Missouri-Pacific Railroad in Matagorda County (TNRCC stream segment 1401)
Biol. Function: Unique habitat-Extensive freshwater wetland habitat[14]

Cummins Creek - From the confluence with the Colorado River in Colorado County upstream to SH 159 in Fayette County
Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]

Gorman Creek (San Saba County)
R. Cons. Area: Colorado Bend State Park

Little Barton Creek - From the confluence with Barton Creek three miles southeast of Bee Caves in Travis County upstream to its headwaters four miles east of Shingle Hills in west Travis County
Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]

Little Blanco River - From the Blanco/Comal County line upstream to its headwaters near Twin Sisters in the southern part of Blanco County
Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]

Oatmeal Creek - From the confluence with the San Gabriel River three miles southeast of Bertram in Burnet County upstream to its headwaters located 6.5 miles southeast of Burnet in east Burnet County
Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]

Onion Creek - From the confluence with the Colorado River in Travis County to the most upstream crossing of FM 165 in Blanco County (TNRCC stream segment 1427)
R. Cons. Area: McKinney Falls State Park
Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]

***Pedernales River** - From a point immediately upstream of the confluence of Fall Creek in Travis County to FM 385 in Kimble County (TNRCC stream segment 1414)
Biol. Function: National Wild and Scenic Rivers System nominee, Significant natural area[10]
R. Cons. Area: Pedernales Falls State Park; Stonewall Park; LBJ State Park; LBJ National Park
Aq. Life: Exceptional aesthetic value[10]

***Rocky Creek** - From the confluence with the Lampasas River 0.5 mile northeast of Oakalla in Burnet County upstream to the union of North and South Rocky creeks 4.5 miles southwest of Oakalla in the northeastern corner of Burnet County
Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]

Table 3. Streams that meet the riparian conservation area criteria (31 TAC 357.8 (b) (3)).

River or Stream Segment	County	Conservation Area
Barton Creek	Travis	Zilker Park
Blanco River	Blanco	Blanco State Park
Bull Creek	Travis	Bull Creek Preserve
Cedar Lake Creek	Matagorda	San Bernard National Wildlife Refuge; Part of the Great Texas Coastal Birding Trail
Colorado River	San Saba	Colorado Bend State Park
Gorman Creek	San Saba	Colorado Bend State Park
Onion Creek	Travis	McKinney Falls State Park
Pedernales River	Gillespie	Pedernales Falls State Park; Stonewall Park; LBJ State Park; LBJ National Park
San Bernard River	Wharton	Attwater Prairie Chicken NWR

Table 4. Streams that meet the high water quality/exceptional aquatic life/high aesthetic value criteria (31 TAC 357.8 (b) (4)).

River or Stream Segment	County	Significance
Barton Creek	Travis	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Blanco River	Blanco	Overall use[4]
Blanco River	Hays	Overall use[4]
Bull Creek	Travis	Benthic macroinvertebrates[19]; Amphibians[19]; High aesthetic value
Colorado River	San Saba	Exceptional aesthetic value[10]
Colorado River	Mills	Exceptional aesthetic value[10]
Colorado River	Fayette	Overall use[4]
Cummins Creek	Colorado	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2], Fish[1,3]
Cummins Creek	Fayette	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2], Fish[1,3]
Little Barton Creek	Travis	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]
Little Blanco River	Blanco	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Oatmeal Creek	Burnet	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]
Onion Creek	Travis	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Onion Creek	Blanco	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Pedernales River	Travis	Exceptional aesthetic value[10]
Pedernales River	Blanco	Exceptional aesthetic value[10]

Table 3. Streams that meet the riparian conservation area criteria (31 TAC 357.8 (b) (3)).

River or Stream Segment	County	Conservation Area
Barton Creek	Travis	Zilker Park
Blanco River	Blanco	Blanco State Park
Bull Creek	Travis	Bull Creek Preserve
Cedar Lake Creek	Matagorda	San Bernard National Wildlife Refuge; Part of the Great Texas Coastal Birding Trail
Colorado River	San Saba	Colorado Bend State Park
Gorman Creek	San Saba	Colorado Bend State Park
Onion Creek	Travis	McKinney Falls State Park
Pedernales River	Gillespie	Pedernales Falls State Park; Stonewall Park; LBJ State Park; LBJ National Park
San Bernard River	Wharton	Attwater Prairie Chicken NWR

Table 4. Streams that meet the high water quality/exceptional aquatic life/high aesthetic value criteria (31 TAC 357.8 (b) (4)).

River or Stream Segment	County	Significance
Barton Creek	Travis	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Blanco River	Blanco	Overall use[4]
Blanco River	Hays	Overall use[4]
Bull Creek	Travis	Benthic macroinvertebrates[19]; Amphibians[19]; High aesthetic value
Colorado River	San Saba	Exceptional aesthetic value[10]
Colorado River	Mills	Exceptional aesthetic value[10]
Colorado River	Fayette	Overall use[4]
Cummins Creek	Colorado	Ecoregion Stream[1], Benthic macroinvertebrates[1,2], Fish[1,3]
Cummins Creek	Fayette	Ecoregion Stream[1], Benthic macroinvertebrates[1,2], Fish[1,3]
Little Barton Creek	Travis	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]
Little Blanco River	Blanco	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Oatmeal Creek	Burnet	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]
Onion Creek	Travis	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Onion Creek	Blanco	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]
Pedernales River	Travis	Exceptional aesthetic value[10]
Pedernales River	Blanco	Exceptional aesthetic value[10]

Pedernales River	Gillespie	Exceptional aesthetic value[10]
Rocky Creek	Burnet	Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]
Tres Palacios Creek Tidal	Matagorda	Overall use[4]
West Bernard Creek	Wharton	Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]

Table 5. Streams that meet the threatened or endangered species/unique community criteria (31 TAC 357.8 (b) (5)).

River or Stream Segment	County	Significance
Barton Creek	Travis	Only known location of Barton Springs salamander[14,17]
Bull Creek	Travis	Jollyville Plateau salamander[19]
Cedar Lake Creek	Matagorda	Reddish egret, Wood stork, Brown pelican, White-faced ibis[36]
Colorado River	San Saba	Concho water snake[13]; Texas fawnfoot[41]; Texas pimpleback[41]
Colorado River	Mills	Concho water snake[13]; Texas fawnfoot[41]; Texas pimpleback[41]
Colorado River	Fayette	Blue sucker[16]
Colorado River	Matagorda	Blue sucker[16]
Colorado River	Fayette	Blue sucker[16]
San Bernard River	Wharton	Unique community-Live Oak-Water Oak-Pecan bottomlands[14]

San Bernard River - From the Wharton/Brazoria County line upstream to the point where the river crosses into Austin County south of New Ulm (within TNRCC stream segment 1302)
R. Cons. Area: Attwater Prairie Chicken National Wildlife Refuge
End/Threat: Unique community-Live Oak-Water Oak-Pecan bottomlands[14]

Tres Palacios Creek Tidal - From the confluence with Tres Palacios Bay in Matagorda County to a point one mile upstream of the confluence of Wilson Creek in Matagorda County (TNRCC stream segment 1501)
Aq. Life: Overall use[4]

West Bernard Creek - From the confluence with the San Bernard River in Wharton County upstream to the FM 2764 crossing in Wharton County
Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]

Table 1. Lower Colorado River Basin stream segments that meet the biological function criteria (31 TAC 357.8 (b) (1)).

River or Stream Segment	County	Function
Bull Creek	Travis	Nearly pristine stream with a largely intact riparian area
Colorado River	San Saba	Texas Natural Rivers System nominee[10]; White bass spawning area[14]
Colorado River	Mills	Texas Natural Rivers System nominee[10]; White bass spawning area[14]
Pedernales River	Travis	National Wild and Scenic Rivers System nominee. Significant natural area[10]
Pedernales River	Blanco	National Wild and Scenic Rivers System nominee, Significant natural area[10]
Pedernales River	Gillespie	National Wild and Scenic Rivers System nominee. Significant natural area[10]

Table 2. Streams that meet the hydrologic function criteria (31 TAC 357.8 (b) (2)).

River or Stream Segment	County	Function
Bull Creek	Travis	Largely intact riparian area reduces downstream flooding
Colorado River	Matagorda	Unique habitat-Extensive freshwater wetland habitat[14]

San Bernard River - From the Wharton/Brazoria County line upstream to the point where the river crosses into Austin County south of New Ulm (within TNRCC stream segment 1302)
R. Cons. Area: Attwater Prairie Chicken National Wildlife Refuge
End/Threat: Unique community-Live Oak-Water Oak-Pecan bottomlands[14]

Tres Palacios Creek Tidal - From the confluence with Tres Palacios Bay in Matagorda County to a point one mile upstream of the confluence of Wilson Creek in Matagorda County (TNRCC stream segment 1501)
Aq. Life: Overall use[4]

West Bernard Creek - From the confluence with the San Bernard River in Wharton County upstream to the FM 2764 crossing in Wharton County
Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]; Fish[1,3]

Table 1. Lower Colorado River Basin stream segments that meet the biological function criteria (31 TAC 357.8 (b) (1)).

River or Stream Segment	County	Function
Bull Creek	Travis	Nearly pristine stream with a largely intact riparian area
Colorado River	San Saba	Texas Natural Rivers System nominee[10]; White bass spawning area[14]
Colorado River	Mills	Texas Natural Rivers System nominee[10]; White bass spawning area[14]
Pedernales River	Travis	National Wild and Scenic Rivers System nominee. Significant natural area[10]
Pedernales River	Blanco	National Wild and Scenic Rivers System nominee, Significant natural area[10]
Pedernales River	Gillespie	National Wild and Scenic Rivers System nominee. Significant natural area[10]

Table 2. Streams that meet the hydrologic function criteria (31 TAC 357.8 (b) (2)).

River or Stream Segment	County	Function
Bull Creek	Travis	Largely intact riparian area reduces downstream flooding
Colorado River	Matagorda	Unique habitat-Extensive freshwater wetland habitat[14]

Table 6. Summary table of ecologically significant stream segments in the Lower Colorado River Water Planning Area and the selection criteria

STREAM	COUNTY	BIO FX	HYDRO FX	R CONS AREA	AQ LIFE	THREAT/END
Barton Creek	Travis			X	X	X
Blanco River	Blanco			X	X	
Bull Creek	Travis	X	X	X	X	X
Colorado River	Bastrop				X	
Colorado River	Burnet	X			X	
Colorado River	Fayette				X	
Colorado River	Matagorda	X	X			
Colorado River	Mills					X
Colorado River	San Saba	X		X	X	X
Colorado River	Travis				X	
Cummins Creek	Colorado				X	
Lake Creek	Matagorda			X		
Little Barton Creek	Travis				X	
Little Blanco River	Blanco				X	
Oatmeal Creek	Burnet				X	
Onion Creek	Hays				X	
Pedernales River	Blanco	X		X	X	
Pedernales River	Gillespie	X		X	X	
Pedernales River	Hays	X			X	
Pedernales River	Travis	X			X	
Rocky Creek	Burnet				X	
San Bernard River	Colorado			X		
Tres Palacios Creek Tidal	Matagorda				X	
West Bernard Creek	Wharton				X	

LCRA
THE POWER TO MAKE A DIFFERENCE.

RECEIVED
DEC 1 5 1999
AQUA WATER SUPPLY CORP.

December 14, 1999

Mr. John Burke, P.E.
General Manager
Aqua WSC
P.O. Drawer P
Bastrop, TX 78602

Dear John:

Over the past six months, the Lower Colorado Regional Water Planning Group (LCRWPG) has been soliciting recommendations for stream segments in the LCRWPG planning area which have unique ecological characteristics or would provide unique reservoir sites for future water supplies. The LCRA has reviewed all the stream segments in the lower Colorado River basin to determine if they would be appropriate candidates for such designations. Five stream segments have been identified as being of particular ecological importance:

1. **Cummins Creek** – Unclassified stream segment; from the confluence in Segment 1402 (Colorado River below La Grange) upstream to FM 159,

2. **Colorado River above Lake Buchanan** – TNRCC Segment 1409; from the confluence of Yancey Creek in Burnet/San Saba/Lampasas County upstream to the confluence of the San Saba River in San Saba County,

3. **Llano River** – TNRCC Segment 1415; from the confluence of Johnson Creek in Llano County to County Road 2768 near Castell,

4. **Pedernales River** – TNRCC Segment 1414; from the confluence of Fall Creek in Travis County upstream to Stonewall in Gillespie County, and

5. **Colorado River above La Grange** – TNRCC Segment 1434; from La Grange in Fayette County upstream to FM 969 (Utley) in Bastrop County.

As an element in our evaluations, the LCRA has also considered the consequences of a stream being designated by the LCRWPG as ecologically unique or a unique reservoir site. At this time, the LCRA cannot determine either: (1) the true level of protection that would be afforded by such a designation or (2) the impacts on local property rights.

JAN. 31.2000 10:52AM LCRA WATER RESOURCES NO.971 P.3/3

Because of these uncertainties, the LCRA will not recommend to the LCRWPG the designation of any stream segment as either ecologically unique or uniquely suited to reservoir development.

It would be erroneous to assume that this recommendation means that the LCRA consider the above five streams or any others not to be ecologically unique and worth protecting. The LCRA considers all parts of the Colorado River and its tributaries as valued riverine ecosystems that should be preserved. Protecting water quality has been one ofLCRA's primary duties since its creation in 1934 and is explicitly part of its legislative mandate. The LCRA will continue its extensive efforts to monitor water quality conditions and actively seek to protect all streams from existing and potential pollution problems.

If I can provide any additional information, please feel free to contact me at 1-800-776-5272, ext. 4064.

Sincerely,

Quentin

Quentin W. Martin, Ph.D., P.E.
Chief Water Resources Planner

LOWER COLORADO RIVER AUTHORITY

Mar-02-00 15:52 P.01

HICKS COMPANY

ENVIRONMENTAL
ARCHEOLOGICAL
AND PLANNING
CONSULTANTS

FAX Transmittal

DATE: March 2, 2000

TIME:

MESSAGE TO: Jim Barho , 512-756-8591

FIRM:

FAX NO.: 512-756-0247

MESSAGE FROM:

TRANSMITTED BY: Roy Frye

NUMBER OF PAGES INCLUDING COVER PAGE: 3

COMMENTS:

Mr. Barho: This information is transmitted at the behest of Denis Qualls, of the Brazos River Authority. It relates to a section of the Colorado River that is the boundary of Water Planning Regions K and G. This section has been identified as a potential unique stream segment (among 18 others in the Brazos G Region). If you have questions, please call me at 512-478-0858.

1504 West 5th Street, Austin, TX 78703
512-478-0858
FAX 512-474-1849

3.2.5 Colorado River – Lampasas County

This designated river segment begins immediately upstream of the confluence of Yancey Creek in Lampasas County, and proceeds upstream to the Lampasas/Mills County line (See Figures 3-15 and 3-16). This segment is within TNRCC stream segment # 1409, and is approximately 30 river miles in length. This portion of the Colorado River exhibits exceptional beauty, traversing through rolling hills and rugged topography of the Edwards Plateau ecological region[7]. Vegetation adjacent to the river is comprised principally of live oak-juniper parks. Stream corridor vegetation includes pecan, cottonwood, sycamore, elm, hackberry, live oak, greenbriar and poison ivy. Age of vegetation varies from mature to old growth; however the riparian corridor is generally narrow and frequently fragmented and disturbed. Over 150 species of birds have been observed at Colorado Bend State Park, located on the west side of the Colorado River within this segment. Gorman Falls, located on the western bank of the Colorado River, approximately 10 miles above Lake Buchanan, is a 60-foot high waterfall with travertine formations. Water quality within this segment is good. The river channel is diverse with alternating flat water, riffles, pools, and sandbars.

Evaluation Criteria

1) *Biological Function:* Texas Natural Rivers System nominee, white bass spawning area (TPWD[4,5]).

2) *Hydrologic Function:* Insufficient information to confirm significance.

3) *Riparian Conservation Area:* None designated (Note: Although Colorado Bend State Park would qualify, the park is on the west side of the Colorado River and not within the Brazos G RWPA).

4) *High Water Quality/Exceptional Aquatic life/high Aesthetic Value:* Exhibits exceptional beauty and aesthetic value(TPWD[4,5]).

5) *Threatened or Endangered Species/Unique Communities:* Confirmed occurrence of the Concho River water snake which is Federally listed as threatened (TPWD[4,5]).

Mar-02-00 15:52 P.03

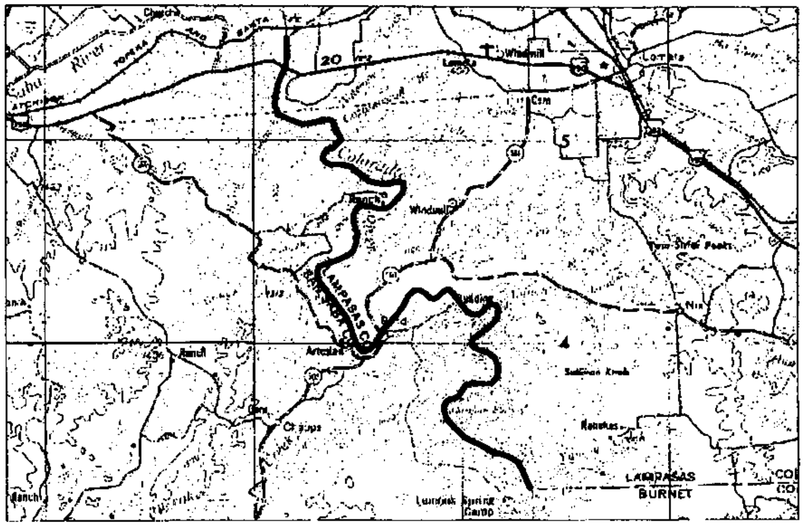

Figure 3-15. Map Location of Colorado River

Figure 3-16. Colorado River

Wednesday, February 16, 2000

To: John Barho
Chairman
Unique Streams Segment Committee
LCRWPG

From: Bob Pickens
Alternate
LCRWPG
Colorado County

Subject: Recommendation for Shaw's Bend Reservoir Site

I would like to recommend the site of Region L's option C-18, Shaw's Bend Reservoir, be recognized as having the following unique sites under our selection criteria of Reparian Conservation, Unique Communities, High Aesthetic Value, and Biologic Function:

1. Fern Hollows and Bluffs
2. Horseshoe Bend Woodland
3. Harvey Creek Woodland

Additionally, this area has numerous pre-historic sites and one historic site, Burnham's Ferry Crossing.

Supporting material for this recommendation is attached and has been excerpted from
"Colorado Coastal Plains Project, Texas
Environmental Inventory and Impact Assessment"
For: U. S. Department of Interior, Bureau of Reclamation, Southwest Region
By: ECS Technical Services, Fort Worth, Texas
April 1985

My apologies for not submitting this sooner, but until Region L grew ominous, it did not seem too relevant since Region K had not focused on it. Therefore, I feel that I would be remiss in my obligation to the landowners at the site if I did not make an attempt to get this information into the records.

Thank you for considering this recommendation.

COLORADO COASTAL PLAINS PROJECT, TEXAS

Environmental Inventory

and

Impact Assessment

(Contract No. 3-CS-50-01650)

Prepared for:

U.S. Department of the Interior
Bureau of Reclamation
Southwest Region

Prepared by:

ECS Technical Services
Fort Worth, Texas

APRIL 1985

George R. High
Project Coordinator

R. John Taylor, Ph.D.
Principal Investigator

William F. Mahler, Ph.D.
Threatened & Endangered
Species Botanist

Elton R. Prewitt
Archeological Research

PROJECT OVERVIEW

The Colorado Coastal Plains Environmental Resources Investigation and Impact Assessment consists of a compilation of data pertaining to vegetation resources, physical features, unique areas, and land use analyses. The report also includes the results of archeological research conducted within a portion of the project area. Project lands include approximately 452,762 acres (707 square miles) within south central Texas. Approximately 210,092 acres lie within proposed reservoir sites from Columbus to Austin. 233,000 acres are within Wharton and Matagorda counties and comprise the Wharton-Matagorda County Land Use Assessment area. Approximately 10,900 acres consist of riverine and first terrace areas along the Colorado River, portions of which are within proposed reservoir sites and the Wharton-Matagorda County Land Use Analysis area.

Investigations of proposed reservoir site lands are organized to address resources which may be impacted by construction and operation of two alternative reservoir systems. Scenarios referred to in text consist of construction of a single dam at Shaws Bend with a conservation pool elevation of 220 feet msl. and a multi-reservoir system consisting of in-channel impoundments extending from Shaws Bend to Austin. Conservation pool elevations of the multi-reservoir system would be 10 to 15 feet above the existing river level.

The report is compiled in the following 10 sections:

1. Introduction and Project Summary
2. Summary of Impacts
3. Regional Setting
4. Vegetation Analyses—Reservoir Site Locations
5. Threatened and Endangered Species Research
6. Vegetation Analyses—Riverine and First Terrace Areas
7. Unique Areas Identification
8. Physical Features and Land Use Analyses
9. Archeological and Historical Sites Analysis
10. Wharton-Matagorda County Land Use Analysis

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B	Index to Mylar Overlays
C	Vegetation Resources by Reservoir Site Five-foot Increments
D	Physical Features and Land Use Resources by Reservoir Site, Five-foot Increments
E	Expanded Geological Descriptions
F	Species Presence List
G	Sampling Methodology
H	Threatened and Endangered Species Research Data

SECTION 1

INTRODUCTION

Colorado Coastal Plains Project, Texas

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SECTION 1

1.0 INTRODUCTION AND PROJECT SUMMARY

ECS Technical Services, Inc. has conducted a series of studies to identify and evaluate environmental resources within the Colorado Coastal Plains Project Area, Texas. The study was performed to determine impacts which would result from construction of a single reservoir between Columbus and La Grange and a series of six in-channel reservoirs between Columbus to the vicinity of Austin.

1.1 Project Background

The Bureau of Reclamation is in the preliminary phases of investigation and planning for municipal and industrial (M&I) water supply sources within Texas. The investigation has been conducted as part of a series of steps which originated during the early 1950's and resulted in the preparation of a report entitled: "Water Supply and the Texas Economy". As a result of a favorable reception given to the document, the Agency was requested to initiate studies of all river basins entering the Gulf of Mexico. The results of the investigations, collectively designated as the Texas Basins Project, were reported in February 1965. Subsequently, the 93rd Congress appropriated the necessary funds to initiate the Colorado Coastal Plains investigation. Phase I of the study concluded in 1981 with a status report that recommended more detailed investigations of a dam and reservoir between Columbus and La Grange.

Phase II investigations set into motion steps necessary to: (1) further evaluate and quantify water needs projections, (2) determine if a dam in the La Grange-Columbus vicinity should be recommended for construction, and (3) identify and quantify environmental impacts which could result from construction and operation of such a reservoir.

The Colorado Coastal Plains Environmental Resources Assessment was originally based on the assumption that a single reservoir would be constructed between La Grange and Columbus with the intended dam site to be in the vicinity of Shaws Bend. Based on this assumption, initial studies were conducted to evaluate relative impacts from operation of a conservation pool at 220 feet msl. Work to be performed included analyses of reservoir pool, dam site and surrounding lands to provide detailed analyses of vegetation resources, physical features, unique

Field team members identified areas considered to be unique to the region in terms of social, historic, and ecological significance. The evaluation of unique areas included their relative importance to the region and possible impacts to the area which may result from reservoir construction and operation.

Extensive evaluations were conducted to identify and quantify physical features within alternative reservoir sites and adjacent project lands. Principal land uses were also included as part of the physical features analysis.

Investigations were conducted to determine the vegetation and other resources within the Lower Colorado River Basin from Mansfield Dam to the Gulf of Mexico. The primary objective of the study was to quantify expected impacts which would result from construction and operation of a single reservoir between Columbus and La Grange and construction and operation of a series of six in-channel impoundments from Columbus to near Austin. In-channel reservoirs which were evaluated were: Shaws Bend, La Grange, Wilco, Hills Prairie, Reed Bend, and Webberville. Data were compiled for each reservoir site based on five-foot elevation increments within the following elevations:

Reservoir Scenario	Elevation Parameters (ft. m.s.l.)
Single Impoundment Scenario	
Shaws Bend Dam Site	215 - 240
Multiple Reservoir Scenario	
Shaws Bend Dam Site	200 - 225
La Grange Dam Site	255 - 275
Wilco Dam Site	290 - 315
Hills Prairie Dam Site	330 - 350
Reed Bend Dam Site	350 - 375
Webberville Dam Site	390 - 410

Impacts to vegetation, physical features and land use resources within the project area were quantified based on inundation due to conservation pool operations as well as inundation during 100-year and 500-year flood events. Based on the size and configuration of the Shaws Bend (single impoundment) reservoir, back water effects of flooding were evaluated for 100-year and 500-year events. Backwater effects evaluations for each of the in-channel reservoirs were not considered due to their relative sizes. The following identifies reservoir elevations used for

SECTION 1 - Page 3

Each section contains a table of contents and references applicable to the section contents and an abstract delineating the principal findings addressed in the section. The principal investigator (or investigators) responsible for section contents is identified on appropriate section title pages.

1.4 Methodologies and Data Analysis

Methodologies used in the analyses of vegetation resources, physical features, land uses, and archeological investigations included extensive field survey and sampling techniques in conjunction with low altitude and high altitude false-color infrared aerial photography. When possible and appropriate, data were supplemented by published information. Specific methods used in the research are identified in appropriate sections.

Results of field investigations and aerial photography evaluations were used to prepare mylar overlays to 1:24,000 scale U.S.G.S. Topographic Sheets. The overlays were prepared in sets to identify area vegetation communities, physical features, and elevations by five-foot increments within the reservoir study areas; elevations used for 100-year and 500-year flood event analyses for the Shaws Bend single reservoir scenario; riverine and first terrace vegetation resources; and land uses within the Wharton-Matagorda County Land Use Study Area. A listing indicating overlays and corresponding topographic sheets used in project mapping is provided in Appendix B.

The overlays and corresponding topographic maps are provided in Volume II.

SECTION 2

SUMMARY OF IMPACTS

Colorado Coastal Plains Project, Texas

George R. High
Principal Investigator

ABSTRACT

SUMMARY OF IMPACTS

Analyses have been made to determine probable impacts to area vegetation, unique areas, physical features and land uses relative to the construction and operation of a single impoundment at Shaws Bend and a series of in-channel impoundments from Shaws Bend to the vicinity of Austin. The data were compiled by reservoir based on conservation pool operations and flooding resulting from a 100-year and 500-year event.

(Construction and conservation pool operations of a single reservoir at Shaws Bend would create a direct impact to approximately 12,910 acres of forest, pasture, cultivated, and other lands. Construction and operation of a series of in-channel impoundments would create an immediate impact to approximately 6,600 acres of similar lands and approximately 140 acres used for residential purposes.

Construction of a single reservoir at Shaws Bend would inundate (under conservation pool operations) approximately 4,700 acres of bottomland forest and riverine habitat. Impacts expected from a series of reservoirs would total approximately 2,780 acres. Similarly, impacts to tame pasturelands are expected to total more than 3,500 acres under a single reservoir operational concept whereas operation of a series of reservoirs would affect approximately 1,500 acres. No impacts to lands used for residential/urban purposes are expected based on operation of a single reservoir. If a series of reservoirs were constructed, approximately 150 acres would be lost in the vicinity of Webberville. Impacts to other vegetation types and land uses would be relatively similar, regardless of construction scenario.

Additional analyses were performed relative to probable secondary impacts to native and improved pecan orchards. Data indicate maintenance of a water surface above the existing levels will result in an increased ground water table which will kill mature trees. Based on these data, construction of a single reservoir would result in the loss of approximately 2,180 acres of pecan orchard. Construction of a series of reservoirs would destroy approximiately 880 acres of orchards.

Analyses pertaining to unique areas indicate construction and operation of a single reservoir at Shaws Bend would adversely impact Harvey Creek and Horseshoe Bends

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2.0 SUMMARY OF IMPACTS

Construction and operation of a reservoir or series of reservoirs within the Colorado Coastal Plains Project area would result in adverse impacts to various natural and man-made resources within the region. The severity of impacts would be contingent on the size of reservoir constructed and lands flooded. Therefore, the following summary of impacts has been developed to address the effects of construction of a single reservoir at Shaws Bend or a series of six in-channel impoundments extending from Shaws Bend to the vicinity of Austin. Anticipated impacts have been tabulated based on reservoir waters at the following elevations:

Shaws Reservoir Scenario:

	Elevations msl		
	Conservation Pool	100-year Flood	500-year Flood
Shaws Bend	220	222-295*	223-297*

Multi-Reservoir Scenario:

Reservoir	Conservation Pool	100-year Flood	500-year Flood
Shaws Bend	200	210	225
La Grange	255	265	275
Wilco	290	300	315
Hills Prairie	330	340	350
Reed Bend	350	360	375
Webberville	390	400	410

* Variable, due to backwater effect (preliminary analysis)

Acreage totals used in the summary have been tabulated to identify lands (and resources) effected under each operational concept for the single reservoir scenario at Shaws Bend as well as a composite of reservoirs for the multi-reservoir scenario. Total water surface acreages for both scenarios are as follows:

TABLE 2-1

VEGETATION COMMUNITY ACREAGES BY H.E.P. COVER TYPE CATEGORY

Direct Impacts Based on Operation of a Single Reservoir at Shaws Bend
Colorado Coastal Plains Project, Texas

Map Unit	H.E.P. Cover Type/ Community	Conservation Pool Acres	%	100-yr Flood Event Acres	%	500-yr Flood Event Acres	%
	Pecan, Cottonwood, Sycamore, Elm, Willow						
50	Improved Variety Pecan Orchard	287	6.1	430	4.9	444	4.9
51	Native Pecan Orchard	1,273	27.1	1,339	15.2	1,358	14.9
52	Planted Fruit Orchard	0	0	0	0	0	0
60	Cottonwood Bottomlands	757	16.1	757	8.6	758	8.3
61	Elm-Ash-Hackberry	1,707	36.3	5,079	57.6	5,307	58.3
63	Willow Bottomlands	557	11.9	943	10.7	959	10.5
67	Elm Woodlands	112	2.4	268	3.0	280	3.1
69	Sycamore Bottomlands	4	0.1	4	< 0.1	4	< 0.1
	Total H.E.P. Cover Type	4,697		8,820		9,110	
	Live Oak, Post Oak, Water Oak, Yaupon, Pine						
62	Oak-Juniper Forest	170	92.4	213	55.6	231	54.8
65	Oak-Yaupon Forest	0	0	83	21.7	84	20.0
66	Oak-Hickory Forest	14	7.6	25	6.5	26	6.2
74	Yaupon Thickets	0	0	23	6.0	24	5.7
80	Pine Forest	0	0	0	0	0	0
81	Pine-Oak Forest	0	0	39	10.2	56	13.3
	Total H.E.P. Cover Type	184		383		421	
	Savannah						
41	Pasture with Trees	1,170	100.0	4,000	100.0	4,246	100.0
	Native Grassland						
71	Native Prairie	0	0	0	0	0	0

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TABLE 2-2

VEGETATION COMMUNITY ACREAGES BY H.E.P. COVER TYPE CATEGORY

Direct Impacts Based on Operation of a Multiple Reservoir System
Colorado Coastal Plains Project, Texas

Map Unit	H.E.P. Cover Type/ Community	Conservation Pool Acres	Conservation Pool %	100-yr Flood Event Acres	100-yr Flood Event %	500-yr Flood Event Acres	500-yr Flood Event %
	Pecan, Cottonwood, Sycamore, Elm, Willow						
50	Improved Variety Pecan Orchard	57	2.0	167	3.5	1,701	13.9
51	Native Pecan Orchard	94	3.4	712	14.7	2,588	21.1
52	Planted Fruit Orchard	0	0	0	0	0	0
60	Cottonwood Bottomlands	137	4.9	354	7.3	793	6.5
61	Elm-Ash-Hackberry	1,816	65.2	2,675	55.2	5,798	47.3
63	Willow Bottomlands	665	23.9	913	18.9	1,220	9.9
67	Elm Forest	16	0.6	21	0.4	151	1.2
69	Sycamore Bottomlands	0	0	0	0	8	0.1
	Total H.E.P. Cover Type	2,785		4,842		12,259	
	Live Oak, Post Oak, Water Oak, Yaupon, Pine						
62	Oak-Juniper Forest	22	46.8	31	45.5	309	62.5
65	Oak-Yaupon Forest	25	53.2	27	37.9	51	10.3
66	Oak-Hickory Forest	0	0	9	13.6	67	13.5
74	Yaupon Thickets	0	0	0	0	0	0
80	Pine Forest	0	0	0	0	0	0
81	Pine-Oak Forest	< 1	0	2	3.0	68	13.7
	Total H.E.P. Cover Type	47		69		495	
	Savannah						
41	Pasture with Trees	1,161	100.0	3,148	100.0	8,756	100.00
	Native Grassland						
71	Native Prairie	0	0	0	0	0	0

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tabulated by five-foot increment for each reservoir and are provided in Appendix C. All vegetation categories have been organized by Habitat Evaluation Procedure (H.E.P.) cover type.

2.1.1 Conservation Pool Impacts

Data indicate normal conservation pool operations of a single impoundment at Shaws Bend would be more detrimental to wooded bottomland communities than those of a multi-reservoir system. Overall impacts to the pecan, cottonwood, sycamore, elm, and willow Cover Type would result in the inundation of approximately 4,700 acres if a single impoundment were constructed. Impacts resulting from a multi-reservoir impoundment would result in the loss of approximately 2,780 acres of habitat. Similarly, construction and operation of a single reservoir at Shaws Bend would directly impact approximately 3,590 acres of tame pasture, whereas, the multi-reservoir impacts would total approximately 1,520 acres. Although impacts to upland vegetation communities would be minimal regardless of reservoir alternative, approximately four times as much oak, yaupon, juniper habitat would be taken as a result of single reservoir conservation pool operations. Impacts to area agricultural (cultivated) lands have been evaluated to determine expected losses under both construction alternative. Data indicate approximately 2,840 acres of cultivated land would be lost due to conservation pool operations at Shaws Bend. Anticipated impacts to cultivated lands under the multiple reservoir scenario would be approximately 590 acres. Significant impacts to urban and built-up lands would be incurred as a result of construction and operation of a series of reservoirs within the project area. Based on conservation pool operations of a series of reservoirs, approximately 147 acres of lands, primarily used for residential purposes, would be inundated. Principal impacts would be in the vicinity of Webberville where relatively light density housing is located within the proposed dam construction site. Impacts to other lands within the proposed reservoir sites would be similar, regardless of construction alternative.

TABLE 2-3

VEGETATION COMMUNITY IMPACTS
(in acres)

Resulting from Conservation Pool Operations
Single and Multiple Reservoir Alternatives
Colorado Coastal Plains Project, Texas

HEP/Community	Reservoir Alternative Map Unit	Single	Multiple
Pecan, Cottonwood, Sycamore, Elm, Willow			
Improved Variety Pecan Orchards	50	287	57
Native Pecan Orchards	51	1,273	94
Fruit Orchards	52	0	0
Cottonwood Bottomlands	60	757	137
Elm-Ash-Hackberry Forest	61	1,707	1,816
Willow Bottomlands	63	557	665
Elm Bottomlands	67	112	16
Sycamore Bottomlands	69	4	0
Total Cover Type		4,697	2,785
Live Oak, Post Oak, Water Oak, Yaupon, Pine			
Oak-Juniper Forest	62	170	22
Oak-Yaupon Forest	65	0	25
Oak-Hickory Forest	66	14	0
Yaupon Thickets	74	0	0
Pine Forest	80	0	0
Pine-Oak Forest	81	0	< 1
Total Cover Type		184	47
Savannah			
Pasture with Scattered Trees	41	1,170	1,161
Native Grassland			
Native Tall-grass Prairie	71	0	0
Tame Pasture			
Tame Pasture (maintained)	40	3,106	904
Pasture with Shrubs	42	330	287
Pasture with Forbs	44	155	330
Total Cover Type		3,591	1,521

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The following estimates have been made based on direct and secondary impacts expected from conservation pool operations. Secondary impacts represent acreages located five feet and below conservation pool operations.

Direct and Secondary Impacts to
Pecan Orchards (in acres)

Single Reservoir Alternative (Shaws Bend):

Immediate Impacts	Secondary Impacts	Total
1,560	581	2,141

Multiple Reservoir Alternative:

Immediate Impacts	Secondary Impacts	Total
151	319	470

The analysis of secondary impacts has been based on data provided in Appendix C and does not differentiate recently planted orchards (of immature trees) from mature improved variety orchards. The lack of differentiation is based on the assumption that all identified orchards will reach maturity during or prior to reservoir completion.

Construction of either reservoir scenario would prove beneficial to regional ecological resources. Much of the area designated as reservoir land is relatively flat and water depths during conservation pool operations would be less than five feet. As a result, much of the project area would become a littoral environment with large near-shore areas of shallow water. Similarily, wetland habitat within remnant ox-bow lakes and other low areas would be flooded as backwater sloughs. Construction of a single impoundment at Shaws Bend would create approximately 118 miles of shoreline during conservation pool operations. Conservation pool operations for the multi-reservoir scenario would create approximately 280 miles of shoreline.

Additional beneficial impacts would result from inundation of numerous acres of nonproductive (barren) soils located along the river. River margin

2.2 Threatened and Endangered Species

Investigations have been conducted to determine the presence of endangered and threatened plant species which could be impacted by reservoir construction or operation. Herbaria and literature data indicate the following taxa to possibly be within the Colorado Coastal Plains Reservoir areas:

Amsonia repens Shinners
Eleocharis austrotexana Johnston
Hymenoxys texana (Coulter & Rose) Cockerell
Spiranthes parksii Correll
Thalictrum texanum (Gray) Small

Field investigations, conducted for Spiranthes parksii and Thalictrum texanum, provided negative results. Based on habitat within known populations of S. parksii, project lands were found to be edaphically different from those required to support the species. Soils within known populations are generally absent of limestone substrata, common throughout upland areas of the project site.

Although field studies were conducted to determine the presence of T. texauum, lack of information pertaining to habitat requirements, range and distribution and the presence of viable populations elsewhere, resulted in inconclusive findings pertaining to the possible presence in the project area. Recent collection records and herbaria data indicate the species to be adapted to either a prairie environment or an oak forest habitat with an understory of shrubs and grasses. Based on available habitat descriptions, the species may be located within areas along floodplain margins or within oak woodlands. Therefore, it is recommended that thorough field investigations be conducted following selection of reservoir construction alternative. If a single reservoir were to be constructed at Shaws Bend, detailed investigations should be performed at the proposed dam site (including adjacent upland areas which would be impacted) and within lands which would be impacted by conservation pool operations. If the multiple reservoir scenario is selected, investigations should be conducted at each proposed dam location. Based on previously completed field investigations and vegetation/habitat mapping, 4,945 acres of oak forest and prairie environments are within the Shaws

Impacts due to extreme flooding under each reservoir alternative would be inconsequential. Analyses performed by Prewitt & Associates (consulting archeologists) indicate mitigative actions would be warranted, should reservoir construction be initiated.

Other unique areas within the region would be uneffected by reservoir construction as both Camp Lone Star and the Red Bluffs are above maximum flood elevations. Some undeveloped river frontage owned by Camp Lone Star would be inundated if reservoir levels reached 230 to 240 feet during flood conditions.

2.4 Physical Features and Land Use

Construction and operation of a single reservoir at Shaws Bend or a series of reservoirs from Shaws Bend to the vicinity of Austin will effect physical features within the region. The degree of severity of impacts is largely contingent upon location relative to proposed dam sites and areas which would be inundated under conservation pool and flood conditions. Physical features and land uses which have been identified within the project area are:

- Electrical Facilities
  - High Voltage Electrical Lines
  - Utility Trunk Lines
  - Utility End Users
- Oil and Gas Wells (including proposed well locations)
- Transportation Network
  - Public Roads and Highways
  - Private Roads and Trails
  - Railroads
  - Petroleum Pipelines

TABLE 2-4

PHYSICAL FEATURES IMPACT ANALYSIS

Direct Impacts Based on Operation of a Single Reservoir at Shaws Bend
Colorado Coastal Plains Project, Texas

	Conservation Pool	100-year Flood Event	500-year Flood Event
Land Use Analyses (acres)			
Upland Agricultural	738	5,141	5,526
Bottomland Agricultural	12,065	33,804	39,011
Urban/Residential	0	12	20
Commercial/Industrial	0	0	0
Gravel Excavation (active)	110	485	533
Gravel Excavation (inactive)	0	50	72
Total Acres	12,913	39,492	45,162
Oil and Gas Production (wells)			
Proposed Well Location	0	17	18
Abandoned Well Location	1	1	1
Dry Hole	0	10	10
Oil Well (producing)	0	49	55
Gas Well (producing)	0	0	0
Abandoned Oil Well	0	2	4
Transportation Network (miles)			
Public Roads and Highways	0.20	12.43	16.37
Private Roads and Trails	75.20	139.59	157.21
Railroads	0	2.20	2.64
Petroleum Pipelines	0.86	20.37	25.25
Electrical Facilities			
High Voltage Lines (miles)	0.20	5.19	6.97
Utility Trunk Lines (miles)	8.50	43.38	53.10
End Users	9	164	203
Structures			
Residential	6	63	65
Non-residential	21	226	251
Total	27	289	316

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2.4.1 Electrical Facilities

Construction and operation of a dam at the proposed Shaws Bend location would result in adverse impacts to two high voltage lines. The severity of impact would be dependant upon the intended conservation pool elevation selected for operations. Construction and operation of a reservoir at Shaws Bend with a conservation pool elevation at 220 feet msl would result in minimal impacts to the right-of-way of the 345 kv LCRA line which crosses the river near Mullins Prairie. Operation of a series of reservoirs from Shaws Bend to the vicinity of Austin would impact a total of 0.92 miles of right-of-way, most of which consists of existing river surface.

Impacts during flood conditions would be substantially greater under the single reservoir scenario than would occur as a result of construction of a series of reservoirs during a 100-year flood event and nearly equal during a 500-year flood event. Lines which would receive the greatest impact during flood conditions are associated with a single reservoir at Shaws Bend are the 345 kv line through Mullins Prairie and the 138 kv line which serves the LCRA pump station near Ellinger. Impacts to the LCRA pump station would be minimal. Potential impacts to line rights-of-way have been evaluated based on 100-year and 500-year flood events. Construction of an impoundment at La Grange would inundate as much as 10,250 linear feet of 69 kv line right-of-way northwest of the city (based on 500-year flood elevations). During normal conservation pool operations, approximately 1,625 feet of right-of-way would be inundated.

Operations of the Wilco Reservoir at Smithville would result in the maximum inundation of approximately 11,000 linear feet of 69 kv line rights-of-way north of the city. Additionally, the BBEC substation at the site could be adversely effected as the elevation at the site is approximately 312 feet msl. During normal conservation pool elevations, approximately 1,200 linear feet of rights-of-way would be inundated and the substation would not be effected.

greater if a multiple reservoir system were constructed than would occur under a single reservoir alternative.

2.4.3 Transportation Network

Data indicate reservoir construction and operation would have a minimal effect on roads crossing the Colorado River, regardless of construction alternative. River bridges at Columbus, La Grange, Smithville, Utley and Del Valle are of sufficient height to preclude flooding by conservation pool operations.

Construction and operation of a large dam at the proposed Shaws Bend location would inundate a minimum of 75.20 miles of private roads and trails if the water surface were at 220 feet elevation (conservation pool elevation). Construction of a series of reservoirs would impact approximately four miles of private roads and trails. Comparison of data relative to flood conditions indicates a 100-year flood will have a substantially greater impact under the single reservoir alternative than would occur under the multiple reservoir concept. Conversely, a 500-year flood would create greater impacts under the multiple reservoir scenario.

Data indicate area railroads would be generally uneffected by reservoir construction and operation with the possible exception of the Missouri-Kansas-Texas Railroad which crosses Hills Prairie near Bastrop. Conservation pool operations of a single reservoir at Shaws Bend would not impact area railroads. If a multiple reservoir system were constructed, 0.31 miles of right-of-way would be impacted. During flood conditions, backwater effects from the Shaws Bend Dam (single reservoir alternative) would impact as much as 2.64 miles of right-of-way. Impacts under similar conditions for the multiple reservoir system would be less than two miles.

Construction and operation of a dam at the Shaws Bend location would require the relocation of numerous pipelines within the project site and within the general project area. Lines which cross the proposed reservoir site or those which would be directly effected by construction would during a 500-year flood event. Reservoir operations at other elevations would have little or no effect on the lines. Under maximum flood conditions, approximately two linear miles of a 16-inch Phillips gas line would be inundated by the La Grange Reservoir.

Construction of the La Grange Reservoir would similarly inundate portions of a 16-inch Intertex line during 100-year and 500-year flood events. Inundation would be minimal and would impact less than two linear miles of right-of-way.

Construction and operation of the Wilco Dam would result in the inundation of as much as 4,000 linear feet of Valero Marketing Company gas lines during extreme flood conditions. The line is located northeast of Smithville. A 12-inch Valero Marketing Company gas line which crosses the river between Utley and Webberville. During 500-year flood event conditions, approximately 800 linear feet of line right-of-way would be inundated.

Reservoir construction or operations would not significantly effect other pipeline rights-of-way.

2.4.4 Land Use

Gross analyses of land uses indicate construction and conservation pool operations of a single reservoir at Shaws Bend will impact approximately twice as much agricultural bottomland area as would be impacted by a multiple reservoir system. Impacts to upland agricultural uses under the single reservoir concept would be almost four times those of the multiple reservoir system. Severe impacts to residential/urban land uses would result from construction of a multiple reservoir system. Major areas affected are associated with the Webberville Reservoir in which dam construction and operations would take approximately 110 acres.

Flood condition evaluations for a 100-year event indicate substantially higher impacts would be expected to agricultural bottomland and

TABLE 2-6

RELATIVE IMPACT SEVERITY BY CONSTRUCTION SCENARIO

	Conservation Pool		100-year Flood		500-year Flood	
	Single Reservoir	Multiple Reservoir	Single Reservoir	Multiple Reservoir	Single Reservoir	Multiple Reservoir
HEP Cover Type						
Bottomland Forest	6	4	6	4	4	6
Upland Forest	8	2	8	2	5	5
Savannah	5	5	6	4	3	7
Native Grasslands	0	0	0	0	0	0
Maintained Pasture	7	3	7	3	5	5
Cultivated (cropland)	8	2	7	3	5	5
Mesquite-Huisache Grassland	9	1	8	2	6	4
Urban, Built-up Areas	0	10	1	9	1	9
Nonclassified Lands	4	6	5	5	3	7
Cover Type Summary	47	33	48	32	32	48
Land Use and Principal Physical Features						
Land Use						
Upland Agricultural	8	2	9	1	7	3
Bottomland Agricultural	7	3	7	3	4	6
Urban/Residential	0	10	1	9	1	9
Commercial/Industrial	0	0	0	10	0	10
Gravel Excavation Sites	4	6	5	5	3	7
Land Use Summary	19	21	22	28	15	35
Oil and Gas Production	0	10	8	2	7	3

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if a single reservoir were constructed. Conversely, greater impacts to commercial/industrial and residential lands would be expected if a multiple reservoir system were in place. All other land use categories and physical features would be impacted to a relatively similar degree, regardless of reservoir scenario.

SECTION 5

THREATENED AND ENDANGERED SPECIES RESEARCH

Colorado Coastal Plains Project, Texas

William F. Mahler, Ph.D.
Principal Investigator

ABSTRACT

THREATENED AND ENDANGERED SPECIES RESEARCH

Investigations were conducted to determine the presence of endangered or threatened plant species within the area. As a result of herbaria and literature analyses, five taxa were identified as potentially within project areas which would be impacted by construction and operation of reservoirs between Columbus and Austin. Those taxa included in the analysis were:

Amsonia repens Shinners
Eleocharis austrotexana Johnson
Hymenoxys texana (Coulter & Rose) Cockerell
Spiranthes parksii Correll
Thalicutrum texanum (Gray) Small

Initial data indicated suitable habitat appeared to be available to support S. parksii and T. texanum and field investigations were conducted to provide additional data. Based on herbaria records and literature, the project area is not suitable to support the other species.

Spiranthes parksii is an endangered species, endemic to open oak and juniper woodlands and populations have been found in the vicinity of Bryan, Texas and elsewhere. Little is known regarding the required habitat of T. texanum and herbaria records contain conflicting data. Furthermore, only one population of the taxa has been found since 1970. Therefore, the taxon has been proposed by the U.S. Fish and Wildlife Service for listing as either threatened or endangered.

Field investigations were conducted during the fall 1983 to evaluate habitat suitability for S. parksii and during the spring 1984 to evaluate habitat suitability for T. texanum. Although extensive studies were conducted to locate populations of both taxa, investigative results proved negative. Based on field studies conducted for S. parksii, project lands are edaphically different from those of known populations; field studies conducted for T. taxanum resulted in inconclusive findings pertaining to habitat suitability.

Therefore, it has been concluded that none of the researched species are within project site impact areas with the possible exception of T. texanum. Based on inconclusive results of herbaria, literature and field research, additional field investigation are warranted, following selection of construction alternative and refinement of construction plans.

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5.0 THREATENED AND ENDANGERED SPECIES RESEARCH

Evaluations were made to determine the potential for the occurrence of threatened or endangered plant species within the project area. Although the evaluations principally included species which are listed by the U.S. Fish and Wildlife Service as threatened, endangered, or as potentially threatened or endangered (Federal Register, 1980), they also considered species included by the Texas Organization for Endangered Species (TOES) as threatened, endangered or rare endemics (TOES, 1984).

Investigations were conducted using herbaria and literature research to determine species distribution, records of previous collections, and habitat preference for each species. Field investigations were made to evaluate habitat suitability within the area and, as appropriate, field team members investigated the possible occurrance of specific species.

Literature and herbaria data indicate five species to possibly occur within the project area. One species is listed as endangered, two species has been proposed for listing as endangered and two species have been deleted from the listing of proposed species. Those species which were investigated are:

- Amsonia repens Shinners
- Eleocharis austrotexana Johnston
- Hymenoxys texana (Coulter & Rose) Cockerell
- Spiranthes parksii Correll
- Thalicutrum texanum (Gray) Small

Appendix H provides taxonomic, collection, distribution, habitat and other information pertinent to each species. A descriptive summary of each species is provided in the following text.

5.1 Amsonia repens

Amsonia repens was first described in 1951 by L. H. Shinners from the type specimen collected by V. L. Cory in Wharton County (Cory 55089, 29 March 1948

(SMU)). Specimens were subsequently collected in Austin and Wood counties. Amsonia repens is a semi-aquatic species which occurs within wet areas along roadsides and depressions of prairies as well as around lakes and ponds in wooded areas. Areas of similar habitat may infrequently exist within upland project site locations.

The U.S. Fish and Wildlife Service has dropped the species from further consideration as either threatened or endangered.

5.2 Eleocharis austrotexana

Eleocharis austrotexana was first collected by L. H. Shinners in Atascosa County in 1955 (Shinners 19709 (SMU)) and described in 1964 by M. C. Johnson. Subsequently, speciments have been collected in Kleberg, Liberty, and San Patricio counties. Habitat preference of the species is limited to sandy clay soils of forests and localized areas of sandy clays in the Gulf Prairie. Such soils are not in the project area.

The species has been dropped by the U.S. Fish and Wildlife Service as under review for potential listing as either threatened or endangered based on the wide spread distribution.

5.3 Hymenoxys texana

Hymenoxys texana has been officially listed (proposed) as threatened or endangered. The species was first collected near Hockley, Texas (Harris County) in 1889 and 1890 by F. W. Thurow. During 1891, the species was taxonomically described and classified by Coulter and Rose as Actinella texana. In 1898, E. L. Green transferred the species to Picradenia which was subsequently transferred, in 1904, by T. D. A. Cockerell to the genus Hymenoxys.

During the period 1890 through 1981, no collections were made and the species was believed to be extinct. In March 1981, collections were made from an area north of Cypress, Texas (Harris County) by J. W. Kessler and at Hockley, Texas by W. F. Mahler (Mahler, 1983).

Hymenoxys texana occupies a specific habitat which is described as open, barren, clay hardpans within a prairie vegetation type. The habitat type and location of known populations are similar to that of Choloris texensis and Machaeranthera aurea, both of which are rare Texas endemics. Field observations indicate that the project area does not provide suitable habitat for the species.

Recommendations have been made to list the species as endangered (Mahler, 1983) and it should be officially listed as such during 1985. The Texas Organization for Endangered Species (TOES) recognizes the taxon as a "Watch List Species" which indicates that it is neither increasing nor decreasing in range but should be monitored to assure its survival (TOES, 1984).

5.4 Spiranthes parksii

Spiranthes parksii is the only species which was reviewed as potentially occurring within the project area which is listed by the U.S. Fish and Wildlife Service and TOES as endangered. The species was first discovered in 1945 in the vicinity of Bryan, Texas by H. B. Parks. During 1945 through 1978, populations could not be found until, in 1978, it was rediscovered by P. M. Catling and K. L. McIntosh (Catling and McIntosh, 1979) in oak forest near the Brazos River. Until recent months, the only known populations of the species were limited to three small locations near Bryan, Texas (Brazos County). During early November 1983, additional populations were found in Grimes, Burleson and Robertson counties which surround the original population.

Sprianthes parksii occupies upland areas within open oak and juniper forest. Recent data acquired by the Species Recovery Team (personal conversation with Dr. H. Wilson, Texas A&M University) indicate it to be associated with gravelly, sandy soils on well drained ridges. Field investigations were conducted during the Fall 1983 to evaluate habitat suitability and the possible presence of S. parksii within portions of the project area. Although much of the work was restricted to upland ares in proximity to the proposed Shaws Bend dam site, investigation also included upland areas of Oak-Juniper forest upstream from the site.

Results of field investigations indicate that although soils types within the project area are similar to those found at known populations in Bryan County, project area lands are edaphically different from known population sites. Soils within the project area are generally underlain with limestone whereas soils associated with known populations are absent of limestone substrata. Therefore, construction of a reservoir, or series of reservoirs, within the Colorado Coastal Plains Project area will not impact the species.

5.5 Thalictrum texanum

Thalictrum texanum was first collected in the late 1800's by E. Hall and reported in his publication entitled "Plantae Texanae". The collection was subsequently included as a variety of T. debile in B. L. Robinson's section of the "Synoptic Flora of North America". In 1903, J. K. Small elevated the taxon to the rank of species, where it is currently recognized.

The original collection of T. texanum was made in Harris County, in the vicinity of Houston. During 1970, an additional population was found in Brazos County in habitat similar to that of Sprianthes parksii.

Thalictrum texanum is presently proposed by the U.S. Fish and Wildlife Service as threatened or endangered and the taxon is currently under review pending additional information pertaining to its vulnerability to threats (Federal Register, 1983).

Based on 1970 collections, habitat preference of the taxon appears to be that of oak forest with an understory of shrubs and grasses; however, herbaria research (from collection labels) indicates that collections were made in Harris County in a prairie environment. Presently, there is only one population known to exist. The species is limited to a grassy roadside park area in Waller County, approximately 0.5 miles west of Brookshire, Texas (Brown 8492, 10 March 1985, (SMU)). The Brookshire population is approximately 50 miles east of the proposed Shaws Bend Dam site. Although suitable habitat may exist within the project area to support the species, field investigations conducted during the spring 1984 failed to locate populations.

Therefore, based on conflicting habitat descriptions and the possibility that suitable habitat may exist within the project area, the possible presence of the species within the project lands cannot be conclusively determined. Therefore, it is recommended that thorough field investigations be conducted following selection of reservoir construction alternative. If a single reservoir were to be constructed at Shaws Bend, detailed investigations should be performed at the proposed dam site (including adjacent upland areas which would be impacted) and within lands which would be impacted by conservation pool operations. If the multiple reservoir scenario is selected, investigations should be conducted at each proposed dam location. Based on previously completed field investigations and vegetation/habitat mapping, 4,945 acres of oak forest and prairie environments are within the Shaws Bend Reservoir; 2,729 acres are within multiple reservoir areas. Additional lands which may require further investigations would be dependent upon proposed barrow sites, construction sites and access roads. Scheduling for such investigations should be conducted during the spring of two consecutive years; a total of two field trips.

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SECTION 5

THREATENED AND ENDANGERED SPECIES RESEARCH

Colorado Coastal Plains Project, Texas

William F. Mahler, Ph.D.
Principal Investigator

ABSTRACT

UNIQUE AREAS IDENTIFICATION

Field investigations have resulted in the identification of six areas as unique to the region. Five sites are located within the Shaws Bend Reservoir area; one site is in the vicinity of Bastrop. Unique areas have been defined as sites which provide an unusual (atypical) setting to the area in terms of vegetation resources or habitat or are of social, historical, recreation, or aesthetic value. Those sites which are of interest due to vegetation or habitat value are: Fern Hollows and Bluffs, Horseshoe Bend Woodlands and Harvey Creek Woodlands. Sites which are of recreation, social, historic or aesthetic value are: Burnam's Ferry Crossing, Camp Lone Star, and Red Bluffs.

Horseshoe Bend Woodlands and the Harvey Creek Woodlands, contain mature elm, ash, hackberry and oak and have remained undisturbed for a considerable length of time. Additionally, the Horseshoe Bend Woodlands provide a unique habitat within a portion of the project site which is primarily comprised of open fields and cultivated lands.

A few locations within the south central Shaws Bend Project area contain Fern Hollows and Bluffs which provide a habitat unique to the area. The areas are relatively secluded and large trees provide good canopy cover and, natural springs provide a continuous water supply to the area. As a result, the areas support palmetto (Sabal minor), resurrection fern (Polypodium polypodioides), Ombligo de Venus (Hydrocotyle umbellata) and other unusual taxa.

Burnam's Ferry Crossing is located in the south central portion of the Shaws Bend Reservoir site. The area is of historic interest as it was along the La Bahia Road linking southwestern Louisiana and San Antonio. Presently, the site is privately owned and used annually by the Boy Scouts for camping.

Camp Lone Star is located south of the river approximately two miles from La Grange. It occupies approximately 125 acres and lies within dense upland forest. The site is of recreational interest and is in continuous operation throughout the year. During 1983, Camp Lone Star provided facilities for 15,000 camper-day usage.

The Red Bluffs unique area is located along the Colorado River near Bastrop and are of aesthetic interest due to their elevation above the river and surrounding floodplain lands. Upland areas are vegetated in dense pine and oak woodlands and portions of the bluffs have remained relatively undisturbed and pristine.

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7.0 UNIQUE AREAS IDENTIFICATION

The investigation and identification of unique areas was conducted by field team members as part of vegetation sampling and resources analyses. Criteria used in the evaluation were based on locations with unusual vegetation composition, unusual land forms, areas of scenic or aesthetic value, and locations of specific social and cultural interest.

Information used for the identification of unique areas was acquired as a result of work conducted during vegetation sampling. Input to the identification of potential unique areas was acquired through review of area topographic sheets, with specific attention to land forms, creeks and streams and through detailed evaluations of sterioscopic false-color infrared aerial photographs. Input was also solicited from area residents which proved exceptionally beneficial in the identification of areas which could be considered unique.

Intensive field investigations have resulted in the identification of six sites which were considered unique to the central Texas region. Three sites are unique in terms of environmental and ecological significance, two sites are of historical and recreational significance, and one site was identified as unique due to unusual land form and aesthetic value.

Due to subjectivity used in judging some areas, the relative importance of each site must be evaluated with respect to importance to any one or a combination of several of the criteria used in the evaluation. Those sites identified as unique to the area are:

Fern Hollows and Bluffs
Horseshoe Bend Woodlands
Harvey Creek Woodlands
Burnam's Crossing
Camp Lone Star
Red Bluffs

7.1 Fern Hollows and Bluffs

Several areas within the central portion of the Shaws Bend Reservoir Site provide unique habitat for hydrophyllic vegetation. Upland areas, south of the river are frequently cut by deep ravines and, within a limited area, bluffs are located near the river edge.

Ravines and bluffs within the area are heavily vegetated in understory and relatively mature trees provide good canopy. Additionally, many of the areas are continuously moist as a result of springs which provide a reliable water source to the area.

The combination of ample and reliable water supply and dense canopy has resulted in excellent habitat for ferns, mosses and other hydrophyllic plants infrequently found within the project area. Unusual species observed during field investigation include: Palmetto (Sabal minor), resurrection fern (Polypodium polypodioides), inland sea oats (Chasmanthium sp.), Ombligo de Venus (Hydrocotyle umbellata), meadow spikegrass (Selaginella apoda), and buckeye (Aesculus pavia).

Field investigations, review of aerial photography, and use of topographic sheets indicate Fern Hollows and Bluffs occupy approximately 30 acres within the Shaws Bend project site. Although similar habitat may exist within other river reaches, none were found during field investigations. Figure 7-1 identifies the general locality of the unique area, Exhibit 7-A, taken within the habitat, shows the proliference and diversity of vegetation within the area.

7.2 Horseshoe Bend Woodlands

The Horseshoe Bend Woodlands consist of a pristine area which has remained relatively undisturbed during the past 30 years. The area occupies approximately 100 acres within the central portion of a remnant ox-bow lake which was cut off from the river during the 1940's. Other area ox-bow lakes have been generally cleared for agricultural purposes.

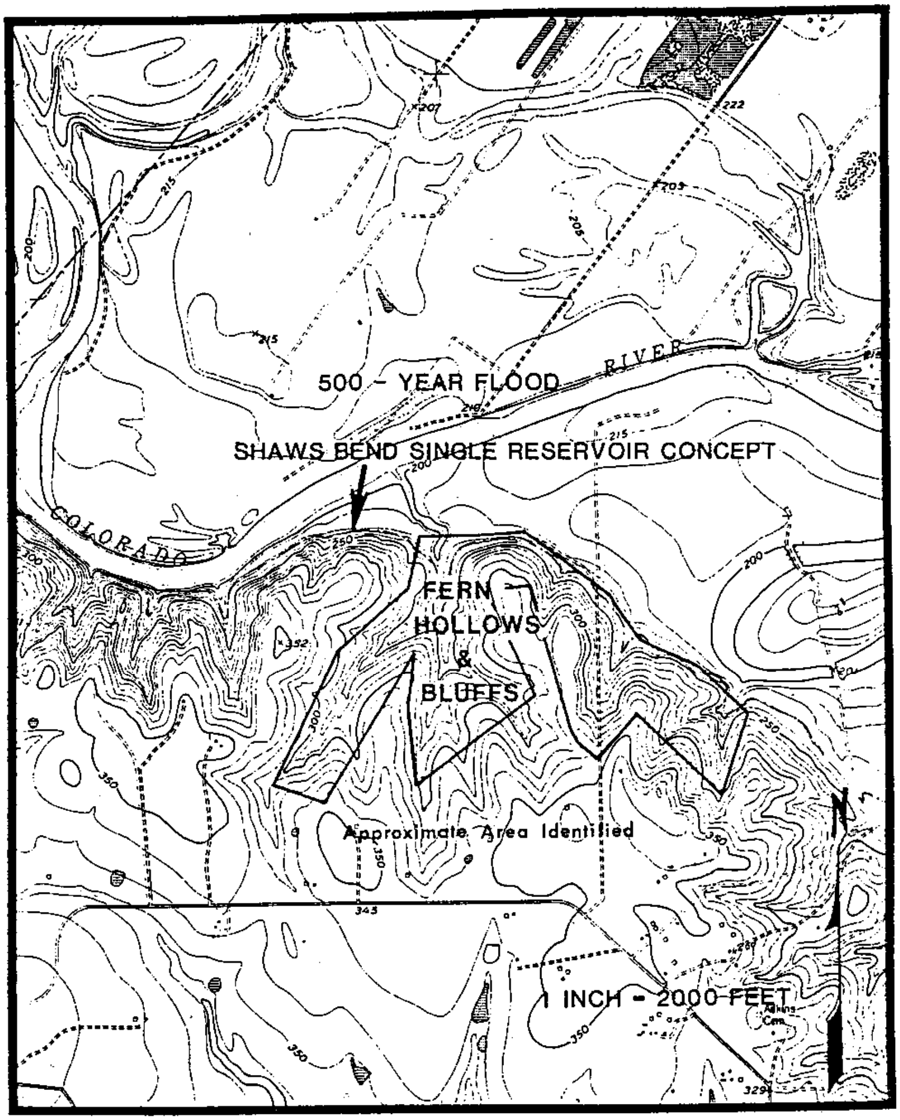

FIGURE 7-1

FERN HOLLOWS AND BLUFFS

Unique Area

SECTION 7 - Page 3

Vegetation of the Horseshoe Bend Woodlands is dominated by the Elm-Ash-Hackberry Community; however, relatively homogeneous stands of mature cottonwood, hackberry, and other species have become established in various scattered locations.

In addition to the relatively undisturbed nature of the woodlands, the area provides unique habitat for area wildlife. Surrounding lands, on the north side of the river, are generally maintained in pasture and cultivation. The presence of a major woodland area provides valuable habitat for area wildlife. The Horseshoe Bend Woodlands location is identified on Figure 7-2.

7.3 Harvey Creek Woodlands

The Harvey Creek Woodlands (Figure 7-3) total approximately 30 acres and are comprised of relatively undisturbed, mature oaks, elms, and hackberry. In addition, the creek provides a continuous water supply to the area and numerous pools and riffles are located along a reach above the confluence with the Colorado River. The area provides valuable bottomland habitat for many avian and mammalian species.

Harvey Creek Woodlands and surrounding areas are shown on Exhibit 7-B. Uplands surrounding the Harvey Creek area have been of archeological interest as the locality was extensively used as Indian encampments. Local residents frequently visit the woodlands and surrounding areas in search of Indian artifacts and for solitude. During the late 1800's the vicinity of Harvey Creek was the site of a Black Community and the Pleasant Hill Church and Cemetary are located in the woodlands, south of the creek. The cemetary is not maintained, however, the church was recently repaired and remains in relatively good condition.

Detailed investigations throughout the project area indicate the Harvey Creek Woodlands to be significantly different from other similar habitats. Although numerous heavily wooded areas are present within other project site areas, none were found to be in a relatively undisturbed condition as those of Harvey Creek. Furthermore, Harvey Creek flows freely throughout much of the year whereas

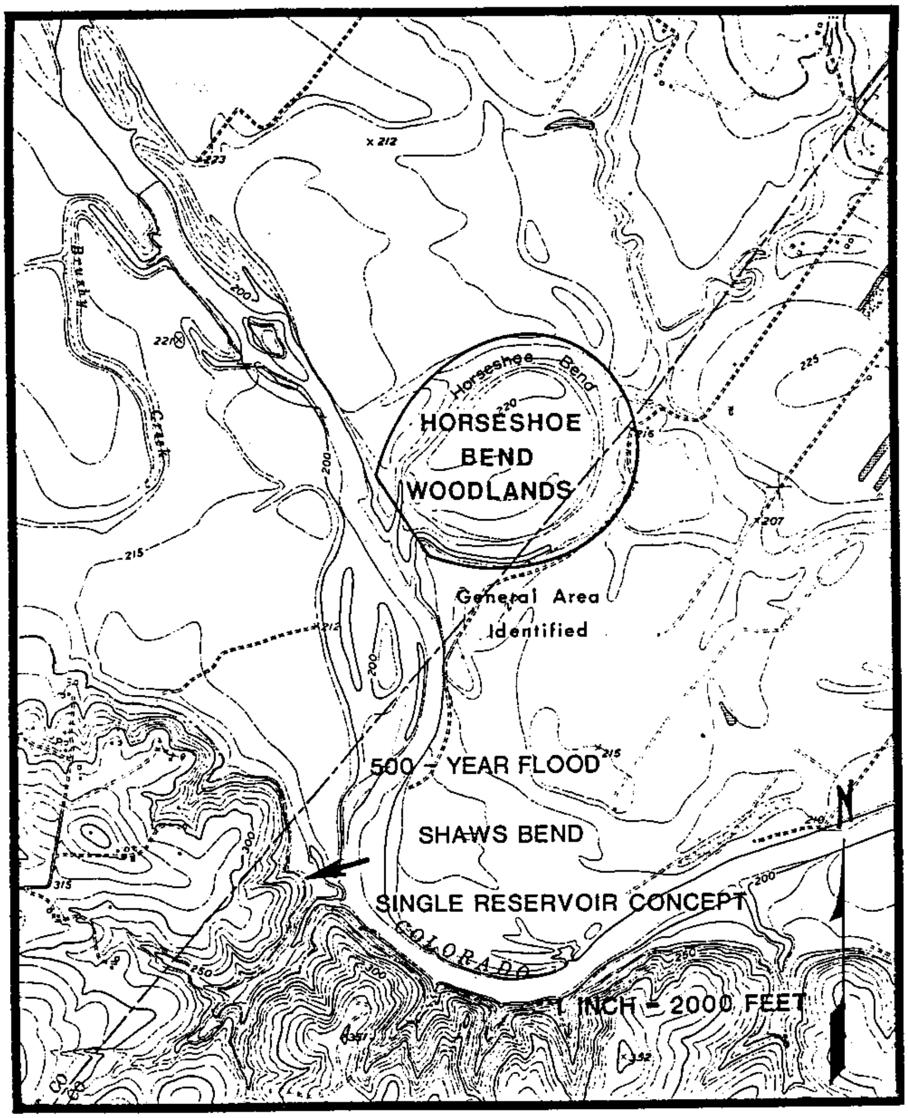

FIGURE 7-2
HORSESHOE BEND WOODLANDS
Unique Area

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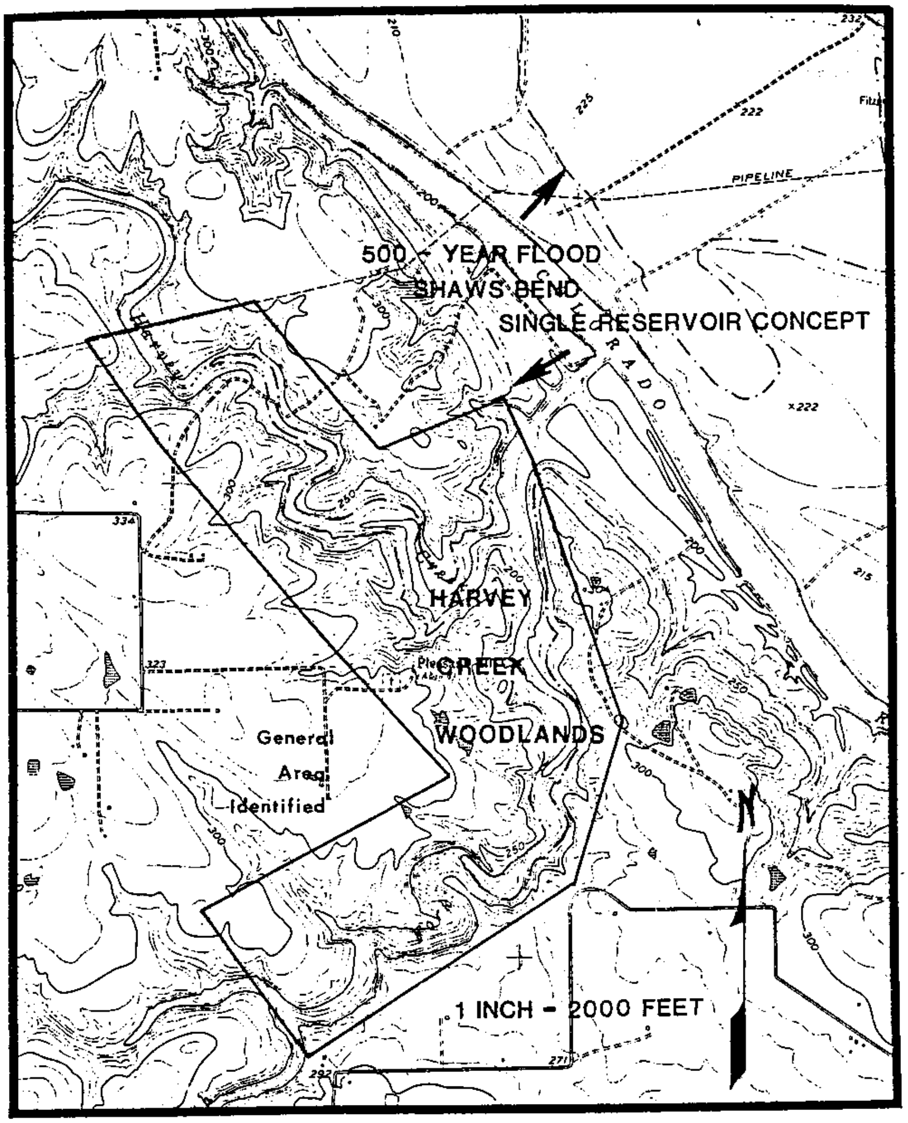

FIGURE 7-3
HARVEY CREEK WOODLANDS
Unique Area

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many streams within the project area are ephemeral, flowing only as a result of immediate runoff.

7.4 Burnam's Crossing

The historic site of Burnam's Crossing is located approximately 12 miles upstream from Columbus in Colorado County. During the 1820's a ferry was established by Jessie Burnam at the site of the La Bahia Road linking southwestern Louisiana and San Antonio. During 1836, the ferry was used by General Sam Houston in his retreat from Gonzales to San Jacinto and was destroyed to prevent use by the Mexican Army. Access to the site was made across the broad floodplain north of the river, south of the river the area consists of a relatively large first terrace surrounded by bluffs. The road to the uplands remains in relatively good condition and is used by local landowners and others.

During recent years, a concrete boat ramp has been constructed for private use; no other modifications to the site have been made. The site remains of local interest as it is used annually by Boy Scouts as a camp site. The relative importance of Burnam's Crossing as a recreational site is insignificant with respect to other suitable locations along the river. Although the site is infrequently used by the Boy Scouts, and the area is ideal as a camp site, other privately held lands can probably be made available for use.

Burnam's Crossing was the site of extensive trading activities during the late 18th through early 20th century. Although superficial evidence of its previous importance no longer exists, archeological research at the site should provide valuable insight regarding the early inhabitants of the area. If the location becomes inundated by reservoir waters, potentially valuable resource of archeological significance would be lost. Construction of a dam at Shaws Bend would require site mitigation.

Figure 7-4 identifies the Burnam's Ferry Crossing site.

7.5 Camp Lone Star

Camp Lone Star, located on the south side of the river approximately two miles southeast from La Grange, is owned and operated by Texas Outdoors Ministry of the Lutheran Church, Missouri Synod. The camp occupies approximately 125 acres, primarily within upland forest and has a 2,000 foot frontage on the Colorado River. All water and sanitary facilities are maintained on the premises and the facility is in year-around operation. During 1983, occupancy levels totaled at 15,000 camper days.

Lone Star Camp is identified on Figure 7-5.

7.6 Red Bluffs

The Red Bluffs unique area is located in the vicinity of Bastrop (Figure 7-6) overlooking the Colorado River at an elevation of approximately 100 feet (above river surface). Although the area is of little ecological significance except as a roost for vultures and other birds, the site is unique from an aesthetic aspect.

The Red Bluffs are of Reklaw Formation (refer to Section 3.3, Regional Geology) and contain glauconitic clay ironstone which is browinsh black, reddish brown and weathers light brown to light gray. The lower portion of the Red Bluffs is grayish-green in color and consists of quartz sand.

Upland areas are dominated by pine woods and oaks. The first terrace vegetation below the Red Bluffs has remained relatively undisturbed and dominated by large sycamores with a basal area of approximately 72 square feet per acre.

Exhibit 7-C, photograph taken from the vicinity of Red Bluffs, shows dense overstory vegetation along the Colorodo River and heavily wooded upland areas. Wooded uplands are primarily pine-oak woodlands and oak-juniper woodlands. Pasturelands across the river are maintained in Bermuda-grass; river terraces are typical of those throughout the Colorado River floodplain.

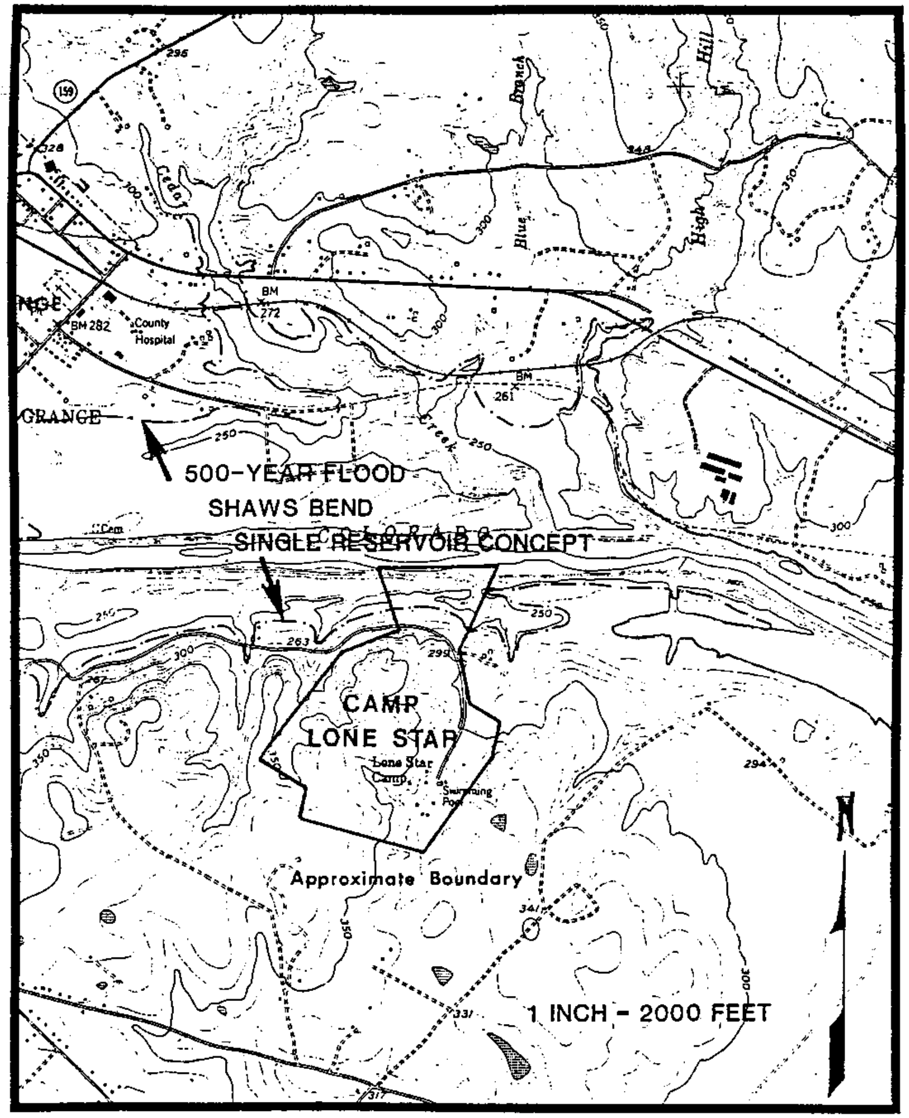

FIGURE 7-5
LONE STAR CAMP
Unique Area

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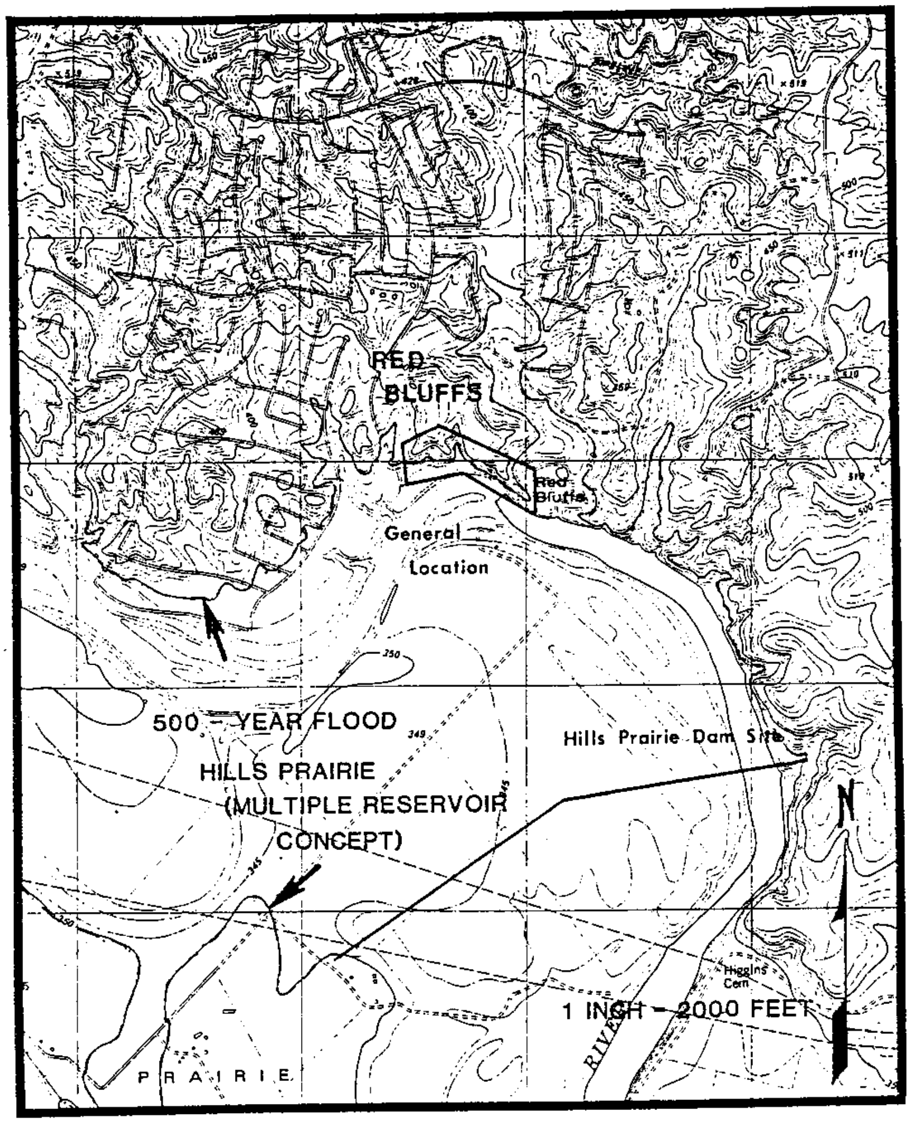

FIGURE 7-6
RED BLUFFS
Unique Area

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SECTION 9

ARCHEOLOGICAL AND HISTORICAL SITES ANALYSIS

Colorado Coastal Plains Project, Texas

Elton R. Prewitt
Principal Investigator

ABSTRACT

False-color infrared aerial photography was studied to determine the potential usefulness of this method of analysis for predicting archeological and historical site occurrences in the Colorado Coastal Plains Project. The archeological aerial photography analysis was conducted in late 1983 by Prewitt and Associates, Inc. as part of a larger study performed by ECS Technical Services, Fort Worth, Texas under a contract from the U.S. Department of the Interior, Bureau of Reclamation.

Potential sites identified from the aerial photographs include 64 prehistoric and six historic sites. Ten of the potential prehistoric sites were field checked; two were determined to be the locations of previously unrecorded sites. None of the historic sites were checked for accuracy although one coincided with a previously recorded site. Thirty-one of the 64 prehistoric site predictions were examined during the field check, a recent sampling survey conducted by New World Research, Inc., or other previous investigations. Eleven of these 31 predicted locations were found to be accurate. This yields an accuracy ratio of 35 percent.

It is concluded that this type of study is more useful for preliminary indications of overall site density rather than precise locational data. It is recommended that analysis of false-color infrared imagery for archeological site data be continued. It is further suggested that future studies not be conducted on a "blind" basis; rather, existing local or regional site location data should be analyzed first to provide a basis for greater accuracy in site predictions.

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SECTION 9

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9.0 ARCHEOLOGICAL AND HISTORICAL SITES ANALYSIS

9.1 Introduction

A predictive investigation of archeological and historical sites in the original Study Areas 1 and 2 of the Colorado Coastal Plains Project (refer to Appendix A) was conducted by Prewitt and Associates, Inc. in conjunction with the vegetation resources study undertaken by ECS Technical Services. Project location and area characteristics have been described in Section 1 and, therefore, are not repeated as part of this section.

Previous archeological studies in and near the current project area have demonstrated that a wide range of prehistoric and historic sites can be expected along the Colorado River and its tributaries (Nunley, 1963; Jackson and Skelton, 1975; Skelton and Freeman, 1979; Laurens, et al., 1979; Pevey and Van Cleve, 1981; Nightengale and Jackson, 1983). Excavations of varying intensity have provided a basic framework for chronological and functional studies extending from Paleoindian to Historic times (Hester and Collins, 1969; Carter and Ragsdale, 1976; Skelton, 1977; Fullem, 1977; Young, 1979). Based on the background data provided by these studies, it can be expected that a high density of both prehistoric and historic sites exists within the project area.

The purpose of this study is to examine stereoscopic false-color infrared aerial photographs to determine the utility of this method of study for locating archeological and historical sites in the Colorado Coastal Plains Project. While aerial photographs have been used by archeologists for many years and for varied purposes, increasing availability of false-color infrared imagery in recent years has allowed more-widespread use of this tool for archeological investigations. Particular success has been achieved in locating house ruins, irrigation and water retention features, roads, and other architectural and engineering features in the arid Southwestern United States (Lyons, 1976; Lyons and Hitchcock, 1977; Lyons and Ebert, 1978; Herrington, 1979; Lyons and Mathien, 1980). Greater difficulty has been encountered in the effective use of false-color infrared aerial photographs in semiarid regions of Texas where the activities of hunting and gathering peoples left more-subtle remains than the architectural and engineering features of the

Southwest (Prewitt, 1983). Archeological studies of aerial photographs, other than false-color infrared, have met with even greater difficulties although, to a certain degree, they have been successful (Prewitt, 1976; Holz and Prewitt, 1981; Prewitt, et al., 1983).

As previously noted, the study was limited to Areas 1 and 2 as specified by the Bureau of Reclamation. This limitation substantially restricts the effective areal coverage, particularly in the vicinity of the mouths of Williams Creek and Cedar Creek, then extending upstream along the Colorado River. The study was terminated at the U.S. Highway 77 bridge at La Grange since the proposed Shaws Bend Reservoir limits are confined to the existing river channel by the time it reaches that point. For comparative purposes, site predictions also were made for Study Area 3 even though it was not included in the ensuing analysis. The difference in total site numbers is dramatic; a total of 70 potential prehistoric and historic site locations were identified in Study Areas 1 and 2 while 212 locations were identified in Study Areas 1, 2, and 3 combined.

9.2 Analysis Methods

The study of false-color infrared aerial photographs of the Colorado Coastal Plains Project was essentially a blind test. The specific locations of known archeological sites were not reviewed by the photointerpreter prior to the study. However, familiarity with the project area led to an inescapable situation where a few of the site locations were known to the photointerpreter. This knowledge biased the interpretation process to the extent that certain landforms were identified as high potential site locations. Specifically, low rises on stream terraces adjacent to creeks, fossil channel scars, and the river were immediately recognizable as having high site occurrence potential. Consequently, the study is not a totally blind test although an attempt was made to keep the interpretations as objective as possible.

The imagery studied consisted of 9-by-9 inch format false-color infrared contact prints produced at an approximate scale of 1:12,000 (1 in. = 1000 ft). The actual scale of the nonrectified photographs is closer to 1:11,500 (1 in. = 964 ft). The stereoscopic imagery, supplied by the Bureau of Reclamation, had approximately

56 percent overlap and 40 percent sidelap. A folding pocket stereoscope was used during the analysis. Potential site locations were plotted as accurately as possible on USGS 1:24,000 scale topographic maps.

9.2.1 Prehistoric Site Signatures

The recognition characteristics for prehistoric sites were derived from previous experience in the immediate project area, from other known characteristics along the Colorado River, and from previous experience in photointerpretation along the Blanco River and the San Gabriel River. Rises or knolls on floodplains are known to be favored site locations during prehistoric times, and these were used as key identifiers in predicting site locations. Even though some previously known sites such as 41CD10 are reported to be possible burned rock middens (Nunley 1963:35-36), it was expected that vegetation cover and less-dense accumulations of burned rocks would preclude the use of blue color tones for site identifiers such as was successfully used on the Stockton Plateau in the Trans-Pecos region of Texas (Prewitt 1983).

Variations in soil and vegetation tones which occur in conjunction with floodplain rises are particularly identified as potential site locations. Where tributary streams extend beyond the limits of the Colorado River floodplain, small terrace remnants, particularly higher terrances and those with distinct rises, are identified as high site potential locations. In all situations, either river or creek floodplains, the low rises do not necessarily appear on the USGS topographic maps. Thus, the same site prediction obtained from the aerial photographs can be neither obtained from the topographic maps, nor can they be identified without stereoscopic photographs.

It must be made explicit that these landforms are generally relatively recent in the geologic history of the project area. Consequently, it must be expected that older, and potentially more deeply buried, sites will not necesssarily coincide with these surface features. The predictions, then, should reflect a bias toward later sites that were occupied after about

6000 B.P. (B.P. = years before present calculated from A.D. 1950). Even so, some earlier sites should be included in the predictions since it can be assumed that some of the modern landform expressions began developing in the late Pleistocene or early Holocene.

To this point, all discussions regarding prehistoric site locations have dealt with depositional (or accretionary) landforms. Stable or deflationary (erosional) landforms present different problems. These are upland areas where lithic resource procurement localities and ephemeral temporary campsites may be expected to occur. These types of sites are more difficult to deal with in the sense that they are not readily identifiable. All of the upland lobes overlooking the Colorado River and its major tributaries are potential site locations for either of the previously mentioned activities. These are as equally identifiable on the USGS topographic maps as they are on the photographs. Consequently, very few site predictions were made for these upland areas. Only where distinctive small rises are associated with either soil or vegetation tonal changes were predictions made for this type of site. Most of these were found to be marginal to Study Areas 1 and 2. Since they occur more frequently in Study Area 3, few are included within this analysis.

9.2.2 Historic Site Signatures

Somewhat different recognition characteristics were used to identify potential historic sites. To an extent, rises on the floodplain remain a key consideration, but other factors predominate. These are described separately for sites with standing structures and those without standing structures.

9.2.2.1 Standing Structures

These potential historic sites are identified on the basis of the shapes of houses visible on the photographs. Two styles of houses, felt to be characteristic of the late nineteenth century and early twentieth century, were readily identifiable. Both consist of an elongated (rectangular) main unit that is either one story or two stories and has a secondary add-on unit on the rear. Variations in the placement of the add-on units account for the two basic stylistic differences. The first style is a symmetrical "T" where the add-on is centered on the rear of the main unit. The second style is an assymetrical "L" where the add-on is placed near or flush with the alignment of one end of the main unit. In both styles, the rooflines form a distinct 90° angle. Occasionally, the houses also exhibit dormers on the front. Outbuildings, pens, and access roads are usually associated with the houses and form distinctive farmstead complexes. In some cases, simple square or rectangular houses are identified as potential historic sites. These are usually abandoned structures with overgrown access roads and other evidence of discontinued use. Vegetation within farmsted complexes is usually enhanced in comparison to surrounding vegetation.

9.2.2.2 No Standing Structures

This type of potential historic site is identified on the basis of enhanced vegetation that occurs in rectangular or square patterns, stock pens, and occasionally the presence of outbuildings. Houses once associated with these sites have either been moved, burned, or allowed to deteriorate into a pile of rubble and rotted lumber. Access roads are usually overgrown and appear to be abandoned. Frequently, these sites appear on the 1957 edition USGS topographic maps as occupied houses. In these cases, it can be assumed that the houses were abandoned sometime during the past 25 years.

9.3 Analysis Results

Seventy potential site locations were identified in Study Areas 1 and 2 during the analysis of the photographs. Following the airphoto analysis, records of known sites were checked to determine the locations of previously recorded sites. These two groups of sites are summarized in this section. Three gross environmental settings are used as categories for sorting and analysis. These are: uplands, bottomlands, and creek terraces in uplands. Uplands include the higher landforms outside the incised Pleistocene/Holocene valley of the Colorado River. This category includes the valley wall. Bottomlands include the modern floodplain and the Holocene and Pleistocene alluvial deposits contained within the incised valley. Creek terraces in uplands include alluvial deposits in tributary creek valleys incised into the upland landforms outside the incised river valley.

9.3.1 Site Predictions

The criteria used for identifying potential site locations have already been defined. The predicted sites are segregated into two groups based on age and cultural affiliation. These are prehistoric and historic.

9.3.1.1 Prehistoric Sites

An overwhelming majority of the potential sites identified are prehistoric in age (Table 9-1). Sixty-four (91.4 percent) sites are included in this category. Although the prehistoric sites are predicted to occur in all three of the environmental zones described earlier, there is a noticeable bias toward the bottomlands that reflects the constraints of the study area rather than real differences in site location. Fifty-seven (89 percent) of the predicted prehistoric sites are located in the bottomlands. In contrast, only three (5 percent) are located in the uplands, and four (6 percent) are on upland creek terraces. No attempt has been made to further segregate the bottomland sites although several topographic settings may be appropriate for future analyses of this sort. These include: riverbank, creekbank, oxbow lake bank, and isolated depositional or erosional knolls.

9.3.1.2 Historic Sites

Few potential sites in the study area are identified in this category (Table 9-2). Six (8.6 percent) sites are included. As with the prehistoric sites, they are unequally distributed in the three major environmental zones. However, in this case, the locational bias is probably not a direct reflection of the study area restrictions. The majority are, again,

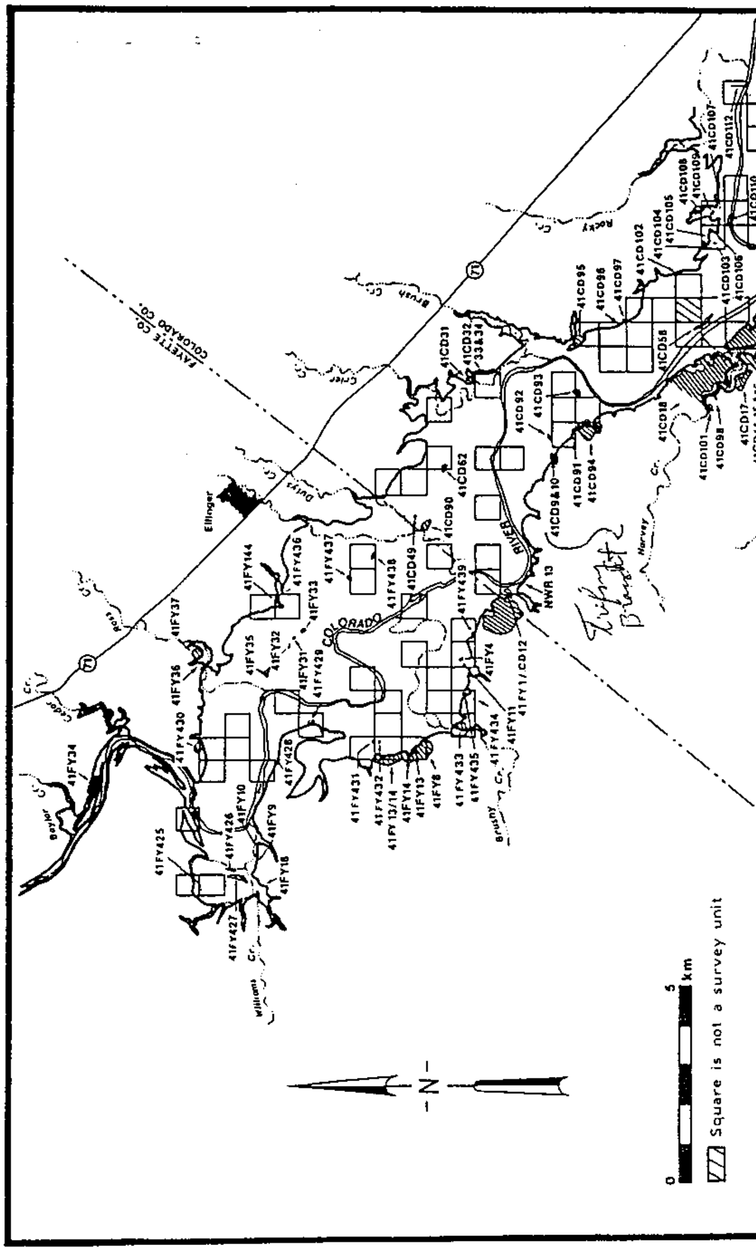

FIGURE 14. SITES LOCATED DURING THE SAMPLE AND JUDGEMENTAL SURVEYS AND AS PART OF THE RELOCATION OF PREVIOUSLY KNOWN SITES.

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LCRA THE POWER TO MAKE A DIFFERENCE. WaterCo

INTEROFFICE MEMORANDUM

DATE: February 28, 2000

TO: Lower Colorado Regional Water Planning Group

FROM: Quentin Martin Quentin Martin

SUBJECT: Evaluation of Increased Highland Lakes Water Supply Available with Diversion from Llano River to Lake Buchanan

Background

Several planning group members have proposed the concept of diverting water from the Llano River into Lake Buchanan. Such a diversion has the potential for increasing the water supply in the Highland Lakes if that water can be captured for later use.

Initial study of this concept was undertaken by Mr. Holton Cook under contract to the LCRA in 1955. He was charged to evaluate the feasibility of connecting the Llano River to Lake Buchanan so river water could be diverted for hydropower generation at Buchanan Dam. He concluded that the canal would not be cost effective to increase hydropower generation. His analysis did not consider water supply improvements. A conceptual system diagram of the Llano River - Buchanan canal is shown in Figure 1.

The economic merits of the potential canal depend largely on the additional water supply made available. The purpose of this memorandum is to report on results of a study to evaluate the water supply impacts of such a project.

Scope and Methodology

The firm water supply from the Highland Lakes is called the Combined Firm Yield (CFY). The CFY is the maximum annual water supply available from the lakes, after honoring all senior water rights, during a repetition of the critical drought period. The critical drought occurs from early1947 to early 1957.

The LCRA Water Management Plan (WMP, 1999) describes the process used to determine the CFY, which has been computed at 445,266 acre-feet annually.

To determine the impact of the Llano River diversion canal, the CFY was recomputed by Mr.

Richard Brown, of the LCRA staff, using the following assumptions:

- All procedures and assumptions used in determined the WMP CFY are also used in this analysis,
- A maximum daily Llano River diversion canal capacity of 500 cfs, and
- All daily flows in the Llano River less than 500 cfs are diverted to Lake Buchanan.

Results

The CFY using the Llano diversion was found to be 444,695 acre-feet annually - a drop of 571 acre-feet per year from the CFY without the project. There is a net loss in water supply with the diversion canal. This seems a strange result, but it is accurate.

Why did this result occur? The key consideration is the storage of Llano River water during the critical drought. Without the diversion canal, all Llano River water flows into Lake Travis after first passing through lakes LBJ and Marble Falls. During the entire critical drought, Lake Travis is never full. So the Llano River water will be captured during all months of the critical drought for later use even without moving it to Lake Buchanan.

Another critical factor to consider is the available lake storage during the first six months in 1947. This is the beginning of the critical drought period. Figure 2 shows the monthly ending storage in both lakes without the diversion canal. Note that in January through March, both lakes are full. Water in the Llano River during those months will spill from the Highland Lakes regardless of which lake it enters. There's no place to store it.

The first lake to drop from full is Lake Travis in April, 1947. Note in Figure 2 that Lake Buchanan remains full until June. Even with the Llano diversion, Lake Buchanan can't hold any more water. All the Llano River flows have to be stored in Travis, which is where they are stored without the diversion channel.

As the drought proceeds past 1947, both lakes have storage available for the Llano River flows. With the diversion canal, part of the Llano water would move into Lake Buchanan. Since Buchanan is a shallower reservoir than Lake Travis, it has more surface area in proportion to its storage. Thus, it loses more water to evaporation for every acre-foot stored than does Lake Travis. Therefore, during the drought period, putting more Llano water into Lake Buchanan increases lake evaporation losses compared to storing it all in Lake Travis. The resulting decrease in CFY with the Llano River diversion is caused by this increased evaporation loss in Buchanan.

Please advise me if you would like additional information.

CC: SB1 Consultants

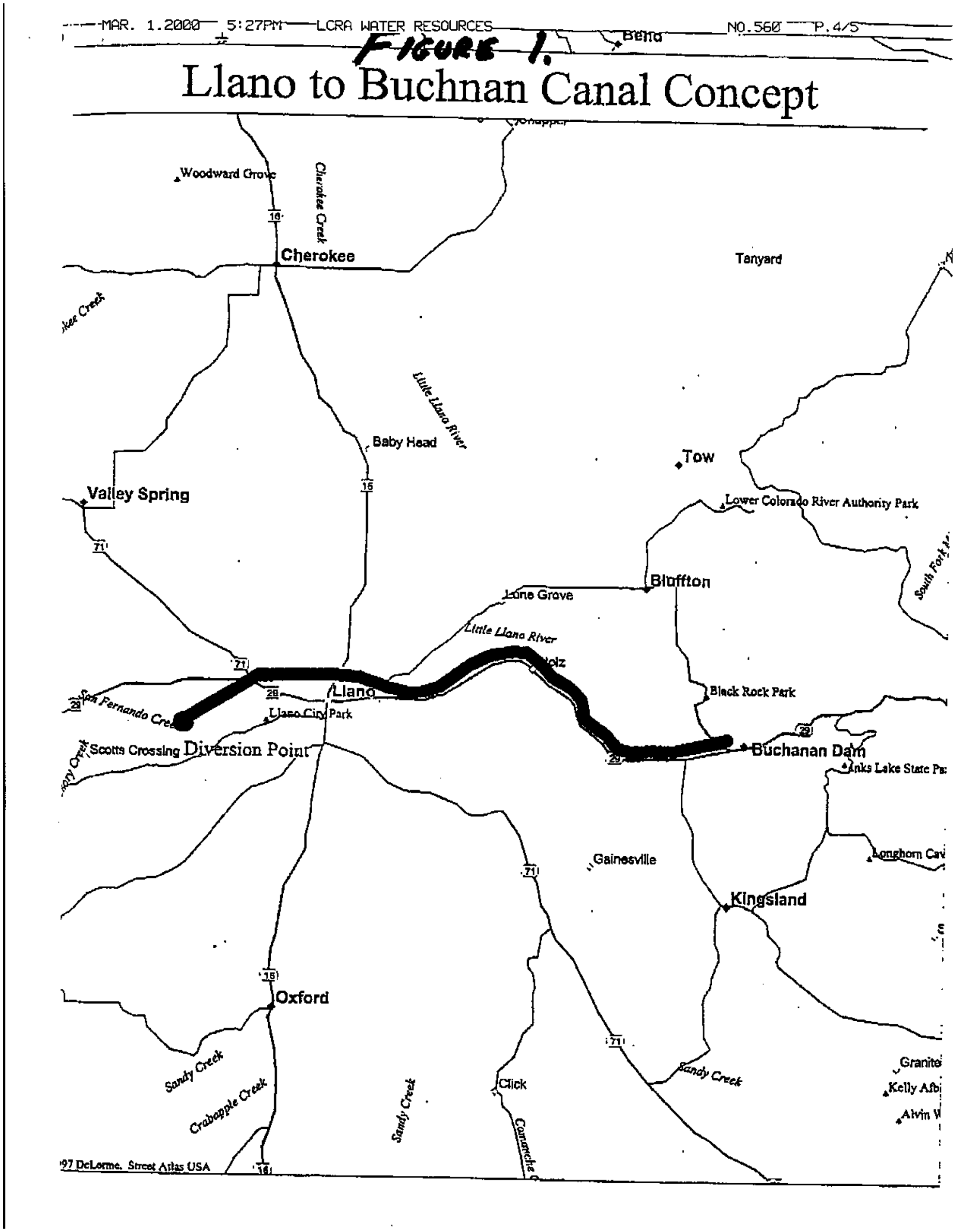
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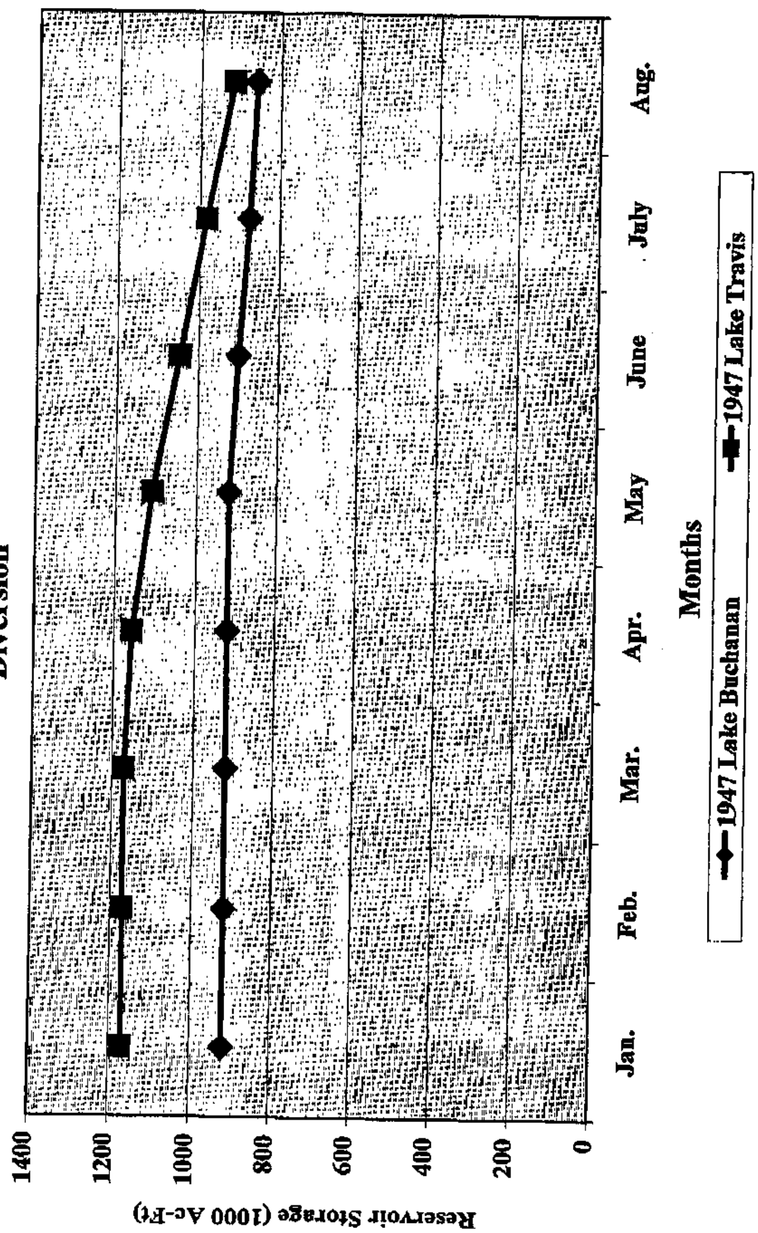
FIGURE 1.
Llano to Buchnan Canal Concept
Woodward Grove
Cherokee Creek
Cherokee
Tanyard
Little Llano River
Baby Head
Tow
Valley Spring
Lower Colorado River Authority Park
Bluffton
Lone Grove
Little Llano River
Black Rock Park
Llano
San Fernando Creek
Llano City Park
Buchanan Dam
Scotts Crossing
Diversion Point
Gainesville
Longhorn Cav
Kingsland
Oxford
Sandy Creek
Crabapple Creek
Sandy Creek
Click
Sandy Creek
Granite
Kelly Afb
Alvin W
'97 DeLorme, Street Atlas USA

Figure 2. 1947 Simulated Lake Storage Without Llano River Diversion



Listing of Source Documents for Section 8.3

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2. Bauer, J., R. Frye, and B. Spain. 1991. "A Natural Resource Survey for Proposed Reservoir Sites and Selected Stream Segments in Texas." Texas Parks & Wildlife Department, Austin, Texas.
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9. Lower Colorado River Authority. 2000. *Aquatic Resource Characterization Report,* (Available online at http://www.lcra.org/lands/wrp/wq/wq_arcprog.htm March 2000).
10. McMahan, C. A., R. G. Frye, and K. L. Brown. 1984. T*he Vegetation Types of Texas Including Cropland.* Texas Parks & Wildlife Department, Austin, Texas.
11. Mosier, D. T. and R. T. Ray. 1992. *Instream Flows for the Lower Colorado River: Reconciling Traditional Beneficial Uses With the Ecological Requirements of the Native Aquatic Community*. Lower Colorado River Authority, Austin, Texas.
12. National Park Service. 1995. *The Nationwide Rivers Inventory*. United States Department of the Interior, Washington, D.C.
13. Texas Natural Resource Conservation Commission (now the Texas Commission on Environmental Quality). 1995. *Texas Surface Water Quality Standards.* Texas Natural Resource Conservation Commission (now the Texas Commission on Environmental Quality), Austin, Texas.
14. Texas Parks & Wildlife Department. 1979. *An Analysis of Texas Waterways.* Texas Parks and Wildlife Department, Austin, Texas.
15. Members of the local community have voiced strong opposition to giving a USS designation to Cummins Creek due to the uncertainties that exist regarding the impacts to property rights that such a designation may have. Also, there is concern in the local community that such a designation may infringe upon the Cummins Creek WCID's mandate.

APPENDIX 8D

TPWD SUPPLEMENTAL INFORMATION RESOURCES THE 2006 REGION K PLAN UNIQUE STREAM SEGMENT RECOMMENDATIONS

Rocky Creek:

Bayer, C. E., J. R. Davis, S. R. Twidwell, R. Kleinsasser, G. Linam, K. Mayes, and E. Hornig. 1992. Texas aquatic ecoregion report: an assessment of least disturbed streams. Draft. Texas Water Commission, Austin, Texas.

The Barton Springs Segment of the Edwards Aquifer:

A comprehensive list of literature about the Barton Springs portion of the Edwards aquifer was prepared by the City of Austin in collaboration with the Austin History Center and is available at http://www.ci.austin.tx.us/aquifer/. A partial list of existing information obtained from this website is given in Appendix C (Austin, City of 2000).

General Overview:

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This section provides background information on the ***ten streams in the Lower Colorado Region identified and recommended by the Subcommittee as warranting further study for consideration of designation as ecologically unique*** (in the *2006 Region K Plan*). A listing of source documents for this section is contained in *Appendix 8C*. Additional information resources have also been provided by the TPWD in *Appendix 8D*.

Table 8.1 Stream Segments Identified for Further Study for Potential Designation as Ecologically Unique

Stream Segment	Location
Barton Springs segment of the Edwards Aquifer	Recharge stretches of Barton, Bear, Little Bear, Onion, Slaughter, and Williamson Creeks in Travis and Hays Counties
Bull Creek	From the confluence with Lake Austin upstream to its headwaters in Travis County
Colorado River	Within TCEQ classified Segments 1409 and 1410 including Gorman Creek in Burnet, Lampasas, and Mills Counties
Colorado River	TCEQ classified Segments 1428 and 1434 in Travis, Bastrop, and Fayette Counties
Colorado River	TCEQ classified Segment 1402 including Shaws Bend in Fayette, Colorado, Wharton, and Matagorda Counties
Cummins Creek	From the confluence with the Colorado River upstream to FM 159 in Fayette County
Llano River	TCEQ classified Segment 1415 from the confluence with Johnson Creek to CR 2768 near Castell in Llano County
Pedernales River	TCEQ classified Segment 1414 in Kimball, Gillespie, Blanco, and Travis Counties
Rocky Creek	From the confluence with the Lampasas River upstream to the union of North Rocky Creek and South Rocky Creek in Burnet County.
Hamilton Creek	From the outflow of Hamilton Springs to the confluence with the Colorado River.

8.1.1 Barton Creek Within the TCEQ Classified Stream Segment 1430 From the Confluence With Town Lake in Travis County to FM 12 in Hays County

Barton Creek is the TCEQ classified stream Segment 1430 and extends from the confluence with Town Lake in Travis County to FM 12 in Hays County. The creek is in the Central Texas Plateau ecoregion and the watershed lies within the live oak-ashe juniper woods vegetation association. Water quality is generally good to exceptional, although coliform levels are occasionally elevated after storm events. Nitrite levels can also be high due to the influence of groundwater. Substrate is typically limestone bedrock with rubble, boulders, and gravel. The upper portions of the streams are generally intermittent, except in spring-fed reaches, which limits aquatic habitat. A comprehensive list of literature about the Barton Springs portion of the Edwards aquifer was prepared by the City of Austin in collaboration with the Austin History Center, and is available at http://www.ci.austin.tx.us/aquifer/. Barton Creek meets the following criteria for designation as ecologically unique:

- <u>Riparian Conservation Area</u>: the lower end of the stream is in the City of Austin's Zilker Park
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological

assemblages; the stream exhibits high dissolved oxygen (DO) concentrations and a diverse and complex benthic macroinvertebrate community

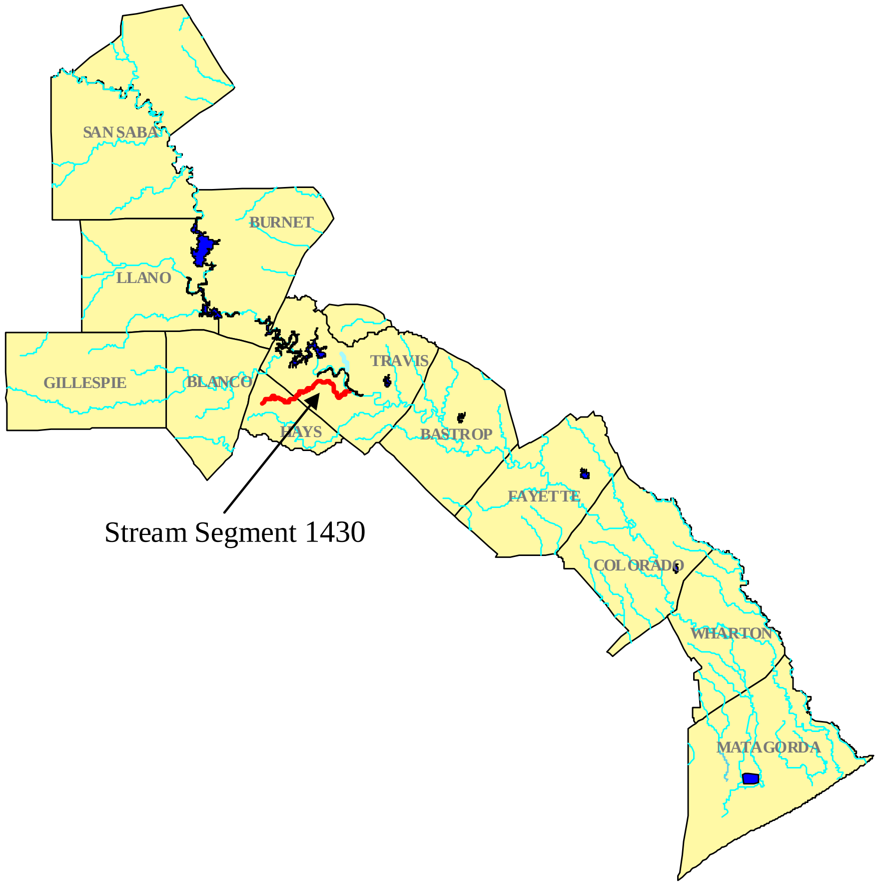
- Endangered/Threatened Species: the stream contains the only known population of the Barton Springs salamander (*Eurycea sosorum*), a federally listed endangered species

8.1.2 Bull Creek From the Confluence With Lake Austin Upstream to its Headwaters

Bull Creek lies wholly within Travis County in the northwest portion of the City of Austin (*Figure 8.2*). The watershed for the stream is approximately 32 square miles in a rapidly developing area. The watershed is located on the eastern edge of the Texas Hill Country and immediately west of the Balcones Fault Zone. Numerous seeps and springs provide baseflow to Bull Creek. Water quality is generally good, although some degradation has occurred due to development. The Bull Creek watershed contains suitable habitat for a variety of rare and endangered species including the Golden-Cheeked Warbler (*Dendroica chrysoparia*), Black-Capped Vireo (*Vireo atricapillus*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Bee Creek Cave harvestman (*Texella redelli*), Bone Cave harvestman (*Texella redelli*), Tooth Cave ground beetle (*Rhadine persephone*), Kretshcmarr Cave mold beetle (*Texamaurops reddeli*), and Jollyville Plateau salamander (*Eurycea* sp.). In addition, the watershed contains a very diverse flora. Bull Creek meets the following criteria for designation as ecologically unique:

- Biologic Function: nearly pristine stream with a largely intact riparian area
- Hydrologic Function: pervious cover and intact riparian zone reduce downstream flooding
- Riparian Conservation Area: Bull Creek Preserve
- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: overall pristine nature gives the stream a high aesthetic value; stream has a diverse and complex benthic macroinvertebrate community, and an abundance and diversity of amphibians
- Endangered/Threatened Species: the stream contains a population of the Jollyville Plateau salamander (*Eurycea* sp.), a federally listed endangered species

Figure 8.1: Location and Map of Barton Creek Stream Segment 1430



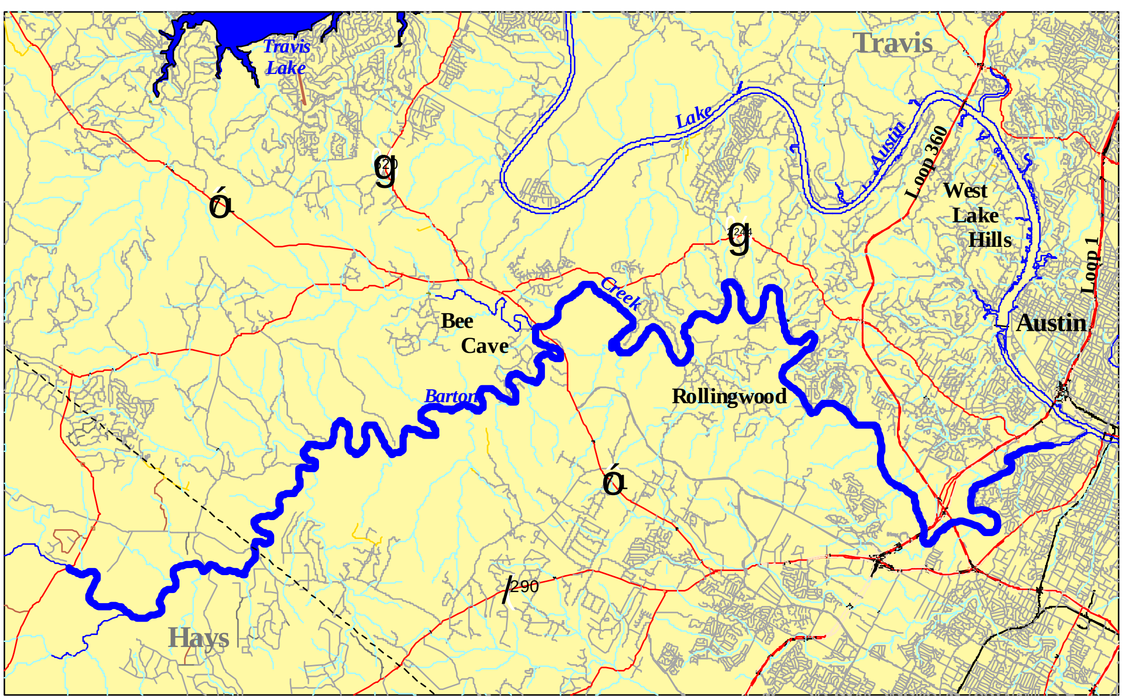
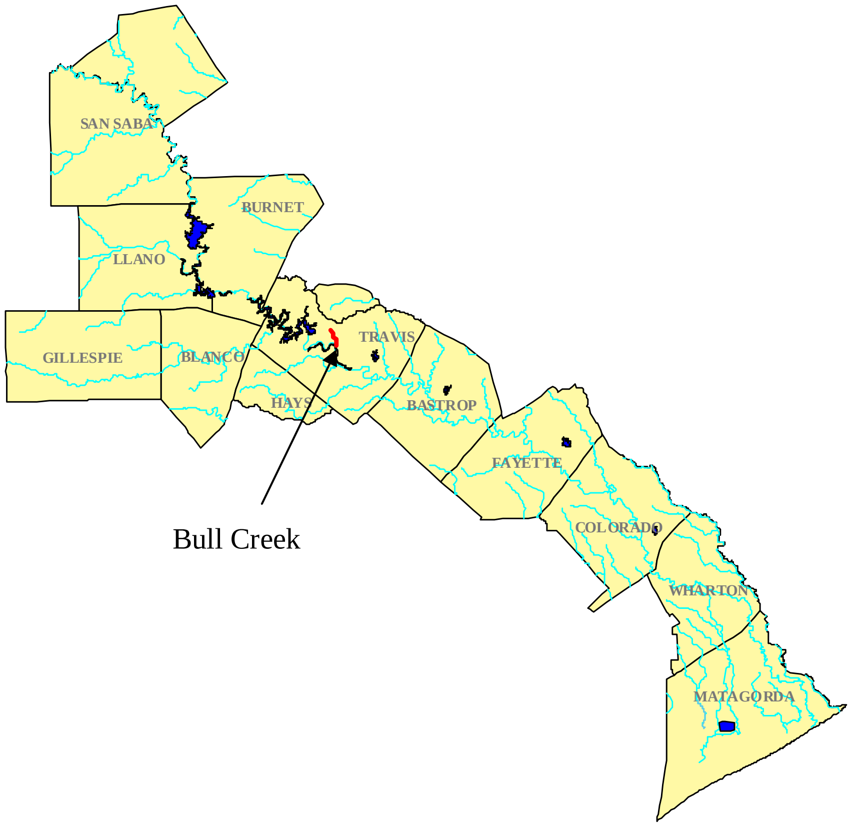
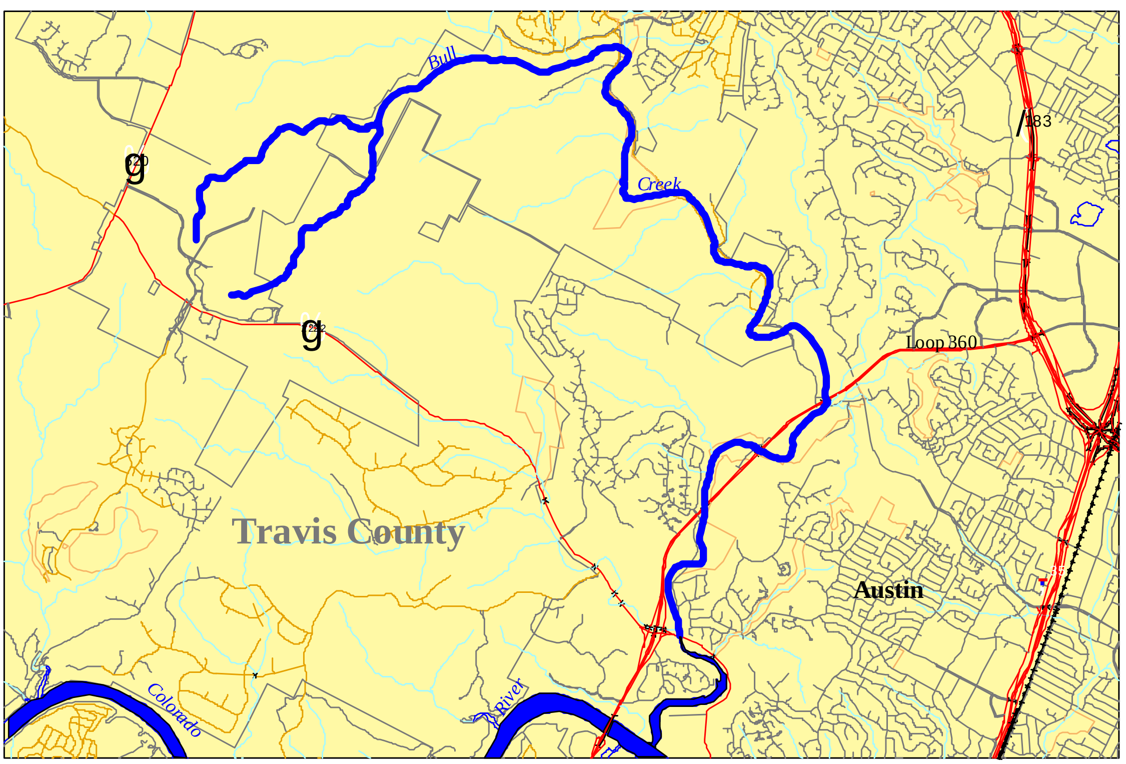


Figure 8.2: Location of Bull Creek





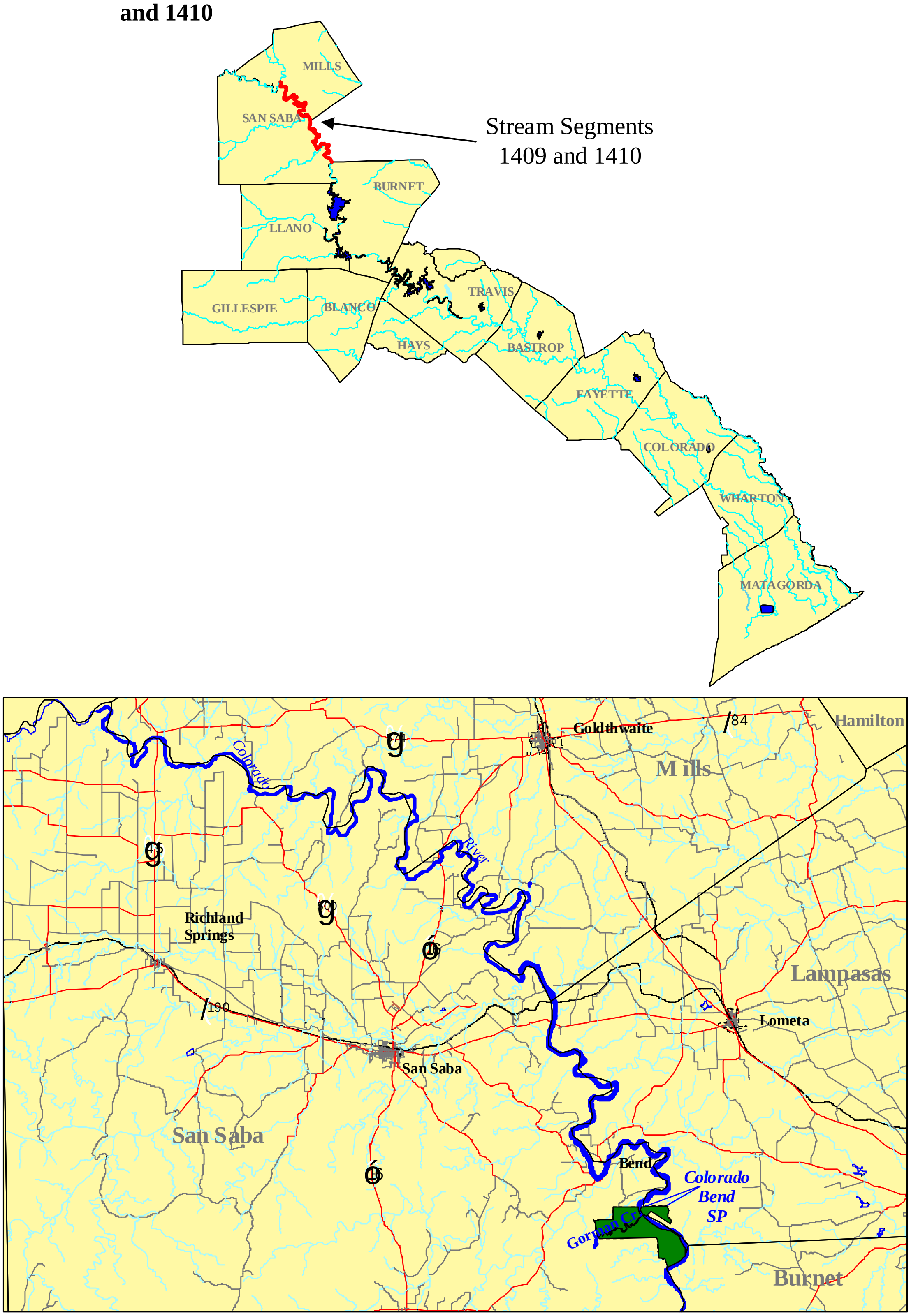
8.1.3 Colorado River Within TCEQ Classified Stream Segments 1409 and 1410 Including Gorman Creek in Burnet, Lampasas, and Mills Counties

This segment consists primarily of the Colorado River upstream of Lake Buchanan to the Brown/San Saba/Mills county line, but also includes the Gorman Creek tributary (*Figure 8.3*). The stream segment is within the Central Texas Plateau ecoregion. Vegetation types common along the stream are mostly live oak-juniper parks. The river itself is wide and relatively shallow, flowing over a bed of limestone and gravel. A few stretches of small rapids exist on the upper part of this section down to the point where the backwaters of Lake Buchanan deepen the river and slow its flow.

Among the segment's scenic attributes are high limestone bluffs, vistas of rugged cedar-covered hills, and the existence of one of the most spectacular waterfalls in Texas. Gorman Falls is formed at the point where Gorman Creek tumbles into the Colorado River over a 75-foot-tall limestone bluff. The water coming from the creek is clear and cold, and many ferns and mosses grow on the slippery rocks and travertine deposits below the falls. The TCEQ identifies the segment as having a high aquatic life use. The National Park Service identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free-flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. The segment meets the following criteria for designation as ecologically unique:

- Biologic Function: white bass spawning area
- Riparian Conservation Area: Colorado Bend State Park
- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: exceptional aesthetic value
- Endangered/Threatened Species: Concho water snake (Nerodia paucimaculata), a federal and state listed endangered species, as well as the rare and endemic mollusks, Texas fawnfoot and Texas pimpleback

Figure 8.3: Location of the Colorado River Within TCEQ Classified Stream Segments 1409 and 1410

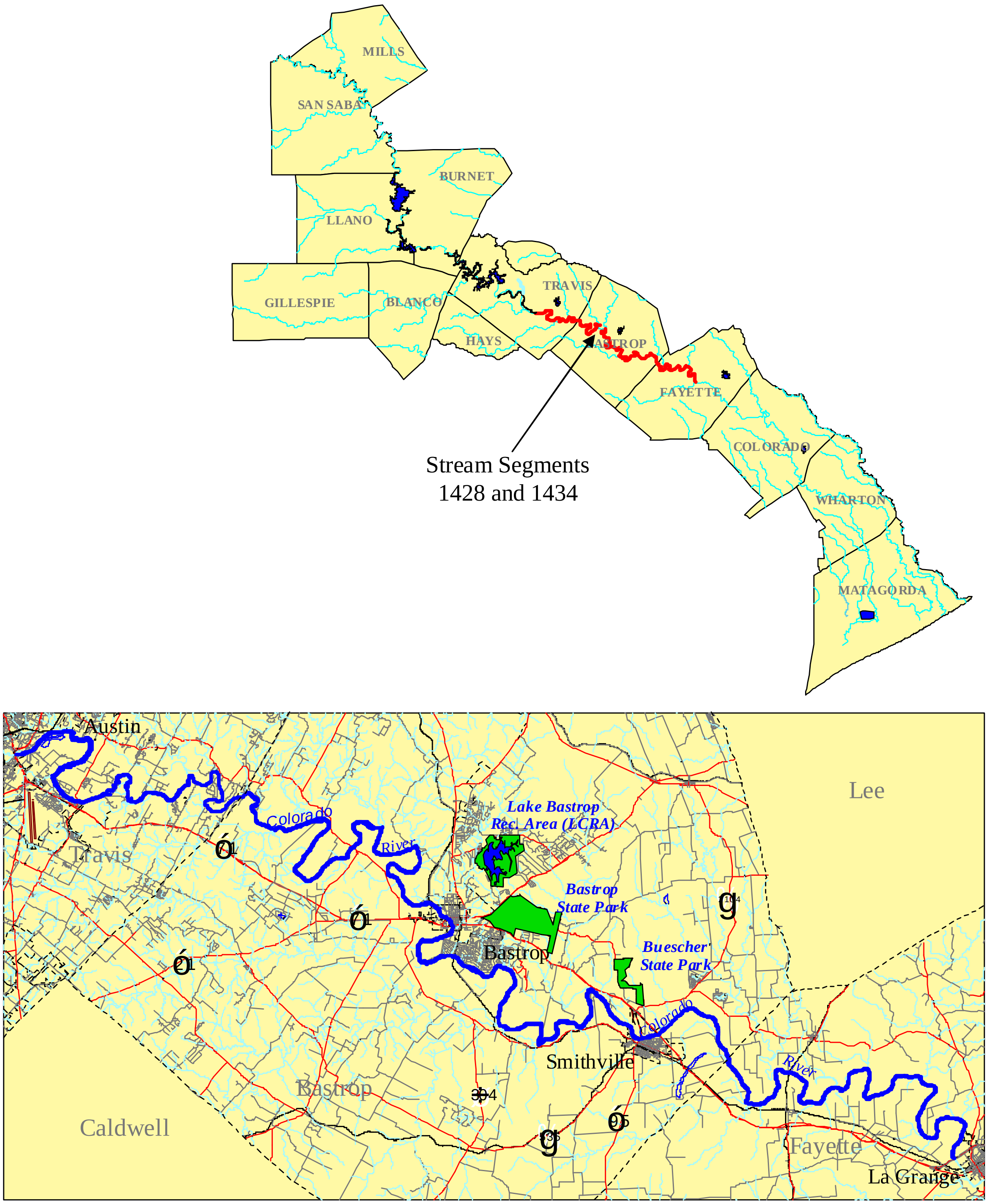


8.1.4 Colorado River Within TCEQ Classified Stream Segments 1428 and 1434 in Travis, Bastrop, and Fayette Counties

The segment includes the Colorado River from a point 100 meters downstream of SH 71 in La Grange to Longhorn Dam in Austin and portions of Wilbarger, Big Sandy, Alum, and Cedar Creeks in Bastrop County (*Figure 8.4*). Extensive information about the segment in Bastrop County, submitted by the Bastrop County Environmental Network (BCEN), is presented in *Appendix 8B*. In general, water levels in the Colorado River are controlled by releases from Lake Travis and Lake Buchanan. The occurrences of low instream flows often depend on the discharge rate of return flows from the City of Austin. Instream flows in the smaller creeks within Bastrop County originate from diffuse surface water runoff, groundwater contributions, and springs. The segment lies within the Texas Blackland Prairies ecoregion. Substrate in the streams is typically sand and/or gravel. Several reaches of the segment are characterized by rubble and boulder fields. The TCEQ has classified the mainstem river as supportive of exceptional aquatic life uses. Water quality is generally good although nutrient levels are often elevated. Water quality in the creeks is typically good but influenced by flow levels, land use patterns, and wastewater discharges. Cedar Creek contains an exceptional macroinvertebrate community and, based on the ichthyofauna, a high Index of Biotic Integrity rating. This portion of the Colorado River has a diverse fish community, including the state listed threatened blue sucker (*Cycleptus elongatus*). In addition, the state and federally listed endangered Houston toad (*Bufo houstonensis*) occurs in the area. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: undeveloped riverine habitat, part of the Central Flyway of migratory birds
- <u>Hydrologic Function</u>: extensive riparian zone attenuates flooding and improves water quality via filtration and soil stabilization; riparian and stream channels hydrologically connected to an alluvial aquifer and the Carrizo-Wilcox aquifer
- <u>Riparian Conservation Area</u>: McKinney Roughs Environmental Learning Center
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aquatic life use
- <u>Endangered/Threatened Species</u>: blue sucker (*Cycleptus elongatus*), a state listed endangered species and the federal and state listed endangered Houston toad (*Bufo houstonensis)*

Figure 8.4: Location of the Colorado River Within TCEQ Classified Stream Segments 1428 and 1434



8.1.5 Colorado River Within the TCEQ Classified Stream Segment 1402 Including Shaws Bend in Fayette, Colorado, Wharton, and Matagorda Counties

The segment extends from just downstream of the Missouri-Pacific Railroad trestle in Matagorda County to a point 100 meters downstream of SH 71 in La Grange, a distance of 150 miles (*Figure 8.5*). The segment lies within the Texas Blackland Prairies ecoregion and flows into the East Central Texas Plains ecoregion. Substrate varies from primarily gravel in the upper reaches of the segment to gravel/cobble riffles and extensive sand-dominated reaches downstream. Instream flow is largely dependent on upstream releases for rice irrigation but also receives contributions from the intervening watershed. The water quality of the segment is typically good and supports a high aquatic life use designation. Nutrient levels are elevated, but DO concentrations are typically higher than the minimum required to maintain a high aquatic life use designation. The fish community is generally diverse and includes the blue sucker (*Cycleptus elongatus*), a state listed endangered species. Although not contained in this report, additional information about the segment is available in feasibility studies performed by ECS Technical Services for the U.S. Department of the Interior, which includes the Shaw's Bend Reservoir site. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: undeveloped riverine habitat, part of the Central Flyway of migratory birds
- <u>Endangered/Threatened Species</u>: blue sucker (*Cycleptus elongatus*), a state listed endangered species

8.1.6 Cummins Creek From the Confluence With the Colorado River in Colorado County Upstream to FM 159 in Fayette County

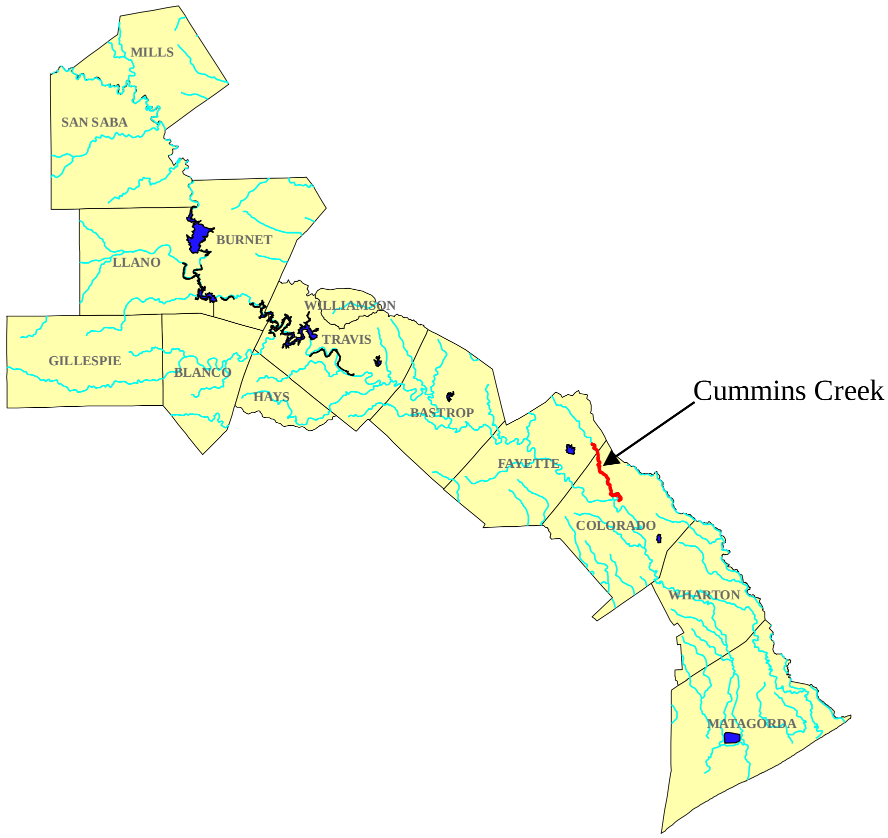
Cummins Creek lies within the Texas Blacklands Prairie ecoregion in Colorado and Fayette Counties (*Figure 8.6*). The stream is characterized by shallow to moderately deep pools, riffles, and occasional shallow runs. Substrate is predominantly fine sands with gravel and rubble in riffles and runs. Cummins Creek is within the post oak savannah vegetation region. The surrounding land use is mostly agricultural. Water quality is generally good, and the stream supports diverse macroinvertebrate and fish communities. The LCRA rated the creek, which has at least 27 species of fish as suitable for a high aquatic life use for fish. Among the fish species that have been collected in the stream is the Guadalupe bass (*Micropterus treculi*). Cummins Creek supports at least 28 species of aquatic macroinvertebrates. Several varieties of mayflies and caddisflies, which are considered intolerant of pollution, are present. Cummins Creek was rated an excellent aquatic life use category for macroinvertebrates based on work by the LCRA. The segment meets the following criteria for designation as ecologically unique:

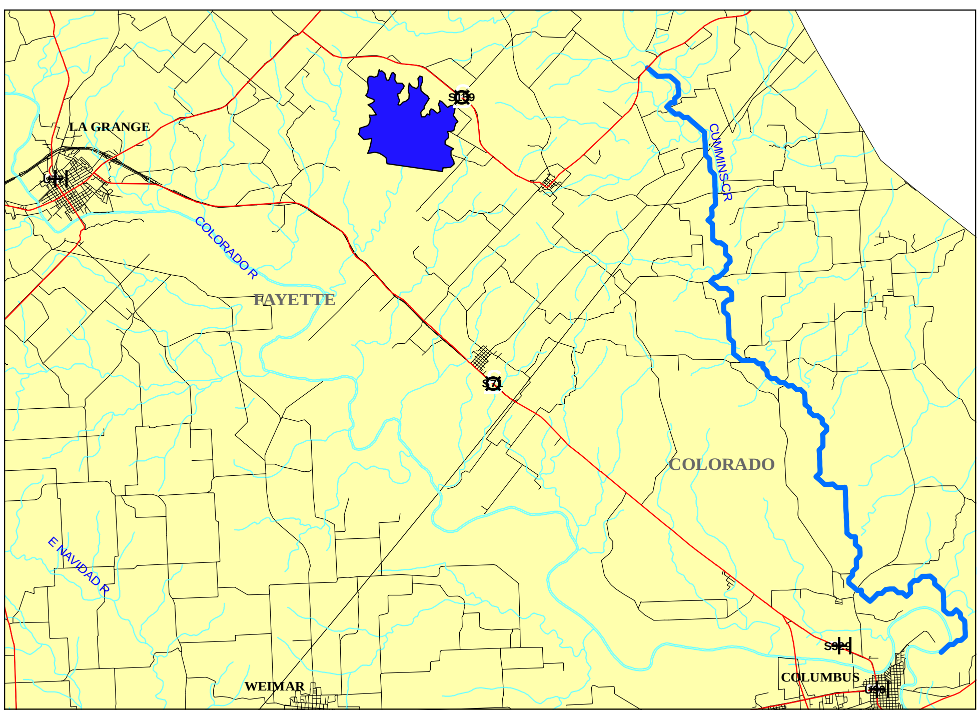
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages the stream

- <u>Exhibits High Dissolved Oxygen Concentrations and a diverse and complex benthic macroinvertebrate community</u>

Figure 8.5: Location of the Colorado River Within the TCEQ Classified Stream Segment 1402

Figure 8.6: Location of Cummins Creek





8.1.7 Llano River Within the TCEQ Classified Stream Segment 1415 From the Confluence With Johnson Creek to County Road 2768 Near Castell in Llano County

The Llano River between the confluence with Johnson Creek and County Road (CR) 2768 in Llano County is part of TCEQ classified stream Segment 1415 (*Figure 8.7*). The Llano River is a spring-fed stream of the Edwards Plateau and is widely known for its scenic beauty. It is in the Central Texas Plateau ecoregion and is characterized by the live oak-mesquite parks vegetation type. Riparian vegetation includes elm, willow, sycamore, and salt-cedar. The stream has designated water uses for contact recreation, as a public water supply, and for high aquatic life uses. Among the fish found in the stream is the Guadalupe bass (*Micropterus treculi*). The substrate is composed of limestone bedrock and gravel. In addition, large boulders and slabs of granite and gneiss occur in the river. This section of the Llano River is widely known for the one-billion-year-old igneous and metamorphic rocks, which form the riverbed. The area is a part of the Llano Uplift, which is one of the most unique geologic features in Texas. Land use along the stream is generally rural and includes ranching and agriculture. The segment meets the following criteria for designation as ecologically unique:

- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aesthetic value

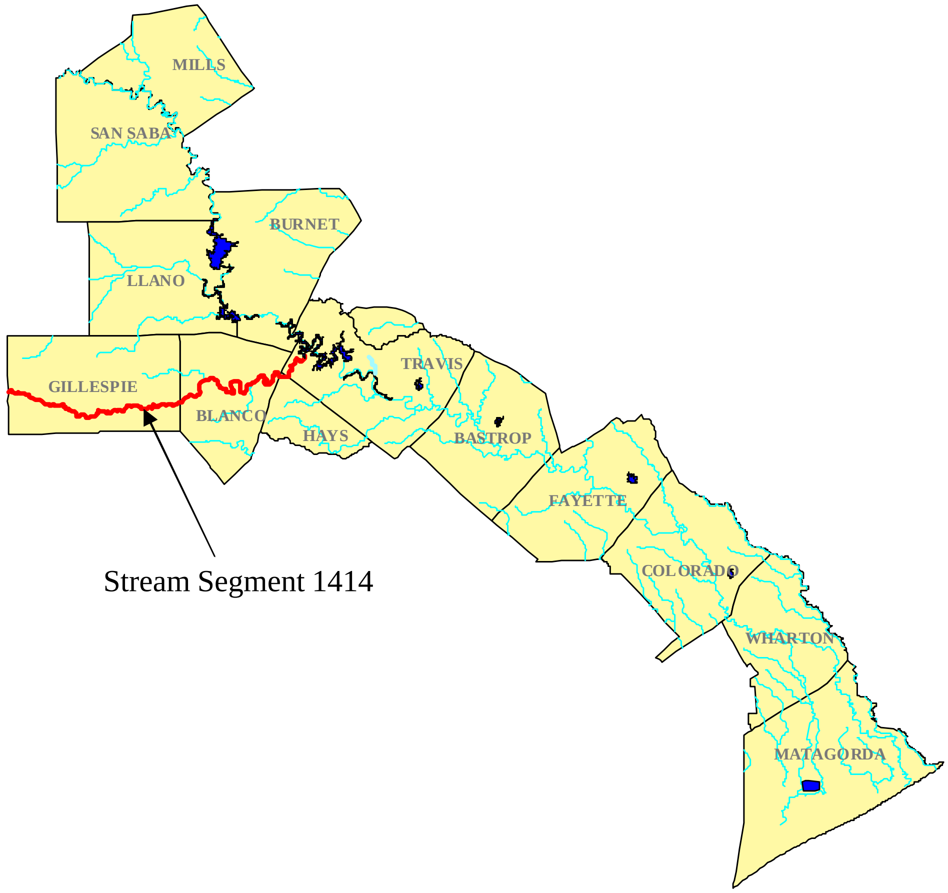
8.1.8 Pedernales River Within the TCEQ Classified Stream Segment 1414 in Kimball, Gillespie, Blanco, and Travis Counties

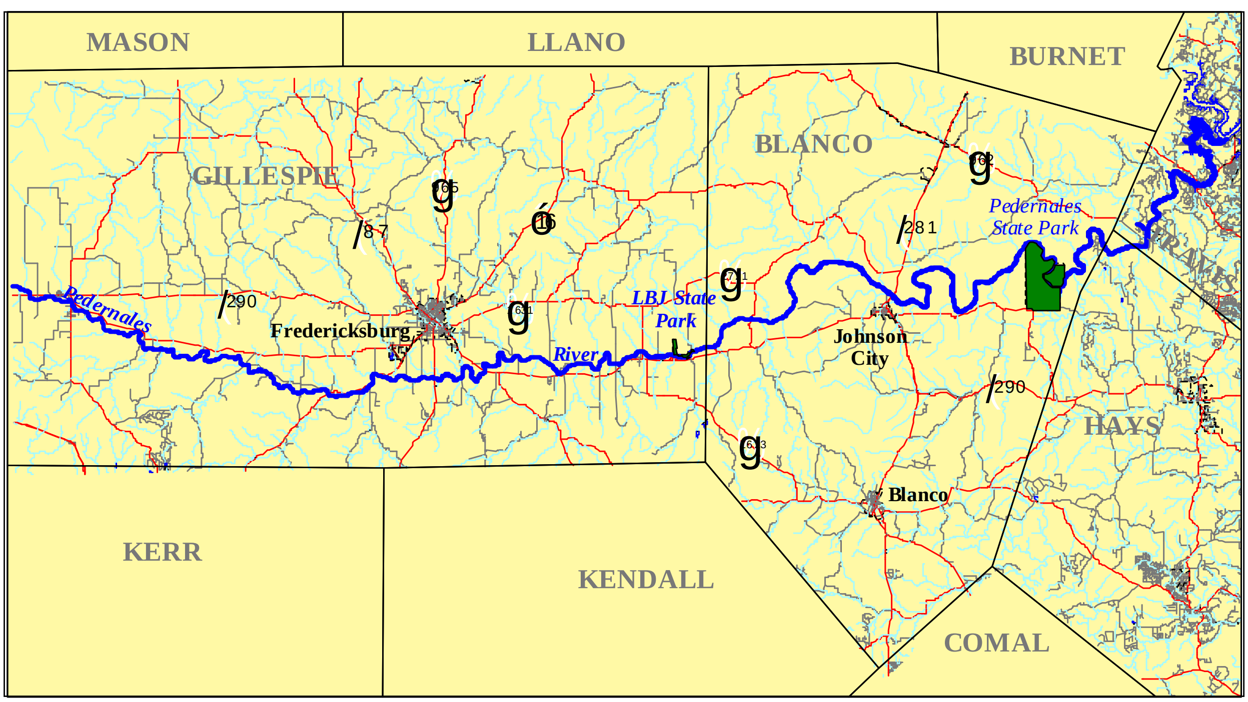
The Pedernales River from a point immediately upstream of the confluence of Fall Creek in Travis County upstream to FM 385 in Kimble County makes up the TCEQ classified stream Segment 1415 (*Figure 8.8*). Most of this segment lies within the LCRWPA. The Pedernales River in general has high water quality and supports a high aquatic life use. The stream is within the Central Texas Plateau ecoregion. Surrounding vegetation is characteristic of the live oak-ashe juniper parks and live oak-mesquite-ashe juniper parks vegetation regions. The river is spring-fed and free flowing, with many limestone outcroppings. The National Park Service identified the segment for inclusion in the National Rivers Inventory based on the degree to which the river is free flowing, the degree to which the river and corridor is undeveloped, and the outstanding natural and cultural characteristics of the river and its immediate environment. Bald cypress, red columbine, and native orchids are found adjacent to the river. Among the fish species that occur in the stream is the Guadalupe bass (*Micropterus treculi*). Other aquatic species typical of Hill Country spring-fed streams also inhabit the Pedernales River. Along the river are several state and national parks including Pedernales Falls State Park, LBJ State Park, and LBJ National Park. The segment meets the following criteria for designation as ecologically unique:

- <u>Biologic Function</u>: significant natural area
- <u>Riparian Conservation Area</u>: Pedernales Falls State Park, LBJ State Park, LBJ National Park, and Stonewall Park
- <u>High Water Quality/Exceptional Aquatic Life/High Aesthetic Value</u>: exceptional aesthetic value

Figure 8.7: Location of the Llano River From Johnson Creek Confluence to CR 2768

Figure 8.8: Location of the Pedernales River Within the LCRWPA





8.1.9 Rocky Creek From the Confluence With the Lampasas River Upstream to the Union of North Rocky Creek and South Rocky Creek in Burnet County

Rocky Creek lies within the Brazos River Basin in northeast Burnet County (*Figure 8.9*). The stream is approximately 6 miles long with a drainage area of 94 square miles. The stream is in the Central Texas Plateau ecoregion and within the oak-mesquite-juniper parks/woods vegetation association. The upper reach flows through the live oak-ashe juniper parks association. Long deep runs with numerous short riffles and occasional deep glides characterize the creek morphology. Limestone bedrock, gravel, and rubble are the dominant substrate types. In sampling for the Texas Aquatic Ecoregion Project, 54 species of aquatic invertebrates and 15 species of fish were collected. The segment meets the following criteria for designation as ecologically unique:

- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value: the stream was selected as an ecoregion stream based on its physical attributes, water quality, and biological assemblages; the stream exhibits high DO concentrations and a diverse and complex fish and benthic macroinvertebrate community.

8.1.10 Hamilton Creek From the Confluence With the Colorado River Upstream to the Outflow of Hamilton Springs in Burnet County

Hamilton Creek originates at Hamilton Springs in south central Burnet County 5 miles northwest of Burnet and flows south for 22 miles to its confluence with the Colorado River in TCEQ classified stream segment 1404 (*Figure 8.10*). The upper reaches of Hamilton Creek are intermittent with flow increasing downstream due to municipal discharges from the City of Burnet and other sources. The stream flows through the Edwards Plateau ecoregion, a region of limestone outcrops and a mixture of granitic and sandy soils. Throughout the Edwards Plateau live oak, shinnery oak, mesquite and juniper dominate the woody vegetation. There is a limited riparian cover adjacent to the stream. TCEQ identifies Hamilton Creek as Segment 1404A with water body uses for contact recreation and fish consumption with an intermediate aquatic life use.

Following the adoption of the Region K Water Supply Plan, the LCRWPG was made aware of a proposed open pit mine being considered in Burnet County adjacent to Hamilton Creek. Local residents in the area around Hamilton Creek came to the RWPG indicating that the pristine nature of the creek was unique and worthy of consideration as a Unique Steam Segment (USS). The hope was that such a designation would protect the creek from potential adverse impacts due to the proposed mining operation. The RWPG, on December 11, 2002, took action on this request by authorizing the issuance of a letter from the RWPG to the TCEQ and the LCRA expressing concerns about excessive water mining and non-point source pollution damage to the creek. At the February, 12, 2003, RWPG meeting, the group approved the recommendation that Hamilton Creek, from the outflow of Hamilton Springs to the Colorado River, be designated as a USS and that the recommendation be submitted to a local legislator for consideration during the 78th Legislative Session. The designation of Hamilton Creek as a USS was not passed during the 78th Texas Legislative Sessions.

Figure 8.9: Location of Rocky Creek in Burnet County

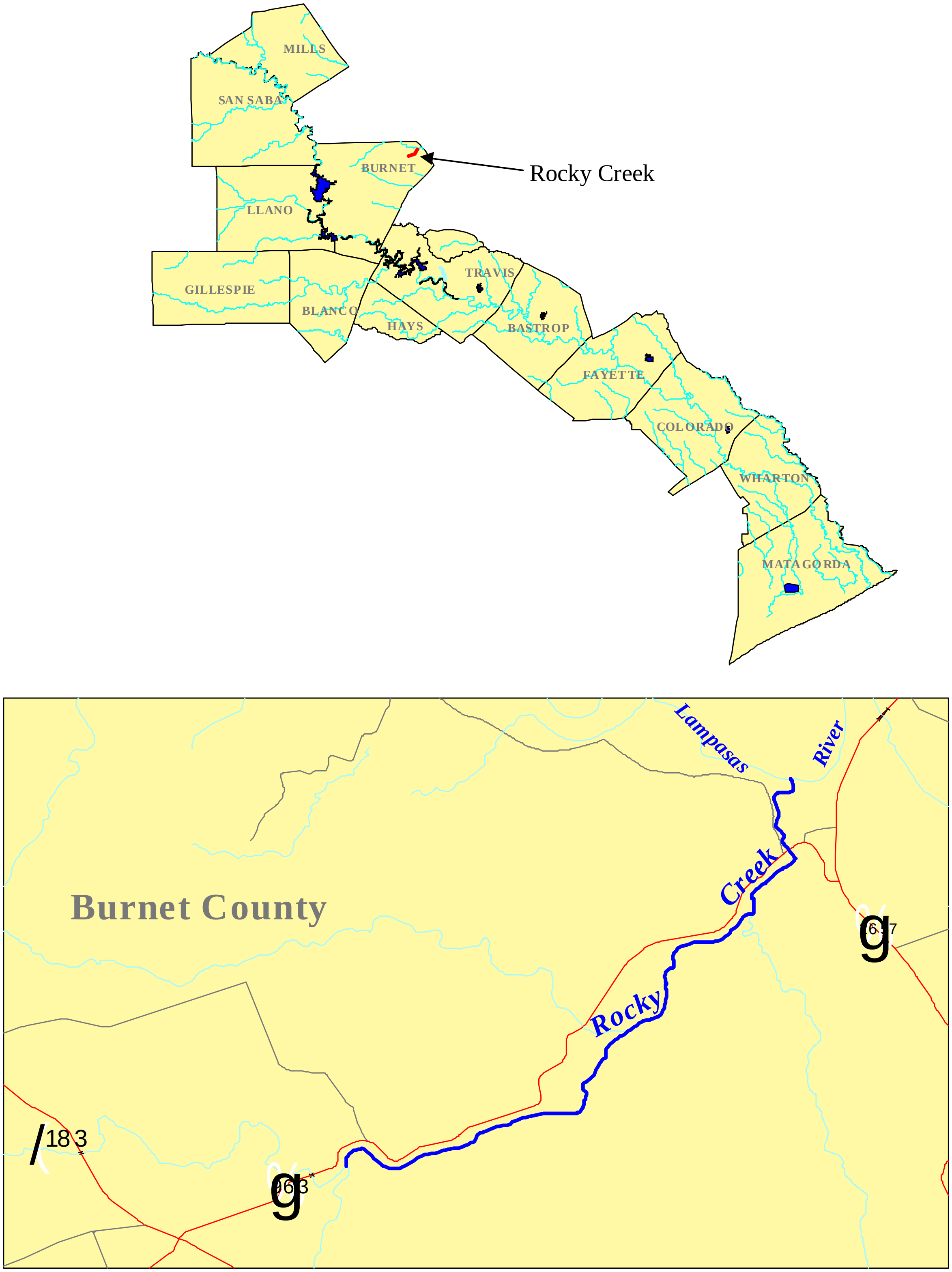
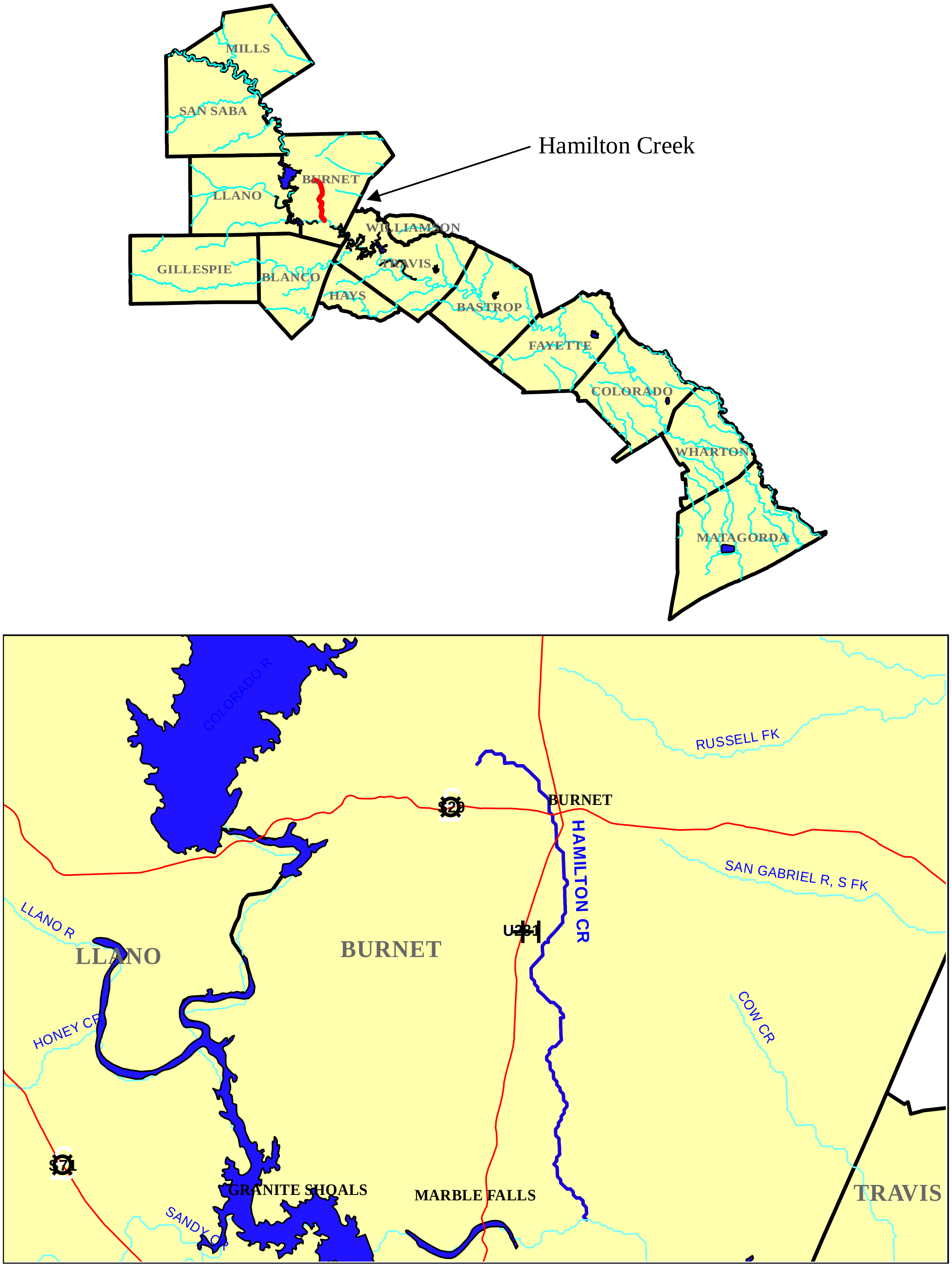


Figure 8.10: Location of Hamilton Creek in Burnet County



8.1.11 Conclusions and Recommendations

The protection intended to be provided by the designation of a river or stream segment as ecologically unique is to preclude a state agency or political subdivision of the state from financing the actual construction of a reservoir in a specific river or stream segment designated by the legislature as ecologically unique. In addition numerous programs presently exist to protect areas of special ecological significance. Since the LCRWPG currently has not recommended strategies for state financed reservoirs on any of the ten identified stream segments, and in the absence of additional environmental data, the LCRWPG takes no action at this time to designate these stream segments as ecologically unique. However, further study may be warranted in future Lower Colorado Regional Water Plans.

This section provides background information and recommendations on eight specific reservoir sites, one specific reservoir enhancement project, and several non-specific reservoir sites in the Lower Colorado Region considered by the USS/RS Subcommittee as possible candidates for designation as reservoir sites. The recommendations include support of certain potential projects, opposition to certain potential reservoir sites, and support for further study of certain projects. It should be noted that the TWDB guidelines state that public support and acceptance can be considered under "other criteria" for evaluating water supply management strategies.

8.1.1 Mills County Potential Reservoir Projects

For the 2001 Regional Plan, the LCRWPG passed a resolution *"supporting the efforts of residents in Mills County and adjoining areas to construct water supply projects involving dams and reservoirs for water supply and the construction of pipelines and other facilities related thereto"* (*Appendix 8A*). There are three projects cited in the 2001 Regional Plan as being under development by the Fox Crossing Water District and Donald G Rauschuber & Associated (DGRA). These sites include off-channel reservoir alternatives for Pompey Creek and Bennett Creek, and an in-channel reservoir alternative on the Colorado River. To date, there are no engineering technical reports evaluating these locations other than a site map created by the Natural Resources Conservation Service (NRCS). There is no indication that anything other than an in-channel dam is currently being pursued by any entity within Mills County. *Table 8.2* below contains the preliminary data currently available from DGRA on the two off-channel and the one on-channel reservoir sites. Please note this information is extremely preliminary.

Table 8.2 Projected Cost for Selected Mills County Surface Water Reservoir Projects

Reservoir Alternative	Reservoir Area (ac)	Average Reservoir Depth (ft)	Reservoir Conservation Pool (ac-ft)	Drainage Area (sq mi)	Reservoir Yield (mgd)	Creek Elevation at Dam (ft msl)	Dam Top Elevation (ft msl)
Pompey Creek	240	42	10,080	53	0.4 - 0.75	1,245	1,350
Bennett Creek	525	16	8,400	100	0.8 - 1	1,260	1,300
Colorado River		10 or 16	510 or 3,400			1,130	
Reservoir Alternative	**Dam Height (f)**	**Dam Length (ft)**	**Estimated Cost ($)**	**Annual Debt Service* ($)**	**Annual O&M Cost ($)**	**Total Projected Annual Cost ($)**	**Unit Water Cost ($/1,000 gal)**
Pompey Creek	105	1,500	3,938,000	343,333	30,000	373,333	1.78
Bennett Creek	40	5,000	5,188,333	452,343	100,000	552,343	1.68
Colorado River	20		3.5-6.9 million				

* Annual debt service is calculated at 6% for 20 years

8.1.2 Shaws Bend Potential Reservoir Project

Reservoir Project Opposition is recommended for the potential Shaws Bend Reservoir site in Colorado and Fayette Counties. This potential reservoir site has been explored in the past by the SCTRWPG. This site is within the boundaries of the LCRWPA and would involve an in-channel dam on the Colorado River approximately five miles west of the City of Columbus. Large local opposition to this project was demonstrated at the various LCRWPG public meetings and in correspondence during the 2001 LCRWPG plan preparation. In addition, this site has many attributes that may qualify it to be considered for designation as a USS (see *Section 8.3.5*). However, to date, no USS recommendations have been made by the LCRWPG.

A U.S. Bureau of Reclamation Environmental Inventory and Impact Assessment Study was conducted on the Colorado Coastal Plains, which includes the Shaws Bend Reservoir site, and the results and analyses were compiled in an April 1985 report. This report states that construction and conservation pool operations (220 feet mean sea level [msl]) would adversely impact various natural and man-made resources. The reservoir would inundate 12,400 acres and directly impact a total of 12,913 acres of forest, pasture, cultivated, and other lands. Impacts from 100- and 500-year flood events would be even greater. Vegetation resources impacted would include pecan orchards, woodlands, bottomland forests, riverine habitat, pastures, and native grasslands/prairies. Five threatened or endangered species could possibly be located within the Shaws Bend Reservoir area. Five unique areas have been identified within the 210,000-acre project area, and it has been determined that three of them would definitely be adversely affected. Unique areas are defined as sites that provide an unusual setting with regard to vegetation resources or habitat, or are of social, historical, recreational, or aesthetic value. A 1.4-mile stretch up-channel containing pristine bottomlands with pools and riffles at Harvey Creek Woodlands would be inundated by approximately 10 feet of water. Approximately 70 percent of Horseshoe Bend Woodlands would be inundated under normal conservation pool operations, and during flood events the entire woodland would be inundated. The third site with vegetative/habitat value is the Fern Hollows and Bluffs, which contain secluded canopies of large trees, natural springs, and unusual hydrophilic plant species. Most of the historical Burnam's Ferry Crossing would be inundated by conservation pool reservoir waters, and it has already been determined that mitigation would be required if the reservoir were constructed. This area was part of the La Bahia Road from southwestern Louisiana to San Antonio and is currently privately owned and used annually by the Boy Scouts for camping. Camp Lone Star is located near La Grange and its 125 acres of dense upland forest is of recreational value for camping year-round. In addition, preliminary identification of many potential archeological sites has been made in the Shaws Bend Reservoir project area. Man-made resources that would be adversely affected include roadways, electrical line right-of-ways, oil/gas wells, and petroleum pipelines.

8.1.3 Cummins Creek Potential Reservoir Project

Reservoir Project Opposition is recommended for the potential Cummins Creek Reservoir site in Colorado County. This potential reservoir site was considered as a water supply option under consideration by the SCTRWPG in their 2001 Regional Plan. This site is within the boundaries of the Lower Colorado Region near the City of Columbus and the confluence with the Colorado River and would involve an off-channel dam on Cummins Creek. This reservoir would utilize flows from Cummins Creek plus diversion of unappropriated Colorado River flows. Large local opposition to this project was demonstrated at the various LCRWPG public meetings and in correspondence during the 2001 Plan Meetings. Cummins Creek has a WCID which covers only Fayette County, and there are already 15 dams along the creek. There are more than 7,200 acres of bottomland along the creek within the proposed reservoir project area as well as spring-fed sections of the creek. It has already been determined by the SCTRWPG that mitigation would be required for inundation of 6,600 acres, which includes riparian woodlands. Portions of the Colorado River and Cummins Creek that would be affected by the reservoir project have been listed as "ecologically significant" stream segments by the TPWD.

8.1.4 Potential Llano County Small In-Channel Check Dams Project

Support is recommended for further study and potential development of small in-channel check dams within existing floodplains in Llano County. Specific locations need to be identified and further analyses are needed for these projects. The USS/RS Subcommittee is interested in gauging local public support and determining actual need for this project before the recommendation process moves forward. The Subcommittee needs additional information for this project.

8.1.5 Potential Llano County Diversion of the Llano River to the Lake Buchanan Project

Support is recommended for further study of the Llano County diversion of the Llano River to Lake Buchanan. Benefits of this reservoir enhancement project include the potential enhancement of lake levels in the Highland Lakes System and potential flood control in Llano County. The original study conducted in the 1950s (which was updated in the early 1990s) indicated this project would not be cost effective. However, recent engineering technology improvements (specifically mentioned were the methods to excavate dolomite) and decreasing the pipeline path length can improve the unit cost of this option. Specific information on local support is also needed for the consideration of this option. The LCRA provided the LCRWPG with a technical memorandum**,** which describes the LCRA's 1999 Water Management Plan evaluation of increased Highland Lakes water supply available with diversion of water from the Llano River to Lake Buchanan. In the previous plan, the LCRA determined the firm maximum annual water supply from Highland Lakes (combined firm yield or CFY) during a repeat of the drought of record to be 445,266 ac-ft/yr. The impact of the proposed Llano River diversion canal was determined by recalculating the CFY, as well as the economic merits of the diversion that largely depend on how much additional water supply is made available. However, this analysis did not consider potential water supply improvements. The new CFY of Highland Lakes, incorporating the Llano River diversion, was determined to be 444,695 ac-ft/yr, which is an annual decrease of 571 acre feet (ac-ft). The net loss of water due to the diversion canal occurs in Lake Buchanan because this lake has more evaporative surface area than Lake Travis, where all of the Llano River water would have been stored without the diversion canal.

8.1.6 Clear Creek Potential Reservoir Project

Reservoir Project Opposition is recommended for the potential Clear Creek Reservoir site in Fayette County. Clear Creek is an approximately 8-mile-long tributary of Cummins Creek and is a few miles north of Lake Fayette. There are no official reservoir projects currently under consideration for this creek. However, there has been large local opposition to any reservoir projects in this area at the various LCRWPG public meetings and in correspondence.

8.1.7 Further Study and Potential Development of LCRA Off-Channel Flood Storage Facilities

Support is recommended for further study and potential development of the LCRA off-channel flood storage facilities. Specific locations need to be identified and further analysis is needed, especially regarding impacts to recommended upstream reservoir projects.

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CHAPTER 9.0: WATER INFRASTRUCTURE FINANCING RECOMMENDATIONS

9.1 INTRODUCTION

Infrastructure financing needs have long been a key concern of the Texas Water Development Board (TWDB) as it pursues its mission of providing adequate funding to timely meet local water needs. The 77th Legislature, in Senate Bill (SB) 2, added the formal preparation of an Infrastructure Financing Report (IFR) to the regional planning process. The purpose of the IFR is to determine the amount of funding needed from outside sources to implement Region K's management strategies as recommended in the 2011 Regional Plan. The intent of this portion of Chapter 9 is to present the following:

- The total capital cost of all the improvements recommended in the management strategies portion of the Plan.
- The results of the Infrastructure Survey letters that were sent by the Regional Water Planning Group (RWPG) to each identified municipal water user group (WUG) that had a recommended water management strategy that required a capital cost.
- An estimate of the capital cost of the Plan improvements that cannot be funded out of local revenues and funding sources.
- A review of the funding options listed in the responses to the Infrastructure Survey letters.
- A review of the Policy Statements in Chapter 8 that the RWPG adopted that dealt with funding issues.

9.2 CAPITAL COSTS FOR THE 2011 REGION K WATER PLAN

The total capital cost of the water management strategies (WMS) proposed by the 2011 Region K Water Plan is $850 million over the 50-year planning period. This total cost includes project cost estimates for the major capital improvement strategies involving the development of new supply projects, treatment and transmission cost estimates, and capital infrastructure expenses related to irrigation conservation measures (namely, precision laser-leveling). The total cost also includes estimates associated with localized WUG costs for expansion of existing groundwater and surface water capabilities for treatment and transmission systems, additional wells, and additional storage. Costs for major capital improvement projects are estimated at $745 million. The WUG-level costs for localized expansion of groundwater costs are estimated at $105 million. *Table 9.1* summarizes the estimated costs for both the major capital improvement strategies and the WUG-level strategies for the region.

Table 9.1: Recommended Strategies Requiring Capital Expenditure

Water Management Strategy	Starting Decade [1]	Largest Firm Yield [2] (ac-ft/yr)	Total Project Cost [3] (2008 $)
Major Capital Improvement Strategies			
Construct Goldthwaite Channel Dam	2010	0	$3,269,500
City of Austin Direct Reuse [4]	2010	53,700	$429,195,700
Reuse by Highland Lakes Communities	2010	5,000	$5,751,000
Purchase Water From City of Austin for Hays County	2010	1,100	$2,987,000
Aquifer Storage and Recovery	2040	10,000	$270,627,490
Development of Saline Zone of Edwards-BFZ Aquifer	2010	7,100	$27,862,100
HB 1437 Irrigation Conservation	2020-2060	25,000	$3,817,900
Subtotal			**$743,510,700**
Local WUG-level Strategies			
New or Expanded Use of Groundwater	2010	30,949	$105,643,000
Total			**$849,153,700**

[1] The Starting Decade is shown as 2010 for several WUGs since it is anticipated that they will start planning/engineering work on some of the projects right away in order to have the projects constructed by the time they are needed, which could result in expenditures being spread out over the entire planning period.

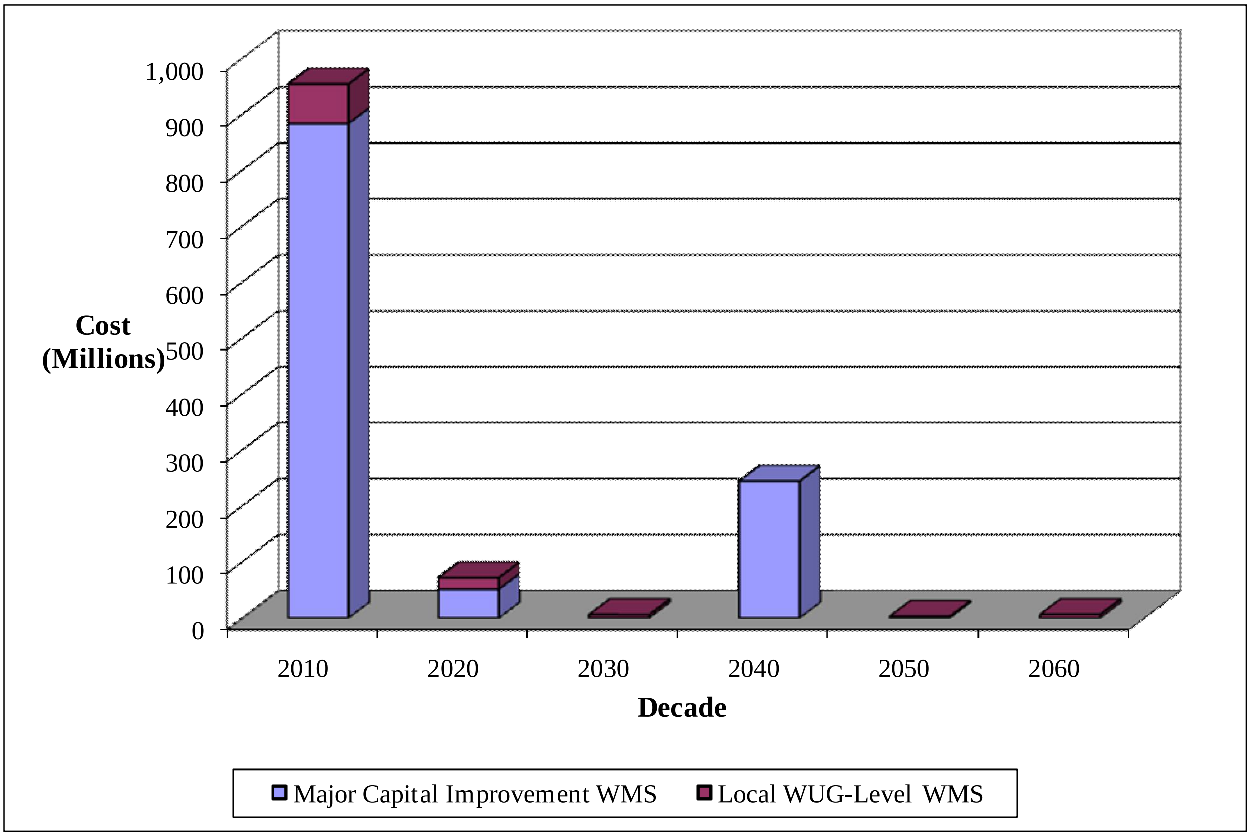
[2] The Largest Firm Yield indicated the largest annual firm yield of the project over the planning period. This value was used to calculate unit costs. Several projects will produce different amounts of water each year of the planning period, and this largest firm yield will not be available every year.

[3] Total Project Costs include capital costs (construction costs - September 2008); engineering, contingencies, financial, and legal services costs (assumed percent of capital costs); land and easements costs; environmental and archeological studies and mitigation costs; interest during construction; and water right acquisition costs.

[4] Note that the City of Austin continually updates its Capital Improvements Program spending plan through its budgeting and approval process; therefore, the anticipated capital expenditures related to City of Austin water management strategies are subject to change.

Figure 9.1 illustrates how the capital costs for both major capital improvements as well as WUG-level strategies shown above are distributed over the planning period. For simplicity, the WUG-level costs are shown as all beginning in 2010 in the above *Table 9.1*; however, several entities do not have a need until later in the planning period. Therefore, in *Figure 9.1*, the WUG-level costs for new or expanded use of groundwater are shown as occurring in the decade in which facilities are required.

Figure 9.1: Costs by Starting Decade and Category



Note that in some cases actual expenditures will likely be spread out over the entire planning period.

Table 9.1 and *Figure 9.1* show only those proposed strategies with associated capital project costs. Several of the strategies proposed by the Plan do not require any capital expenditures for the individual WUG due to sufficient existing system capacity, continuation of strategy already being implemented, or cost borne by other entities, etc. Some of these strategies include municipal conservation, water purchase contract amendments, purchase of water from a wholesale water provider (WWP), pumping of additional groundwater for entities that already have the additional capacity available, continued use of return flows, and irrigation strategies involving use of the LCRA-SAWS Water Project (LSWP)[1]. While no capital expenditures are shown for these strategies, annual operational costs are incurred over the planning period. Some of these annual costs include implementation cost for municipal conservation efforts, annual purchase cost for water obtained under new or amended contracts, and additional annual energy costs associated with pumping of additional groundwater using existing facilities. In the case of the LSWP, per the Definitive Agreement between LCRA and SAWS, Region K is not responsible for the associated costs of the LSWP, which will be paid primarily through water use fees and surcharges imposed on SAWS. Annual costs associated with these strategies are factored into the comparison with socioeconomic impacts of unmet water needs discussed in Sections 9.4 and 9.5 below.

[1] The project is the subject of litigation. For a description of the status of the project *see* p. 4-34.

9.3 ANALYSIS OF POSSIBLE FINANCING OPTIONS

9.3.1 Municipal Water User Groups

Surveys were sent out to 10 districts and municipalities and two wholesale water providers (WWPs) with projected water shortages. This mailing included municipal users and wholesale providers in the region who have an identified shortage during the planning period and have a recommended water management strategy that requires a capital cost. Of these, 4 responses were received as of July 14, 2010, two of which were from the City of Austin and LCRA, which are both characterized as WWPs. As of July 14, 2010, the total capital costs of the returned surveys equaled nearly $498 million, which is 90% of the total capital costs of all 12 surveys mailed out ($552.8 million). Of the possible $498 million in future cost, the survey responses indicated a potential future request for $151.6 million in funding. Responses received are tabulated in *Appendix 9A*, and the survey correspondence is found in *Appendix 9B*.

The surveys requested responses for five types of funding: Planning, Design, and Permitting; Acquisition and Construction; Excess Capacity; Rural; and Disadvantaged. The majority of survey responses indicated a potential future request for funding for Planning, Design, and Permitting, and Acquisition and Construction. One response showed a potential request for funding for Excess Capacity. None of the responses anticipated use of funding for Rural or Disadvantaged categories of projects.

9.3.2 Non-Municipal Water User Groups

Non-municipal WUG demands, supplies, and resulting needs are reported at the county and basin level. It is expected that within the non-municipal water user categories, funding will come from a combination of the methods outlined below, which in turn, come from a review of existing funding programs, funding methodologies outlined as part of recommended strategies (discussed also in Chapter 4), and review of information contained in previous water plans.

<u>Manufacturing</u>: The only manufacturing WUG with a need and a capital cost associated with the recommended strategy is the Hays County – Colorado River Basin Manufacturing WUG. The strategy proposed for this WUG falls into the new/expanded use of groundwater category. It is anticipated that the manufacturers will directly construct the required infrastructure to supply the additional groundwater.

<u>Steam-Electric Power</u>: Steam-electric power is projected to increase in direct proportion to population and manufacturing growth, and along with it, an associated increase in water demand. The Wharton County – Brazos-Colorado Basin Steam-Electric Power WUG is the only user other than the City of Austin with an anticipated capital cost for addressing needs over the planning period. This capital cost is associated with development of the Gulf Coast Aquifer groundwater source. It is expected that plant owners will obtain financing through traditional methods for private power industries in order to complete the project, and these costs will be passed through to the customer through the rate charged for providing electric power. The City of Austin steam-electric strategy with capital costs is the City of Austin Direct Reuse strategy that is combined with the municipal and manufacturing needs under the Major Capital Improvements category in *Table 9.1*.

<u>Mining</u>: Shortages in the Mining WUG category are anticipated across the region, with the majority of the needs to be met through the new or expanded use of groundwater. Capital costs associated with new or additional facilities would be borne by the private mining company. In fact, much of the mining occurs in

areas where the surface mine penetrates shallow groundwater, so the need is more for pumping and recirculation equipment than for actual groundwater wells.

Livestock: The primary strategy for addressing the needs of Livestock WUGs in the region is new or expanded use of groundwater supplies. The estimated capital costs required to implement this strategy were developed under the assumption that each individual livestock owner would develop or expand their groundwater use individually on their property, rather than from development of a larger collection and distribution system for a group of users. Therefore, it is anticipated that capital costs would be borne individually by the respective landowner.

Irrigation: Irrigation capital infrastructure costs are related to the precision laser-leveling component of the irrigation conservation strategy. HB 1437, enacted in 1999 during the 76th session of the Texas Legislature, authorized LCRA to transfer up to an additional 25,000 ac-ft/yr from the Colorado River Basin to new customers within the Brazos River Basin. The legislation allows the transfer only if there is no net loss to the Colorado River Basin and requires that any adverse effects of the transfer be mitigated. Funding for this mitigation is addressed through the establishment of an Agricultural Water Conservation Fund (Ag Fund). One of the mitigation projects proposed is the precision laser-leveling of rice fields. Irrigation users will be responsible for paying 20 percent of the capital cost of the precision leveling. Individual irrigators would predominantly fund this share of the capital cost. Assistance may also be available to the irrigators through the Ag Fund. Note that the capital costs shown above in *Table 9.1* and *Figure 9.1* represent the irrigators 20 percent capital cost portion.

Additional irrigation conservation measures and improvements are part of the LCRA-SAWS Water Project[2] and, as mentioned above, the costs for the water project are to be borne by SAWS.

9.3.3 Wholesale Water Providers

There are two WWPs, as defined by the State planning process in Region K: LCRA and the City of Austin (COA).

Lower Colorado River Authority (LCRA): LCRA has developed their FY2011 Capital Improvments Plan, which includes a section on Water Services that provides information on specific projects planned for the next five years. Specifically, the plan discusses four major categories of capital expenditures: Water and Wastewater Utilities, Stored Water, Hydroelectric, and Irrigation. With respect to funding, LCRA's plan indicates that its policy allows funding of its capital program to come from a combination of net revenues and debt. The plan states that water and wastewater utility, hydroelectric, flood, irrigation, and other river management projects are to be funded using new tax-exempt commercial paper debt, while net revenues will fund all other capital expenditures to the extent available.

City of Austin (COA): Austin Water Utility (AWU) updates its ten-year Capital Improvements Program (CIP) plan annually. The update process includes reviewing all existing CIP projects, identifying new projects, and evaluating financing options. AWU generally finances its capital improvement projects through a combination of cash or current revenues, bonds, and grant funding, to the extent available. The percent share of each funding source is typically 20 percent for cash or current revenues, 65 percent for bonds, and up to 15 percent for Federal Government Grant Programs (through the Bureau of

[2] The project is the subject of litigation. For a description of the status of the project *see* p. 4-34.

Reclamation's Grant Program, for example.) To the extent that grant programs do not supplement the funding needs, the remainder would be funded by cash and bonds.

9.4 INTRODUCTION TO SOCIOECONOMIC IMPACTS OF UNMET WATER NEEDS

The following excerpts are taken directly from the Introduction to the TWDB report entitled *Socioeconomic Impacts of Projected Water Shortages in the Lower Colorado Planning Area (Region K)*, dated May 2010. The full report, which includes the information below as well as additional sociological impacts, such as reduction in population and school enrollment, is provided in full as *Appendix 9C* to this chapter:

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this study in support of the Lower Colorado Regional Water Planning Group (Region K).

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water, farmers cannot irrigate, refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Table 9.2 and *Figure 9.2* summarize estimated economic impacts. Variables shown include:[3]

- **Regional income** – total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income, and interest payments for the region
- **Jobs** – number of full and part-time jobs required by a given industry including self-employment
- **Business taxes** – sales, excise, fees, licenses, and other taxes paid during normal operation of an industry (does not include any type of income tax)

If drought of record conditions return and water supplies are not developed, study results indicate that the Region K Water Planning Area would suffer significant losses. If such conditions occurred in 2010, lost income to residents in the region could total $138 million with associated job losses as high as 1,989. State and local governments could lose nearly $14.6 million in tax receipts. If such conditions occurred in 2060, income losses could run $2,933 million, and job losses could total 21,576. Approximately $393 million worth of State and local taxes would be lost. Reported figures are probably conservative because they are based on estimated costs for a single year; however, in much of Texas, the drought of

[3] Regional income plus business taxes are a suitable measure of economic prosperity because they are a better measure of net economic returns.

record lasted several years. For example, in 2030, models indicate that shortages would cost residents and businesses in the region $1,396 million in lost income. Thus, if shortages lasted for three years, total losses related to unmet needs could easily approach $4,188 million.

Table 9.2: Annual Economic Impacts of Unmet Water Needs

Year	Income ($ millions)[1]	Jobs	State and Local Taxes ($ millions)[1]
2010	$137.79	1,989	$14.60
2020	$1,326.15	8,447	$178.65
2030	$1,395.74	9,860	$185.78
2040	$2,245.55	14,651	$304.67
2050	$2,407.36	16,273	$325.82
2060	$2,932.61	21,576	$393.08

Source: TWDB, Office of Water Resources Planning
[1] In year 2008 dollars

9.5 SOCIOECONOMIC IMPACTS AND ANNUAL COSTS OF IMPLEMENTING THE REGIONAL WATER PLAN

As discussed in the previous section and in more detail in the full report in *Appendix 9C*, there are significant negative economic impacts which would occur during the return of drought of record conditions at anytime during the planning period, if sufficient water supplies are not developed. These impacts have both sociological, and in turn, economic consequences on the region. The economic consequences to the region were summarized in *Table 9.2* in the previous section. *Table 9.3* below compares the total estimated annual cost of implementing the Regional Plan's recommended strategies with the total economic impact of unmet water needs, shown for each decade across the entire planning period.

Table 9.3: Comparison of Annual Costs of Implementing Strategies and Annual Economic Impacts of Unmet Water Needs

Year	Total Estimated Annual Cost of Strategies ($ millions)[1]	Total Socioeconomic Impact to Region ($ millions)[1]
2010	34.10	152.39
2020	36.45	1,504.80
2030	38.68	1,581.52
2040	66.50	2,550.22
2050	67.48	2,733.18
2060	72.53	3,325.69

[1] The total socioeconomic impacts provided in year 2006 dollars. Total estimated annual costs of strategies provided in September 2008 dollars. The values are provided for comparison purposes only.

The annual socioeconomic cost to the region is larger than the annual cost of implementing water strategies by a factor of 4.5 in decade 2010, and increases to a factor of 46 by 2060. Therefore, if drought of record conditions were to occur during the planning period, the anticipated annual socioeconomic impacts of unmet water needs on the region greatly outweigh estimated annual costs of implementing the strategies recommended to meet those water needs.

It should also be noted here that the above analysis does not include costs for impact on the environment. There is no readily available study which defines the economic cost of reduced instream flows to the above cost impacts. There is data available about the economic impact of reduced inflows on the fishery industry in Matagorda Bay. The economic impact of the shrimp industry alone is estimated at $330 million annually and supports 30,000 jobs (Texas Center for Policy Study 2002). However it is difficult to determine whether or not the impacts predicted assume that the water provided in the LCRA Management Plan is considered available. LCRA is and remains committed to providing the instream flows and bay and estuary freshwater inflows currently included in their management plan, which would take place regardless of whether or not the management strategies noted in this plan are implemented. This issue deserves more in-depth study in the next round of planning.

9.6 REGION K POLICY STATEMENTS FROM CHAPTER 8 THAT DISCUSS FUNDING

In this round of regional water planning, the RWPG has included several policy statements in Chapter 8 that discuss funding issues. These policy statements include the following:

- Support State funding for linking groundwater and surface water models by the TWDB during the development of the next generation of Groundwater Availability Models/Water Availability Models (GAMs/WAMs) with a priority for specific areas where groundwater and surface water closely relate and interact, such as concentrations of base-flow springs or stream-based recharge.

- *Texas Legislature* – Monitor the Environmental Flows Allocation Process set up by the 80th Texas Legislature through Senate Bill 3. Monitor and provide adequate funding for environmental flows.

- Region K policy is to encourage new funding sources for GCDs specific to data collection and storage methods that emphasize ease of public accessibility. Region K policy is to support the funding needs of the TWDB for the maintenance and expansion of state-wide groundwater databases.

- The LCRWPG encourages the funding of research efforts to determine water savings and incorporate the information into an update of the 2004 Best Management Practices guide. This information should be aimed at providing water suppliers with useful information for developing and implementing conservation goals and successful management strategies.

- The LCRWPG encourages TWDB to aid the NRCS State Conservationist in targeting water conservation program funding to projects that offer the most water conservation benefit for the state. The TWDB should also offer expert testimony to the Agriculture Committees of both the Senate and the House regarding the need and effectiveness of water conservation accomplished through EQIP in order to highlight the ongoing need for adequate EQIP funding.

- The LCRWPG supports the continuation and expansion of TWDB funding for retail utility water loss projects.

- LCRWPG supports water providers having the ability to have a dedicated yearly funding source for water conservation programs and projects.

- The LCRWPG supports adequate and timely state funding for the regional water planning process. This funding is critical for the development of long-term, sustainable, environmentally protective and conservation-effective water management strategies as well as the collection of water data and groundwater availability information, including the refinement of modeling data, public information materials, and administrative assistance.

- The LCRWPG recommends the State should provide adequate funding for water treatment and radioactive waste disposal for those rural communities that may lose their water supply if such financial support is lacking.

APPENDIX 9A

TABULATED SURVEY RESULTS

APPENDIX 9B

SURVEY CORRESPONDENCE

APPENDIX 9C

SOCIOECONOMIC IMPACTS OF PROJECTED WATER SHORTAGES IN THE LOWER COLORADO WATER PLANNING AREA (REGION K), TWDB, MAY 2010

IFR Return Statistics

RWPG	Number of Returned Surveys	Total Number of Surveys	Percentage Returned Surveys	Total Capital Costs of Returned Surveys	Total Capital Costs of Surveys	Percentage of Capital Costs Returned
A	16	17	94.12%	$206,553,300.00	$408,769,600.00	50.53%
B	0	2	0.00%	$0.00	$384,132,500.00	0.00%
C	0	169	0.00%	$0.00	$17,239,418,027.00	0.00%
D	15	17	88.24%	$24,263,038.49	$30,213,767.20	80.30%
E	3	3	100.00%	$691,258,000.00	$691,258,000.00	100.00%
F	0	9	0.00%	$0.00	$780,730,362.00	0.00%
G	9	61	14.75%	$614,833,231.00	$5,190,851,691.00	11.84%
H	17	223	7.62%	$205,202,299.00	$8,406,506,532.00	2.44%
I	5	24	20.83%	$247,946,549.00	$1,108,048,380.73	22.38%
J	0	3	0.00%	$0.00	$26,552,150.00	0.00%
K	4	12	33.33%	$497,838,744.00	$552,733,928.00	90.07%
L	5	24	20.83%	$4,636,364,010.00	$6,944,906,859.00	66.76%
M	0	63	0.00%	$0.00	$570,128,605.74	0.00%
N	0	3	0.00%	$0.00	$308,911,950.00	0.00%
O	7	31	22.58%	$684,372,045.00	$698,415,857.00	97.99%
P	0	1	0.00%	$0.00	$85,429,083.00	0.00%
State	81	662	12.24%	$7,808,631,216.49	$43,427,007,292.67	17.98%

Note: Report is based on data developed and submitted by the 16 Regional Water Planning Groups for the 2012 State Water Plan.
All volumes are represented in acre-feet per year.

Results of TWDB IFR Survey for Region K Water Users

IFRProjectDataId	EntityID	Name	Type	RWPG	County	Basin	Funding Type	DBProjectID	Project Name	Cost	Year of Need	Date Submitted
840	7	AUSTIN	BOTH	K	TRAVIS	COLORADO	PLANNING, DESIGN, AND PERMITTING	403	COA DIRECT REUSE (MUNICIPAL & MANUFACTURING)	$ -	2010	6/25/10 11:12 AM
730	307	BUDA	WUG	K	HAYS	COLORADO	PLANNING, DESIGN, AND PERMITTING	367	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	$ 300,000.00	2010	6/18/10 10:47 AM
731	307	BUDA	WUG	K	HAYS	COLORADO	ACQUISITION AND CONSTRUCTION	367	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	$ 6,500,000.00	2010	6/18/10 10:47 AM
732	307	BUDA	WUG	K	HAYS	COLORADO	EXCESS CAPACITY	367	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	$ -	2010	6/18/10 10:47 AM
733	307	BUDA	WUG	K	HAYS	COLORADO	RURAL	367	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	$ -	2010	6/18/10 10:47 AM
734	307	BUDA	WUG	K	HAYS	COLORADO	DISADVANTAGED	367	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	$ -	2010	6/18/10 10:47 AM
735	307	BUDA	WUG	K	HAYS	COLORADO	PLANNING, DESIGN, AND PERMITTING	788	DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER	$ 140,000.00	2010	6/18/10 10:47 AM
736	307	BUDA	WUG	K	HAYS	COLORADO	ACQUISITION AND CONSTRUCTION	788	DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER	$ 1,250,000.00	2015	6/18/10 10:47 AM
737	307	BUDA	WUG	K	HAYS	COLORADO	EXCESS CAPACITY	788	DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER	$ -	2010	6/18/10 10:47 AM
738	307	BUDA	WUG	K	HAYS	COLORADO	RURAL	788	DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER	$ -	2010	6/18/10 10:47 AM
739	307	BUDA	WUG	K	HAYS	COLORADO	DISADVANTAGED	788	DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER	$ -	2010	6/18/10 10:47 AM
479	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	PLANNING, DESIGN, AND PERMITTING	363	EXPANSION OF TRINITY AQUIFER	$ -	2010	5/4/10 2:51 PM
480	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	ACQUISITION AND CONSTRUCTION	363	EXPANSION OF TRINITY AQUIFER	$ -	2010	5/4/10 2:51 PM
481	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	EXCESS CAPACITY	363	EXPANSION OF TRINITY AQUIFER	$ -	2010	5/4/10 2:51 PM
482	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	RURAL	363	EXPANSION OF TRINITY AQUIFER	$ -	2010	5/4/10 2:51 PM
483	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	DISADVANTAGED	363	EXPANSION OF TRINITY AQUIFER	$ -	2010	5/4/10 2:51 PM
484	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	PLANNING, DESIGN, AND PERMITTING	380	GOLDTHWAITE CHANNEL DAM	$ 250,000.00	2012	5/4/10 2:51 PM
485	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	ACQUISITION AND CONSTRUCTION	380	GOLDTHWAITE CHANNEL DAM	$ 1,155,950.00	2014	5/4/10 2:51 PM
486	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	EXCESS CAPACITY	380	GOLDTHWAITE CHANNEL DAM	$ -	2010	5/4/10 2:51 PM
487	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	RURAL	380	GOLDTHWAITE CHANNEL DAM	$ -	2010	5/4/10 2:51 PM
488	844	GOLDTHWAITE	WUG	K	MILLS	COLORADO	DISADVANTAGED	380	GOLDTHWAITE CHANNEL DAM	$ -	2010	5/4/10 2:51 PM
504	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	PLANNING, DESIGN, AND PERMITTING	808	AQUIFER STORAGE AND RECOVERY	$ 10,000,000.00	2030	5/24/10 3:41 PM
505	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	ACQUISITION AND CONSTRUCTION	808	AQUIFER STORAGE AND RECOVERY	$ -	2010	5/24/10 3:41 PM
506	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	EXCESS CAPACITY	808	AQUIFER STORAGE AND RECOVERY	$ 120,000,000.00	2040	5/24/10 3:41 PM
507	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	RURAL	808	AQUIFER STORAGE AND RECOVERY	$ -	2010	5/24/10 3:41 PM
508	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	DISADVANTAGED	808	AQUIFER STORAGE AND RECOVERY	$ -	2010	5/24/10 3:41 PM
499	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	PLANNING, DESIGN, AND PERMITTING	807	REUSE BY HIGHLAND LAKES COMMUNITIES	$ 2,000,000.00	2020	5/24/10 3:41 PM
500	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	ACQUISITION AND CONSTRUCTION	807	REUSE BY HIGHLAND LAKES COMMUNITIES	$ 10,000,000.00	2030	5/24/10 3:41 PM
501	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	EXCESS CAPACITY	807	REUSE BY HIGHLAND LAKES COMMUNITIES	$ -	2010	5/24/10 3:41 PM
502	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	RURAL	807	REUSE BY HIGHLAND LAKES COMMUNITIES	$ -	2010	5/24/10 3:41 PM
503	87	LOWER COLORADO RIVER AUTHORITY	WWP	K	N/A	N/A	DISADVANTAGED	807	REUSE BY HIGHLAND LAKES COMMUNITIES	$ -	2010	5/24/10 3:41 PM

AECOM
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.aecom.com

April 29, 2010

[redacted]

Subject: Water Infrastructure Funding Survey for Regional Water Planning

Dear [redacted]:

The Lower Colorado Regional Planning Group (LCRWPG), also known as Region K, is currently updating the 2011 Regional Water Plan. Your political subdivision is projected to have water demands that exceed the currently available water supply during the 50-year planning period. This may be due to projected population and demand growth, limitations on water supply, or a combination of the two.

Throughout the Region K planning area, the LCRWPG is recommending various strategies for meeting the identified shortages, including combinations of water conservation, expanded use of groundwater, water reuse, desalination of brackish groundwater, and new or existing surface water supplies to meet the projected water demands. Some of these water management strategies will require capital construction costs to implement. The purpose of this letter is to let you know that one or more water management strategies with capital construction costs have been recommended by the LCRWPG for your political subdivision during the 50-year planning period. There is no legal requirement that your political subdivision implement the particular water management strategies recommended for you; however, any facilities which require state permits or state financial assistance must be determined as being consistent with the Region K Plan prior to approval of the permits and funding.

The Texas Water Code requires the Regional Water Planning Groups to survey all political subdivisions with projected water needs requiring capital costs about infrastructure financing. The goal of the survey is to determine potential State Funding levels for existing infrastructure loan and grant programs, and to identify any areas not addressed by current programs. It is very important that you respond to this survey so that the State can accurately determine the amount of funding that may be needed in the future.

We are providing you with an online survey link. To access your specific online survey, please go to:

[redacted]

We would appreciate your assistance in completing the survey by **May 31, 2010**. If you would prefer not to complete the survey online, please contact me at the phone number or email address below and I can send you a hard copy version. Also, please contact me should you have questions regarding the survey. We appreciate your assistance with this planning requirement.

Sincerely,

Jaime J. Burke, P.E.
Project Manager
AECOM
512-457-7798
jaime.burke@aecom.com

Infrastructure Financing Survey Report

7: AUSTIN

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Your cooperation and responses to these questions are crucial in helping the state in ensuring that our communities and our citizens have adequate water supplies. If you have any questions related to the financial programs offered by the TWDB or about the survey questions, please contact Jaime Burke by phone at (512)457-7798 or by email at jaime.burke@aecom.com. If you have any computer or technology related problems with the survey, please contact Wendy Barron by phone at (512) 936-0886 or by email at wendy.barron@twdb.state.tx.us.

Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

- WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

•Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

403 - COA DIRECT REUSE (MUNICIPAL & MANUFACTURING) $125,394,337.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Infrastructure Financing Survey Report

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

Section 3: Contact Information

1. Name: ____________________
2. Phone Number: ____________________
3. Email: ____________________
4. Comments ____________________

Infrastructure Financing Survey Report

87: LOWER COLORADO RIVER AUTHORITY

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Your cooperation and responses to these questions are crucial in helping the state in ensuring that our communities and our citizens have adequate water supplies. If you have any questions related to the financial programs offered by the TWDB or about the survey questions, please contact Jaime Burke by phone at (512)457-7798 or by email at jaime.burke@aecom.com. If you have any computer or technology related problems with the survey, please contact Wendy Barron by phone at (512) 936-0886 or by email at wendy.barron@twdb.state.tx.us.

Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

- WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

•Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

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807 - REUSE BY HIGHLAND LAKES COMMUNITIES $15,920,000.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

808 - AQUIFER STORAGE AND RECOVERY $168,711,000.00

Planning, design, permitting	Cost:	Year:
Acquisition and contruction	Cost:	Year:
Excess Capacity	Cost:	Year:
Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

Section 3: Contact Information

1. Name: __________
2. Phone Number: __________
3. Email: __________
4. Comments __________

Infrastructure Financing Survey Report

194: AQUA WSC

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Your cooperation and responses to these questions are crucial in helping the state in ensuring that our communities and our citizens have adequate water supplies. If you have any questions related to the financial programs offered by the TWDB or about the survey questions, please contact Jaime Burke by phone at (512)457-7798 or by email at jaime.burke@aecom.com. If you have any computer or technology related problems with the survey, please contact Wendy Barron by phone at (512) 936-0886 or by email at wendy.barron@twdb.state.tx.us.

Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

- WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

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•Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

115 - LOCAL GROUNDWATER (CARRIZO-WILCOX AQUIFER)- TEMPORARY OVERDRAFT $1,984,000.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

165 - ADDITIONAL CARRIZO AQUIFER DEVELOPMENT (INCLUDES OVERDRAFTING) $2,728,000.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	
Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

350 - EXPANSION OF CARRIZO-WILCOX AQUIFER $6,248,640.00

Expand existing use of groundwater from the Carrizo-Wilcox Aquifer in Bastrop County

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	
Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

Section 3: Contact Information

1. Name: ______________________
2. Phone Number: ______________________
3. Email: ______________________

4. Comments

Infrastructure Financing Survey Report

224: BASTROP

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Your cooperation and responses to these questions are crucial in helping the state in ensuring that our communities and our citizens have adequate water supplies. If you have any questions related to the financial programs offered by the TWDB or about the survey questions, please contact Jaime Burke by phone at (512)457-7798 or by email at jaime.burke@aecom.com. If you have any computer or technology related problems with the survey, please contact Wendy Barron by phone at (512) 936-0886 or by email at wendy.barron@twdb.state.tx.us.

Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

•WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

- •State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

- •Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- •Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- •Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- •Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- •Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

365 - EXPANSION OF OTHER AQUIFER $1,721,920.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Infrastructure Financing Survey Report

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

Section 3: Contact Information

1. Name: ____________________
2. Phone Number: ____________________
3. Email: ____________________
4. Comments ____________________

Infrastructure Financing Survey Report

307: BUDA

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

Your cooperation and responses to these questions are crucial in helping the state in ensuring that our communities and our citizens have adequate water supplies. If you have any questions related to the financial programs offered by the TWDB or about the survey questions, please contact Jaime Burke by phone at (512)457-7798 or by email at jaime.burke@aecom.com. If you have any computer or technology related problems with the survey, please contact Wendy Barron by phone at (512) 936-0886 or by email at wendy.barron@twdb.state.tx.us.

Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

•WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

•Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

367 - DEVELOPMENT OF CARRIZO-WILCOX AQUIFER $6,807,200.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

788 - DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER $1,391,124.00

Planning, design, permitting	Cost:	Year:
Acquisition and contruction	Cost:	Year:
Excess Capacity	Cost:	Year:
Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

Section 3: Contact Information

1. Name: ____________________
2. Phone Number: ____________________
3. Email: ____________________
4. Comments ____________________

Infrastructure Financing Survey Report

356: CIMARRON PARK WATER COMPANY

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

http://www.twdb.state.tx.us/assistance/financial/financial_main.asp

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Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

•WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

•State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

•Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

•Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

•Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

•Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

•Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

788 - DEVELOPMENT OF SALINE ZONE OF EDWARDS-BFZ AQUIFER $1,669,349.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Infrastructure Financing Survey Report

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

Section 3: Contact Information

1. Name: ______________________
2. Phone Number: ______________________
3. Email: ______________________
4. Comments ______________________

Infrastructure Financing Survey Report

757: ELGIN

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

The TWDB has several funding programs for water projects identified in the 2012 state water plan. Funds are targeted toward: 1) construction of water supply projects, 2) planning and design and permitting for projects that have long development time frames meaning that construction would require 5-10 years of planning, design and permitting, and 3) projects that would be built with excess capacity intended to meet future water needs. These programs offer various attractive financing options such as subsidized interest rates, deferral of principal and interest during planning, design and permitting phase, partial deferral of interest and principal for those portions of the project which are optimally sized for future needs. Additionally, grant funding is available for those service areas which qualify as rural or economically disadvantaged. More information on these financial assistance programs (i.e., the Water Infrastructure Fund, the State Participation Fund, and the Economically Disadvantaged Areas Program) can be found at the TWDB website at:

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Section 1: Project Financing Information

For project(s) identified in the State Water Plan, the TWDB has funding available for different aspects of a project. The different programs available are:

- WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

For each of the project(s) listed below, please enter only the amounts you wish to receive from TWDB programs in the 'Cost' field and the earliest date you wish to receive these amounts. In addition, the total amount entered into all five categories cannot exceed the total cost of the project. Each of the five categories corresponds to a funding program available at the TWDB. Each of the funding programs and categories are described below.

- Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

346 - NEW LCRA CONTRACTS $17,556,000.00

Purchase surface water from LCRA - assume surface water treatment plant would need to be constructed as part of strategy

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

350 - EXPANSION OF CARRIZO-WILCOX AQUIFER $4,165,760.00

Planning, design, permitting	Cost:	Year:
Acquisition and contruction	Cost:	Year:
Excess Capacity	Cost:	Year:
Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

Section 3: Contact Information

1. Name: ______
2. Phone Number: ______
3. Email: ______
4. Comments ______

Infrastructure Financing Survey Report

776: FAYETTE WSC

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

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Section 1: Project Financing Information

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- •WIF-Deferred offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- •WIF-Construction offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- •State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- •Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- •Economically Distressed Areas Program (EDAP) offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

- State Participation funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

If you are interested in receiving funds from the above programs, please complete the remainder of the survey.

Please enter only the amounts you wish to receive from TWDB program in the Project Costs fields and do not enter a specific project cost more than once.

Section 2: Projects

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- Planning, design, permitting: Enter costs into the 'Planning, design, permitting' category if you want to participate in the WIF-Deferred program. The WIF-Deferred program offers subsidized interest and deferral of principal and interest for up to 10 years for planning, design and permitting costs.

- Acquisition and construction: Enter costs into the 'Acquisition and construction' category if you want to participate in the WIF-Construction program. The WIF-Construction program offers subsidized interest for all construction costs, including planning, acquisition, design, and construction.

- Excess Capacity: Enter costs into the 'Excess capacity' category if you want to participate in the State Participation program. State Participating funding offers partial interest and principal deferral for the incremental cost of project elements which are designed and built to serve needs beyond 10 years.

- Rural: Enter costs into the 'Rural' category if you want to participate in the Rural areas funding program. Rural areas funding offers grants and 0% interest loans for service areas which are not in a Metropolitan Statistical Area (MSA) and in which the population does not exceed 5,000. The service area must also meet the EDAP eligibility criteria.

- Disadvantaged: Enter costs into the 'Disadvantaged' category if you want to participate in the Economically Distressed Areas Program (EDAP). EDAP offers funding through grants and loans for service areas within a project which meet the EDAP eligibility criteria. Eligibility for the TWDB's EDAP requires that the median household income of the area to be served by the proposed project be less than 75 percent of the Texas median household income ($39,927), as shown in the 2000 Census. EDAP eligibility also requires adoption of Model Subdivision rules by the appropriate planning entities.

355 - EXPANSION OF GULF COAST AQUIFER $676,480.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

371 - DEVELOPMENT OF OTHER AQUIFER $2,887,868.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	
Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

Section 3: Contact Information

1. Name: ____________________
2. Phone Number: ____________________
3. Email: ____________________
4. Comments ____________________

Infrastructure Financing Survey Report

844: GOLDTHWAITE

As part of the regional and state water planning process, regional water planning groups recommend water supply projects for each of their respective regions. The purpose of this survey is gather information from your organization regarding how you plan to finance water supply projects recommended for the 2012 state water plan, and determine whether you intend to use financial assistance programs offered by the State of Texas and administered by the Texas Water Development Board (TWDB).

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363 - EXPANSION OF TRINITY AQUIFER $1,352,960.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

380 - GOLDTHWAITE CHANNEL DAM				$1,405,950.00
Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	
Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

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4. Comments ______________________

Infrastructure Financing Survey Report

1587: LLANO

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369 - DEVELOPMENT OF ELLENBURGER-SAN SABA AQUIFER $3,624,413.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

878 - DEVELOPMENT OF HICKORY AQUIFER $4,697,200.00

Planning, design, permitting	Cost:	Year:
Acquisition and contruction	Cost:	Year:
Excess Capacity	Cost:	Year:
Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

Section 3: Contact Information

1. Name:
2. Phone Number:
3. Email:
4. Comments

Infrastructure Financing Survey Report

2266: RICHLAND SUD

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479 - BOTTLED WATER PROGRAM $2,000.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

574 - REPLACEMENT WELL $1,291,720.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	
Rural	Cost:		Year:	
Disadvantaged	Cost:		Year:	
	Total:			

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Infrastructure Financing Survey Report

2367: SMITHVILLE

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350 - EXPANSION OF CARRIZO-WILCOX AQUIFER $1,041,440.00

Planning, design, permitting	Cost:		Year:	
Acquisition and contruction	Cost:		Year:	
Excess Capacity	Cost:		Year:	

Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

768 - DEVELOPMENT OF QUEEN CITY AQUIFER $4,190,135.00

Planning, design, permitting	Cost:	Year:
Acquisition and contruction	Cost:	Year:
Excess Capacity	Cost:	Year:
Rural	Cost:	Year:
Disadvantaged	Cost:	Year:
	Total:	

Section 3: Contact Information

1. Name: ____________________
2. Phone Number: ____________________
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Socioeconomic Impacts of Projected Water Shortages for the Lower Colorado Regional Water Planning Area (Region K)

Prepared in Support of the 2011 Lower Colorado Regional Water Plan

Stuart D. Norvell, Managing Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

S. Doug Shaw, Agricultural Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

May 2010

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Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: *"The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs"* [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Lower Colorado Regional Water Planning Group (Region K).

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200 acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands, and people would experience a shortage of 100 acre-feet assuming drought of record conditions.

Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1: *Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales** - total production measured by sales revenues;
- **intermediate sales** - sales to other businesses and industries within a given region;
- **final sales** – sales to end users in a region and exports out of a region;
- **employment** - number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income** - total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes** - sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted as "output" in an IO model. Thus, total sales double-count or overstate the true economic value of goods

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[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

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[2] Royal, W. *"High And Dry - Industrial Centers Face Water Shortages."* in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;

- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;

- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and

- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$D_{i,t} = Q_{i,t} *, S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

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the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, *"Cost of Industrial Water Shortages,"* Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). As shown in Table 2, the overwhelming majority of irrigation in Region K is for rice. Table 3 displays average (2003-2007) gross revenues per acre for rice production applied in the analysis.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors

IMPLAN category	TWDB category
Oilseeds	Soybeans and "other oil crops"
Grains	Grain sorghum, corn, wheat and "other grain crops"
Vegetable and melons	"Vegetables" and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All "other" crops	"Forage crops", peanuts, alfalfa, hay and pasture, rice and "all other crops"

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Region K Regional Water Planning Area (average 2003-2007)

Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Oilseeds	<1	<1%	<1	<1%
Grains	6.96	4%	9	2%
Vegetable and melons	<1	<1%	<1	<1%
Tree nuts	5	3%	7	1%
Fruits	<1	<1%	1.24	<1%
Cotton	1	1%	1.11	<1%
Rice	145	91%	541	97%
Total	**160**	**100%**	**559.96**	**100%**

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB's annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as "failed acres," "golf course" or "waste water."

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Region K Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
All Other Crops	$460	Based on five-year (2003-2007) average weighted by acreage for "rice."
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region.* Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors.* Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

3. *Reduce sales revenues for forward processers in proportion to lost rice production.* As discussed in Section 1.1, input output models capture indirect losses to suppliers and other businesses that depend upon rice farming, but only those providing inputs to rice production. Multipliers do not capture potential impacts to forward processors, in this case rice mills, which add considerable value to the product and hence income and jobs to the state. For example, Texas rice farming directly generates about $60 to $80 in gross state product. Once the rice harvested it is sold to rice mills that process and resell the crop. This added value generates an additional $60 to $80 million in direct gross state product. Impacts measured in the study capture this additional value added.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of "other" is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill

stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors.* Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk manufacturers) would likely have little to process. This is not an unreasonable premise. Since the 1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[5] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[6]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[7] For example,

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[5] Ferreira, W.N. *"Analysis of the Meat Processing Industry in the United States."* Clemson University Extension Economics Report ER211, January 2003.

[6] Ward, C.E. *"Summary of Results from USDA's Meatpacking Concentration Study."* Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[7] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. *"Waste Not, Want Not: The Potential for Urban Water Conservation in California."* Pacific Institute. November 2003. U.S. Bureau of

if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as "county-other." Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

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the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: *"U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.,"* Fort Belvoir, VA. See also, Joseph, E. S., 1982, *"Municipal and Industrial Water Demands of the Western United States."* Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, *"Evaluation of Water Conservation for Municipal and Industrial Water Supply."* U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[8] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[9]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions (average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total Monthly Cost	Avg. Monthly Use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[10] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the

[8] Bell, D.R. and Griffin, R.C. "*Community Water Demand in Texas as a Century is Turned.*" Research contract report prepared for the Texas Water Development Board. May 2006.

[9] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[10] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[11] Earlier findings of the U.S. Water Resources Council showed a national average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[12] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[13] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[14] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[15]

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[11] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. *"Residential End Uses of Water."* Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

[12] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation."* USEPA Report no. 841-B-95-002. April, 1995.

[13] Planning and Management Consultants, Ltd. *"Evaluating Urban Water Conservation Programs: A Procedures Manual."* Prepared for the California Urban Water Agencies. February 1992.

[14] Zewe, C. *"Tap Threatens to Run Dry in Texas Town."* July 11, 2000. CNN Cable News Network.

[15] Associated Press, *"Ballinger Scrambles to Finish Pipeline before Lake Dries Up."* May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people

Water shortages as a percentage of total monthly household demands	No. of gallons remaining per household per day	No of gallons remaining per person per day	Economic loss (per acre-foot)	Economic loss (per gallon)
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use.

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[16] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[17]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

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[16] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[17] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	\$730 - \$2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	\$2,040 - \$10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	\$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.

2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[18] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

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[18] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[19] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[20]

[19] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[20] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. *"Social Impact Assessment."* in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2. Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economics impacts of water shortages for water user groups with reported deficits. According to the 2011 *Lower Colorado Regional Water Plan*, during severe drought irrigation, municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Region K economy generates slightly more than $79 billion in gross state product for Texas ($73 billion in income and $6 billion in state and local business taxes) and supports nearly 1,033,690 jobs (Table 8). Generating nearly $12 billion worth of income per year manufacturing (particularly computer electronics and pharmaceuticals) is the primary base economic sector in the region.[21] Municipal sectors also generate substantial amounts of activity, nearly $61 billion per year in gross state product, and are major employers in the region. While municipal sectors are the largest employer and source of wealth, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing. In other words, without base industries many municipal jobs would not exist.

[21] Base industries are those that supply markets outside of a region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Lower Colorado Regional Economy by Water User Group ($millions)[a]						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation[b]	$132.09	$67.62	$64.64	1,905	$62.55	$2.41
Livestock	$992.27	$549.93	$442.34	13,264	$99.62	$13.36
Manufacturing	$56,646.30	$14,932.96	$41,713.34	127,416	$12,275.86	$348.07
Mining	$2,578.62	$1,837.98	$740.64	$4,439.00	$1,572.37	$137.52
Steam-electric	$1,342.07	$377.55	$964.52	2,823	$932.02	$158.93
Municipal	$96,908.91	$31,257.19	$65,651.72	883,845	$57,858.80	$5,225.90
Regional total	$158,600.26	$49,023.23	$109,577.20	1,033,692	$72,801.22	$5,886.19

[a] Appendix 1 displays data for individual IMPLAN sectors that make up each water use category.
[b] Irrigation includes activity for both rice farms and rice mills.
Source: Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Agricultural Water Shortages

Irrigation

According to the 2011 *Lower Colorado Regional Water Plan*, during severe drought the counties of Bastrop, Colorado, Fayette, Matagorda, Mills and Wharton would experiences shortages of irrigation water without new management strategies. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by an estimated $84 million in 2010 and $56 million in 2060 with potential job losses ranging from 994 to 660 (Table 9). Figures include impacts to rice mills.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	**Lost income from reduced rice production and milling activity ***	**Lost state and local tax revenues from reduced rice production and milling activity**	**Lost jobs from rice production and milling activity**
2010	$75.35	$8.72	994
2020	$70.93	$8.21	935
2030	$66.12	$7.65	872
2040	$61.50	$7.12	811
2050	$57.05	$6.60	752
2060	$50.09	$5.80	660

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

Livestock

Several counties (Colorado, Fayette, Llano, and Matagorda) show water shortages for livestock producers. Given that these shortages are small relative to total livestock demands, we assume producers would haul water by tanker to fill stock pond and cisterns. The cost to producers across all counties would total about $4.5 million per annum in each decade.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities in Region K. At the regional level, the estimated economic value of domestic water shortages totals $63 million in 2010 and $1,034 million in 2060 (Table 10). Municipal shortages would also restrict the operation of many commercial businesses reducing gross state product by an estimated $43 million in 2010 and $633 million in 2060.

Table 10: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)

Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$63.32	$38.33	$3.97	733	$13.24
2020	$277.85	$182.18	$18.26	3,528	$37.05
2030	$385.04	$245.98	$24.88	4,861	$55.64
2040	$529.21	$339.71	$35.32	7,042	$83.14
2050	$756.51	$396.14	$41.36	8,282	$153.95
2060	$1,034.28	$573.34	$60.28	12,222	$230.90

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages are projected to occur in Bastrop, Fayette, Hays, Matagorda and Wharton counties. The Region K planning group estimates that these manufacturers would be short nearly 150 acre-feet of water in 2010 and about 935 acre-feet in 2060. Shortages of these magnitudes would reduce gross state product (income plus taxes) by an estimated $5 million in 2010 and $65 million in 2060 (Table 11).

Table 11: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	**Lost income due to reduced manufacturing output**	**Lost state and local business tax revenues due to reduced manufacturing output**	**Lost jobs due to reduced manufacturing output**
2010	$4.64	$0.45	97
2020	$13.09	$1.31	285
2030	$22.11	$2.05	431
2040	$28.59	$2.62	549
2050	$34.26	$3.12	651
2060	$59.48	$4.95	987

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.5 Impacts of Mining Water Shortages

Mining water shortages are projected to occur in Burnett, Fayette, and Liberty counties, and would primarily affect aggregates (sand and gravel) operations. In total, shortages would reduce gross state product by an estimated $19 million in 2010 and $12 million in 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)			
Decade	**Lost income due to reduced mining output**	**Lost state and local business tax revenues due to reduced mining output**	**Lost jobs due to reduced mining output**
2010	$17.57	$1.19	159
2020	$16.82	$1.14	153
2030	$15.40	$1.04	140
2040	$13.36	$0.90	122
2050	$10.74	$0.71	98
2060	$11.16	$0.74	102

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.6 Impacts of Steam-electric Water Shortages

Water shortages for steam-electric water user groups are projected to occur in Bastrop, Fayette, Matagorda, Travis, and Wharton counties, and would reduce gross state product by $2 million dollars in 2010, and $2,559 million 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)

Decade	Lost income due to reduced electrical generation	Lost state and local business tax revenues due to reduced electrical generation	Lost jobs due to reduced electrical generation
2010	$1.90	$0.27	6
2020	$1,043.13	$149.73	3,546
2030	$1,046.13	$150.16	3,556
2040	$1,802.39	$258.71	6,127
2050	$1,909.17	$274.03	6,490
2060	$2,238.54	$321.31	7,605

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level.

2.7 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment. In 2010, estimated population losses total 2,393 with corresponding reductions in school enrollment of 675 students (Table 14). In 2060, population in the region would decline by 25,988 people and school enrollment would fall by 4,807 students.

Table 14: Social Impacts of Water Shortages (2010-2060)

Year	Population Losses	Declines in School Enrollment
2010	2,393	675
2020	10,174	2,886
2030	11,876	3,146
2040	17,647	3,261
2050	19,601	3,620
2060	25,988	4,807

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 15 displays the results.

Table 15: Distribution of Impacts by Major River Basin (2010-2060)

Water Use	2010	2020	2030	2040	2050	2060
Irrigation						
Brazos	<1%	<1%	<1%	<1%	<1%	<1%
Brazos-Colorado	51%	52%	52%	52%	53%	51%
Colorado	3%	3%	3%	3%	3%	3%
Colorado-Lavaca	31%	32%	33%	34%	35%	38%
Lavaca	14%	13%	12%	10%	9%	7%
Livestock						
Brazos	24%	24%	24%	24%	24%	24%
Colorado	40%	40%	40%	40%	40%	40%
Colorado-Lavaca	30%	30%	30%	30%	30%	30%
Lavaca	6%	6%	6%	6%	6%	6%
Manufacturing						
Colorado	64%	73%	77%	79%	80%	80%
Colorado-Lavaca	0%	0%	0%	0%	0%	1%
Guadalupe	5%	3%	2%	2%	2%	2%
Lavaca	31%	23%	21%	19%	18%	17%
Mining						
Brazos	<1%	<1%	<1%	<1%	<1%	<1%
Brazos-Colorado	<1%	<1%	<1%	<1%	<1%	<1%
Colorado	99%	98%	97%	97%	95%	95%
Lavaca	1%	1%	2%	2%	3%	3%
Municipal						
Brazos	<1%	<1%	<1%	<1%	<1%	<1%
Colorado	98%	99%	99%	99%	100%	100%
Guadalupe	0%	0%	0%	0%	0%	0%
Lavaca	2%	1%	1%	1%	0%	0%
Steam-electric						
Brazos-Colorado	0%	0%	0%	0%	0%	<1%
Colorado	100%	100%	100%	100%	100%	>99%

Appendix 1: Economic Data for Individual IMPLAN Sectors for Lower Colorado Regional Water Planning Area

Economic Data for Agricultural Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Irrigation	All other crop farming (rice)	10	$60.66	$54.54	$6.12	774	$29.71	$1.17
Irrigation	Fruit Farming	5	$28.03	$3.74	$24.45	691	$16.06	$0.61
Irrigation	Rice milling	49	$21.75	$0.17	$21.58	36	$2.49	$0.15
Irrigation	Tree Nut Farming	4	$16.71	$8.95	$7.76	295	$11.56	$0.41
Irrigation	Grain Farming	2	$2.32	$0.11	$2.21	67	$1.07	$0.04
Irrigation	Vegetable and Melon Farming	3	$1.83	$0.09	$1.74	34	$1.34	$0.02
Irrigation	Cotton Farming	8	$0.59	$0.01	$0.58	5	$0.22	$0.01
Irrigation	Oilseed Farming	1	$0.20	$0.01	$0.20	3	$0.10	$0.00
	Total irrigation		**$132.09**	**$67.62**	**$64.64**	**1,905**	**$62.55**	**$2.41**
Livestock	Cattle ranching and farming	11	$469.96	$325.87	$144.09	10,040	$37.13	$9.88
Livestock	Cheese manufacturing	64	$178.60	$73.97	$104.63	241	$12.97	$1.09
Livestock	Meat processed from carcasses	68	$110.94	$32.73	$78.21	258	$10.87	$0.56
Livestock	Fluid milk manufacturing	62	$79.43	$19.11	$60.32	133	$9.13	$0.57
Livestock	Rendering and meat byproduct processing	69	$48.31	$26.81	$21.50	91	$11.48	$0.33
Livestock	Animal production- except cattle and poultry	13	$44.98	$38.14	$6.84	2,201	$4.37	$0.69
Livestock	Poultry and egg production	12	$33.41	$26.18	$7.22	230	$11.25	$0.11
Livestock	Animal- except poultry- slaughtering	67	$26.65	$7.13	$19.53	70	$2.43	$0.13
	Total livestock		**$992.27**	**$549.93**	**$442.34**	**13,264**	**$99.62**	**$13.36**
	Total agriculture		**$1,124.36**	**$617.55**	**$506.99**	**15169**	**$162.17**	**$15.77**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Mining and Steam-electric Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Mining	Oil and gas extraction	19	$1,901.89	$1,766.26	$135.63	1,831	$1,095.27	$114.04
Mining	Support activities for oil and gas operations	28	$368.31	$51.16	$317.15	1,553	$333.91	$15.15
Mining	Drilling oil and gas wells	27	$120.05	$0.60	$119.45	200	$33.21	$4.38
Mining	Sand- gravel- clay- and refractory mining	25	$114.95	$12.13	$102.81	568	$68.27	$3.28
Mining	Stone mining and quarrying	24	$66.46	$6.84	$59.62	249	$39.02	$0.35
Mining	Support activities for other mining	29	$2.74	$0.04	$2.70	20	$0.91	$0.11
Mining	Other nonmetallic mineral mining	26	$2.30	$0.23	$2.07	11	$1.06	$0.06
Mining	Coal mining	20	$1.94	$0.73	$1.21	7	$0.73	$0.16
Mining	Iron ore mining	21	$0.00	$0.00	$0.00	0	$0.00	$0.00
Mining	Copper- nickel- lead- and zinc mining	22	$0.00	$0.00	$0.00	0	$0.00	$0.00
Mining	Gold- silver- and other metal ore mining	23	$0.00	$0.00	$0.00	0	$0.00	$0.00
Total Mining	**NA**		**$2,578.62**	**$1,837.98**	**$740.64**	**$4,439.00**	**$1,572.37**	**$137.52**
Steam-electric	**Power generation and supply**		**$1,342.07**	**$377.55**	**$964.52**	**2,823**	**$932.02**	**$158.93**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Electronic computer manufacturing	302	$24,498.91	$5,702.75	$18,796.15	9,746	$1,613.72	$126.44
Manufacturing	Semiconductors and related device manufacturing	311	$11,287.74	$6,007.64	$5,280.10	12,094	$2,696.34	$76.30
Manufacturing	New residential 1-unit structures- all	33	$3,320.82	$0.00	$3,320.81	21,394	$1,175.14	$18.50
Manufacturing	Commercial and institutional buildings	38	$1,917.68	$0.00	$1,917.68	18,651	$1,006.96	$12.41
Manufacturing	Pharmaceutical and medicine manufacturing	160	$1,607.56	$293.78	$1,313.78	1,747	$455.37	$10.51
Manufacturing	All other electronic component manufacturing	312	$867.97	$497.39	$370.58	3,664	$297.15	$5.02
Manufacturing	Other new construction	41	$840.59	$0.00	$840.59	8,559	$467.01	$3.68
Manufacturing	Plastics and rubber industry machinery	263	$598.81	$26.67	$572.13	1,906	$306.80	$4.48
Manufacturing	Telephone apparatus manufacturing	306	$592.57	$14.51	$578.06	657	$106.99	$3.43
Manufacturing	New residential additions and alterations-all	35	$476.81	$0.00	$476.80	2,548	$186.29	$2.63
Manufacturing	Petroleum refineries	142	$419.22	$155.83	$263.40	18	$238.69	$8.68
Manufacturing	Highway- street- bridge- and tunnel construct	39	$412.91	$0.00	$412.91	3,612	$215.66	$2.75
Manufacturing	New multifamily housing structures- all	34	$370.60	$0.00	$370.59	3,110	$181.41	$1.05
Manufacturing	Jewelry and silverware manufacturing	380	$333.02	$6.72	$326.30	1,297	$112.38	$1.80
Manufacturing	Ready-mix concrete manufacturing	192	$312.44	$1.52	$310.92	1,084	$107.69	$2.73
Manufacturing	Surgical appliance and supplies manufacturing	376	$299.56	$74.76	$224.79	675	$166.49	$1.49
Manufacturing	Water- sewer- and pipeline construction	40	$297.69	$0.00	$297.70	2,364	$138.34	$2.00
Manufacturing	Construction machinery manufacturing	259	$279.00	$38.08	$240.93	392	$51.55	$1.55
Manufacturing	Other communications equipment manufacturing	308	$240.22	$137.70	$102.52	693	$67.04	$1.29
Manufacturing	Industrial process variable instruments	316	$230.83	$72.94	$157.89	858	$94.05	$1.27
Manufacturing	Soft drink and ice manufacturing	85	$224.93	$12.56	$212.37	338	$41.55	$1.84
Manufacturing	Petrochemical manufacturing	147	$214.99	$98.50	$116.49	27	$17.12	$0.97
Manufacturing	Lighting fixture manufacturing	326	$212.77	$0.14	$212.63	856	$70.99	$1.75
Manufacturing	Commercial printing	139	$208.45	$103.56	$104.89	2,468	$147.24	$1.82
Manufacturing	Semiconductor machinery manufacturing	268	$193.53	$36.57	$156.96	305	$45.53	$0.96
Manufacturing	Plastics plumbing fixtures and all other plastics	177	$192.98	$139.80	$53.18	959	$74.55	$1.29
Manufacturing	All other manufacturing	Various	$6,193.72	$1,511.54	$4,682.18	27,394	$2,193.82	$51.48
Manufacturing	**Total manufacturing**	**NA**	$56,646.30	$14,932.96	$41,713.34	127,416	$12,275.86	$348.07

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Municipal	Wholesale trade	390	$10,178.94	$4,873.30	$5,305.64	45,128	$5,361.62	$1,502.90
Municipal	Real estate	431	$6,309.70	$2,497.72	$3,811.98	30,663	$3,651.19	$776.89
Municipal	Owner-occupied dwellings	509	$5,564.52	$0.00	$5,564.52	0	$4,310.65	$657.97
Municipal	State & Local Non-Education	504	$5,125.29	-$0.01	$5,125.29	77,431	$5,125.29	$0.00
Municipal	Food services and drinking places	481	$3,452.49	$440.88	$3,011.61	66,214	$1,511.16	$176.53
Municipal	State & Local Education	503	$3,007.31	$0.00	$3,007.30	68,855	$3,007.30	$0.00
Municipal	Offices of physicians- dentists- and other he	465	$2,950.97	$0.00	$2,950.97	23,663	$2,104.31	$18.48
Municipal	Telecommunications	422	$2,932.63	$1,007.30	$1,925.32	8,188	$1,210.29	$202.61
Municipal	Software publishers	417	$2,728.88	$313.45	$2,415.43	7,518	$1,535.59	$24.39
Municipal	Monetary authorities and depository credit in	430	$2,223.88	$732.44	$1,491.44	8,321	$1,561.65	$28.45
Municipal	Architectural and engineering services	439	$2,207.35	$1,391.44	$815.91	17,617	$1,198.94	$9.90
Municipal	Hospitals	467	$2,112.08	$0.00	$2,112.08	17,768	$1,151.85	$14.70
Municipal	Insurance carriers	427	$2,002.12	$583.81	$1,418.31	7,713	$745.18	$92.77
Municipal	Warehousing and storage	400	$1,852.94	$1,704.24	$148.70	30,873	$1,354.05	$9.63
Municipal	Legal services	437	$1,613.89	$1,024.27	$589.62	10,916	$1,035.79	$32.03
Municipal	Securities- commodity contracts- investments	426	$1,547.14	$1,027.45	$519.70	12,953	$554.51	$16.41
Municipal	Motor vehicle and parts dealers	401	$1,418.75	$154.27	$1,264.47	12,081	$737.12	$208.18
Municipal	Nondepository credit intermediation and rela	425	$1,327.96	$812.96	$514.99	7,539	$793.32	$60.69
Municipal	Management consulting services	444	$1,229.18	$946.19	$282.99	8,545	$657.82	$5.13
Municipal	Custom computer programming services	441	$1,179.82	$98.33	$1,081.49	10,095	$998.26	$6.21
Municipal	Insurance agencies- brokerages- and related	428	$1,078.66	$632.98	$445.67	7,705	$914.89	$5.69
Municipal	Food and beverage stores	405	$1,059.15	$141.60	$917.55	17,064	$549.69	$120.19
Municipal	Federal Non-Military	506	$963.45	$0.00	$963.45	7,791	$963.45	$0.00
Municipal	All other miscellaneous professional and tech	450	$922.27	$823.43	$98.84	1,894	$332.44	$6.66
Municipal	Building material and garden supply stores	404	$903.30	$140.09	$763.21	8,855	$440.94	$134.02
	All other municipal sectors	NA	$6,193.72	$1,511.54	$4,682.18	27,394	$2,193.82	$51.48
	Total municipal	**NA**	**$96,908.91**	**$31,257.19**	**$65,651.72**	**883,845**	**$57,858.80**	**$5,225.90**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Appendix 2: Impacts by Water User Group

Irrigation ($millions)						
	2010	2020	2030	2040	2050	2060
Bastrop County						
Reduced income from reduced crop production	$0.0133	$0.0056	$0.0045	$0.0035	$0.0027	$0.0019
Reduced business taxes from reduced crop production	$0.0015	$0.0006	$0.0005	$0.0004	$0.0003	$0.0002
Reduced jobs from reduced crop production	0	0	0	0	0	0
Colorado County						
Reduced income from curtailed rice production and milling activity	$6.90	$5.89	$4.91	$3.96	$3.04	$2.16
Reduced business taxes from curtailed rice production and milling activity	$0.80	$0.68	$0.57	$0.46	$0.35	$0.25
Reduced jobs from curtailed rice production and milling activity	91	78	65	52	40	28
Fayette County						
Reduced income from reduced crop production	$0.00	$0.01	$0.01	$0.01	$0.01	$0.01
Reduced business taxes from reduced crop production	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Reduced jobs from reduced crop production	0	0	0	0	0	0
Matagorda County						
Reduced income from curtailed rice production and milling activity	$70.93	$67.75	$63.99	$60.38	$56.92	$53.58
Reduced business taxes from curtailed rice production and milling activity	$8.21	$7.84	$7.41	$6.99	$6.59	$6.20
Reduced jobs from curtailed rice production and milling activity	935	893	844	796	751	706
Mills County						
Reduced income from reduced crop production	$0.04	$0.03	$0.03	$0.02	$0.02	$0.02
Reduced business taxes from reduced crop production	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Reduced jobs from reduced crop production	0	0	0	0	0	0
Wharton County						
Reduced income from curtailed rice production and milling activity	$13.03	$11.98	$10.97	$9.99	$9.05	$5.48
Reduced business taxes from curtailed rice production and milling activity	$1.51	$1.39	$1.27	$1.16	$1.05	$0.63
Reduced jobs from curtailed rice production and milling activity	172	158	145	132	119	72

Livestock ($millions)						
	2010	2020	2030	2040	2050	2060
Burnet County						
Annual costs of hauling water by tanker	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55
Colorado County						
Annual costs of hauling water by tanker	$0.60	$0.60	$0.60	$0.60	$0.60	$0.60
Fayette County						
Annual costs of hauling water by tanker	$0.53	$0.53	$0.53	$0.53	$0.53	$0.53
Llano County						
Annual costs of hauling water by tanker	$1.49	$1.49	$1.49	$1.49	$1.49	$1.49
Matagorda County						
Annual costs of hauling water by tanker	$1.34	$1.34	$1.34	$1.34	$1.34	$1.34

Manufacturing ($millions)

	2010	2020	2030	2040	2050	2060
Bastrop County						
Reduced income from reduced manufacturing activity	$0.47	$0.99	$1.64	$2.22	$2.69	$7.01
Reduced business taxes from reduced manufacturing activity	$0.04	$0.08	$0.13	$0.18	$0.22	$0.58
Reduced jobs from reduced manufacturing activity	8	18	29	39	48	124
Fayette County						
Reduced income from reduced manufacturing activity	$3.13	$9.73	$13.06	$16.26	$19.04	$22.51
Reduced business taxes from reduced manufacturing activity	$0.35	$1.08	$1.45	$1.80	$2.11	$2.49
Reduced jobs from reduced manufacturing activity	78	243	327	407	477	563
Hays County						
Reduced income from reduced manufacturing activity	$1.04	$2.37	$7.42	$10.11	$12.54	$29.53
Reduced business taxes from reduced manufacturing activity	$0.07	$0.15	$0.47	$0.64	$0.79	$1.87
Reduced jobs from reduced manufacturing activity	11	24	75	102	127	299
Matagorda County						
Reduced income from reduced manufacturing activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.41
Reduced business taxes from reduced manufacturing activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
Reduced jobs from reduced manufacturing activity	0	0	0	0	0	1
Wharton County						
Reduced income from reduced manufacturing activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.0169
Reduced business taxes from reduced manufacturing activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.0018
Reduced jobs from reduced manufacturing activity	0	0	0	0	0	0

Mining ($millions)						
	2010	2020	2030	2040	2050	2060
Burnet County						
Reduced income from reduced mining activity	$1.45	$1.62	$1.69	$1.76	$1.80	$1.89
Reduced business taxes from reduced mining activity	$0.08	$0.09	$0.09	$0.09	$0.10	$0.10
Reduced jobs from reduced mining activity	14	16	17	18	18	19
Colorado County						
Reduced income from reduced mining activity	$16.12	$15.20	$13.63	$11.50	$8.83	$9.16
Reduced business taxes from reduced mining activity	$1.12	$1.05	$0.94	$0.80	$0.61	$0.63
Reduced jobs from reduced mining activity	145	137	123	103	79	82
Fayette County						
Reduced income from reduced mining activity	$0.00	$0.00	$0.08	$0.11	$0.11	$0.11
Reduced business taxes from reduced mining activity	$0.00	$0.00	$0.01	$0.01	$0.01	$0.01
Reduced jobs from reduced mining activity	0	0	1	1	1	1

Steam-electric ($millions)

	2010	2020	2030	2040	2050	2060
Bastrop County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$31.03	$67.39	$67.39
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$4.45	$9.67	$9.67
Reduced jobs from reduced electrical generation	0	0	0	105	229	229
Fayette County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$707.63	$707.63	$907.02
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$101.57	$101.57	$130.19
Reduced jobs from reduced electrical generation	0	0	0	2406	2406	3083
Matagorda County						
Reduced income from reduced electrical generation	$1.90	$1,043.13	$1,043.13	$1,043.13	$1,043.13	$1,045.49
Reduced business taxes from reduced electrical generation	$0.27	$149.73	$149.73	$149.73	$149.73	$150.06
Reduced jobs from reduced electrical generation	6	3,546	3,546	3,546	3,546	3,554
Travis County						
Reduced income from reduced electrical generation	$0.00	$0.00	$2.99	$20.60	$91.01	$217.24
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.43	$2.96	$13.06	$31.18
Reduced jobs from reduced electrical generation	0	0	10	70	309	738
Wharton County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$0.00	$1.41
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$0.00	$0.20
Reduced jobs from reduced electrical generation	0	0	0	0	0	0

Municipal ($millions)

	2010	2020	2030	2040	2050	2060
Aqua WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.62	$26.11	$75.35	$142.24
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$52.86
Lost jobs due to reduced commercial business activity	0	0	0	0	0	1,176
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$5.63
Lost utility revenues	$0.00	$0.00	$1.10	$6.79	$11.39	$17.24
Austin						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$27.42	$69.83
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$46.14	$95.28
Barton Creek West						
Monetary value of domestic water shortages	$0.07	$0.07	$0.06	$0.05	$0.05	$0.05
Lost utility revenues	$0.10	$0.10	$0.09	$0.09	$0.09	$0.09
Bastrop						
Monetary value of domestic water shortages	$0.08	$0.50	$3.04	$4.26	$7.73	$13.76
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$16.21	$24.16	$68.28
Lost jobs due to reduced commercial business activity	0	0	0	361	537	1,519
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$1.72	$2.57	$7.27
Lost utility revenues	$0.12	$1.49	$2.81	$4.74	$6.33	$8.32
Bastrop County WCID #2						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.18
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.29
Bee Cave Village						
Monetary value of domestic water shortages	$19.27	$24.02	$28.74	$32.96	$36.04	$39.16
Lost income from reduced commercial business activity	$28.34	$36.37	$44.33	$51.44	$56.65	$61.92
Lost jobs due to reduced commercial business activity	457	586	715	829	913	998
Lost state and local taxes from reduced commercial business activity	$2.55	$3.27	$3.99	$4.63	$5.10	$5.57
Lost utility revenues	$1.85	$2.32	$2.78	$3.20	$3.50	$3.81

Municipal (cont.)	2010	2020	2030	2040	2050	2060
Bertram						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.03	$0.10	$0.21
Lost utility revenues	$0.00	$0.00	$0.00	$0.05	$0.15	$0.26
Briarcliff Village						
Monetary value of domestic water shortages	$0.00	$0.00	$0.06	$0.16	$0.24	$0.30
Lost utility revenues	$0.00	$0.00	$0.09	$0.17	$0.23	$0.30
Buda						
Monetary value of domestic water shortages	$0.00	$0.00	$0.38	$1.18	$8.05	$11.86
Lost utility revenues	$0.00	$0.00	$0.61	$1.50	$2.55	$3.42
Cimarron Park Water Company						
Monetary value of domestic water shortages	$2.82	$5.66	$5.00	$6.41	$10.02	$11.84
Lost income from reduced commercial business activity	$0.00	$0.00	$0.69	$0.98	$1.33	$1.62
Lost jobs due to reduced commercial business activity	0	0	28	39	54	65
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.11	$0.15	$0.21	$0.25
Lost utility revenues	$0.30	$0.47	$0.65	$0.84	$1.06	$1.25
Cottonwood Shores						
Monetary value of domestic water shortages	$0.05	$2.98	$7.22	$11.67	$17.16	$23.01
Lost income from reduced commercial business activity	$0.00	$0.22	$1.02	$1.69	$2.43	$3.34
Lost jobs due to reduced commercial business activity	0	9	41	68	98	134
Lost state and local taxes from reduced commercial business activity	$0.00	$0.03	$0.16	$0.26	$0.38	$0.52
Lost utility revenues	$0.05	$0.39	$0.76	$1.19	$1.66	$2.24
County-other (Bastrop)						
Monetary value of domestic water shortages	$0.00	$1.05	$16.93	$47.78	$72.44	$110.51
County-other (Blanco)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.05	$0.08
County-other (Burnet)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.21	$1.15	$1.73	$2.79

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
County-other (Colorado)						
Monetary value of domestic water shortages	$0.11	$0.11	$0.11	$0.10	$0.10	$0.09
County-other (Fayette)						
Monetary value of domestic water shortages	$0.15	$0.17	$0.01	$0.04	$0.03	$0.02
County-other (Hays)						
Monetary value of domestic water shortages	$0.00	$1.01	$17.11	$34.05	$63.12	$90.11
County-other (Llano)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.04	$0.23	$0.46	$0.75
County-other (Mills)						
Monetary value of domestic water shortages	$0.000	$0.000	$0.000	$0.000	$0.031	$0.055
County-other (Travis)						
Monetary value of domestic water shortages	$0.001	$0.001	$0.001	$0.002	$0.004	$0.004
Creedmoor MAHA WSC						
Monetary value of domestic water shortages	$0.00	$6.49	$10.21	$11.95	$13.38	$15.34
Lost income from reduced commercial business activity	$0.00	$1.22	$3.42	$4.16	$4.88	$5.67
Lost jobs due to reduced commercial business activity	0	38	108	131	154	179
Lost state and local taxes from reduced commercial business activity	$0.00	$0.17	$0.49	$0.59	$0.70	$0.81
Lost utility revenues	$0.00	$0.79	$1.00	$1.16	$1.31	$1.48
Dripping Springs						
Monetary value of domestic water shortages	$5.72	$24.82	$32.45	$41.43	$57.16	$65.95
Lost income from reduced commercial business activity	$3.28	$20.82	$28.93	$37.16	$47.36	$55.37
Lost jobs due to reduced commercial business activity	73	463	644	827	1,054	1,232
Lost state and local taxes from reduced commercial business activity	$0.35	$2.22	$3.08	$3.95	$5.04	$5.89
Lost utility revenues	$1.05	$2.47	$3.28	$4.10	$5.12	$5.92
Dripping Springs WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.01	$0.27	$0.59
Lost utility revenues	$0.00	$0.00	$0.00	$0.03	$0.42	$0.72

Municipal (cont.)

	2010	2020	2030	2040	2050	2060
Elgin						
Monetary value of domestic water shortages	$0.00	$4.34	$10.34	$19.91	$31.30	$41.55
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$12.10	$18.54	$53.43
Lost jobs due to reduced commercial business activity	0	0	0	269	413	1,189
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$1.29	$1.97	$5.69
Lost utility revenues	$0.00	$1.11	$2.15	$3.72	$5.01	$6.64
Fayette WSC						
Monetary value of domestic water shortages	$0.00	$0.33	$2.92	$4.96	$7.48	$13.97
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.58
Lost jobs due to reduced commercial business activity	0	0	0	0	0	23
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.09
Lost utility revenues	$0.00	$0.47	$1.01	$1.43	$1.95	$2.62
Goforth WSC						
Monetary value of domestic water shortages	$0.10	$0.26	$0.48	$0.70	$0.98	$1.09
Lost utility revenues	$0.02	$0.04	$0.06	$0.07	$0.09	$0.10
Goldthwaite						
Monetary value of domestic water shortages	$10.21	$11.26	$11.42	$11.30	$11.16	$11.14
Lost income from reduced commercial business activity	$6.71	$7.45	$7.56	$7.48	$7.37	$7.36
Lost jobs due to reduced commercial business activity	203	226	229	226	223	223
Lost state and local taxes from reduced commercial business activity	$1.07	$1.18	$1.20	$1.19	$1.17	$1.17
Lost utility revenues	$0.99	$1.10	$1.11	$1.10	$1.09	$1.08
Granite Shoals						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.02	$0.12
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.03	$0.19
Jonestown						
Monetary value of domestic water shortages	$1.28	$4.38	$4.37	$6.24	$8.57	$10.34
Lost income from reduced commercial business activity	$0.00	$0.00	$1.86	$2.70	$3.36	$8.17
Lost jobs due to reduced commercial business activity	0	0	41	60	75	182
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.20	$0.29	$0.36	$0.87
Lost utility revenues	$0.26	$0.46	$0.65	$0.82	$0.95	$1.10

Municipal (cont.)						
	2010	2020	2030	2040	2050	2060
Kingsland WSC						
Monetary value of domestic water shortages	$0.31	$0.45	$0.44	$0.44	$0.47	$0.51
Lost utility revenues	$0.35	$0.44	$0.43	$0.43	$0.46	$0.50
Lake LBJ MUD						
Monetary value of domestic water shortages	$0.14	$0.33	$0.43	$0.49	$0.63	$0.83
Lost utility revenues	$0.25	$0.53	$0.62	$0.70	$0.80	$0.93
Lakeway						
Monetary value of domestic water shortages	$15.03	$38.28	$50.54	$37.90	$42.37	$56.68
Lost income from reduced commercial business activity	$0.00	$0.00	$20.19	$27.77	$33.43	$39.11
Lost jobs due to reduced commercial business activity	0	0	449	618	744	870
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$2.15	$2.96	$3.56	$4.16
Lost utility revenues	$3.08	$4.79	$6.43	$7.95	$9.07	$10.21
Llano						
Monetary value of domestic water shortages	$22.12	$23.75	$23.99	$24.17	$24.48	$24.98
Lost income from reduced commercial business activity	$21.04	$22.66	$22.90	$23.08	$23.37	$23.87
Lost jobs due to reduced commercial business activity	$17.35	$18.69	$18.88	$19.03	$19.28	$19.69
Lost state and local taxes from reduced commercial business activity	456	491	496	500	506	517
Lost utility revenues						
Manor						
Monetary value of domestic water shortages	$0.00	$8.20	$11.97	$22.74	$25.07	$27.44
Lost income from reduced commercial business activity	$0.00	$6.03	$8.17	$20.34	$23.31	$26.34
Lost jobs due to reduced commercial business activity	0	134	182	452	519	586
Lost state and local taxes from reduced commercial business activity	$0.00	$0.64	$0.87	$2.16	$2.48	$2.80
Lost utility revenues	$0.00	$1.72	$2.15	$2.55	$2.84	$3.14
Manville WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$6.12	$39.06	$45.99	$52.74
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$14.03	$17.24	$20.55
Lost jobs due to reduced commercial business activity	0	0	0	442	544	648
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$2.00	$2.46	$2.93
Lost utility revenues	$0.00	$0.00	$1.52	$4.00	$4.73	$5.56

Municipal (cont.)

	2010	2020	2030	2040	2050	2060
Marble Falls						
Monetary value of domestic water shortages	$0.00	$0.22	$1.41	$9.08	$12.43	$18.68
Lost utility revenues	$0.00	$0.39	$1.79	$3.15	$3.95	$4.86
Meadow Lakes						
Monetary value of domestic water shortages	$2.63	$6.32	$9.82	$20.20	$24.42	$27.58
Lost income from reduced commercial business activity	$0.00	$0.00	$2.50	$7.20	$8.51	$9.96
Lost jobs due to reduced commercial business activity	0	0	79	227	268	314
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.36	$1.03	$1.21	$1.42
Lost utility revenues	$0.63	$1.14	$1.70	$2.24	$2.56	$2.91
Mountain City						
Monetary value of domestic water shortages	$0.04	$0.04	$0.04	$0.03	$0.03	$0.03
Lost utility revenues	$0.05	$0.05	$0.05	$0.04	$0.04	$0.04
Pflugerville						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.94	$2.27
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$1.68	$3.63
Polonia WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.01	$0.14	$0.23	$0.33
Lost utility revenues	$0.00	$0.00	$0.01	$0.03	$0.05	$0.06
Richland SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.003	$0.003	$0.005
Lost utility revenues	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01
River Place on Lake Austin						
Monetary value of domestic water shortages	$5.14	$9.03	$9.03	$8.96	$8.96	$8.96
Lost utility revenues	$1.13	$1.63	$1.63	$1.62	$1.62	$1.62
Rolling Wood						
Monetary value of domestic water shortages	$0.00	$7.58	$7.54	$7.50	$7.48	$7.52
Lost income from reduced commercial business activity	$0.00	$3.04	$3.03	$3.01	$3.00	$3.02
Lost jobs due to reduced commercial business activity	0	96	95	95	95	95
Lost state and local taxes from reduced commercial business activity	$0.00	$0.43	$0.43	$0.43	$0.43	$0.43
Lost utility revenues	$0.00	$0.74	$0.74	$0.74	$0.73	$0.74

Municipal (cont.)

	2010	2020	2030	2040	2050	2060
Round Rock						
Monetary value of domestic water shortages	$0.19	$3.02	$5.30	$10.62	$12.62	$14.64
Lost income from reduced commercial business activity	$0.00	$3.83	$14.12	$19.27	$24.41	$29.50
Lost jobs due to reduced commercial business activity	0	62	228	311	393	476
Lost state and local taxes from reduced commercial business activity	$0.00	$0.34	$1.27	$1.73	$2.20	$2.66
Lost utility revenues	$0.31	$0.67	$1.05	$1.32	$1.61	$1.90
Schulenburg						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.04	$0.11	$0.30
Lost utility revenues	$0.00	$0.00	$0.00	$0.07	$0.20	$0.38
Smithville						
Monetary value of domestic water shortages	$0.00	$4.34	$10.34	$19.91	$31.30	$41.55
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$1.14	$2.13
Lost jobs due to reduced commercial business activity	0	0	0	0	36	67
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.16	$0.30
Lost utility revenues	$0.14	$0.57	$0.96	$1.73	$2.04	$2.93
Travis Co. WCID #18						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.16	$0.45
Lost utility revenues	$0.00	$0.00	$0.00	$0.01	$0.25	$0.52
West Lake Hills						
Monetary value of domestic water shortages	$0.00	$36.95	$41.31	$43.91	$46.77	$49.82
Lost income from reduced commercial business activity	$0.00	$62.37	$69.72	$74.11	$78.95	$84.08
Lost jobs due to reduced commercial business activity	0	1,005	1,124	1,195	1,272	1,355
Lost state and local taxes from reduced commercial business activity	$0.00	$5.61	$6.28	$6.67	$7.11	$7.57
Lost utility revenues	$0.00	$3.63	$4.06	$4.31	$4.59	$4.89
Windermere Utility Co.						
Monetary value of domestic water shortages	$0.00	$44.80	$44.37	$43.95	$43.95	$43.95
Lost income from reduced commercial business activity	$0.00	$40.83	$40.44	$40.06	$40.06	$40.06
Lost jobs due to reduced commercial business activity	0	908	900	891	891	891
Lost state and local taxes from reduced commercial business activity	$0.00	$4.35	$4.30	$4.26	$4.26	$4.26
Lost utility revenues	$0.00	$4.07	$4.03	$3.99	$3.99	$3.99

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CHAPTER 10.0: PUBLIC INVOLVEMENT ACTIVITIES

10.1 OVERVIEW

The Lower Colorado Regional Water Planning Group (LCRWPG) made a commitment to conducting public outreach as a part of their duties as Planning Group members. The public involvement effort was led by Planning Group member Laura Marbury and a four-member Public Information and Participation Committee that she chaired. Committee members were James Kowis, Teresa Lutes, Haskell Simon, and Jennifer Walker.

Major aspects of this effort included:

- **Holding more than 20 open regular meetings of the Planning Group** for presentation of material, discussion, deliberation, voting on specific measures, and public comment between June 2006 and March 2010. Members of the public attended all of these meetings, which were posted on the Texas Secretary of State website and the Region K website in accordance with the Open Meetings Act. Every meeting included a scheduled time for public comment and questions. Nearly all of the meetings were held in Bastrop in Bastrop County, with two meetings being held in Wharton in Wharton County and Burnet in Burnet County.
- **Holding public meetings to receive input by the public** on both the scope of work for both the First Biennium Studies and the 2011 Region K Water Plan, on the First Biennium Studies themselves, and on the population and water demand projections.
- **Serving as speakers at various civic and interest group meetings** representing a wide spectrum of interests and public opinion. These presentations took place throughout the planning period and in various counties of the region.
- **Conducting surveys** to obtain feedback on population and water demand projections and to obtain information regarding water conservation and drought management strategies.
- **Maintaining a web page** with documentation and notices of meetings and discussions, with links from the LCRA home page and the Texas Water Development Board (TWDB) website.
- **Providing fact sheets** that were used as handouts at the public meetings and hearing.
- **Forming a Population and Water Demand Committee** in order to assist in the determination of the methodology used to update the population and water demand projections in Chapter 2 of the Region K Plan.
- **Forming a SH 130/45 and Northern Hays Committee** to discuss the issue of future growth in the area and determine whether the Region K Plan provides for that growth. This committee was formed as part of the First Biennium Studies for this round of planning.
- **Developing policy statements** through the Region K Legislative Committee regarding public involvement and education that have been adopted by Region K and which are located in Chapter 8 of the report.
- **Giving an interview with a local radio station** regarding the water planning process.

Once the Region K Initially Prepared Regional Water Plan was approved by the Planning Group, the Group continued required public involvement by:

- **Holding two public meetings throughout the region**, which were publicized through news releases and advertisements.
- **Holding a public hearing** to solicit public comments on the Initially Prepared-Regional Water Plan.
- **Making the Draft Regional Water Plan** available to the public by placing a copy of the Draft Water Plan in at least one public library in each county and either the county courthouse's law library or the county clerk's office. The Draft Water Plan was also posted on the Region K and TWDB websites.

These activities of the Regional Water Planning Group (RWPG) members are discussed in more detail below.

10.2 PLANNING GROUP MEETINGS THROUGHOUT THE REGION

Regular Planning Group Meetings

More than 20 Planning Group meetings were held between July 2006 and August 2010 for presentation of material, discussion, deliberation, voting on specific measures, and public comment. These meetings were mainly held in Bastrop (in Bastrop County), although two of the meetings were held in other locations throughout the region to enable a broader spectrum of the public to observe the work and to ask questions or comment. *Table 10.1* provides information on the feedback and comments received at the meetings held throughout the region.

In addition to regular planning group meetings, two public meetings to receive public input on the population and water demand projections were held on March 19, 2009, and on April 2, 2009, which are listed in *Table 10.3* in Section 10.4.5. Comments received as a result of those meetings have been included in *Appendix 10D*.

Table 10.1 LCRWPG Publicized "Local" Meetings Throughout the Region

Date	Meeting Type	Meeting Location	# Public Attending	Public Comments
6/14/06	Regular Public Meeting	City of Bastrop, Bastrop County	9	None
8/23/06	Regular Meeting and Public Meeting to Solicit Input on a Proposed Scope of Work for	City of Bastrop, Bastrop County	8	None
1/10/07	Regular Meeting	City of Bastrop, Bastrop County	13	None
6/20/07	Regular Meeting	City of Bastrop, Bastrop County	16	None
9/12/07	Regular Meeting	City of Bastrop, Bastrop County	14	None
1/9/08	Regular Meeting	City of Bastrop, Bastrop County	6	None
4/9/08	Regular Meeting	City of Bastrop, Bastrop County	20	None
5/19/08	Scope of Work Public Meeting and Scoping Committee Meeting for Region K 2011 Plan	City of Bastrop, Bastrop County	6	None
9/3/08	Regular Meeting	City of Bastrop, Bastrop County	10	None
11/12/08	Regular Meeting	City of Bastrop, Bastrop County	7	None
1/14/09	Regular Meeting	City of Bastrop, Bastrop County	17	None
3/11/09	Regular Meeting	City of Bastrop, Bastrop County	8	Steve Box referred to the gallons per capita per day (gpcd) figures in the current Region K plan appendix (adopted in 2006) and requested that gpcd figures be included in the tables for public review. This would help in the evaluation process to determine the reasonableness of the projections. An overall total would also be helpful.
4/8/09	Regular Meeting	Burnet Community Center, Burnet	9	None
5/5/09	Regular Meeting	City of Bastrop, Bastrop County	6	None

Table 10.1 LCRWPG Publicized "Local" Meetings Throughout the Region (continued)

Date	Meeting Type	Meeting Location	# Public Attending	Public Comments
6/10/09	Regular Meeting	Wharton Civic Center, Wharton County	9	Steve Box made a comment that the regional water planning process has no provision for taking into account environmental flows on the demand side of the equation in quantitative analyses. Jennifer Walker indicated that meeting the LCRA's Water Management Plan environmental flows (instream and bay and estuary inflows) criteria is part of the analysis thus far and noted that environmental flow requirements stemming from the SB3 environmental flows process may change the requirements for future plans.
9/9/09	Regular Meeting	City of Bastrop, Bastrop County	13	None
10/14/09	Regular Meeting	City of Bastrop, Bastrop County	8	None
12/9/09	Regular Meeting	City of Bastrop, Bastrop County	10	Steve Box commented that the environmental flows need to be compared to the established environmental flows, that it seems confusing whether the base flows are meeting the environmental flows. And secondly what are the environmental impacts of not meeting established flows? The question arises of what is acceptable as an environmental impact and would some strategies be readjusted to address.
1/13/10	Regular Meeting	City of Bastrop, Bastrop County	10	None
1/27/10	Regular Meeting	City of Bastrop, Bastrop County	5	Steve Box asked about the availability of data from the SAWS studies. He stated that if a restraining order on the data occurred, it would dilute the public's ability to review.

10.3 PRESENTATION TO CIVIC AND SPECIAL-INTEREST GROUPS

Using their own materials and a standardized set of presentation materials, Planning Group members gave presentations to civic and special-interest groups. *Table 10.2* provides a summary of this outreach effort with a listing of the LCRWPG presentations to civic and special interest groups.

These presentations were made to groups composed of individuals from all types of general and special interests that were identified by the TWDB in the establishment of the RWPGs.

Table 10.2 LCRWPG Public Outreach Record: Presentations by Group Members to Community Groups

Presenter	Date	City	County	Community Group	Topic/Subject
Ronald Gertson	Monthly, throughout planning process		Wharton	Coastal Bend Groundwater	Update on Region K planning
Bob Pickens	Various		Colorado	Colorado County GCD	Update on Region K planning
John Burke	10/29/09	San Marcos	Hays	Texas State University	Region K Water Planning

10.4 REGION K ACTIVITIES

10.4.1 Population and Water Demand Committee

The Population and Water Demand Committee was formed in January 2009 in order to review the population projections in the 2006 Region K Plan, evaluate the latest available data, studies, and information on population for the Region K area, and to recommend any changes.

The committee met several times in early 2009 to determine county population totals, evaluate methodologies for distributing county totals among the WUGs in each county, and review steam-electric demand projections from TWDB reports, while providing planning group member knowledge of facility current and expected usage in the planning area.

The committee assisted in discussions with TWDB staff regarding the LCRWPG-developed population projections, and assisted in the revision of the projections after receiving recommendations from the TWDB staff. The committee was also instrumental in developing a Resolution that the LCRWPG adopted regarding the issue of having to revise the population projections.

10.4.2 SH 130/45 and Northern Hays Committee

The Region K SH 130/45 and Northern Hays Committee was created in mid-2007 to provide input on the Evaluation of High Growth Areas Task of the First Biennium Studies. The committee looked at available information about the projected growth in the SH 130 corridor. Discussion occurred on how best to determine the projected growth numbers. The Onion Creek Recharge strategy in Hays County was also one of the sub-tasks that the committee provided feedback on. Meetings were held in November and December of 2007.

10.4.3 Advertising and Media

The LCRWPG advertised Region K regular meetings through the Secretary of State website, the Region K website, and mailouts to interested parties of meeting agendas and associated meeting materials. *Appendix 10A* contains a sample press release for the public hearing and public meetings to receive public input on the Initially Prepared 2011 Region K Water Plan.

10.4.4 Surveys

The Planning Group conducted two surveys to obtain feedback on population and water demand projections and to gain information regarding water conservation and drought management strategies. These letters and surveys are summarized below, and examples of the survey letters and types of responses are contained in *Appendix 10B*.

- The Regional Water Planning Population and Water Demand Projections survey was mailed on March 12, 2009, to stakeholders in the Region K area soliciting feedback on the population and water demand projections. A revised version of the survey was sent again on May 7, 2009. Twenty-one comments were received from the two surveys and the related public meetings. See *Appendix 10B* for the survey letters and comment responses.
- A survey to help identify the water conservation and drought management strategies used by water user groups was mailed to Region K stakeholders on August 7, 2009. Thirty-two responses were received. See *Appendix 6A* for the survey letter.

10.4.5 Public Meetings and Hearing

In addition to the meetings shown earlier in *Table 10.1*, additional meetings were held for the primary purpose of gaining input and answering questions from the public. This included two public meetings to receive public comments on the First Biennium Study Reports, two public meetings to receive public input on the population and water demand projections, and one public hearing and two public meetings for comment on the Initially Prepared Regional Water Plan. All seven of these meetings are summarized in *Table 10.3* below, with details in *Appendix 10C*. Summaries of the First Biennium Study Reports can be found in *Appendix 10E*.

Table 10.3 Region K Public Meetings and Hearing

Date	Location	Public Attendance	Media Attendance	Comments*
12/03/08	AECOM office, Austin, Travis County	0	0	None
01/14/09	Aqua WSC, Bastrop, Bastrop County	17	0	4 written
03/19/09	LCRA Boardroom, Austin, Travis County	18	0	10 verbal 3 written
04/02/09	LCRA Boardroom, Austin, Travis County	1	0	1 verbal 7 written
3/10/10	Bay City Civic Center, Bay City, Matagorda County (IPP public meeting)	11	1	0 written
3/31/10	Burnet Community Center, City of Burnet, Burnet County (IPP public meeting)	38	0	2 written
4/28/10	Thompson Conference Center, University of Texas Campus, Austin, Travis County (IPP public hearing)	13	0	1 verbal 0 written

* The verbal and written comments from the meetings as well as the responses can be found in *Appendix 10D.*

10.5 RELATED OUTREACH ACTIVITIES WITHIN THE REGION K AREA BEYOND THE LCRWPG

There are several ongoing studies, workgroups, and legislative committees whose findings may affect the way water needs are met, what the requirements will be, and other factors. The following related studies are activities within the Region K area beyond the LCRWPG.

10.5.1 LCRA Water Management Plan

LCRA currently operates the Lower Colorado River under provisions of the 1999 Water Management Plan (WMP). This plan is approved by Texas Commission on Environmental Quality (TCEQ) as a condition of the LCRA's water rights permits for Lakes Buchanan and Travis, the two major water supply reservoirs in the Highland Lakes. Recommended amendments to the plan were developed through a stakeholder process that began in early 2001 and are currently under review by TCEQ. Several parties have contested this round of amendments.

General information and a copy of the recommended updates can be found on the LCRA's website at http://www.lcra.org/water/wmp.html.

10.5.2 The LCRA-SAWS Water Project Scientific Studies

LCRA and SAWS have undertaken the study of the project's water supply potential, construction and operational costs, and environmental effects. During this study period, the proposal will be re-examined, refined with current information, and examined with public input. This study period started in 2004 and is scheduled for completion in 2010. Annual project viability assessments will be conducted each November. The assessments as well as monthly update reports can be found at the project website at: http://www.lcra.org/lswp. At the end of the study period, if LCRA and SAWS determine the project is technically feasible, environmentally sound, and cost effective, the implementation period will follow. For answers to specific questions, contact lcrasawswaterproject@lcra.org.

10.5.3 Environmental Flows Advisory Group

The 80th Texas Legislature established the Environmental Flows Advisory Group which is composed of nine members. This group is comprised of three Senate members, three House members and three public members. The public members are representatives of TCEQ, TWDB, and TPWD. This Advisory Group is tasked with balancing the demand placed on the State's water resources by the growing population and the requirements of the riverine, bay, and estuary systems. To assist them, the Advisory Group has formed the Texas Environmental Flows Science Advisory Committee along with Basin and Bay Area Stakeholders Committees. The Advisory Group has recently been for the Colorado and Lavaca Rivers and Matagorda and Lavaca Bays Basin and Bay Area Stakeholder Committee. Additional committee information, updates and activities can be found at TCEQ's website at: http://www.tceq.state.tx.us/permitting/water_supply/water_rights/eflows/group.html

In September 2009, the Texas Environmental Flows Advisory Group appointed members of the Colorado and Lavaca Rivers and Matagorda and Lavaca Bays Stakeholder Committee. The committee will make recommendations to the TCEQ on the quantity of water needed to maintain the health of the named rivers and bays.

10.5.4 Irrigation District Advisory Panel

There are advisory panels for each of the three irrigation systems operated by LCRA: Garwood, Lakeside, and Gulf Coast. These groups are self-elected and are sponsored by LCRA. LCRA discusses with these groups anything related to LCRA's operations that is relevant to the customer groups. The discussions range from rate changes, changes in operations procedures, key projects impacting the irrigation districts, and other items that need to be communicated.

APPENDIX 10A

LCRWPG SAMPLE PRESS RELEASE

APPENDIX 10B

THE REGIONAL WATER PLANNING POPULATION AND WATER DEMAND PROJECTIONS SURVEY

APPENDIX 10C

LCRWPG INITIALLY PREPARED REGIONAL WATER PLAN PUBLIC HEARING PRESENTATION

APPENDIX 10D

LCRWPG DRAFT PLAN COMMENTS AND LCRWPG RESPONSES

APPENDIX 10E

SUMMARIES OF FIRST BIENNIUM STUDY REPORTS

Notice of Public Meetings and Public Hearing

The Lower Colorado Regional Water Planning Group (Region K) will hold two public meetings and a public hearing for the Region K Draft Water Plan. The purpose of the plan is to map out how to conserve water supplies, meet future water supply needs and respond to future droughts in the planning area. The public is invited to participate in any and all of the public meetings and public hearing.

The purpose of the public meetings and hearing is to discuss and receive a brief summary of the Region K 2011 Draft Water Plan and to solicit public feedback and comment. Written and oral comments may be submitted at both meetings and hearing. However, to become part of the official record, comments must be submitted at the public hearing or in writing by **June 28, 2010**. Written comments can be submitted to the following:

John Burke, Chairman
Lower Colorado Regional Water Planning Group
P.O. Drawer P
Bastrop, Texas 78602
512-303-3943

Times and locations for the public meetings and hearing are as follows:

Meeting/Hearing	Date and Time	City	Location*
Public Meeting	**March 10, 2010 10:00 am**	**Bay City, TX**	**Bay City Civic Center 201 7th Street**
Public Meeting	**March 31, 2010 10:00 am**	**Burnet, TX**	**Burnet Community Center 401 East Jackson Street**
Public Hearing	**April 28, 2010 6:00pm**	**Austin, TX**	**Thompson Conference Center Room 2.102 University of Texas Campus 2405 Robert Dedman Drive**

*for maps to the locations, please visit our website at www.regionk.org

Region K consists of all or portions of the following counties: Bastrop, Blanco, Burnet, Colorado, Fayette, Gillespie, Hays, Llano, Matagorda, Mills, San Saba, Travis, Wharton and Williamson.

A digital copy of the Draft Water Plan will be available for viewing on the Region K website at www.regionk.org and the LCRA website at www.lcra.org by March 1, 2010.

Copies of the Draft Water Plan will be available for viewing by March 29, 2010 at the following locations:

Bastrop County
County Clerk's Office
803 Pine Street
Bastrop, TX 78602

Public Library
1100 Church Street
Bastrop, TX 78602

Blanco County
County Clerk's Office
101 E. Pecan Drive
Johnson City, TX 78636

Public Library
1118 North Main Street
Blanco, TX 78606

Burnet County
County Clerk's Office
220 S. Pierce Street
Burnet, TX 78611

Marble Falls Library
101 Main Street
Marble Falls, TX 78654

Colorado County
County Clerk's Office
400 Spring Street, Ste. 103
Columbus, TX 78934

Nesbitt Memorial Library
529 Washington Street
Columbus, TX 78934

Fayette County
County Clerk's Office
529 Washington Street
La Grange, TX 78945

Public Library
855 S. Jefferson
LaGrange TX 78945

Gillespie County
County Clerk's Office
101 West Main Street
Fredericksburg, TX 78624

Public Library
115 W. Main Street
Fredericksburg, TX 78624

Hays County
County Clerk's Office
137 N. Guadalupe Street
San Marcos, TX 78666

San Marcos Library
625 E Hopkins Street
San Marcos TX 78666

Llano County
County Clerk's Office
107 W. Sandstone
Llano, TX 78643

Public Library
102 E. Haynie
Llano, TX 78643

Matagorda County
County Clerk's Office
1700 7th Street
Room 202
Bay City, TX 77414

Bay City Public Library
1100 7th Street
Bay City, TX 77414

Mills County
County Clerk's Office
1011 4th Street
Goldthwaite, TX 76844

Jenny Trent Dew Library
1101 Hutchings
Goldthwaite, TX 76844

Saba County
County Clerk's Office
500 East Wallace Street
San Saba, TX 76877

Public Library
103 S Live Oak Street
San Saba, TX 76877

Travis County
County Clerk's Office
5501 Airport Blvd.
Austin, TX 78751

Public Library
800 Guadalupe
Austin, TX 78701

Wharton County
County Clerk's Office
309 E. Milam
Wharton, TX 77488

El Campo Public Library
200 W. Church,
El Campo, TX 77437

Williamson County
County Clerk's Office
405 Martin Luther King, Jr. St.
Georgetown, TX 78626

Georgetown Public Library
808 Martin Luther King, Jr. St.
Georgetown, TX 78626

Digital copies of the Draft Water Plan may be available at additional public locations. Please go to www.regionk.org for a list of locations.

Austin American-Statesman

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AUSTIN, TX 78703

AFFIDAVIT OF PUBLICATION

THE STATE OF TEXAS
COUNTY OF TRAVIS

Before me, the undersigned authority, a Notary Public in and for the County of Travis, State of Texas, on this day personally appeared:

Carolyn Kline

Advertising Agent of the Austin American-Statesman, a daily newspaper published in said County and State that is generally circulated in Bastrop, Bell, Blanco, Brazos, Burleson, Burnet, Caldwell, Colorado, Comal, Coryell, Fayette, Gillespie, Gonzales, Guadalupe, Hays, Kerr, Lampasas, Lee, Llano, Milam, Nueces, San Saba, Travis, Washington, and Williamson Counties, who being duly sworn by me, states that the attached advertisement was published at the lowest published rate for Classified advertising in said newspaper on the following date(s), to wit:

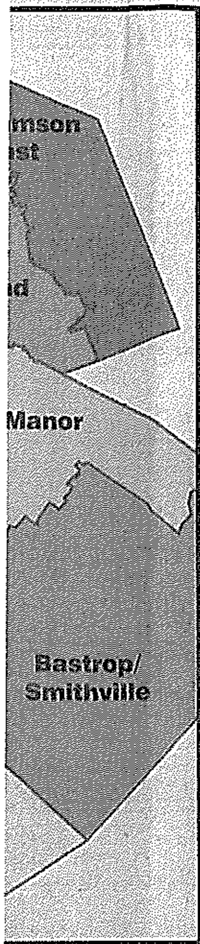
First Published:	**3/17/2010**	Last Published:	**3/17/2010**
Times Published:	**1**	Classification:	**Legal Notices (9980)**
Lines:	**54**	Cost:	**$243.38**

and that the attached is a true copy of said advertisement.

SWORN AND SUBSCRIBED TO BEFORE ME, this the 17th day of March, 2010

SHARY DENISE FOWLER
NOTARY PUBLIC STATE OF TEXAS
COMMISSION EXPIRES:
07-12-2013

Notary Public in and for
TRAVIS COUNTY, TEXAS



Duplexes North Central

ONE MONTH RENT FREE Mopac/Parmer, 3/2, priv fncd, new carpet/paint, WD conn, alarm sys, CACH. $895/mo. plus Dep. 512-784-5876

Spacious 3/2 Major Renovations, Energy Upgrades, W/D Conn., Fenced Patio, Trees. Close to shopping & dining. 8907 Tronewood. 970-3908

Duplexes East Central

$650 Bargain! 2br/1ba close in, 5003 Cottonwood. No pets. Dep $250, Agent 413-9666

Duplexes Northwest

Nice 2/2 duplex at HW 183/ Anderson Mill, lrg yrd, covered patio, tile flr, util. room with W/D conn, 8707-A Pineridge Dr. $700/mo. 512-775-0846

$900- 3/2.5 apt near 183 & McNeil, w/d con, nice yd, garage, fp, great schools. 971-0850 Statesman.com code -UKN01

Duplexes North

Duplex in Round Rock, 2br-1ba, $675, avail now. 4br in Avery Ranch. 3-4 bdrms in Cedar Park. Call Ernie 512-968-4663

Duplexes Northeast

Huge 2/1.5, nr 183/290/ Decker, shps, bus, scls, parks. HasCACH, FP, WD con, all appl. fencd 1000sf, $595 921-4944 Pet under 30 lbs OK

Duplexes Southeast

Duplex, 2br/1bath, CACH, W/D Conn., Del Valle area, Nice, $550mo. + $300dep., 247-4411, 567-5857

Duplexes Southwest

3/2 lux. dplx Drip. Sprgs., stained concrete flr; fire plc; 2-car gar; high ceil; fncd bkyd; pets ok; April; 971-9512 Statesman.com code -9PTKJ

Houses North Central

$985. RRISD. Wells Branch 1000sf. 2-2-2 Storage & Dog Run. Yard maint 853-9670. Statesman.com code -35MND

Houses South Central

3br-2ba on 2 ac, min from dwntwn, country living & a city w/ deer, must have at least 2 yr rental history. $1300/mo, 799-4927

Freshly painted, 2bd/1ba, huge 2 car garage, beautiful refinished wood floors, 3 new ceiling fans, large pecan trees on corner lot.$1125/mo. 444-5327

Houses West

NW. Lakeway 5 yr old 4 bd, 3 bath. Clean, upgrades. Bks to water/golf. $2,100 mo. 266-2995. Statesman.com code -8UNJA

Houses Northwest

Remodeled 4 bdrm/2.5 Bath, LISD Schools, Quiet neighborhood, New paint, carpet, and Kitchen. Large Fenced backyard 512-944-6520. Statesman.com code -1X1VD

Houses North

Homes For Rent 3bed/2bath **$729** mo. all appliances incl washer/dryer! Hurry call Sun Homes @ **888-280-0238** EXP. 03/31/10. RBI#34047 **www.boulderridge.tv**

R.R. - 1100 Greendowns 2-1-CP / Lrg. Fncd Yard $795/$400 Dep. 310-8830 ridgehillinvestments.com

4/2/2 house on corner lot w/ priv. fence. Gatlinburg neighborhood in Pflugerville. Close to elem. school, Dell & Samsung $1200/mo. 512-251-6930

4/2/2- in Pflugerville,

Apartments North

Awesome Wells Branch 1st month free. WD cons 1-1 $500 2-2 $675 Apts NOW! 258-8224

$99 total move in. One month free! 1/1, $425, 2/2, $650 Apartments Now! 512-258-8224

Apartments Southeast

2/2.5, Townhome, 1000sf, $699 W/D conn. Pool, IH-35 Access Apartment Experts, 416-8100

2/1, 825sf, WD conn., pool Free Cable & internet, gym. UT Bus. Apt. Experts, 416-8100

3/2 + office, 1397sf, W/D incl. Pets OK. $1175/mo. 828-4470 AustinApartmentStore.com

Apartments South

2/2.5, Townhome, 1000sf, $699 W/D conn. Pool, IH-35 Access Apartment Experts, 416-8100

2/1, 825sf, WD conn., pool Free Cable & internet, gym. UT Bus. Apt. Exp. 416-8100

Free Washer Dryer $595+ Gated Creekside Setting www.firstcallaustin.com Call First Call, 512-448-4800

Apartments Southwest

2-2 Southwest $699 Washer Dryer www.firstcallaustin.com 512-448-4800

Condos/Townhomes South Central

LIVE IN ZILKER PARK Steps to Barton Springs pool. $1550, Tate Chiles, 512-922-7825 or 327-6634 Statesman.com code -IDY76

Condos/Townhomes Northwest

Houses South

4+/2.5/2 $1590 78749 clean spacious 2story new everything good schools,fenced,pets 633-4257 Statesman.com code -QYHEW

Houses Southwest

3/3, 2800sqft home. Lg family rm, landscape yard, gazebo, cov patio, $1450/mo, $1450/Dep. Great schools. Community pool. Agt 512-535-8874

REDUCED 7017 CROSSWOOD. Lovely 3-2-2, corner, landscaped, carpet, FP, all appls. WD conn., fenced. $1150/mo, $800 dep. Chris, 585-7811

Roommates

See Rental Locator Map for area locations.

C-Central	SC-South Central
EC-East Central	SE-Southeast
NC-North Central	SO-South
NE-Northeast	SW-Southwest
NO-North	W-West
NW-Northwest	

C-1 bedroom, plus cable, bus route 1 & 5. No pets, no drugs. $435 all bills paid, 851-3759

C- Room avail, cable & phone incl, close to 45th & Red River. $425. Call 784-9086

NC- Lrg furn. BR w/ bath & use of kitch, dining, laundry, patio & spa. Quiet but close to HEB, shops, restaurants & busses. Cable, wifi & all bills pd. $550. 2 C 428-5030

NC- Room for rent, $375/mo ABP, located at IH35 & Howard Ln, 1 exit north of Parmer. 577-9906

NE - $95/wk, ABP. Furnished, clean room. W/D. Access to house. 736-5340, 833-5291

NO- 1 roommate wanted for 2000 sf house, $375 + utils, 4-2.5, fenced yrd, in Round Rock by 79 & I35, lrg family rm, vaulted ceilings, beaut kitch, W/D. All bathrms, kitch, FP granite & marble. Remodeled house. Your living space located upstairs. Must have job, will credit check, Rent now! tileman11@gmail.com Daniel, Pics avail.

NW-2222/360, lux house, entire upstairs, garage pkg, studious, $500. No smk/pets. 695-9119

NW Furnished BD w/ BA, Kitch & Laundry priv, $450 + dep, utils included, Call 512-335-1842

SC - Furnished room for rent, $195/mo + utils & dep, near bus route, 445-2270

SE- Priv rm, bath, & entrance. Roommate seldom home. Hwy 71E. $550 + 1/2 util & dep 512-247-7983, 512-626-7562

SO - $390 + util, nice home. Prefer quiet, responsible. No smk/pets/drugs. 825-7036

SW - 4br-2 1/2ba/3 living, looking for 1 roommate. Large home on greenbelt. No pets. $550/mo. 512-217-6149

SW suite w/prvt bath house $425/mo Duplex 4bdrm 2 ba $800/mo Diane, 512-701-3939, djm21499@netscape.net

Manufactured Hm Rentals

1st Month FREE! 2/1 $495 3/2 from $575 512-376-5874 www.silentvalleyhomes.com

Business Rentals Central

Justin Plaza - 600 sqft in charming retail center with lots of parking. **2105 Justin Lane near Burnet Road. $900. 453-8891, 345-0574**

Business Rentals North Central

Office/whse space, 1250sf-2500sf, rents from $875. New carpet/paint. 453-4952.

First Month Free! Small & Large office suites available now! Call Matthew 512-844-7269. www.ExecutiveOfficeTerrace.com

Single story office park,

Business Rentals North

Large 1 room office, 12x24, $400/mo. All bills paid. Town & Country building, EZ access from MoPac. 6521 Burnet Lane. 371-0161.

Business Rentals South

Bear Creek, FM 1626, 1 room executive suite, $350 ABP. 494-9995

BUDA-KYLE-SAN MARCOS. Office/warehouse, warehouse, shop. IH35 frontage or close too. 1,250-5,000 sq.ft. Skiles & Associates, 512-353-3232

9980 Legal Notices

9980-Legal Notices

NOTICE IS HEREBY GIVEN as required by title 18, United States Code, section 983(a)(2)(A) and/or title 19, United States Code, section 1607 et seq of seizure at Austin, Texas, on the dates specified below, of the following merchandise, liable to forfeiture to the United States under provisions of various statutes cited. Any person claiming such property is hereby notified to file his claim at the Customhouse, 7501 Esters Blvd., Suite 160, Irving, Texas 75063 (or by mail to P.O. Box 619050, D/FW Airport, Texas 75261), within 20 days (or 35 days if case is denoted as C.A.F.R.A.) after the first publication of this notice together with a bond in the amount of $5000 or 10% of the value of the claimed property (for cases not denoted as C.A.F.R.A.), whichever is lower, but not less than $250, with approved sureties as provided for in title 19, United States Code, section 1608. The cost bond amount, if required, is specified below for each referenced case. Once the cost bond and/or claim to the merchandise has been filed, the case will be forwarded to the United States Attorney for the institution of forfeiture proceedings in federal district court. If you are indigent (needy and poor) you may not be required to post the monetary bond. If no claim is filed (or bond given) as provided in the aforesaid statute, the property herein described will be declared forfeited to the Government of the United States and disposed of in conformity with the laws and regulations of the Secretary of the Treasury.

2009550600004401: Two Thousand Fifty (2,050) Counterfeit "UL" Adaptors and Two Hundred (200) Counterfeit "UL" Adaptors with Cords - in violation of 19USC1526(e), because the articles bear a "counterfeit" version of a trademark, registered and recorded for importation protection with the United States Government - seized on June 16, 2009 at Austin, Texas (Appraised Value $22,500.00 - Cost Bond Required $2,250.00)

SALE NOTICE

MIDWOOD PARKWAY STORAGE, wishing to avail themselves of the provision of CHAPTER 59 of the TEXAS PROPERTY CODE, as amended from time to time, hereby gives notice of said act to wit On Apr 9, 2010, starting at 10 AM, at 9023 HWY 71 WEST, AUSTIN, TX, 78735, the following tenant's property will be sold to the highest bidder for cash only to satisfy a landlord lien:

Tenant: Netcrystal, Inc. Unit: 153 The contents consist of: Anacom Systems Functional Tester, VVT230 Digital Power Meter, Agilent 34401A, 6 digit multimeter, XHR 150 7 DC power supply 0-150V, 0-7A Also an Associated Environmental Systems Model SD302, mechanical refrigeration chamber.

Tenant: William S Sill, Unit: 277 The contents consist of: office furniture, office desks, office chairs, padded and wheels, 2 drawer file cabinets, and office computer.

9980-Legal Notices

DEPARTMENT OF HOMELAND SECURITY FEDERAL EMERGENCY MANAGEMENT AGENCY

Proposed Base Flood Elevation Determination for The City of Austin, Travis County, Texas, Case No. 09-06-3398P. The Department of Homeland Security's Federal Emergency Management Agency solicits technical information or comments on the proposed Base (1-percent-annual-chance) Flood Elevations (BFEs) shown in the Flood Insurance Study (FIS) and/or on the Flood Insurance Rate Map (FIRM) for your community. These proposed BFEs are the basis for the floodplain management measures that your community is required to either adopt or show evidence of having in effect in order to qualify or remain qualified for participation in the National Flood Insurance Program (NFIP). For a detailed listing of the proposed BFEs and information on the statutory period provided for appeals, please visit FEMA's website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp, or call the FEMA Map Assistance Center toll free at 1-877-FEMA MAP.

Sealed proposals will be received by the Local Government Purchasing Cooperative, Cooperative Purchasing Office, 12007 Research Blvd., Austin, TX 78759 then publicly read as follows:

Proposal No.: Description: Due Date & Time:

353-10, Two Story Permanent Modular Classroom Buildings, 3/31/2010 at 2:00 PM

NOTE: Specifications will be available on-line one month prior to due date.

Proposal Specifications may be obtained from our web site www.vendor.buyboard.com or from the offices of the Texas Association of School Boards, Cooperative Purchasing Office 12007 Research Blvd., Austin, TX, 78759. The Cooperative reserves the right to reject any or all bids & to waive any formalities in bidding except time of filing.

FTWOODS Construction Services, Inc. is soliciting HUB/MBE/WBE/DBE bids for participation on the following project: City of Austin Segment 7, 42" WTM, Bid Date: 03/25/10 at 9:00am

Please fax quotes no later than 3:00pm on 03/24/10 to 512-930-3748 Attn: Spencer Chaney, Contact Information: Spencer Chaney 512-930-2607, schaney@ftwoods.com

REQUEST FOR COMPETITIVE BIDS

Austin Independent School District requests competitive bids for construction of:

AISD Project No.
G10-0001-GROUP
Window Renovations at:
Highland Park Elementary School
4900 Fairview
Austin, TX 78731

100% Performance and Payment Bonds required if the bid is over $25,000. 5% Bid Guaranty required.

BID DEADLINE: 10:00 a.m. Austin time on Friday, April 9, 2010 at AISD Department of Construction Management, **HARTLAND BOND OFFICE**, 1717 West 6th Street, Suite 310, Austin, TX 78703, Ph. 512-414-8940. Sealed Bids will thereafter be opened and read aloud.

Bid Instructions, copies of drawings, specifications and contract documents, addenda (if any) and other documents related to this Request for Bids are available in the Office of the Project Architect indicated below for a deposit amount of $50.00 per set. **The deposit will be refunded upon return in good condition to the Office of the Project Architect within 72 hours of the opening of bids.**

William Tamminga Architects
1716 Cliffwood Drive
Austin, TX 78733
Ph. 512-263-9421

PRE-BID CONFERENCE: 10:00 a.m. Austin time on Friday, March 26, 2010 at Highland Park Elementary School. AISD may consider a Bidder's attendance of the pre-bid conference in its determination of

9980-Legal Notices

REQUEST FOR COMPETITIVE BIDS

Austin Independent School District requests competitive bids for construction of:

AISD Project No.
P09-0078-STELM, Restroom & Accessibility Renovations at St. Elmo ES, 600 West St. Elmo Rd.
Austin, TX 78745

100% Performance and Payment Bonds required if the bid is over $25,000. 5% Bid Guaranty required.

BID DEADLINE: 2:00pm Tuesday, April 6, 2010, AISD Department of Construction Management, **HARTLAND BOND OFFICE**, 1717 West 6th St., Ste. 310, Austin, TX 78703, Ph. 512-414-8940. Sealed Bids will thereafter be opened and read aloud.

Bid Instructions, copies of drawings, specifications and contract documents, addenda (if any) and other documents related to this Request for Bids, are available in the Office of the Project Architect/Engineer indicated below for a deposit amount of $100.00 per set. **The deposit will be refunded upon return in good condition to the Office of the Project Architect within 72 hours of the opening of bids.**

Aguirre Roden, Inc.
700 Lavaca St. Ste. 500
Austin, TX 78701
Ph. 512-478-3020

PRE-BID CONFERENCE: 10:00am Wednesday, March 31, 2010 at St. Elmo ES, check-in at main office. AISD may consider a Bidder's attendance of the pre-bid conference in its determination of best value of each Bid submitted.

AISD reserves the right to reject any and all bids.

NOTICE OF PUBLIC HEARING - REGIONAL WATER PLANNING

The Lower Colorado Regional Water Planning Group (Region K) will provide a brief summary of and receive comments from the public on the Region K 2011 Draft Water Plan. Region K consists of a 14-County planning area, which extends generally along the Colorado River from Mills and San Saba Counties in the Northwest to Matagorda County in the Southeast.

An opportunity to submit written and oral comments (not to exceed three (3) minutes per speaker) on the Region K 2011 Draft Water Plan will be provided during the Public Hearing at the Thompson Conference Center (Room 2.102) on the University of Texas Campus, 2405 Robert Dedman Drive, Austin, Texas, on Wednesday, April 28, 2010 at 6:00 p.m. Visit www.regionk.org for a map to the location.

A digital copy of the Draft Water Plan is available on the Region K website (www.regionk.org). A hard copy will be available in each County Clerk's office and one public library per county within Region K beginning March 29, 2010. Go to www.regionk.org for more details. Written comments on the Draft Water Plan must be received by **June 28, 2010,** at jburke@aquawsc.com or the following address: Mr. John Burke, Chairman, Lower Colorado Regional Water Planning Group, P.O. Drawer P, Bastrop, Texas 78602. For questions contact Chairman Burke at the above address, jburke@aquawsc.com or 512-303-3943.

Notice of Invitation, Karst Services, RFP #57-0RFPSB001: The Texas Department of Transportation's (TxDOT) Environmental Affairs Division (ENV) is soliciting proposals pursuant to the Texas Transportation Code, Chapter 223, Subchapter D, and 43 TAC §§9.80-9.88 for up to three (3) indefinite delivery contracts worth no more than $250,000.00 each for the performance of karst services. Services to be provided may include, but is not limited to, conducting surveys or habitat assessments for protected karst invertebrate species, conducting biological assessments or Section 10.a permits, initiating coordination with state and federal resource

HIGHLAND LAKES NEWSPAPERS, INC.

THE HIGHLANDER
P.O. BOX 1000
MARBLE FALLS, TX.
78654
830-693-4367

BURNET BULLETIN
P.O. BOX 160
BURNET, TX. 78611
512-756-6136

LLANO COUNTY JOURNAL
507A BESSEMER
LLANO, TX. 78643
325-248-0682

AFFIDAVIT OF PUBLICATION

THE STATE OF TEXAS
COUNTY OF BURNET

BEFORE ME, the undersigned authority, on this day personally appeared Cheryl Michel, known to me, who being duly sworn, upon his/her oath deposes and says that: i he/she is the authorized agent of The Highlander/Burnet Bulletin/Llano County Journal newspapers of general circulation in Burnet and Llano counties; and that said newspaper has been continuously and regularly published in the said counties for more than one year; that a copy of the foregoing Notice was published in said newspaper, such publication being on the following dates: 3-16-10, 3-17-10 and a newspaper copy of which is hereto attached.

Signed:

Cheryl Michel
Authorized Agent

SWORN TO AND SUBSCRIBED before me this the 17th day of March, 20 10

Holly Alexander
Notary Public in and/for the State of Texas

HOLLY ALEXANDER
Notary Public, State of Texas
My Commission Expires
November 02, 2013

Classified

PUBLIC NOTICES

at 2402 S. Water Street, Burnet, Texas 78611 at which time the following subjects will be discussed, to-wit:

1. A request to rezone the property located at 803 E. Pecan Street from its current zoning designation of "R-1" Single Family Residential to a zoning designation of "M-1" Manufactured Home zoning district.

2. A request to rezone the property located at 609 Josephine Street from its current zoning designation of "R-1" Single Family Residential to a zoning designation of "C-1" Light Commercial zoning district.

Application has been made with the Texas Alcoholic Beverage Commission for a Package Store Permit by The Bottle, LLC to be located at 2751 W HWY 29, Burnet, TX 78611-3478, Burnet County, Texas. Officers of said company are Stephen Maxwell, Manager.

NOTICE TO CONTRACTORS OF PROPOSED TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT) CONTRACTS

Sealed proposals for contracts listed below will be received by TxDOT until the date(s) shown below, and then publicly read.

CONSTRUCTION/ MAINTENANCE/ BUILDING FACILITIES CONTRACT (S)

Dist/Div: Austin
Contract 0151-02-021 for INSTALL LEFT TURN LANE in BURNET County will be opened on April 07, 2010 at 1:00 pm at the State Office. Contract 0914-00-294 for NON-SITE SPECIFIC SIGNALS in TRAVIS County, etc will be opened on April 07, 2010 at 1:00 pm at the State Office.

Plans and specifications are available for inspection, along with bidding proposals, and applications for the TxDOT Prequalified Contractor's list, at the applicable State and/or Dist/Div Offices listed below. If applicable, bidders must submit prequalification information to TxDot at least 10 days prior to the bid date to be eligible to bid on a project. Prequalification materials may be requested from the State Office listed below. Plans for the above contract(s) are available from TxDOT's website at www.txdot.gov and from reproduction companies at the expense of the contractor.
NPO: 32361
State Office

Constr./Maint. Division
200 E. Riverside Dr.
Austin, Texas 78704
Phone: 512-416-2540

Dist/Div Office (s)

Austin District
District Engineer
7901 N IH35
Austin, Texas 78761-5426
Phone: 512-832-7060

Minimum wage rates are set out in bidding documents and the rates will be part of the contract. TXDOT ensures that bidders will not be discriminated a[...] grounds of r[...] or national o[...]

SUBSCRI[...]
830-69[...]

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NOTICE OF APPLICATION AND PRELIMINARY DECISION FOR SEWAGE SLUDGE PROCESSING PERMIT RENEWAL

PERMIT NO. WQ0003802000

APPLICATION AND PRELIMINARY DECISION. Lower Colorado River Authority, P.O. Box 220, Austin, Texas 78767, has applied to the Texas Commission on Environmental Quality (TCEQ) for a renewal of Texas Pollution Discharge Elimination System (TPDES) Sludge Permit No. WQ0003802000 (EPA I.D. No. TXL005007) to authorize the composting of wastewater treatment plant sludge. The site is approximately 36,075 square feet, with 12,240 square feet of concrete composting pad area. This permit will not authorize a discharge of pollutants into waters in the State. TCEQ received this application on September 29, 2009.

INVITATION TO BID

USED TRUCK CHASSIS/WATE[...]

Sealed bids are now being accepted in t[...] the Burnet County Auditor/ Purchasing [...] the Purchase of a used (1994-2004), sin[...] chassis OR a used (1994-2004) water tr[...] copy of the Invitation to Bid, which incl[...] minimum specifications, call the County [...] Office at (512) 756-5495, or Bids may b[...] at 133 E. Jackson St., Room 101, Burne[...] opening will be Thursday, March 25, 20[...] PM in the Burnet County Auditor's Offi[...] Jackson St., Burnet, TX. Bids will be ac[...] the time of opening.

AMENDED NOTICE C[...] FOR WATE[...] FO[...]

TPD[...]

APPLICATION AND PRELIMIN[...] guson Road, Horseshoe Bay, Tex[...] has applied to the Texas Comn[...] TPDES Permit No. WQ00013690[...] water, auxiliary cooling water, st[...] waste sources, basement under[...] ing waste) at a daily average an[...] via Outfall 001. This application [...]

The facility is located adjacent t[...] City of Marble Falls, and approxi[...] as 78657. The effluent is dischar[...] of the Colorado River Basin. The [...] use, contact recreation, and pub[...]

The TCEQ Executive Director h[...] prepared a draft permit, if appr[...] ity must operate. The Executive [...] issued, meets all statutory and [...] Director's preliminary decision, [...] the City of Horseshoe Bay City C[...]

PUBLIC COMMENT / PUBLIC [...] public meeting about this appl[...] opportunity to submit written [...]

Classified

PUBLIC NOTICES

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State Office

Constr./Maint. Division
200 E. Riverside Dr.
Austin, Texas 78704
Phone: 512-416-2540

Dist/Div Office (s)

Austin District
District Engineer
7901 N IH35
Austin, Texas 78761-5426
Phone: 512-832-7060

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SUBSCRI[...]
830-6[...]

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Sealed bids are now being accepted in t[...] the Burnet County Auditor/ Purchasing [...] the Purchase of a used (1994-2004), sin[...] chassis OR a used (1994-2004) water tr[...] copy of the Invitation to Bid, which incl[...] minimum specifications, call the County [...] Office at (512) 756-5495, or Bids may [...] at 133 E. Jackson St., Room 101, Burne[...] opening will be Thursday, March 25, 20[...] PM in the Burnet County Auditor's Offi[...] Jackson St., Burnet, TX. Bids will be ac[...] the time of opening.

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

The Lower Colorado Regional Water Planning Group (Region K) will provide a brief summary of and receive comments from the public on the Region K 2011 Draft Water Plan. Region K consists of a 14-County planning area, which extends generally along the Colorado River from Mills and San Saba Counties in the Northwest to Matagorda County in the Southeast.

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NOTICE OF APPLICATION AND PRELIMINARY DECISION
FOR SEWAGE SLUDGE PROCESSING PERMIT RENEWAL

PERMIT NO. WQ0003802000

APPLICATION AND PRELIMINARY DECISION. Lower Colorado River Authority, P.O. Box 220, Austin, Texas 78767, has applied to the Texas Commission on Environmental Quality (TCEQ) for a renewal of Texas Pollution Discharge Elimination System (TPDES) Sludge Permit No. WQ0003802000 (EPA I.D. No. TXL005007) to authorize the composting of wastewater treatment plant sludge. The site is approximately 36,075 square feet, with 12,240 square feet of concrete composting pad area. This permit will not authorize a discharge of pollutants into waters in the State. TCEQ received this application on September 29, 2009.

AMENDED NOTICE [...]
FOR WATE[...]
FO[...]

TP[...]

APPLICATION AND PRELIMIN[...] guson Road, Horseshoe Bay, Tex[...] has applied to the Texas Comm[...] TPDES Permit No. WQ00013690[...] water, auxiliary cooling water, st[...] waste sources, basement under[...] ing waste) at a daily average an[...] via Outfall 001. This application [...]

The facility is located adjacent t[...] City of Marble Falls, and approxi[...] as 78657. The effluent is dischar[...] of the Colorado River Basin. The[...] use, contact recreation, and pub[...]

The TCEQ Executive Director h[...] prepared a draft permit, if appr[...] ity must operate. The Executive [...] issued, meets all statutory and [...] Director's preliminary decision, [...] the City of Horseshoe Bay City [...]

PUBLIC COMMENT / PUBLIC [...] public meeting about this app[...] opportunity to submit written [...]

Austin American-Statesman

PO#: 1552496
Ad Id #: 4364165
Acct.#: 5124734032
Account Name: LCRA

LCRA
3700 LAKE AUSTIN BLVD. MS-L404
ATTN: MARI ANORAN
AUSTIN, TX 78703

AFFIDAVIT OF PUBLICATION

THE STATE OF TEXAS
COUNTY OF TRAVIS

Before me, the undersigned authority, a Notary Public in and for the County of Travis, State of Texas, on this day personally appeared:

CAROLYN KLINE
(print name)

Classified Advertising Agent of the Austin American-Statesman, a daily newspaper published in said County and State that is generally circulated in Bastrop, Bell, Blanco, Brazos, Burleson, Burnet, Caldwell, Colorado, Comal, Coryell, Fayette, Gillespie, Gonzales, Guadalupe, Hays, Kerr, Lampasas, Lee, Llano, Milam, Nueces, San Saba, Travis, Washington, and Williamson Counties, who being duly sworn by me, states that the attached advertisement was published at the lowest published rate for Classified advertising in said newspaper on the following date(s), to wit:

First Published: **3/18/2010** Last Published: **3/18/2010**
Times Published: **1** Classification: **BASTROP ADVERTIS**
Size (Lines/Inches): **3 X 3"** Cost: **$129.15**

and that the attached is a true copy of said advertisement.

Carolyn Kline
(sign name)

SWORN AND SUBSCRIBED TO BEFORE ME, this the 18th day of March, 20**10**.

Shary Denise Fowler
Notary Public in and for
TRAVIS COUNTY, TEXAS

SHARY DENISE FOWLER
NOTARY PUBLIC STATE OF TEXAS
COMMISSION EXPIRES:
07-12-2013

Austin American-Statesman
305 South Congress Ave., P.O. Box 670, Austin, Texas 78767-0670 512-445-3832

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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Affidavit of Publication

STATE OF TEXAS
COUNTY OF MATAGORDA

Before me, the undersigned authority, on this day personally appeared Susana Brito who on his/her oath stated: I am the Classified Representative of The Bay City Tribune, a newspaper published in Matagorda County, Texas, and know the facts herein stated to be true and correct: attached is a printed copy of publication of the notice/citation of which it purports to be a copy, as the same appeared in such newspaper in the respective issues of the 17th day of March 2010.

Classified Representative

ROSARIO RESENDEZ
MY COMMISSION EXPIRES
August 5, 2013

Sworn to before me this
2nd day of April 2010

Rosario Resendez

Notary Public in and for Matagorda County, Texas passage ance and r actions e deemed to author- suance of certificates ion, in an principal iot to ex- 3,500,000, om ad va- ation and limited a subordi- on the net of the Ci- works and sewer sys- ing interest te or rates xceed the interest or hereaf- orized by shall be de- within the n of the City at the time ance, and over a pe- ears not to thirty (30) m the date for the pur- evidencing btedness of for all or any he cost of (i) nd drainage ments; (ii) improve- (iii) park im- ents; (iv) nter improve- (v) Service

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animal will go crazy.

Many dogs that have separation anxiety have a hyper-attachment to the owner; are excessively attentive to the owner, and follow him or her everywhere.

They always want to be held, touched, or cling to the owner and sometimes even become anorexic when the owner is not present.

"Occasionally this behavior problem is seen in puppies and adult dogs from rescue groups or

anxiety in dogs can include destructive behavior directed towards personal items like clothing, remote controls, bedding, doorways and windows, in an effort to escape from crates or confined rooms.

Persistent barking, howling, and eliminations with urine and fecal accidents in multiple areas may all be signs of anxiety from being left alone.

If you notice hypersalivation with possible puddles of thick saliva in the crate or near a doorway or

ence.

"It is recommended to not reward anxiety attention seeking from dogs as a level of comfort. Providing attention during these situations will enable your dog and reinforce the unwanted behavior. Positive attention that is initiated by the owner and scheduled training can be helpful," said Crist.

Keep your arrivals and departures to a minimum and non-eventful. It is recommended to perform all departure activities 30 minutes prior to leaving such as feeding, walking, and eliminating.

Do not leave in a hurry because the dog will pick up on this and can be nervous when the owner leaves the home.

Evaluate some of the departure activities the owner performs such as getting the car keys, picking up a wallet or purse, or getting the cell phone.

Any of these can be predictors that the owner is going to depart and make the dog anxious.

One can try to desensitize the dog to some of the departure of the activities by performing them at times when the owner is not leaving.

Teach the pet to be left

that will take the dog long time to consume leaving the television music on in the hous

Dogs may be kept crate which sometime increase or decrease th anxiety level, and ma also protect the home from damage made by unwanted behavior of pet.

You may also use synthetic dog appeasi pheromone (DAP) throughout the house where the pet is loca The pheromone may vide some degree of ing in dogs that expe ence separation anxie

"Sometimes dogs from separation anxi a point where they n be prescribed medica from a veterinarian c veterinary behavior s cialist," said Crist.

"It is recommende the medication and a behavior modificatio gram go hand in han that the medication not replace the modi tion plan. The two nary approved medic for separation anxie dogs are Clomicalm (generic name clomipramine) and Reconcile (generic n fluoxetine)."

PUBLISHER'S AFFIDAVIT

AS

)UNTY

ndersigned authority, this day appeared Cindy Parkhurst

y me duly sworn, says that she is the Publisher

County Citizen, a newspaper published in Colorado County, Texas, and that the notice, a copy
ɔ attached, was published in said newspaper on the following dates:

arch 17 A.D. 2010

CParkhurst

D SWORN TO before me, this the 1st day of April A.D. 2010

JUDY G. WEAVER
Notary Public, State of Texas
My Commission Exp. 02-29-2012

Judy G. Weaver

Notary Public in and for Colorado County, Texas

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STATE OF TEXAS]
]
COUNTY OF FAYETTE]

AFFIDAVIT OF PUBLICATION

My name is **Larry C. Jackson**, and I am **Publisher** of the **Fayette County Record**. I am over the age of 18, have personal knowledge of the facts stated herein, and am otherwise competent to make this affidavit.

The **Fayette County Record** is a legal newspaper publication under Texas law, headquartered and regularly published in the City of **La Grange**, **Fayette** County, Texas. It is a newspaper of general circulation, and is generally circulated in **Fayette, Bastrop and Colorado** Counties.

The attachment hereto was published in the **Fayette County Record** in its publications of March 16, 2010, at or below the newspaper's lowest published rate for classified advertising.

Larry C. Jackson, Publisher

SUBSCRIBED AND SWORN TO BEFORE me this the 17th day of March, 2010.

Notary Public, in and for the State of Texas.

NOTARY PUBLIC STATE OF TEXAS
AILEEN LOEHR
Notary Public, State of Texas
My Commission Expires
OCTOBER 21, 2012

Public notice form
The Fayette County Record

ing 979-743-4126.

(37-2c)

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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(38-1c)

za, Jr., aka Roberto Zaragoza, and wife Bertha Zaragoza, aka Bertha A. Zaragoza, in a Warranty Deed with Vendor's Lien recorded at Volume 1335, Page 478 of the Official Records of Fayette County, Texas; LESS HOWEVER, from the aforedescribed 10.000 acre tract, 4.725 acres of land out of the William H. Taylor League, Abstract No. 97, in Fayette County, Texas, said 4.725 acres being the same 4.725 acre tract of land conveyed by Roberto Zaragoza, Jr. et ux, to Richard G. Cole, et ux, by General Warranty Deed recorded at Volume 1448, Page 147 of the Official Records of Fayette County, Texas; the aforedescribed 5.275 acre tract being located near the intersection of Trinity School Rd. and Old Plum Rd. (Hwy.).

The highest bidder (purchaser) of the above property of the Defendant will receive a Sheriff's Deed, which is without warranty, expressed or implied, and which is subject to any recorded liens and other matters. The bidders are to satisfy themselves concerning the particulars of the property of the Defendant prior to the sale of said property to be conducted at the Courthouse. The above sale is to be made by me to satisfy the above described judgment in the principal sum of $7,656.08 in favor of said Plaintiff, plus all costs of suit, costs of sale, attorneys fees and interest, and the proceeds of the sale applied to the satisfaction thereof and distributed in accordance with law.

WITNESS MY HAND this the 12th day of March, 2010.

S/S Keith Korenek
Keith Korenek, Sheriff
Fayette County, Texas

(38-3wc)

groups. She was an active participant in a Bible study group and for years was a member of the La Grange Sons of Hermann Lodge No. 8.

She is survived by two sons Gary Lincke and wife Gale of La Grange; Mark Lincke and wife Melissa of Olympia, Wash.; one daughter, Debra Porter and husband Bill of Minnetonka, Minn.; and six grandchildren John Lincke, Maria and Max Porter, and Emily, Abigail and Grace Lincke whom she loved and treasured.

She was preceded in death by her husband, Delton; her parents; and one brother, Nelson Kieke.

In lieu of flowers memorials may be made to the St. Paul Evangelical Lutheran Church, P. O. Box 567, La Grange, TX 78945.

Family and friends can view and sign the guestbook online at www.lagrangefunerals.com.

Koenig & Strickland Funeral Home of La Grange was in charge of arrangements.

Cow-Calf Clinic Set In Ammannsville

Fayette County AgriLife Extension Service is hosting a Cow Calf Clinic in Fayette County on April 23 at Schmidt Land and Cattle, 6840 Berger Road in Ammannsville. Registration will begin at 7:30 a.m. with the program starting at 8 a.m. and should conclude around 3 p.m.

Topics will cover Pen Design, Cattle Handling, Basic Health Programs, Livestock Market Outlook, Heifer Development, Trichomoniasis Regulations, and Brush Busters Weed and Brush Control.

Two hours of CEUs will be provided for those with an applicators license, and two hours of BQA credits, as well.

There will be a free lunch provided.

You must RSVP by April 19 to ensure your meal by contacting the Fayette County Extension Office at (979) 968-5831.

REMEMBE

Fifty Years Ago *From th*

March 15, 1960

The Fayette County ASC announced it was interested in getting 100% of the 1,839.5 allotted peanut acres planted in 1960.

CLASSIFIEDS

Ads from 50 Years Ago

WILL PAY $10.00 for information leading to identity of party who ran into small foreign car (Volkswagon) parked in front of Old Masonic Building Monday between 4-5 p.m. See Sheriff Flournoy.

FOR SALE: Antique table, love seat, china cabinet, Mrs. Fritz Gerdes, La Grange, Rt2, Box 185

WANTED: Girl for housework. Mrs. Bruno Schulz, Kerrville, Texas. For more information, contact Mrs. Edmund Kappler, 927 N. Franklin, La Grange. Phone 354-R.

FOR SALE: Two adjoining tracts of land in R.M. Cravens League in Fayette County, each containing 61 acres, more or less. One tract owned by Emma Klatt and other by Erna Van Alstyne Estate. Make written offer to Oscar Henieke, Box 25, Columbus, Texas on or before April 1, 1960. Seller reserves the right to reject any and all offers or bids.

SALESMAN WANTED: I want to talk to a reliable man. Will set you up in a sound one-man business without investment. Watkins dealer needed in South Fayette County. No co-signers required. Must have good character references, also car or light truck. Earnings better than average. Write Watkins Products, Inc., P.O. Box 1349, Duncan, Okla.

WANTED: Electrician's helper at Pratka Electric Service, La Grange

FOR RENT OR LEASE: 220 acre pasture, 20 acre meadow, on the Ernest Orsak Estate near Fayetteville. Call Wharton LE2-3479 or write Ed Orsak, Wharton, Texas, Rt., 2, Box 154.

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PUBLISHER'S AFFIDAVIT

LEGAL NOTICE

NOTICE OF PUBLIC HEARING REGIONAL WATER PLANNING

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40

THE STATE OF TEXAS,
COUNTY OF GILLESPIE

On this 22nd day of March 2010, personally appeared before me the undersigned authority, Terrill D. Collier who states that he is the publisher of the Fredericksburg Standard-Radio Post, published at Fredericksburg, Texas, Gillespie County, and upon being duly sworn by me on oath, states that the attached advertisement is a true and correct copy of the advertising published in said newspaper in one issue thereof, on the following date:

March 17, 2010

Terrill D. Collier

[Publisher]

Sworn to and subscribed before me on the 22nd day of March, A.D. 2010

Notary Public Signature

(SEAL) NATHAN W. CRENWELGE
Notary Public
STATE OF TEXAS
My Comm. Exp. 08/30/2010

THE GOLDTHWAITE EAGLE

1002 Fisher Street - PO Box 249 • Goldthwaite, Texas 76844
325/648-2244 • 800-254-2680 • Fax: 325/648-2024 • goldnews@centex.net

PUBLISHER'S AFFIDAVIT

I solemnly swear that the attached notice was published in *The Goldthwaite Eagle,* a newspaper printed in Mills County, Texas, and of general circulation in said county, as provided by The State of Texas for the service of citation or notice of publication, and the date the issue of said newspaper bore in which said notice was published was March 17, 2010.

A copy of this notice as published, clipped from the newspaper, is attached hereto.

Steven Bridges
Editor

SUBSCRIBED AND SWORN TO BEFORE ME by Steven Bridges, this 22ND day of MARCH, 2010, to certify which witness my hand and seal of office.

Bonita F. Mackey
Notary Public
In and For Mills County, Texas

My Commission Expires:

BONITA F. MACKEY
MY COMMISSION EXPIRES
October 24, 2011

E, BROKER
waite, TX 78644
325-642-2245 Cell
.net

Clarence Grelle, Sales Associate
325/451-0032

ANTIQUE & MODERN
WER - RANCH P.U.

N
:00 A.M.

XAS

light turn East off of 183
blocks to auction *** OR **
& then right on 2 nd St. &
R SIGNS.

will sell the following
on to settle an Estate.

l; Northwood carnival vase; Hull vase; milk & cream
bite TO EAT" 10-2-4
Coy; salt cellars; 10 + oil lamps--including amber
cake stands--including
jugs; enamelware lunch buckets; wooden bowls;
Wagner**pots, pans, Dutch ovens, cornbread pans,
400 + cookbooks; Nabisco Grain Co. wooden adv.
print; set of Salad Master pans; marbles; approx. 10
Life books.

RELATED ITEMS

e, Keen Kutter, Camillus, Barlow, etc.--
/scabbard; hand carved goat feeder; forge blower;
Dimes & other misc. coins.

emaster mod. 760 -30-06 pump**Rem. Woodmaster
*Rem. 30 Rem. Pump - 1910 pat.**Winchester mod.
*several

osene cook stove; prim. Oak wardrobe; oak dressers-
aw feet & 6 pressed back chairs; nice modern dining
iron & other types patio furniture; flat top & miniature
; oak computer desk; custom oak 4 door gun cab.;
D & MISC. ITEMS!
S
power washer; Sears 12 inch wood lathe
; saws; misc. tools; lg. lot of Coleman lanterns &

ood tires & runs well.

/some great & interesting items.
tools will sell first.

duled for March 27.
25-646-3956

NEERS
S
torey 6487
/ID

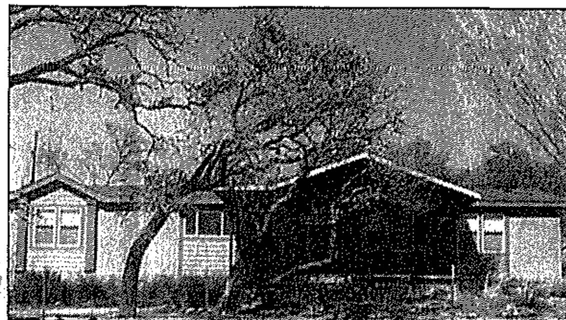
t news,
eos, visit
agle.com

FOR SALE

HOUSE FOR SALE: 1905 Fisher St. Call Lydia at 648-3813 or 938-6943. 1-27-tfc

FOR SALE: Charming 2 bedroom 2 bath home in a great location. Well manicured with many updates and designer touches. 1709 Fisher $40,000. Call 325-642-9643. 3-3-1tpc

LAND FOR SALE: 160 Acre Farm located at the SE Corner of FM 1029 and CR 114. Fenced, wooded, water well, nice stock tank. Across from (East of) Trigger Mountain. Call 214-629-6900 for more info. No Realtor calls please. 3-17-4tc



NICE 2003 Model 1984 Sq. Ft. Mobile Home to be moved, 3 BR, 2 Bath, Large Kitchen, Front Porch Cover, Textured Walls, Bull-nose Corners, Tile CH/A, Ceiling Vents $65,000. Call 512-845-9599 to see 7 miles from Goldthwaite. 3-17-4tc

Judicial District Court of Mills County, at the Courthouse Annex in said County in Goldthwaite, Texas. Said Plaintiff's Petition was filed in said court on the 12th day of March, 2010 in the above entitled cause.

A brief statement of the nature of this suit is as follows, to-wit: **Suit for partition of one certain 137.57 acre tract of land in Mills County, Texas out of Blocks 29 and 30 of the Francisco Vegereal Survey, Abstract No. 696**
as is more fully shown by Plaintiff's Petition on file in this suit.

Issued and given under my hand and seal of said Court at Goldthwaite, Texas this 12th day of March, 2010.

Attorney for Plaintiff or Plaintiff:	Clerk of the Court:
Gerald G. Hale	Carolyn Foster, District Clerk
1412 Fisher Street	P.O. Box 646
PO Box 647	Goldthwaite, Mills Co., TX
Goldthwaite, TX 76844	By Joy Nowell, Deputy

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PUBLISHER'S AFFIDAVIT

I solemnly swear that the above notice was published for a one (1) week period in the Johnson City Record Courier, a newspaper printed in Johnson City, Blanco County, Texas, and of general circulation in said county, as provided in the Texas Probate Code for the service of citation or notice by publication, and the date of issue in which said notice was published was March 11, 2010.

Belinda Nagy

Publisher

SUBSCRIBED AND SWORN TO BEFORE ME by Belinda Nagy

On this 29th day of March, 2010, to certify which witness my hand and seal of office.

MISTY MARTINEZ NORMAN
NOTARY PUBLIC STATE OF TEXAS
COMMISSION EXPIRES:
07-27-2010

Misty Martinez Norman

Notary Public, State of Texas

...er Classifieds

Public Notice

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING The Lower Colorado Regional Water Planning Group (Region K) will provide a brief summary of and receive comments from the public on the Region K 2011 Draft Water Plan. Region K consists of a 14-County planning area, which extends generally along the Colorado River from Mills and San Saba Counties in the Northwest to Matagorda County in the Southeast. An opportunity to submit written and oral comments (not to exceed three (3) minutes per speaker) on the Region K 2011 Draft Water Plan will be provided during the Public Hearing at the Thompson Conference Center (Room 2.102) on the University of Texas Campus, 2405 Robert Dedman Drive, Austin, Texas, on Wednesday, April 28, 2010 at 6:00 p.m. Visit www.regionk.org for a map to the location. A digital copy of the Draft Water Plan is available on the Region K website (www.regionk.org). A hard copy will be available in each County Clerk's office and one public library per county within Region K beginning March 29, 2010. Go to www.regionk.org for more details. Written comments on the Draft Water Plan must be received by June 28, 2010, at jburke@aquawsc.com or the following address: Mr. John Burke, Chairman, Lower Colorado Regional Water Planning Group, P.O. Drawer P, Bastrop, Texas 78602. For questions contact Chairman Burke at the above address, jburke@aquawsc.com or 512-303-3943 1-1

Stonewall Head Start, Inc.'s Annual Report
is available for public review at any one of our three centers:
Harper Center
1099 S. FM 783
Harper, Texas 78631
(830)864-4848
Fredericksburg Center
711 S. Eagle Street
Fredericksburg, Texas 78624
(830)997-0048
Stonewall Center
11247 Hwy 290 W
Hye, Texas 78635
(830)644-2263

Farm & Ranch

2007 Kubota RTV 900W - Outstanding condition. 800 hours, diesel engine, hydraulic dump bed, hydrostatic brakes. Pics on request. $8500.00 210/722-8671 1-2

New & Used Pipe. New: T-Post * Fence Wire * Structural Pipe * Gates * Culverts * Wire ...

Services

AFFORDABLE INSURANCE SOLUTIONS! Life, Health, Dental Disability for individuals, families, businesses. Mark 512-267-4233 www. insphereis.com/mark.darrough TFN-M

Barn teardown & removal, barn clean up. Debris removal/ hauloff. Commercial/rent property cleanup, maintenance. Miscellaneous handyman applications. Locally owned.210-639-8667. TFN

Painting, mowing, brush clearing, fencing. Clean flower beds. No job too small. Any kind of odd jobs. Please call 210-667-7388. TFN

LYNN MILLER CONSTRUCTION---Painting-Remodel-Add Ons 830-868-4876 5-16

Mature, experienced housekeeper has openings for cleaning in Blanco, Johnson City and Sandy. Non-smokers only. References available upon ...

... see all the new goodies! Hours will be Wednesday - Sunday, 9-5. Vendors Welcome. Call Robyn 830-385-6481. 209 Hwy 281 next to Ronnie's BBQ 1-1

Pets for Sale

Registered Australian Kelpie puppies (livestock dogs) for sale now $300. 830-329-4743 1-2M

THREE male pit bull puppies for sale. Born 1/25 $150 each. All brown/white colors and have first shots. Ready immediately call 325-247-4241 TFN-L

AKC registered mini-dachshunds, 2 females, 1 male, $250 - $450 depending on puppy choice and papers. Call: (325) 248-1558 for more info. 1-1L

Carpenter... **Call** 512-78... 8568

Class A ... **qualities** ar... wheel loader... calhoun@n... 847-3400, Wimberly

N... PEST ... Fire Ants • Spiders • Roaches • ... Real Est... an... 830-8...

LBJ STATE PARK, Stonew...
Accepting applications for summer hou...
7-LIFEGUARDS; starting at $8.71 pe... include life guarding, pool maintenance, ... tion, and customer service. Applicant n... necessary lifeguard license, Job Posting...
2-CUSTODIANS; starting at $8.71 pe... include, cleaning, maintenance to facilit... equipment, vehicles and grounds, Job Post...
1-STUDENT INTERN; starting at $9.87... are geared toward practical experience a... park natural and cultural resource...
Job Posting #10-01-003. Visit the agen... www.tpwd.state.tx.us for details. Send y... as soon as possible to LBJ State Park, I... Stonewall, TX. 78671. EOE...

GRANITE ME...
HEALTH CEN...

A newly fast growing established skilled Long T... is seeking quality driven staff for the followi...

DIRECTOR OF REHAB
LVN's - All Shifts
CNA's - Full Time, Part Time, ...
COTA
PHYSICAL THERAPIST
MED AIDE

Please fax or email resume or co... and visit the facility to complete an ...

ACAMPBELL@GRANITEMESAHEA...
FAX: 830-693-2322 • PHONE: 83...
1401 MAX COPELAND DR, MAR...

PUBLISHER'S AFFIDAVIT

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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THE STATE OF TEXAS,
COUNTY OF LLANO

On this 30 day of March 2010 personally appeared before me the undersigned authority Ken R. Wesner who states that he is the Publisher of *The Llano News*, published at Llano, Texas, Llano County, and upon being duly sworn by me on oath states that the attached advertisement is a true and correct copy of advertising published in said newspaper in 1 consecutive issue~~s~~ therefore, on the following date~~s~~:

3/17/10

____

____

____

and that the rate charged does not exceed the lowest rate charged by this publication for classified/public notice advertising nor the lowest rate charged commercial customers for similar advertising.

Ken R. Wesner, Publisher

SUBSCRIBED AND SWORN to before this 30 day of March 2010

Carol M Sheppard

Notary Public in and for the State of Texas

CAROL M. SHEPPARD
NOTARY PUBLIC
STATE OF TEXAS
EXPIRES
07-13-2010

PUBLISHER'S AFFIDAVIT

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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THE STATE OF TEXAS,
COUNTY OF LLANO

On this 17 day of March, 2010 personally appeared before me the undersigned authority Ken R. Wesner who states that he is the Publisher of *The Llano News*, published at Llano, Texas, Llano County, and upon being duly sworn by me on oath states that the attached advertisement is a true and correct copy of advertising published in said newspaper in 1 consecutive issue(~~s~~) therefore, on the following date(~~s~~):

3/17/10

____

____

____

and that the rate charged does not exceed the lowest rate charged by this publication for classified/public notice advertising nor the lowest rate charged commercial customers for similar advertising.

K R Wesner

Ken R. Wesner, Publisher

SUBSCRIBED AND SWORN to before this

17 day of March 2010

Carol M Sheppard

Notary Public in and for the State of Texas

CAROL M. SHEPPARD
NOTARY PUBLIC
STATE OF TEXAS
EXPIRES
07-13-2010

STATE OF TEXAS

COUNTY OF SAN SABA

Before me, the undersigned authority, on this day personally appeared Karen Faught, who being by me duly sworn, deposes and says that:

"She is the Editor of the San Saba News & Star, Inc., a newspaper published in San Saba County, Texas, and having a general circulation in San Saba County, Texas, and that the foregoing attached notice was published in said newspaper on the following date, to wit:

March 18, 2010."

Karen Faught

Subscribed and sworn to before me this the 19 day of March, 2010, to certify which witness my hand and seal of office.

MARGOT Y. CONTRERAS
NOTARY PUBLIC STATE OF TEXAS
COMMISSION EXPIRES:
07-15-2012

Margot Y. Contreras
Notary Public in and for the State of Texas

7-15-2012
My Commission Expires

Margot Y. Contreras
Print Name of Notary Public

near Cherokee
w.sansabaland.com

nice trees, fine place to build a home, run some cattle and hunt! **$3,450/ac.**

• **209 acres** with pavement frontage and game-fenced: Has a really neat 1800 sq.ft. stone cabin, bunkhouse, metal barn, equipment shed, 5 stock tanks and seasonal creek. Manage your own game herd. The exotics are already on the ranch. A very neat ranch that reflects a lot of "pride-of-ownership". **$5,000/ac.**

• **1112 acres with FIVE MILES of Colorado River frontage:** 14 stock tank, good fences, big hills, canyons, fields, trees, brush, pens, mobile home & rural water meter. A great cattle ranch with some of the best hunting and fishing that you will ever find! **$4,950/ac.**

BROWN COUNTY

• **Lake Brownwood frontage** with a great view of the lake! 3 BR, 2 bath home, metal shop, separate office building, privacy fenced, beautiful oaks, floating fishing dock. Everything is completely remodeled or new. Located on a quiet cove. **$329,000.**

• **6 ACRES & HOME** at 4200 S. FM 2125

• **159.25 acres southeast of Goldthwaite** with very cute and comfortable completely remodeled 2/1 house, water well, good fences, 2 tanks, some coastal bermuda, good native grass, rolling hills, scattered trees and good hunting. One tank is stocked with catfish. A great home place or country retreat for just $2,995/acre.

HOMES IN SAN SABA COUNTY

• **1208 W. Church:** 2 BR, 1 bath, carport, cent heat & cooling, hardwood floors, 2 storage bldgs, corner lot. **$67,000.**

• **2305 W. Wallace (Hwy. 190W):** Extremely nice & clean 2 BR, 1 bath, large dining room, nice kitchen with appliances. Central heating & cooling; carport; large tree-shaded yard; fenced back yard with garden area and storage building. **$79,900.**

• **1101 W. Dry in San Saba:** Very spacious, 1693 sq. ft., 2 BR, 2 bath brick with fireplace, central air & heat, appliances, carport, covered patio, storage room, fenced back yard. Priced to sell quickly at just **$62,000.**

CONTRACT

• **909 W. Storey:** A project home on a corner lot near the school. Needs work, but has a good metal roof and seems to be structurally sound.

on 15 acres for only $1,150,000.

LOTS-COMMERCIAL-BUSINESS

• **316 E. Wallace** – Charming approx. 1800 sq.ft. store building was recently renovated. Excellent visibility for your business at busy intersection. **$75,000.**

• **501 and 507 E. Wallace Street**–Seller totally remodeled and converted 2 of the old downtown buildings across from Courthouse into a very popular lodging facility. Excellent opportunity to take over existing business or convert to suit. Call for details. **$450,000 Will sell separately.**

• **Hwy. 16 & Hwy. 190** - Most visible commercial location in San Saba! 2 solidly constructed historical buildings with approx. 6000 sq' ground floor space plus second floor; antique bank vaults, pressed tin ceilings, central heat & air. Backs up to proposed public parking lot. Both buildings on 0.184 acre lot **$340.000**

• **1609 W. Wallace (Hwy 190) in San Saba:** This property is in a great commercial location on a huge corner lot (four-tenths acre). It has a very sound building with approximately 6000 sq. ft. **REDUCED TO $85,000.**

PUBLIC NOTICE

CONSTRUCTION NOTICE

Prior to any type of construction, remodeling, alterations, installations or removal of real property, (Residential or commercial) plumbing & electrical work within the City of San Saba, please check at City Hall so proposed work will be in accordance to the City's regulations on building, housing, electrical and plumbing codes.

LEGAL NOTICE

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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3-18-10

175 Public Notices

Wharton County Notice to Bidders

The Commissioners' Court of Wharton County, Texas will receive sealed bids for the ***Renovation of Annex D*** *located at* 315 E. Milam, Wharton, Texas. Specifications may be obtained from the County website at www.co.wharton.tx.us or by calling (979)532-2640.

Bids submitted must be sealed and clearly marked **"Annex D"** on the outside of envelope. Bids will be accepted at the Auditor's Office until 3:30 p.m. Thursday, April 8, 2010. All bids will be date and time stamped. Any bids received after the specified time will not be considered.

Successful bidder will be required to provide performance bond at signing of contract.

Wharton County Commissioners' Court reserves the right to reject any and/or all bids and act in the best interest of the County.

Sharon Howard Boedeker
County Auditor

NOTICE OF PUBLIC HEARING – REGIONAL WATER PLANNING

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Answer to S...

STATE OF TEXAS
COUNTY OF WHARTON

Before me, the undersigned authority, on this day personally appeared *Bill Wallace*, the *Publisher* of the *Wharton Journal-Spectator,* having general circulation in Wharton County, Texas, who being by me duly sworn, deposes and says that the foregoing attached notice was published in said newspaper on the following dates, to wit: March 17, 2010.

Bill Wallace, Publisher

Subscribed and sworn to before me this the 2nd day of April, 2010, to certify which witness my hand and seal of office.

Helen F. Sevier
Notary Public in and for
Wharton County, Texas

HELEN F SEVIER
NOTARY PUBLIC
STATE OF TEXAS
EXPIRES
01-10-2011

LCRA
Region K

LCRA
Notice of Public Hearing
Regional Water Planning

THE STATE OF TEXAS,

County of WILLIAMSON } Clark Thurmond

being duly sworn, says that he is the publisher of Williamson County Sun / Sunday Sun

a newspaper of general circulation which has been continuously and regularly published for a period of not less than one year in the County of WILLIAMSON*, Texas, preceding the date of the attached notice, and that the said notice was published in said paper as follows:*

First insertion 17TH *day of* March *20*10

Second insertion ____ *day of* ____ *20*____

Third insertion ____ *day of* ____ *20*____

Fourth insertion ____ *day of* ____ *20*____

Gin Burnett
Newspaper Representative.

Subscribed and sworn to before me, this 19th *day of* March *20*10

Witness ~~my hand and official seal.~~

BARBARA A. GINN
Notary Public, State of Texas
My Commission Expires

Barbara A Ginn
Barbara A. Ginn My Commission Expires

'UBLICATION NOTICE

NOTICE OF PUBLIC HEARING - REGIONAL WATER PLANNING

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File No. ____________

IN THE MATTER OF THE

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AFFIDAVIT OF NEWSPAPER REPRESENTA
TO PUBLICATION OF LEGAL NOTICE

Filed the ____________ *da*

____________ *20*__

____

By ____________ *Deputy* __

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

March 12, 2009

AQUA WATER SUPPLY CORPORATION
C/O JOHN BURKE-MANAGER
PO DRAWER P
BASTROP, TX 78602-1989

Re: Lower Colorado Regional Water Plan (Region K)
Initially Prepared Revisions to Population and Water Demand Projections for the 2011 Regional Water Plan

Dear Sir or Madam:

The Lower Colorado Regional Water Planning Group (Region K) is in the process of revising the population and water demand projections from the 2006 Region K Water Plan, intended for use in the 2011 Region K Water Plan. Region K comprises the following counties: **Bastrop, Blanco, Burnet, Colorado, Fayette, Gillespie, Hays (partial), Llano, Matagorda, Mills, San Saba, Travis, Wharton (partial), and Williamson (partial).** The 2006 Region K Water Plan was prepared along with plans from 15 other regional planning areas, which collectively became the 2007 State Water Plan.

Region K has been tasked by the Texas Water Development Board (TWDB) to evaluate and potentially revise the population and water demand projections from the 2006 Region K Water Plan, due to recent growth in many of the counties located within the region exceeding that shown in the 2006 Region K Water Plan. The Region K Population and Water Demand Committee has worked to determine revised population, municipal water demand, and steam-electric water demand projections for 2010 through 2060 for many, but not all, of the counties within Region K.

Each city/ community/ water utility in the region that meets the following criteria is classified as a water user group (WUG):

- Cities with a population of 500 or more;
- Individual utilities providing more than 280 acre-feet per year of water for municipal use;
- Collective Reporting Units (CRUs) consisting of grouped utilities having a common association.

Please see the attached list, containing the initially prepared population and water demand projections and their comparison to the 2006 Region K Water Plan projections for your WUG and the other WUGs in your county. If your WUG is located in more than one county, a list for each county your WUG serves will be provided. Please look to see if revisions to the population and water demand projections are being proposed for your WUG.

If you would like to provide comments to Region K on the proposed revisions, you may do one of two things:

1. A Region K Population and Water Demand Committee Meeting to receive public comments on the revisions is being held Thursday, **March 19, 2009**, at the LCRA's Board Room, Hancock Building, 3700 Lake Austin Blvd, Austin, TX, at 10:00 am. You may attend the meeting and provide written or verbal comments at that time.

2. You may provide written comments (by mail or email) on the revisions until Thursday, **April 2, 2009**.

   Please send comments by **email** to the Population and Water Demand Committee Chair, James Kowis, at James.Kowis@lcra.org.

   Please send comments by **mail** to the following address:

   James Kowis
   Population and Water Demand Committee Chair
   Lower Colorado River Authority
   P.O. Box 220, Mail Stop R325
   Austin, TX 78767

   Please allow sufficient delivery time for comments sent by mail.

The population and water demand projections are an important step in the regional water planning process. We appreciate your assistance in determining the most accurate numbers possible.

Sincerely,

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

JB
Attachment

AQUA WATER SUPPLY CORPORATION
C/O JOHN BURKE-MANAGER
PO DRAWER P
BASTROP, TX 78602-1989

AUSTIN, CITY OF -WATER &
WASTEWATER
C/O TERESA LUTES
PO BOX 1088
AUSTIN, TX 78767-8859

BARTON CREEK WEST WATER SUPPLY
CO
C/O TUMCO CONSULTANTS INC
PO BOX 150068
AUSTIN, TX 78715-0068

BASTROP COUNTY WCID NO 2
C/O WARREN FENDER
PO BOX 708
BASTROP, TX 78602-0708

BASTROP, CITY OF
C/O JAMES MILLER - DIR OF
WATER/WASTEWATER
PO BOX 427
BASTROP, TX 78602-0427

BAY CITY, CITY OF
C/O CLARK YOUNG - PUBLIC WORKS
DIRECTOR
1901 5TH ST
BAY CITY, TX 77414-6143

BEE CAVE, CITY OF
C/O FRANK SALVATO - CITY
ADMINISTRATOR
4000 GALLERIA PARKWAY
BEE CAVE, TX 78738

BERTRAM, CITY OF
C/O TREY SMITH - MAYOR
PO BOX 1604
BERTRAM, TX 78605-1604

BLANCO, CITY OF
C/O JIM RODRIGUE - MAYOR
PO BOX 750
BLANCO, TX 78606-0750

BROOKSMITH SUD
C/O MIKE TAYLOR - GEN MGR
PO BOX 27
BROWNWOOD, TX 76804

BUDA, CITY OF
C/O MIKE BEGGS PUBLIC WORKS
DIRECTOR
PO BOX 1218
BUDA, TX 78610-1218

BURNET, CITY OF
C/O MAYOR ALAN SMITH
PO BOX 1369
BURNET, TX 78611-7369

CANYON LAKE WSC
C/O GENERAL MANAGER
PO BOX 1742
CANYON LAKE, TX 78133

CEDAR PARK, CITY OF
C/O SAM ROBERTS - ASST CITY
MANAGER/PUBLIC WORKS DIRECTOR
600 N BELL BLVD
CEDAR PARK, TX 78613

CHISHOLM TRAIL S U D
C/O DON RAUSCHUBER - GENERAL
MANAGER
PO BOX 249
FLORENCE, TX 76527

CIMARRON PARK WATER COMPANY INC
C/O PRESIDENT
PO BOX 923
MANCHACA, TX 78652-0923

COLUMBUS, CITY OF
C/O DAVID MEISELL, CITY MANAGER
PO BOX 87
COLUMBUS, TX 78934

COTTONWOOD SHORES, CITY OF
C/O SYLVIA BREEN - MAYOR
3808 COTTONWOOD DR
MARBLE FALLS, TX 78657-9433

CREEDMOOR-MAHA WATER SUPPLY
CORP
C/O CHARLES LAWS - GENERAL MGR
12100 LAWS ROAD
BUDA, TX 78610-9607

DRIPPING SPRINGS , CITY OF
C/O MICHELLE FISCHER - CITY
ADMINISTRATOR
PO BOX 384
DRIPPING SPRINGS, TX 78620-0384

DRIPPING SPRINGS WATER SUPPLY CORP
C/O DOUG CONES - MANAGER
PO BOX 354
DRIPPING SPRINGS, TX 78620-0354

EAGLE LAKE, CITY OF
C/O THURSTON WEBB - PUBLIC WORKS
DIRECTOR
PO BOX 38
EAGLE LAKE, TX 77434-0038

EAST BERNARD, CITY OF
C/O MELVIN SANDS - CITY
ADMINISTRATOR
704 CHURCH ST
EAST BERNARD, TX 77435

ELGIN, CITY OF
C/O JOE PARTEN - DIR OF PUBLIC WORKS
PO BOX 591
ELGIN, TX 78621-0591

FAYETTE W S C
C/O KIP BRUNNER - MANAGER
PO BOX 724
LA GRANGE, TX 78945-0724

FLATONIA, CITY OF
C/O MAYOR JEFF HAIRGROVE
PO BOX 329
FLATONIA, TX 78941-0329

FREDERICKSBURG, CITY OF
C/O MAYOR JERYL HOOVER
126 W MAIN ST
FREDERICKSBURG, TX 78624-3708

GOFORTH WATER SUPPLY
CORPORATION
C/O MARIO TOBIAS-MANAGER
8900 NIEDERWALD STRASSE
KYLE, TX 78640-4034

GOLDTHWAITE, CITY OF
C/O MAYOR MIKE MCMAHAN
PO BOX 450
GOLDTHWAITE, TX 76844-0450

GRANITE SHOALS, CITY OF
C/O MAYOR FRANK M REILLY
410 N PHILLIPS RANCH ROAD
GRANITE SHOALS, TX 78654-2030

HILL COUNTRY WATER SUPPLY CORP
C/O JORGE ACEVEDO PRES
13062 W HIGHWAY 290 STE 104
AUSTIN, TX 78737-8834

JOHNSON CITY, CITY OF
C/O MAYOR KERMIT ROEDER
PO BOX 369
JOHNSON CITY, TX 78636-0369

JONESTOWN WATER SUPPLY
CORPORATION
C/O WILLIAM CARTER - PRESIDENT
PO BOX 5096
JONESTOWN, TX 78645-0003

JONESTOWN, CITY OF
C/O GILBERT HERRERA - PUBLIC WORKS
DIRECTOR
18649 FM 1431 STE 4A
JONESTOWN, TX 78645

KEMPNER WSC
C/O DAVID SNEED - GENERAL MANAGER
PO BOX 103
KEMPNER, TX 76539-0103

KINGSLAND WATER SUPPLY
CORPORATION
C/O LINDA RASCHKE - PRESIDENT
PO BOX 73
KINGSLAND, TX 78639-0073

LA GRANGE, CITY OF
C/O SHAWN RABORN CITY MANAGER
PO BOX 339
LA GRANGE, TX 78945-0339

LAGO VISTA, CITY OF
C/O JACK TYLER - PUBLIC WORKS
DIRECTOR
PO BOX 4727
LAGO VISTA, TX 78645-0008

LAKE LBJ MUNICIPAL UTILITY DIST
C/O GENERAL MGR - MICHAEL F THUSS
PO BOX 7765
HORSESHOE BAY, TX 78657-7765

LAKEWAY, CITY OF
C/O STEVE JONES - CITY MANAGER
1102 LOHMANS CROSSING
LAKEWAY, TX 78734

LEE COUNTY WATER SUPPLY
CORPORATION
C/O WILLARD ALBRECHT - PRESIDENT
PO BOX 8
GIDDINGS, TX 78942-0008

LLANO, CITY OF
C/O JOSH BECKER - UTILITY DIRECTOR
301 W MAIN
LLANO, TX 78643-1935

LOOP 360 WATER SUPPLY CORP
C/O JESSE KENNIS - SOUTHWEST WATER
COMPANY
9511 RANCH ROAD 620 NORTH
AUSTIN, TX 78726-2908

LOST CREEK MUNICIPAL UTILITY DIST
C/O RICK CHERYE - BOARD PRESIDENT
1305 QUAKER RIDGE DRIVE
AUSTIN, TX 78746-6211

MANOR, CITY OF
C/O MIKE TULEY - PUBLIC WORKS
DIRECTOR
PO BOX 387
MANOR, TX 78653-0387

MANVILLE WATER SUPPLY
CORPORATION
C/O TONY GRAF - GENERAL MANAGER
PO BOX 248
COUPLAND, TX 78615-0248

MARBLE FALLS, CITY OF
C/O PERRY MALKEMUS - DIRECTOR OF
PUBLIC WORKS
800 3RD ST
MARBLE FALLS, TX 78654-5728

MEADOWLAKES MUD
C/O JOHNNIE THOMPSON - PUBLIC
WORKS MANAGER
177 BROADMOOR SUITE A
MEADOWLAKES, TX 78654-6611

MOUNTAIN CITY OAKS WATER SYSTEM
C/O JOHN ANDERSON
2507 TIMBER RIDGE DR
TEMPLE, TX 76502-8818

MUSTANG RIDGE
C/O WATER UTILITIES DEPARTMENT
12800 US HWY 183 S
BUDA, TX 78610

NORTH AUSTIN MUD NO 1
C/O SOUTHWEST WATER COMPANY
9511 RANCH ROAD 620 NORTH
AUSTIN, TX 78726-2908

NORTH TRAVIS COUNTY MUD NO 5
C/O DARRELL WINSLETT -
SUPERINTENDENT
PO BOX 589
PFLUGERVILLE, TX 78691-0589

ORBIT SYSTEMS INC
C/O PEGGY PAUL
1302 AIRLINE N
ROSHARON, TX 77583-7718

PALACIOS, CITY OF
C/O JOHN MARTINEZ - PUBLIC WORKS
DIRECTOR
PO BOX 845
PALACIOS, TX 77465-0845

PFLUGERVILLE, CITY OF
C/O DARRELL WINSLETT -
SUPERINTENDENT
PO BOX 589
PFLUGERVILLE, TX 78691-0589

POLONIA WSC
C/O AUSTIN PITTMAN - PRESIDENT
PO BOX 778
LOCKHART, TX 78644-0778

RICHLAND SPECIAL UTILITY DISTRICT
C/O WILLIAM HARLOW - PRESIDENT
PO BOX 217
RICHLAND SPRINGS, TX 76871-0217

RIVER PLACE MUD
C/O JIM CASEY - PRESIDENT
10123 TREASURE ISLAND DR
AUSTIN, TX 78730

ROLLINGWOOD, CITY OF
C/O FRANK MILLER - DIRECTOR OF
PUBLIC WORKS
403 NIXON DRIVE
AUSTIN, TX 78746-5512

ROUND ROCK, CITY OF
C/O MICHAEL THANE - UTILITIES
DIRECTOR
212 COMMERCE BLVD
ROUND ROCK, TX 78664

SAN SABA, CITY OF
C/O SCOTT GLAZE - PUBLIC WORKS DIRECTOR
PO BOX 788
SAN SABA, TX 76877-0788

SCHULENBURG, CITY OF
C/O RONALD BROSSMANN - CITY ADMINISTRATOR
PO BOX 8
SCHULENBURG, TX 78956-0008

SHADY HOLLOW MUD
C/O RON STRIED - PRESIDENT
PO BOX 150068
AUSTIN, TX 78715-0068

SMITHVILLE, CITY OF
C/O TEX MIDDLEBROOK - CITY MANAGER
PO BOX 449
SMITHVILLE, TX 78957-0449

SOUTHWEST UTILITIES
C/O WATER UTILITIES DEPARTMENT
PO BOX 907
EL CAMPO, TX 77437-0907

SUNRISE BEACH VILLAGE
C/O WATER UTILITIES DEPARTMENT
124 SUNRISE DR
SUNRISE BEACH VILLAGE, TX 78643-9283

VILLAGE OF THE HILLS
C/O MAYOR VIRGINIA JONES
102 TROPHY DRIVE
THE HILLS, TX 78738

TRAVIS CO WCID NO 17
C/O DEBORAH GERNES - GEN MGR
3812 ECK LN
AUSTIN, TX 78734-1613

TRAVIS CO WCID NO 18
C/O MARSHA HYINK - PRESIDENT
1502 SAN JUAN DRIVE
AUSTIN, TX 78733-1905

TRAVIS CO WCID NO 19
C/O CURTIS JEFFREY - AWR SERVICES INC
500 N CAPITAL OF TEXAS HWY BLDG 1, SUITE 125
AUSTIN, TX 78746

TRAVIS CO WCID NO 20
C/O DAVID YOHE SOUTHWEST WATER COMPANY
9511 RANCH ROAD 620 NORTH
AUSTIN, TX 78726-2908

VILLAGE OF BRIARCLIFF
C/O AARON JOHNSON - CITY ADMINISTRATOR
402 SLEAT DR
SPICEWOOD, TX 78669-2422

VILLAGE OF SAN LEANNA
C/O KATHLEEN LESSING - VILLAGE ADMINISTRATOR
PO BOX 1107
AUSTIN, TX 78767

WEIMAR, CITY OF
C/O RANDAL W JONES - CITY MANAGER
106 EAST MAIN STREET
WEIMAR, TX 78962

WELLS BRANCH MUD NO 1
C/O DON WILLIAMS - DISTRICT MANAGER
3000 SHORELINE DRIVE
AUSTIN, TX 78728-4483

WESTLAKE HILLS, CITY OF
C/O ROBERT WOOD - CITY ADMINISTRATOR
911 WESTLAKE DRIVE
WEST LAKE HILLS, TX 78746

LCRA WEST TRAVIS COUNTY REGIONAL W S
C/O GLORIA BROUSSARD - ENVIRONMENTAL COORDINATOR
PO BOX 220
AUSTIN, TX 78767-0220

WHARTON, CITY OF
C/O HAROLD MATULA - WATER SUPERINTENDENT
120 EAST CANEY STREET
WHARTON, TX 77488-5003

WILLIAMSON-TRAVIS CO MUD NO 1
C/O CHRIS ROCCO - PRESIDENT
14050 SUMMIT DRIVE SUITE 113
AUSTIN, TX 78728-7101

WINDERMERE UTILITY COMPANY INC
C/O DAVID YOHE SOUTHWEST WATER COMPANY
9511 RANCH ROAD 620 NORTH
AUSTIN, TX 78726-2908

Judge Ronnie McDonald
804 Pecan
Bastrop, TX 78602

Judge Bill Guthrie
P.O. Box 471
Johnson City, TX 78636-0387

Judge Donna Klaeger
220 S. Pierce
Burnet, TX 78611

Judge A.G. "Al" Jamison
P.O. Box 236
Columbus, TX 78934

Judge Edward F. Janecka
151 N. Washington, Room 301
LaGrange, TX 78945

Judge Mark Stroeher
101 W. Main, Unit 9
Fredericksburg, TX 78624

Judge Elizabeth Sumter
111 E. San Antonio St., Ste. 300
San Marcos, TX 78666

Judge Wayne Brascom
801 Ford Street, Room 101
Llano, TX 78643

Judge Nate McDonald
1700 Seventh Street, Room 301
Bay City, TX 77414

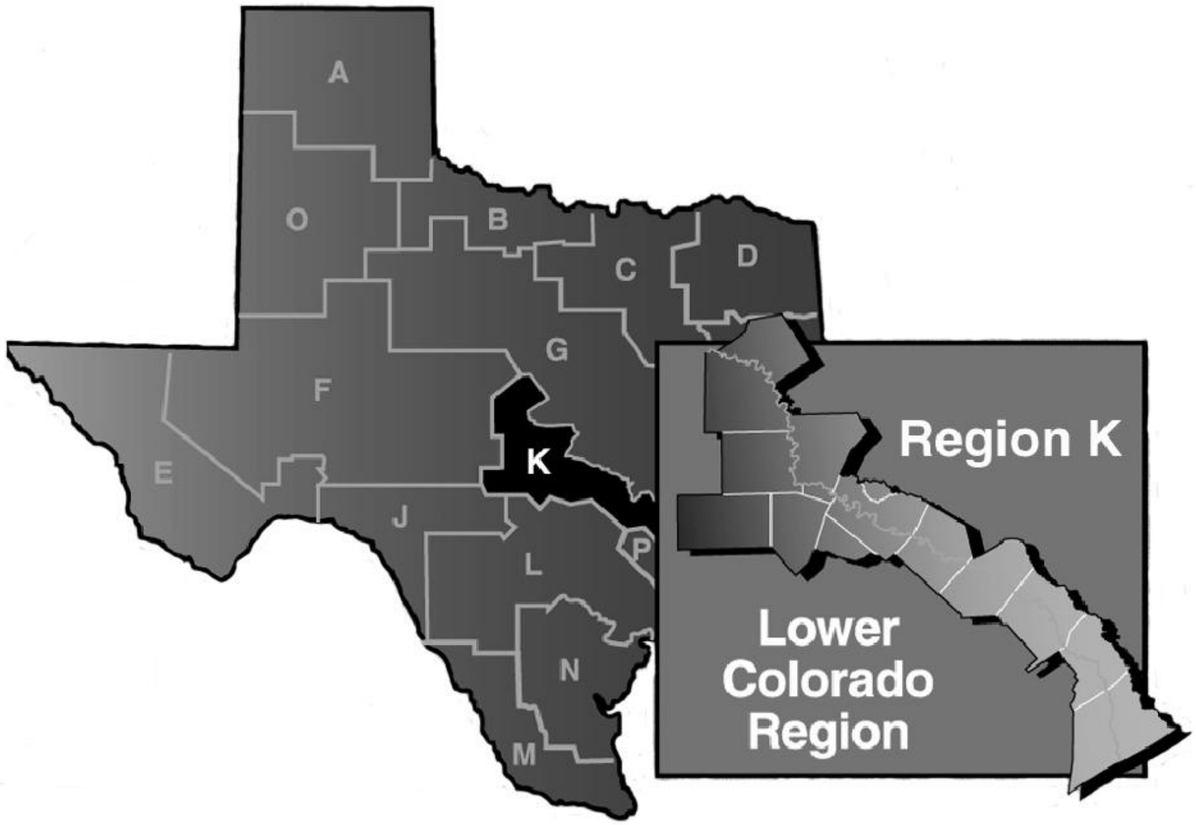
Judge Kirkland A. Fulk
P.O. Box 483
Goldthwaite, TX 76844

Judge Byron Theodosis
500 E. Wallace, Ste. 200
San Saba, TX 76877

Judge Samuel Biscoe
P.O. Box 1748
Austin, TX 78767

Judge John Murrile
309 East Milam, Ste. 600
Wharton, TX 77488

Judge Dan A. Gattis
710 Main Street, Ste. 101
Georgetown, TX 78626



Public Hearing for Initially Prepared Plan
Lower Colorado Regional Water Planning Group

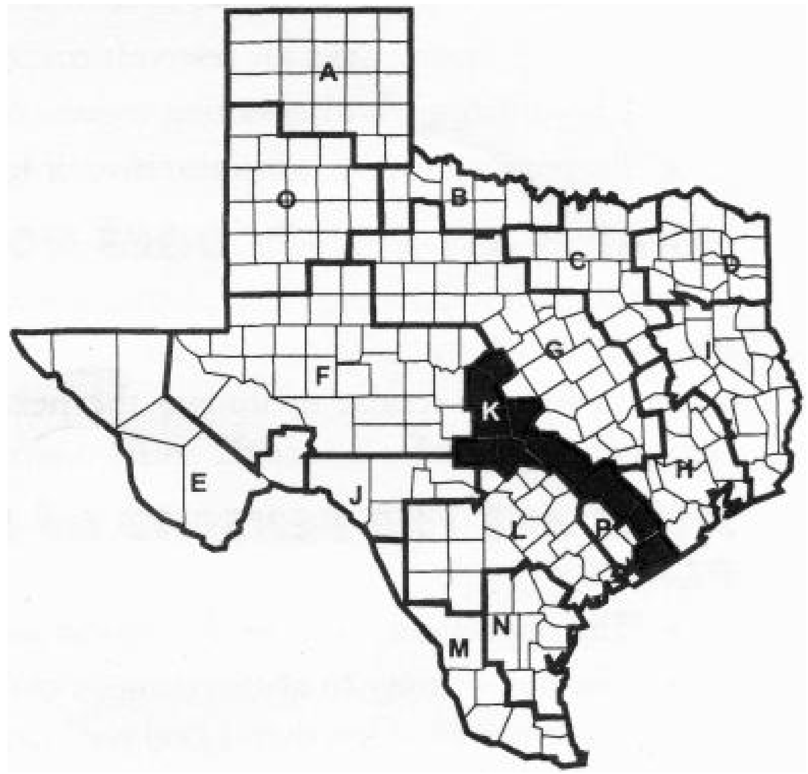
April 28, 2010

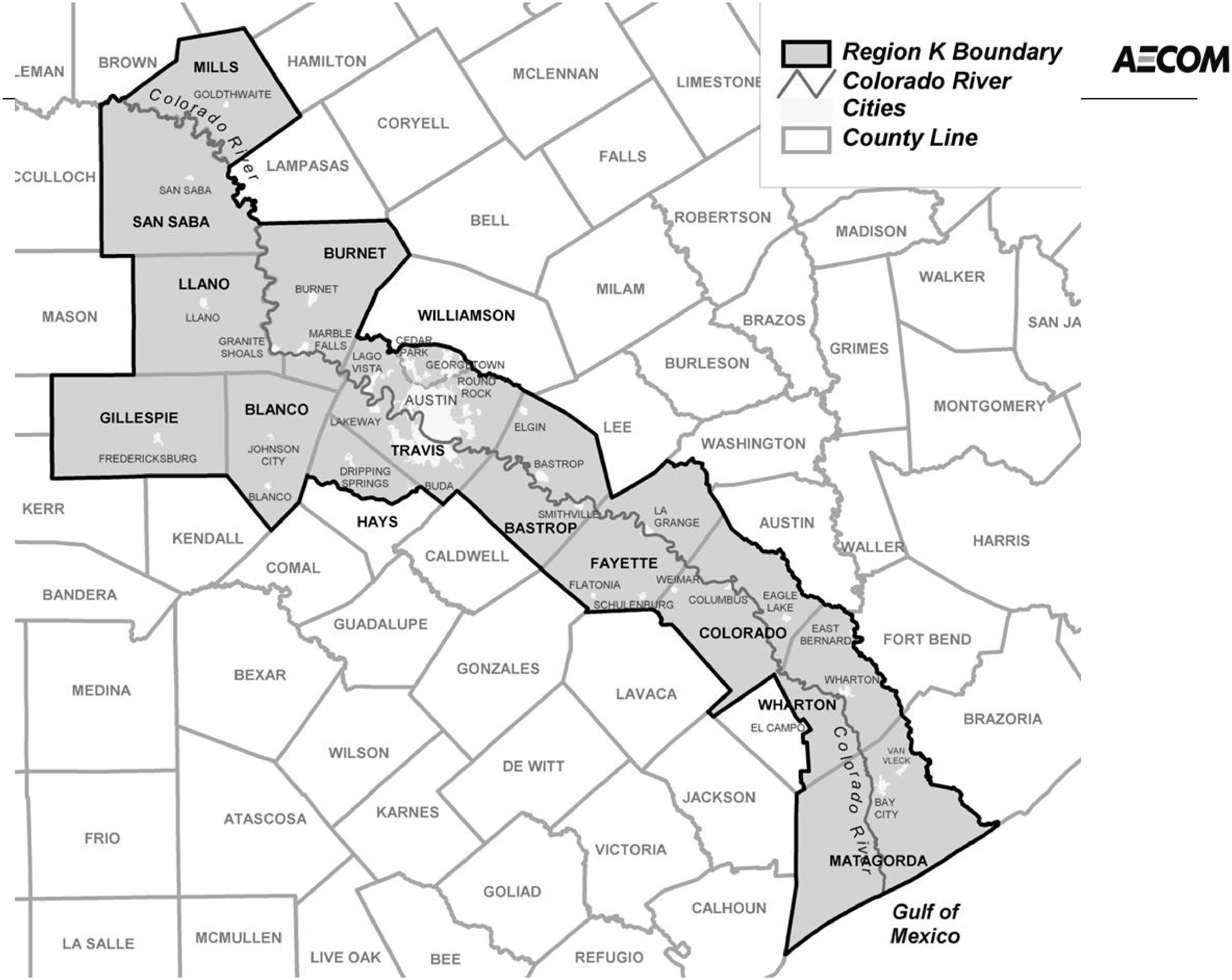
Presentation Outline

- Overview
- Elements of the 2011 Region K Water Plan
  - Population and water demand projections
  - Water availability/supply estimates
  - Water management strategies and their potential impacts
  - Policy recommendations
- Public comments

Regional Water Planning Overview

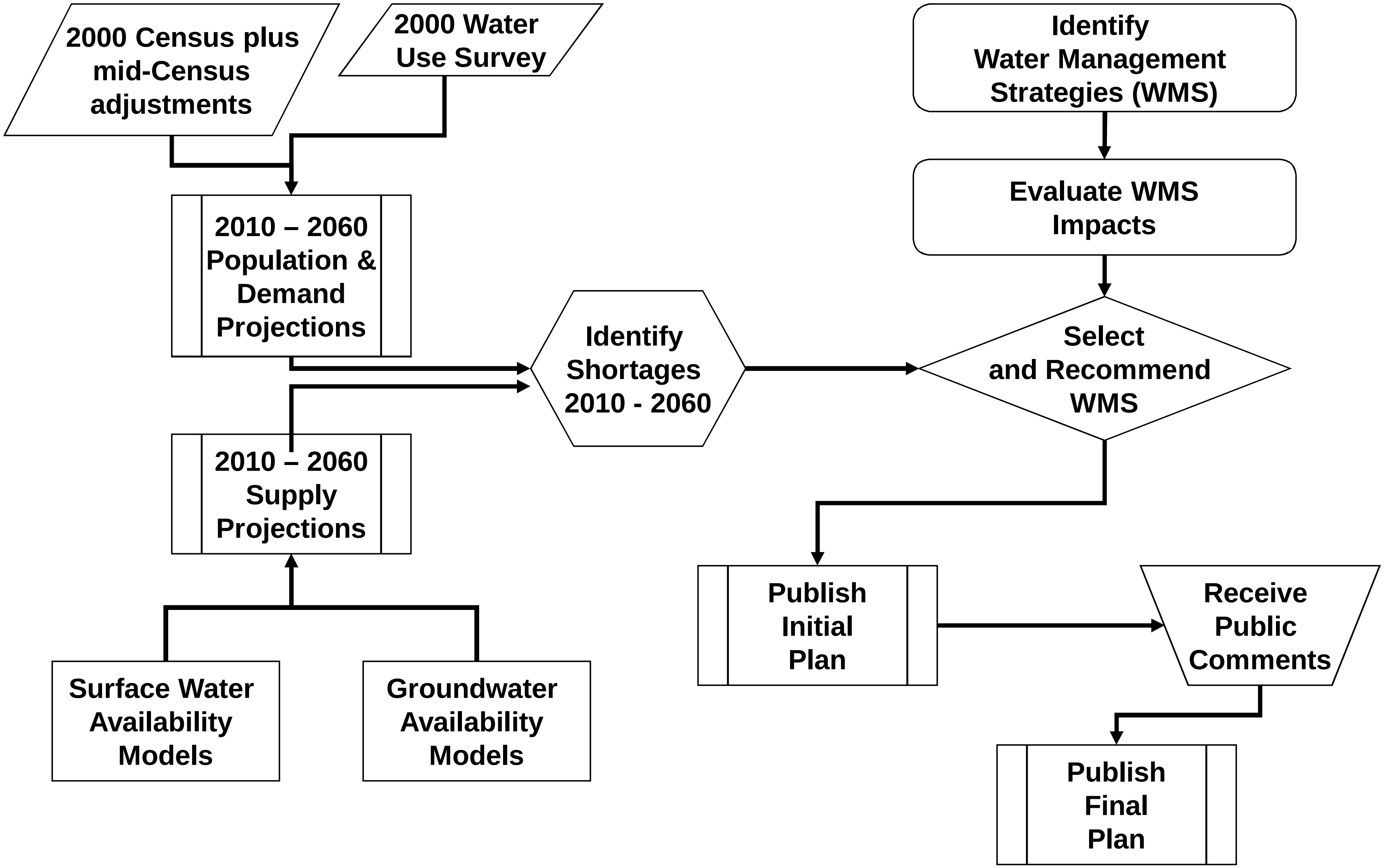
- SB1, 75th Legislature (1997)
- 16 planning regions
- Each region prepares a 50-year water plan, updated every five years
- State Water Plan created from the 16 regional plans
- Regional Water Plans:
  - First published in 2001
  - Latest published in 2006
- State Water Plans:
  - First published in 2002
  - Latest published in 2007





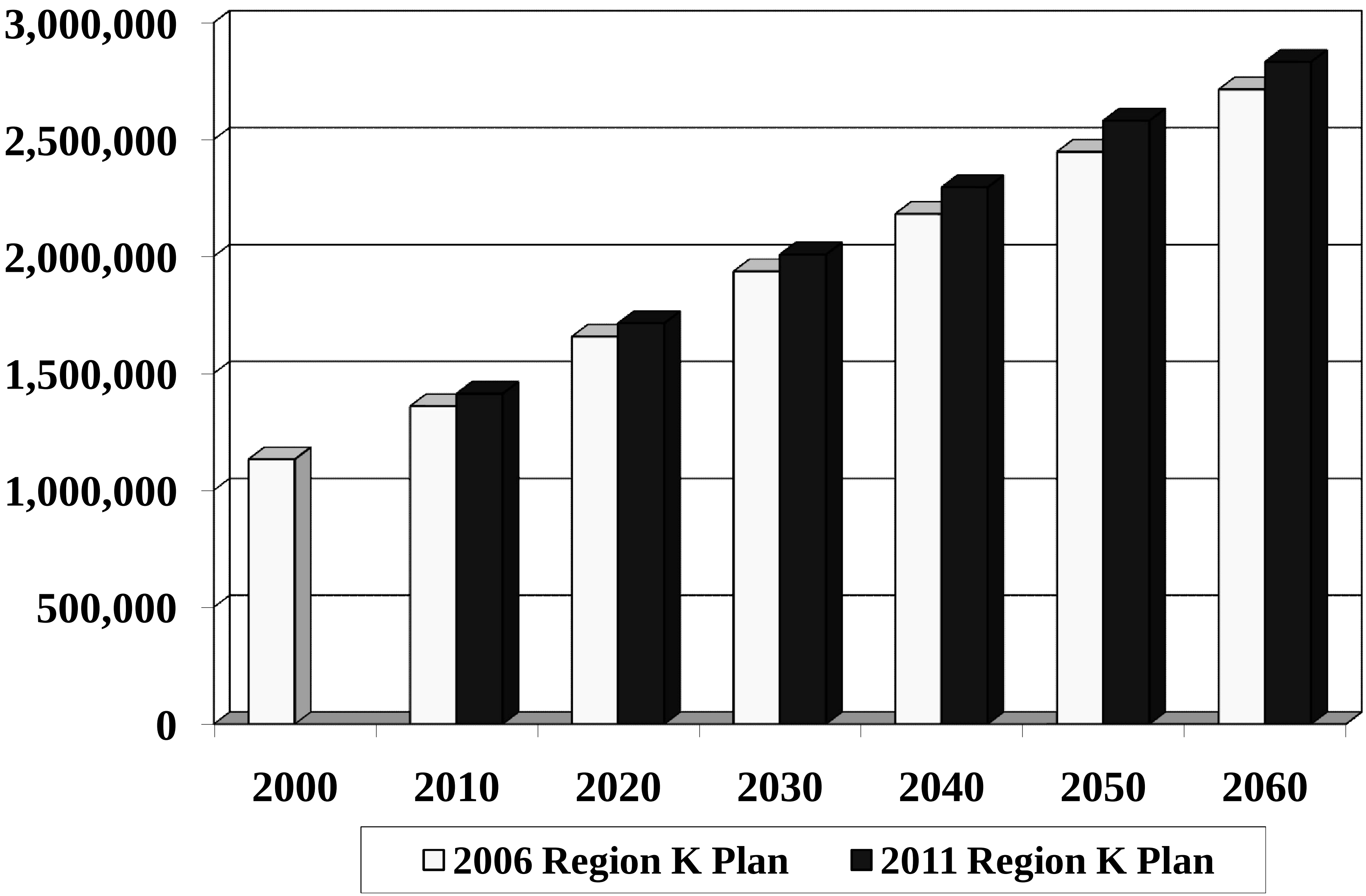
Region K Boundary
Colorado River
Cities
County Line
AECOM
MILLS
GOLDTHWAITE
SAN SABA
SAN SABA
BURNET
BURNET
LLANO
LLANO
GRANITE SHOALS
MARBLE FALLS
GILLESPIE
FREDERICKSBURG
BLANCO
JOHNSON CITY
BLANCO
LAGO VISTA
CEDAR PARK
GEORGETOWN
ROUND ROCK
AUSTIN
LAKEWAY
TRAVIS
DRIPPING SPRINGS
BUDA
HAYS
WILLIAMSON
ELGIN
BASTROP
SMITHVILLE
BASTROP
LA GRANGE
FAYETTE
FLATONIA
SCHULENBURG
WEIMAR
COLUMBUS
EAGLE LAKE
COLORADO
EAST BERNARD
WHARTON
WHARTON
EL CAMPO
VAN VLECK
BAY CITY
MATAGORDA
Colorado River
Gulf of Mexico
BROWN
HAMILTON
MCLENNAN
LIMESTONE
CORYELL
LAMPASAS
FALLS
BELL
ROBERTSON
MADISON
MILAM
WALKER
MASON
BRAZOS
GRIMES
BURLESON
LEE
MONTGOMERY
WASHINGTON
AUSTIN
WALLER
HARRIS
KERR
KENDALL
COMAL
CALDWELL
BANDERA
GUADALUPE
FORT BEND
MEDINA
BEXAR
GONZALES
LAVACA
BRAZORIA
WILSON
DE WITT
JACKSON
FRIO
ATASCOSA
KARNES
VICTORIA
GOLIAD
CALHOUN
LA SALLE
MCMULLEN
LIVE OAK
BEE
REFUGIO

Planning Process

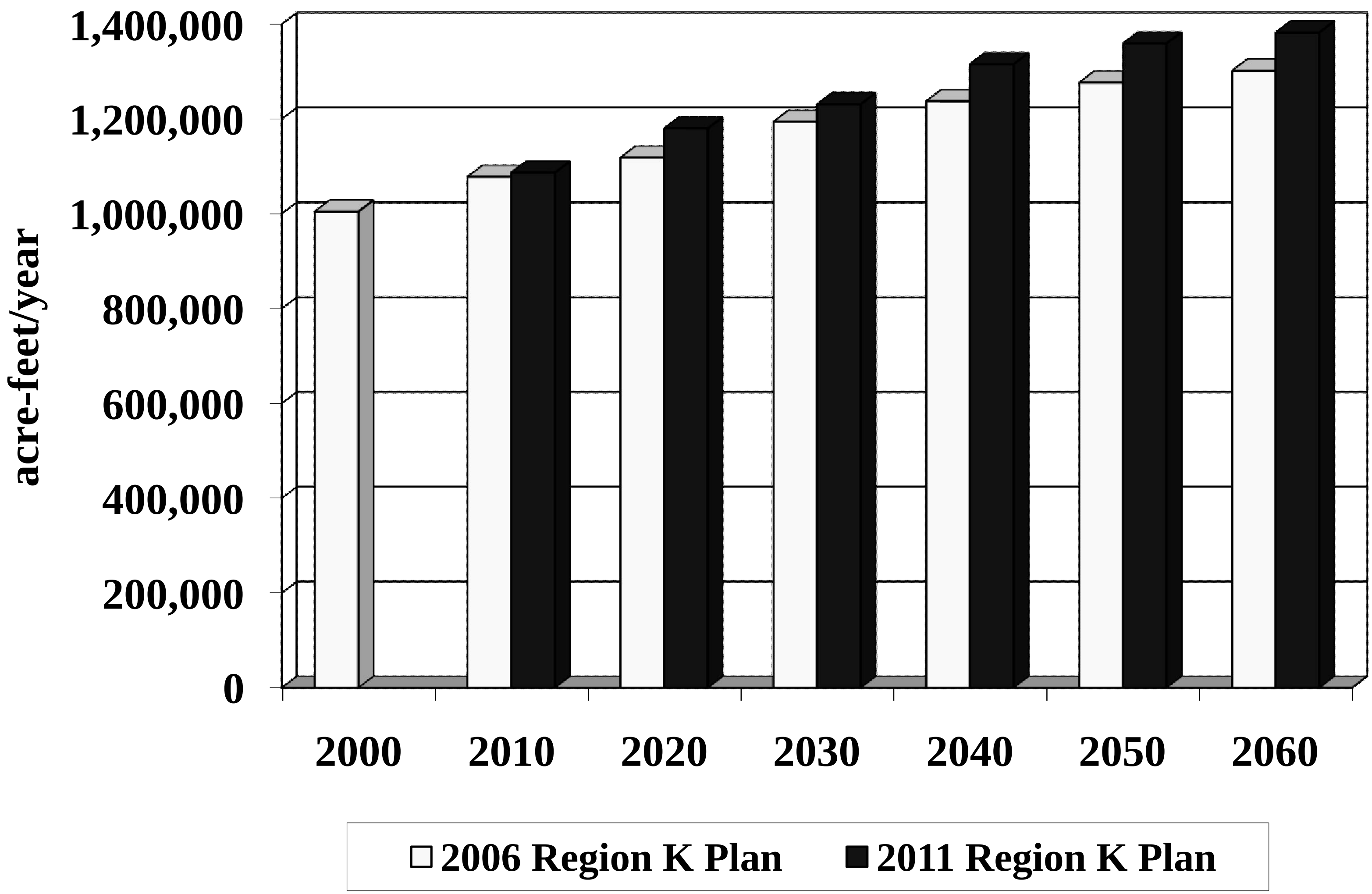


Population and Water Demand Projections (Chapter 2)

Region K Population Projections



Region K Total Water Demand Projections



Municipal Water Demand (ac-ft/yr) = (Population)*(GPCD – gallons per capita day)*(365 days / year)*(1 acre-feet / 325,851 gallons)

Water Availability/Supply Estimates (Chapter 3)

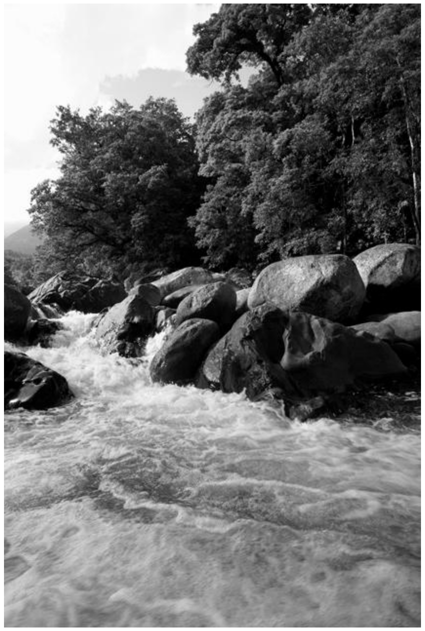
What is Water Availability?

- Surface Water
  - In general, it is the amount of water that is available yearly during a repeat of the conditions of the worst drought on record (1950s).
  - It is a “minimum”. Non-drought years may have more water available.

- Groundwater
  - The amount of water that can be withdrawn from an aquifer in accordance with the principles associated with the management of the aquifer.
  - Typically, it is a sustainable amount, meaning the amount is always available.

Available Surface Water

- Total available water almost 1.3 million acre-feet (2060)
  - 1 acre-foot = 325,851 gallons
- Over 900,000 acre-feet is surface water
- Surface water availability modeling used to determine decadal amounts.



Available Groundwater

- Developed from best information available:

  1. Managed Available Groundwater (MAG) quantities established by TWDB
  2. Local information from Groundwater Conservation Districts (GCD)
  3. Values from a current groundwater management plan
  4. Information from the 2006 Region K Plan

- Yegua-Jackson Aquifer availability added this planning cycle

Supply Source	Available Water (acre-feet per year)		
	Year 2010	Year 2030	Year 2060
Groundwater			
Gulf Coast Aquifer	198,425	198,425	198,425
Carrizo-Wilcox Aquifer	28,400	28,400	28,400
Edwards Aquifer (Balcones Fault Zone)	9,578	9,578	9,578
Trinity Aquifer	17,600	17,598	17,311
Edwards-Trinity (Plateau) Aquifer	1,500	1,500	1,500
Hickory Aquifer	25,616	25,616	25,616
Queen City Aquifer	3,991	3,991	3,991
Sparta Aquifer	9,889	9,889	9,889
Ellenburger-San Saba Aquifer	26,451	26,451	26,451
Marble Falls Aquifer	14,658	14,658	14,658
Yegua-Jackson Aquifer	20,000	20,000	20,000
Other Aquifer [1]	15,562	15,601	15,622
Groundwater Subtotal	**371,670**	**371,707**	**371,441**
Surface Water [2]			
Run of River	485,587	470,347	470,360
Reservoir	402,768	384,597	367,064
Local Supply	70,780	74,419	79,364
Surface Water Subtotal	**959,135**	**929,363**	**916,788**
TOTAL LCRWPA Water Availability	**1,330,805**	**1,301,070**	**1,288,229**

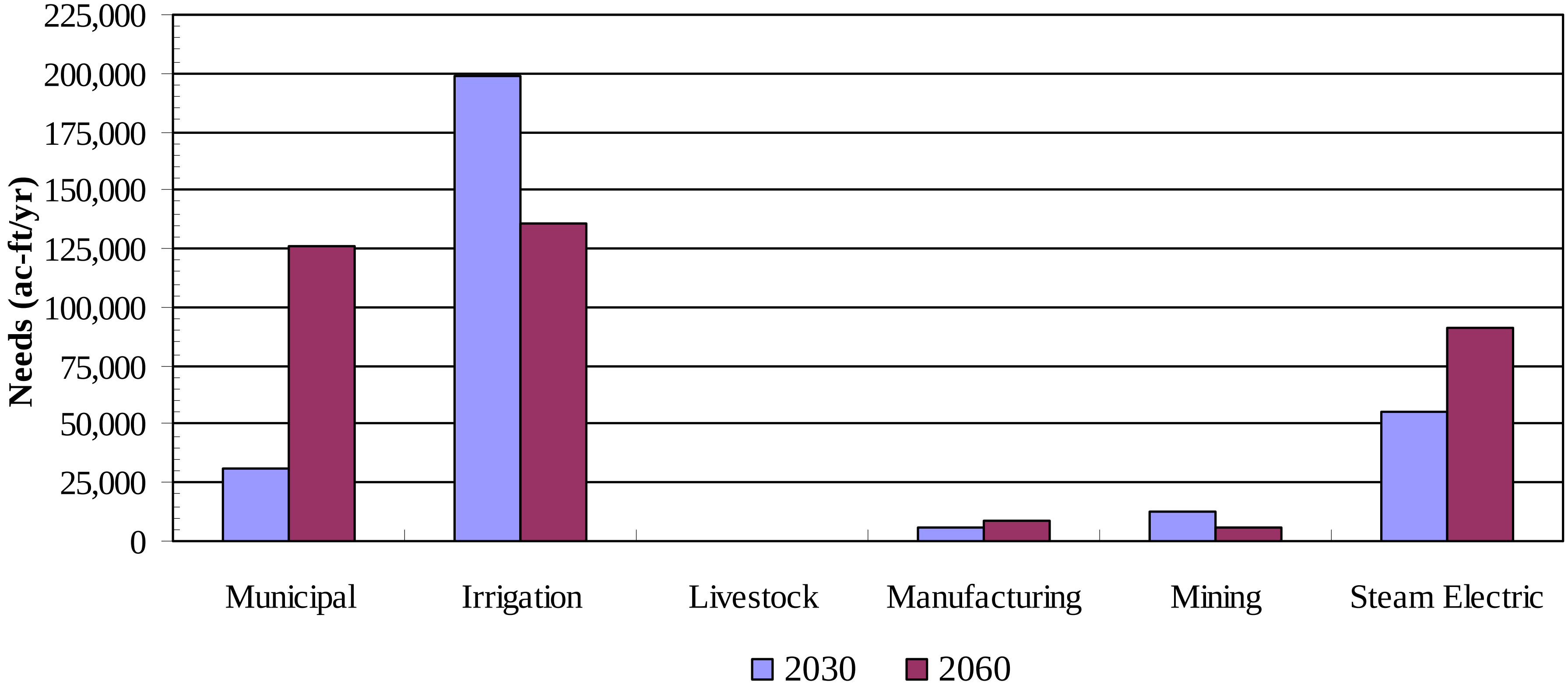
[1] Other Aquifer refers to alluvial aquifer water supplies.

[2] Includes local supplies determined from 2001 Plan.

AECOM

AECOM

Region K Water Shortages (Needs) by Category of Use



Shortage (Need) = Supply – Demand

Note: Supply is based on existing infrastructure that is in place

Water Management Strategies

(Chapter 4)

- Regional
- Municipal
- Steam-electric
- Other non-municipal
- Wholesale water provider
- Alternative

- Water management strategies in the Region K Plan are developed and recommended by the Region K Planning Group to meet calculated needs and do not necessarily reflect the plans of individual water user groups or water providers.

Water Conservation and Drought Management

- Several water conservation strategies recommended in this Plan (municipal, industrial, agricultural)
- Drought management recommended for some WUGs
- Water conservation and drought management survey sent to water utilities
  - Provided information on existing and potential future conservation and drought management measures
- Water loss audit provided by TWDB for inclusion in this Plan
  - Water line losses are higher in Region K than the State average

Additional Principal Water Management Strategies

- Return Flows and Direct Reuse
- Groundwater
  - Increased use of existing supplies
  - Development of new groundwater supplies
    - Includes desalination of brackish groundwater
- Surface Water
  - New or amended contracts with LCRA
- LCRA-SAWS Water Project (LSWP)

LCRA-SAWS Water Project (LSWP) Update

- The strategy is currently the subject of litigation.
- For now it remains in the Region K Water Plan as a recommended strategy.
- The Region K Planning Group has developed alternative water management strategies in case this strategy is not feasible.

Wholesale Water Provider Strategies

AECOM

WWP	Strategy	Supply From WMS (acre-feet per year)					
		2010	2020	2030	2040	2050	2060
LCRA [2]	Irrigation Water Right Amendments [1]	43,000	47,000	55,000	65,000	65,000	106,600
	Available Interruptible Water for Irrigation	255,493	196,568	137,643	78,718	19,793	0
	New Contracts	300	35,864	37,082	59,722	60,477	70,210
	Contract Amendments	2,862	4,340	5,176	7,488	9,965	11,953
	LCRA-SAWS Water Project		201,950	201,950	201,950	201,950	201,950
	Unappropriated Flows and Off-Channel Storage						47,000
	Enhanced Municipal and Industrial Conservation			2,000	10,000	20,000	20,000
	Aquifer Storage and Recovery				10,000	10,000	10,000
	Reuse by Highland Lakes Communities		500	2,000	5,000	5,000	5,000
	Commitment Reductions [3]	0	(15,000)	(17,000)	0	0	0
City of Austin	Conservation	11,030	18,795	24,036	25,385	30,401	36,370
	Direct Reuse (Municipal & Manufacturing)	5,143	13,620	22,077	30,268	36,218	40,468
	Direct Reuse (Steam Electric) Travis	2,315	3,315	7,315	8,315	12,315	13,315
	Purchase Water from LCRA (Steam Electric)	0	0	0	20,975	20,975	26,895

[1] These amendments are proposed to meet increased municipal and industrial demand within the lower Colorado River Basin and are also a necessary component of the LSWP.

[2] LCRA's irrigation strategies are discussed in Section ES.6.5.

[3] Reduction in LCRA commitments due to improved efficiency in Ferguson and COA reuse. The use of this strategy is based on calculated surpluses shown in the 2011 Region K Plan only and does not assume that any legal changes to existing commitments would occur as a result of this strategy.

Travis County Shortages (Needs)

AECOM

Water User Group Name	2010 Needs	2020 Needs	2030 Needs	2040 Needs	2050 Needs	2060 Needs
Austin	0	0	0	0	(30,459)	(62,934)
Barton Creek West WSC	(53)	(50)	(47)	(45)	(43)	(43)
Bee Cave Village	(936)	(1,172)	(1,406)	(1,615)	(1,768)	(1,923)
Briarcliff Village	0	0	(45)	(87)	(117)	(149)
Creedmoor-Maha WSC	0	(431)	(548)	(632)	(715)	(807)
Elgin	0	0	0	0	(1)	(3)
Goforth WSC	(11)	(21)	(30)	(37)	(43)	(48)
Jonestown	(129)	(233)	(329)	(416)	(481)	(554)
Lakeway	(1,681)	(2,613)	(3,513)	(4,338)	(4,954)	(5,572)
Manor	0	(940)	(1,173)	(1,390)	(1,552)	(1,717)
Manville WSC	0	0	(831)	(2,184)	(2,577)	(2,982)
Pflugerville	0	0	0	0	(918)	(1,981)
River Place on Lake Austin	(570)	(823)	(823)	(817)	(817)	(817)
Rollingwood	0	(376)	(374)	(372)	(371)	(373)
Round Rock	(158)	(339)	(528)	(669)	(813)	(957)
Travis County WCID #18	0	0	0	(4)	(135)	(283)
West Lake Hills	0	(1,833)	(2,049)	(2,178)	(2,320)	(2,471)
Windermere Urility Company	0	(2,222)	(2,201)	(2,180)	(2,180)	(2,180)
Steam Electric Power	0	0	(170)	(1,170)	(5,170)	(6,170)
Travis Co. Total Needs	**(3,538)**	**(11,053)**	**(14,067)**	**(18,134)**	**(55,434)**	**(91,964)**

Travis County Recommended Strategies

- Conservation
- Direct Reuse
- Purchase water from LCRA and West Travis Regional Water System
  - includes new and amended contracts, and water for Region G from HB 1437

Bastrop County Shortages (Needs) and Strategies

Water User Group Name	2010 Needs	2020 Needs	2030 Needs	2040 Needs	2050 Needs	2060 Needs
Aqua WSC	0	0	(602)	(3,709)	(6,221)	(9,415)
Bastrop	(65)	(812)	(1,532)	(2,590)	(3,455)	(4,542)
Bastrop County WCID #2	0	0	0	0	0	(144)
County-Other	0	(663)	(1,879)	(3,437)	(4,528)	(5,880)
Elgin	0	(604)	(1,176)	(2,033)	(2,734)	(3,624)
Manville WSC	0	0	0	0	(7)	(52)
Polonia WSC	0	(2)	(7)	(16)	(23)	(30)
Smithville	(74)	(311)	(526)	(946)	(1,115)	(1,601)
Irrigation	(119)	(50)	(40)	(31)	(24)	(17)
Manufacturing	(8)	(17)	(28)	(38)	(46)	(60)
Mining	(4,293)	(4,297)	(4,298)	0	0	0
Steam Electric Power	0	0	0	(1,280)	(2,780)	(2,780)
Bastrop County Total Needs	**(4,559)**	**(6,756)**	**(10,088)**	**(14,080)**	**(20,933)**	**(28,145)**

- Strategies recommended for Bastrop County
  - Conservation and Drought Management
  - Expand current use or develop new use of Carrizo-Wilcox Aquifer, Queen City Aquifer, and alluvial supplies
  - Purchase water from LCRA

Fayette County Shortages (Needs) and Strategies

Water User Group Name	2010 Needs	2020 Needs	2030 Needs	2040 Needs	2050 Needs	2060 Needs
County-Other	(118)	(115)	(14)	(32)	(25)	(16)
Fayette WSC	0	(257)	(552)	(782)	(1,062)	(1,433)
Lee County WSC	0	(48)	(117)	(171)	(232)	(319)
Schulenburg	0	0	0	(34)	(100)	(193)
Irrigation	(20)	(18)	(16)	(14)	(12)	(10)
Livestock	(22)	(22)	(22)	(22)	(22)	(22)
Manufacturing	(45)	(70)	(94)	(117)	(137)	(162)
Mining	0	(4)	(22)	(28)	(29)	(29)
Steam Electric Power	0	0	0	(20,975)	(20,975)	(26,885)
Fayette County Total Needs	**(205)**	**(534)**	**(837)**	**(22,175)**	**(22,594)**	**(29,069)**

- Strategies recommended for Fayette County
  - Conservation
  - Expand current use or develop new use of Gulf Coast Aquifer, Sparta Aquifer, Yegua-Jackson Aquifer, and alluvial supplies
  - Purchase water from LCRA

Hays County (K) Shortages (Needs) and Strategies

Water User Group Name	2010 Needs	2020 Needs	2030 Needs	2040 Needs	2050 Needs	2060 Needs
Buda	0	0	(332)	(817)	(1,395)	(1,869)
Cimarron Park Water Company	(150)	(236)	(329)	(423)	(536)	(629)
County-Other	0	(728)	(2,072)	(3,440)	(5,144)	(6,482)
Dripping Springs	(574)	(1,350)	(1,791)	(2,239)	(2,794)	(3,230)
Dripping Springs WSC	0	0	0	(17)	(213)	(366)
Mountain City	(25)	(23)	(23)	(22)	(22)	(22)
Manufacturing	(93)	(211)	(330)	(450)	(558)	(657)
Hays County Total Needs	**(842)**	**(2,548)**	**(4,877)**	**(7,408)**	**(10,662)**	**(13,255)**

- Strategies recommended for Hays County (Region K)
  - Conservation and Drought Management
  - Increase the availability of the Edwards-BFZ Aquifer by pumping and desalinating the Saline Zone portion
  - Development of the Carrizo-Wilcox Aquifer in Caldwell and Gonzales Counties as part of the Hays-Caldwell Public Utility Agency
  - Development of the Trinity Aquifer
  - Purchase water from City of Austin and LCRA

Alternative Water Management Strategies

- Additional water management strategies that are fully analyzed in case a recommended strategy is no longer feasible or desirable and needs to be replaced. (Plan B)

- The Region K Planning Group has developed alternative water management strategies for the following water users:
  - Irrigation in Colorado, Matagorda, and Wharton Counties
  - LCRA as a wholesale water provider
  - Mills County-Other

Alternative Rice Irrigation Water Management Strategies

Water Management Strategy	2010	2020	2030	2040	2050	2060
Expansion of Gulf Coast Aquifer	0	10,000	10,000	10,000	10,000	10,000
Off-Channel Storage in Reservoirs	0	0	30,000	40,000	40,000	40,000
On-Farm Conservation	0	20,000	20,000	30,000	35,000	35,000
Irrigation District Delivery System Improvements	0	20,000	25,000	40,000	48,000	48,000
Conjunctive Use of Groundwater Resources	0	0	0	0	15,000	15,000
Enhanced Recharge of Groundwater	0	0	0	0	17,200	17,200
Total	**0**	**50,000**	**85,000**	**120,000**	**165,200**	**165,200**

Alternative Water Management Strategies for LCRA Developed by the Region K Planning Group

Water Management Strategy	2010	2020	2030	2040	2050	2060
Groundwater Importation	0	0	0	35,000	35,000	35,000
Brackish Desalination of the Gulf Coast Aquifer	0	0	0	22,400	22,400	22,400
Total	**0**	**0**	**0**	**47,400**	**47,400**	**47,400**

Alternative Brackish Groundwater Desalination Strategy for Mills County-Other (Ellenburger-San Saba Aquifer)

WUG Name	County	River Basin	Water Management Strategies (ac-ft/yr)					
			2010	2020	2030	2040	2050	2060
County-Other	Mills	Colorado	0	0	384	384	384	384

Considered Impacts On:

- Water quality
- Existing water rights
- Instream flows
- Bay and estuary freshwater inflows
- Sustainable aquifer yield
- Agricultural water resources
- Threatened and endangered species
- Wildlife habitat
- Public lands
- Recreation

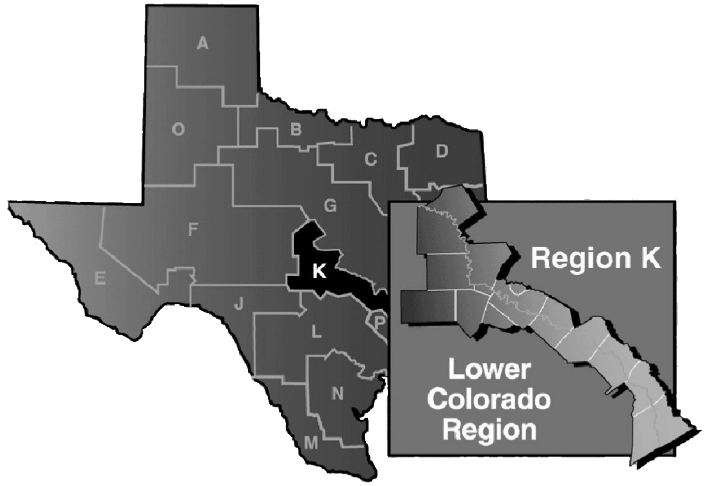
Policy Recommendations

AECOM

- Municipal / industrial conservation
  - Consistent methodology for calculating GPCD
  - Consistent water savings metrics
  - Additional financial assistance to reduce water loss
  - Implementation of conservation coordinators
  - Regional coordination of conservation messaging
  - Dedicated conservation funding for water providers

- Use of water for electrical generation should be optimized by managing surface and groundwater to balance it with other needs in the basin

AECOM



Public Comments

Written comments must be received by **June 28, 2010**
Send comments to:
Mr. John Burke, Region K Chairman
P.O. Drawer P, Bastrop, TX 78602
jburke@aquawsc.com

PUBLIC COMMENTS AND RESPONSES ON

INITIALLY PREPARED 2011 REGION K WATER PLAN

June 28, 2010

Mr. John Burke
Chairman, Lower Colorado Regional
Water Planning Group
c/o Aqua Water Supply Corporation
P.O. Drawer P
Bastrop, Texas 78602

Mr. James Kowis
Lower Colorado River Authority
P.O. Box 220, MC H300
Austin, Texas 78767

Re: Texas Water Development Board Comments for the Lower Colorado Regional Water Planning Group (Region K) Initially Prepared Plan, Contract No. 0904830870

Dear Mr. Burke and Mr. Kowis:

Texas Water Development Board (TWDB) staff completed a review of the Initially Prepared Plan (IPP) submitted by March 1, 2010 on behalf of the Region K Regional Water Planning Group. The attached comments (Attachments A and B) follow this format:

- Level 1: Comments, questions, and online planning database revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and
- Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional plan.

Based on the information provided to date by regional water planning groups, TWDB has identified potential interregional conflicts that are summarized in Attachment C. The TWDB's statutory requirement for review of potential interregional conflicts under Title 31, Texas Administrative Code (TAC) §357.14 will not be completed until submittal and review of adopted regional water plans.

Title 31, TAC §357.11(b) requires the regional water planning group to consider timely agency and public comment. Section 357.10(a)(3) of the TAC requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted. Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan.

If you have any questions, please do not hesitate to contact David Meesey at (512) 936-0852.

Sincerely,

C L Brittin

Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

Attachments (3)

c w/att: Ms. Jaime Burke, AECOM Inc.

ATTACHMENT A

TWDB Comments on Initially Prepared 2011 Region K Regional Water Plan

LEVEL 1. Comments and questions must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

General Comments

1. Population, demand, and water availability figures in various tables and text are slightly different than the amounts in the online planning database. These differences may be due to rounding or reallocation between river basins. Please revise or coordinate with TWDB staff to ensure that the data in the plan is consistent with the database (e.g. pages 2-1 and 2-5; total population projections are off by 1 from TWDB projections for 2020, 2030 and 2050). *[Title 31 Texas Administrative Code (TAC) §357.7(d)(1),(2); §357.5(a)(3)]*

2. Please include one-page summaries of the region-specific studies performed during phase I of this third round of planning including a description of whether and/or how each region-specific study was incorporated into the regional water plan. *[Contract Exhibit "C" Section 11.1]*

Executive Summary

3. Page ES-10, Table ES-4: Water supply from the Lower Colorado River Authority/San Antonio Water System Project is shown as available beginning in 2020. Table 4-28 on page 4-23 shows this supply becoming available in 2010. Please reconcile the two tables.

Chapter 3

4. Please provide a statement regarding any water availability requirements promulgated by a county commissioners court pursuant to TWC §35.019, which in Region K applies to the Hill Country Priority Groundwater Management Area. *[31 TAC §357.5(k)(1)(H)]*

Chapter 4

5. Please describe how the planning group explored opportunities and benefits of regional water supply facilities or providing regional management of regional facilities. *[31 TAC §357.5(e)(6)]*

6. Please describe how publicly available plans of major agricultural, municipal, manufacturing and commercial water users were considered. *[31 TAC §357.5(k)(1)(E)]*

7. Please include a discussion of how information from water loss audits of water users in the region was considered in the development of water management strategies in the final plan. *[31 TAC §357.7(a)(7)(A)(iv)]*

8. Please ensure that the final plan includes quantitative reporting of impacts of potentially feasible water management strategies on agricultural resources, as appropriate. *[31 TAC §357.7(a)(8)(A)(iii)]*

<u>Chapter 6</u>

9. Please ensure that specific factors for each water supply source to initiate a drought response are included in the final plan. *[31 TAC §357.7(a)(3)]*

<u>Appendix 3</u>

10. Appendix 3-D: the total water available to Region K is different for each decade than the amounts shown in tables 3-23 (page 3-49) and ES-2 (page ES-6). Please reconcile these totals.

<u>Appendix 4</u>

11. Appendix 4-B: Please confirm that water management strategy costs are based on September 2008 dollars. *[Contract Exhibit "C"]*

12. *(Attachment B)* Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.

13. *(Attachment C)* Based on the information provided to date by the regional water planning groups, TWDB has also attached a summary, in spreadsheet format, of potential interregional conflicts and apparent water source over allocations that were identified during the review of the online planning database and Initially Prepared Regional Water Plan. *[Additional TWDB comments regarding the general conformance of the online planning database (DB12) format and content to the Guidelines for Regional Water Planning Data Deliverables (Contract Exhibit D) are being provided by TWDB staff under separate cover as 'Exception Reports']*

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

Chapter 1

1. Page 1-28: Footnote 12 states that populations for partial Region K counties were estimated by determining the percent decreases in projections from the Census and TWDB; these decreases were then averaged and applied to (previous decades) partial county projections. Please consider revising this statement to more completely describe and clarify the methodology used for the projections.

Chapter 4

2. Please consider presenting quantitative reporting of and impacts of voluntarily redistributing water in Chapter 5, instead of Chapter 4 in accordance with TWDB guidance.

3. Page 4-113, last paragraph: states that there is "one unique reservoir and twelve unique stream segments within ten miles of the proposed pipeline alignment." Please consider clarifying the basis for these tallies.

REGION K

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
K	Total Available Supply	ES-6	ES.2		1,330,805		1,301,070			1,288,229		1,432,667	1,422,381	1,446,164	1,488,925	1,552,999	1,508,804
K	Identified shortages could not be reconciled with DB12	ES-7			297,000					367,000							
K	Purchase Water from LCRA WMS volume (steam electric)	ES-10	ES.4							26,895							26,885
K	LCRA contract amendments WMS volume	ES-10	ES.4		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911
K	LCRA-SAWS Water Project WMS volume	ES-10	ES-4			201,950	201,950	201,950	201,950	201,950							
K	Carrizo-Wilcox WMS volume	ES-12	ES.5			5,815	8,476	9,779	12,950	12,920			7,502	10,163	21,466	25,612	25,853
K	Ellenberger-San Saba WMS volume	ES-12	ES.5		681	756	788	1,229	1,633	2,076		1,159	1,234	1,266	1,707	2,152	2,618
K	Gulf Coast WMS volume	ES-12	ES.5		4,486	4,261	3,659	2,573	1,185	1,409		4,486	66,261	65,659	64,573	63,185	63,538
K	Hickory WMS volume	ES-12	ES.5		62	62	62	62	62	62		574	550	468	393	323	258
K	Queen City WMS volume	ES-12	ES.5		98	44	40			17		119	50	40			597
K	Trinity WMS voulme	ES-12	ES.5		428		988	937	1,147	1,121		478		1,063	1,137	1,448	1,524
K	Other Aq. WMS volume	ES-12	ES.5		0	416	777	1,366	2,017	2,814		4,291	4,707	5,147	5,948	6,856	7,994
K	Transfer Water Strategy volume, Lee County WSC	ES-12	ES.7			48	117	171	232	319		NA	NA	NA	NA	NA	NA
K	Transfer Water Strategy volume, Manville	ES-12	ES.7						7	52		NA	NA	NA	NA	NA	NA
K	Temporary Drought Period Use of Gulf Coast Aquifer in Matagorda volume	ES-13	ES.9		-	-	-	-	-	47		NA	NA	NA	NA	NA	NA
K	Municipal Water Conservation for Travis county	ES-14	ES-11		12,477	22,300	28,970	31,793	38,298	45,775		1,549	3,035	4,547	5,998	7,389	8,802
K	Rice Irrigation WMS volume, Downstream Return Flows	ES-15	ES.13		-	-	238	950	1,781	2,125		-	-	213	850	1,594	2,125
K	Manufacturing WMS volume	ES-16	ES.14		146	298	452	605				310	344	454	612		
K	COA Steam Electric WMS volume	ES-16	ES.15		29,409	27,409	29,409	56,384	60,384	67,294		2,508	41,320	43,320	83,575	89,075	96,187
K	Rice irrigation alternative WMS volume	ES-17	ES.16		-	50,000	85,000	120,000	165,200	165,200		112,777	145,500	152,099	167,541	171,777	165,200
K	LCRA Alternative WMS Total volume	ES-18	ES.17					47,400	47,400	47,400					57,400	57,400	57,400
K	LCRA Contract Amendment Total WMS volume	4-23	4.28		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911
K	Amend LCRA Contract WMS volume	4-23	4.28		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911
K	Amendment to Irrigation Water Rights for Muni and Industrial Needs WMS volume	4-23	4.28		43,000	47,000	55,000	65,000	65,000	106,600		(27,265)	(42,769)	(50,769)	(57,769)	(67,769)	(90,487)
K	HB 1437 for Williamson Co WMS volume				NA	NA	NA	NA	NA	NA		126	246	349	426	536	645
K	HB 1437 On-Farm Conservation WMS volume				NA	NA	NA	NA	NA	NA		4,000	4,000	4,000	4,000	14,800	25,000
K	Irrigation Supply Reduction due to LSWP WMS volume				NA	NA	NA	NA	NA	NA		-	-	-	-	-	(71,381)
K	LCRA Contract Reductions WMS volume				NA	NA	NA	NA	NA	NA		-	(15,000)	(17,000)	-	-	-
K	Amendment to Irrigation for Municipal and Industrial WMS volume	4-23	4.28		43,000	47,000	55,000	65,000	65,000	106,600		(27,265)	(42,769)	(50,769)	(57,769)	(67,769)	(90,487)
K	LCRA Contract Amendment Total WMS volume (due to Kingsland WSC)	4-30	4.31		2,862	4,340	5,176	7,488	9,965	11,953		2,852	4,329	5,164	7,475	9,951	11,936
K	New LCRA Contracts Total WMS total (due to Kingsland WSC)	4-31	4.32		300	35,864	37,082	59,722	60,477	70,210		310	35,875	37,094	59,735	60,491	70,227
K	Reuse Capital and annual costs	4-40	4.35	$3,566,000						$610,500	NA	NA	NA	NA	NA	NA	NA
K	Downstream Return Flows WMS volume	4-41	4.36		NA	NA	NA	NA	NA	NA		-	-	238	950	1,781	2,375
K	LCRA Contract Reductions WMS volume	4-41	4.36		NA	NA	NA	NA	NA	NA		(27,188)	(24,954)	(25,930)	(34,499)	(35,044)	(41,903)
K	Purchase Water from COA WMS volume	4-41	4.36		NA	NA	NA	NA	NA	NA		1,100	1,100	1,100	1,100	1,100	1,100
K	Co-Other Bastrop Cap/ann costs	4-47	4.41	$4,280,640						$1,410,336	$4,280,640						$1,402,170
K	Manufacturing - Bastrop - Carrizo-Wilcox annual costs	4-47	4.41							$1,646					$2,244		
K	Mining - Colorado Co. - Expand Gulf Coast aquifer capital and annual costs	4-51	4.45							$228	$32,853	$33,160	$26,116	$16,159	$3,710	$5,246	
K	Livestock - Colorado Co. - Gulf Coast aquifer cap/ann costs	4-51	4.45	$138,040						$45,615	$246,500	$80,297	$80,297	$80,297	$80,297	$80,297	$80,297
K	Mining - Colorado Co. - Gulf Coast aquifer annual costs	4-51	4.45							$31,809		$32,853					
K	Livestock - Colorado Co. - Expand Gulf Coast aquifer Cap/ann. Costs	4-51	4.45	$108,460						$34,682	$246,500	$80,297	$80,297	$80,297	$80,297	$80,297	$80,297
K	Livestock - Llano Co. - Expand Hickory Aq. Annual cost	4-53	4.47							$306,436		$297,729	$297,729	$297,729	$297,729	$297,729	$297,729
K	Irrigation -Bastrop Co. - Expand Queen City Aq. Annual costs	4-54	4.48							$1,569		$1,946	$794	$794	$616	$477	$338
K	Llano - Develop Ellenberger-San Saba Capital, Annual Costs	4-65	4.63	$5,551,613						$1,001,966	$3,624,413	$736,897	$736,897	$736,897	$736,897	$736,897	$736,897
K	WMS Name	4-71	4.71	Llano - Allocate Water Strategy							Llano - Development of Hickory Aquifer						

REGION K

		IPP document reference:		Non-matching numbers: IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
K	Water Transfer - Manville WMS volume	4-71	4.71							52		NA	NA	NA	NA	NA	NA
K	Water Transfer - Lee County WSC WMS volume	4-71	4.71			48	117	171	232	319		NA	NA	NA	NA	NA	NA
K	Temporary Drought Use Queen City WMS annual cost	4-72	4.73							$594	$0	$417	$199	$0	$0	$0	$0
K	Temporary Drought Use Gulf Coast Aquifer annual cost	4-72	4.73							$820							$1,758
K	Municipal Water Needs	4-75	4.75		(6,912)	(14,229)	(29,519)	(44,924)	(85,673)	(133,044)		(6,895)	(19,593)	(29,637)	(44,550)	(88,385)	(135,895)
K	Manor MUN Conservation Savings	4-77	4.76			705	780	900	1,030	1,160		102	235	393	490	522	557
K	Goldthwaite Channel Dam Cap/Ann. Costs	4-83	4.80	$1,841,800	$414,787	$414,787	$414,787	$414,787	$414,787	$414,787	$1,405,950	$317,203	$317,203	$317,203	$317,203	$317,203	$317,203
K	Continued Use of Downstream Return Flows WMS volume	4-87	4.84				238	950	1,781					213	850	1,594	
K	WMS name	4-87	4.84	Transfer ROR Supply to Municipal and Industrial							Amendment to Irrigation Water Rights for Municipal and Industrial						
K	Steam Electric Needs	4-103	4.101		(2,493)	(55,305)	(55,475)	(78,730)	(84,230)	(91,342)		(193)	(53,005)	(53,175)	(76,430)	(81,930)	(89,042)
K	Bastrop Co Total WMS	4-109	4.106						21,217	28,429						21,210	28,377
K	Fayette Co Total WMS	4-109	4.106			643	999	22,300	22,661	29,069			595	882	22,129	22,429	28,750
K	Llano Co Total WMS (LCRA CONTRACT REDUCTIONS is not included?)	4-109	4.106			2,913	3,313						(9,087)	(8,687)			
K	Travis Co Total WMS (LCRA CONTRACT REDUCTIONS is not included?)	4-109	4.106		50,059	72,911	94,662	116,950	134,646	156,063		20,926	42,932	59,601	80,526	97,868	112,578
K	TOTAL WMS	4-109	4.106		349,862	575,664	549,663	545,477	529,725	610,750		320,729	533,637	502,485	508,882	492,708	566,893
K	On-Farm Conservation	4-111	4.109					30,000							35,000		
K	Total	4-111	4.109					12,000							12,500		
K	LCRA Alternative WMS name	4-113	4.110	Brackish Desalination of the Gulf Coast Aquifer							Desalination						
K	Mills C-O Alternative WMS name	4-115	4.111	Desalination of Brackish Ellenburger-San Saba Strategy							Desalination						
K	Mills Co-Other Desalination of Brackish Elleburger-San Saba Cap/Ann. Costs	4-116	4.112	$6,285,000						$1,216,400	NA						NA
K	WMS name	Appendix A		Purchase water from LCRA							New or Amended LCRA Contract						
K	Colorado Co. Mining in Colorado basin(Expansion of Gulf Coast Aquifer) WMS volume	Appendix A	4		3,626	3,626	2,803	1,650	214	373		4,181	3,656	2,803	1,650	214	373
K	Colorado Co. Mining in Lavaca basin (Expansion of Other Aquifer) WMS volume	Appendix A	4		100	132	151	168	184	199		NA	NA	NA	NA	NA	NA
K	Colorado Co. Mining in Lavaca basin (Expansion of Gulf Coast Aquifer) WMS volume	Appendix A	4		555	30						100	132	151	168	184	199
K	Hays C-O Water Allocated to Cimarron Park Water	Appendix A	6		(17)	(110)						NA	NA	NA	NA	NA	NA
K	Llano C-O Water Allocated to City of Llano	Appendix A	6		(512)	(488)	(406)	(331)	(261)	(196)		NA	NA	NA	NA	NA	NA
K	Llano WMS name	Appendix A	6	Allocate from Llano C-O							Development of Hickory Aquifer						
K	Matagorda Co Steam Electric Reduction in LCRA Commitment	Appendix A	8				(1,000)	(1,000)	(1,000)	(1,000)				(1,009)	(1,036)	(1,068)	(1,090)
K	Matagorda Co Steam Electric WMS Name	Appendix A	8	Pump brackish water to blend in reservoir							Blend Brackish Surface water in STPNOC Reservoir						
K	Mills C-O Water allocated to Irrigation	Appendix A	8		(50)							NA					
K	Manville WSC Transfer Water to Manville	Appendix A	10						(7)	(52)						NA	NA
K	Lee County WSC WMS - Water Transfer	Appendix A	1			(48)	(117)	(171)	(232)	(319)		NA	NA	NA	NA	NA	NA
K	Lee County WSC WMS - Water Transfer	Appendix A	5			48	117	171	232	319		NA	NA	NA	NA	NA	NA
K	Alternative WMS name	Appendix A	Alternative WMS	Development of Ellenburger-San Saba Aquifer							Desalination of Ellenburger-San Saba Aquifer						
K	Alternative LCRA WMP Interruptible Supply WMS volume	Appendix A	Alternative WMS		NA	NA	NA	NA	NA	NA		112,777	95,500	67,099	42,541	6,577	-
K	Development of Carrizo-Wilcox annual/Cap cost	Appendix 4B	cost breakdown	NA					$856,991	$881,392	$5,434,871	$0	$0	$0	$0	$834,654	$859,055
K	Expansion of Carrizo-Wilcox annual/Cap cost	Appendix 4B	cost breakdown	$4,280,640	$0	$763,900	$1,022,730	$1,269,214	$1,244,736	$1,410,336	$4,280,640	$0	$755,734	$1,014,564	$1,261,048	$1,236,570	$1,402,170
K	new Carrizo/Wilcox well field annual cost	Appendix 4B	cost breakdown							$11,318							NA
K	Drought Management annual cost	Appendix 4B	cost breakdown							NA							$13,250
K	Manville - New LCRA Contract annual cost	Appendix 4B	cost breakdown		$0	$0	$0	$0	$0	$0	$0	$0	$0	$114,678	$301,392	$356,592	$418,692
K	Smithville -drought management annual cost	Appendix 4B	cost breakdown							NA							$14,400
K	Manufacturing-Bastrop-Colorado basin -Expand Carrizo WMS annual cost	Appendix 4B	cost breakdown			$262	$636	$935	$1,197	$1,646	$0	$299	$636	$1,047	$1,421	$1,721	$2,244
K	Co-Other- Blanco-New well field Ellenbergr -San Saba capital/annual costs	Appendix 4B	cost breakdown	$1,977,110	$273,910	$273,910	$273,910	$273,910	$275,444	$276,304	$1,977,110	$0	$0	$0	$0	$0	$275,444
K	Bertram -Expansion Ellenbrgr-San Saba, New wells annual cost	Appendix 4B	cost breakdown		$0	$0	$0	$0	$0	NA	$0	$0	$0	$0		$0	$898

REGION K

		IPP document reference:		*Non-matching numbers* IPP document number							Online Planning Database (DB12) number						
Region IPP	Item	Page number	Table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060
K	Chisolm Trail SUD HB 1431 WMS annual cost	Appendix 4B	cost breakdown		$3,105	$5,348	$7,590	$10,005	$12,248	$14,835		NA	NA	NA	NA	NA	NA
K	Kempner WSC- Burnet-Brazos basin-Conservation annual cost	Appendix 4B	cost breakdown		$14,201	$22,484	$28,993	$34,910	$39,643	$49,702		NA	NA	NA	NA	NA	NA
K	Kingsland WSC-new LCRA contract annual cost	Appendix 4B	cost breakdown		NA	NA	NA	NA	NA	NA		$1,380	$1,518	$1,656	$1,794	$1,932	$2,346
K	Llano-New Ellenbergr-San Saba Cap/ann costs	Appendix 4B	cost breakdown	$5,551,613	$1,001,966	$1,001,966	$1,001,966	$1,001,966	$1,001,966	$1,001,966	$3,624,413	$736,897	$736,897	$736,897	$736,897	$736,897	$736,897
K	Llano-Dvlp Hickory Aquifer Cap/ann costs	Appendix 4B	cost breakdown	NA	NA	NA	NA	NA	NA	NA	$4,697,200	$876,077	$866,336	$833,057	$802,618	$774,209	$747,829
K	Livestock-Llano - Expand Hickory suppy annual costs	Appendix 4B	cost breakdown		$306,436	$306,436	$306,436	$306,436	$306,436	$306,436		$297,729	$297,729	$297,729	$297,729	$297,729	$297,729
K	Co other- Mills-Expand Trinity supply	Appendix 4B	cost breakdown						$1,496	$1,945					$1,496	$1,982	$337
K	Austin annual costs	Appendix 4B	cost breakdown		NA	NA	NA	NA	NA	NA		$21,000,843	$21,000,843	$21,000,843	$21,000,843	$21,000,843	$21,000,843
K	Elgin-Expansion of Carrizo-Wilcox Cap/Ann costs	Appendix 4B	cost breakdown	$2,082,880		$385,048	$472,222	$600,201	$700,216	$367,214	NA	$0	$0	$0		$37	$112
K	West Travis Co Regional WS annual costs	Appendix 4B	cost breakdown					$59,478	$146,142	$223,422	$0	$0	$0	$0		$0	$0
K	Steam Electric power - Travis-Direct Reuse COA Cap/annual costs	Appendix 4B	cost breakdown	NA	NA	NA	$89,912	$618,807	$2,734,388	$3,263,284	$302,250,510	$1,970,065	$2,821,065	$6,225,065	$7,076,065	$10,480,065	$11,331,065
K	Steam-electric power Wharton - Dvlp Gulf Coast Aquifer - Annual costs	Appendix 4B	cost breakdown		$26,319	$26,319	$26,319	$26,319	$26,319	$30,825		$0	$0	$0	$0	$0	$30,825

REGION K

POTENTIALLY OVER ALLOCATED SOURCES

Source Name	Source Region	Source County	Source Basin	Comments	Over allocated by WUG or WWP?	Interregional?
CARRIZO-WILCOX AQUIFER	K	BASTROP	COLORADO	GBRA Simsboro Project	BOTH	Yes - K/L
GULF COAST AQUIFER	K	MATAGORDA	BRAZOS-COLORADO	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	COLORADO	BRAZOS-COLORADO	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	COLORADO	LAVACA	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	MATAGORDA	COLORADO	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	MATAGORDA	COLORADO-LAVACA	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	WHARTON	BRAZOS-COLORADO	Conjunctive use of groundwater - includes overdrafts	WUG	No
GULF COAST AQUIFER	K	WHARTON	COLORADO-LAVACA	Conjunctive use of groundwater - includes overdrafts	WUG	No
QUEEN CITY AQUIFER	K	BASTROP	BRAZOS	Temporary Drought Period Use of Queen City Aquifer	WUG	No

LOWER COLORADO REGIONAL WATER PLANNING GROUP

John E. Burke, P.E.
Chairman

P.O. Drawer P
Bastrop, TX 78602

Phone: 512/303-3943
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July 28, 2010

Ms. Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information
Texas Water Development Board

Subject: Response to TWDB Comments on Initially Prepared 2011 Region K Regional Water Plan

Dear Ms. Brittin:

Here are our region's formal responses for your comments on the Initially Prepared Region K Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates the guidance and support of the TWDB in the development of this important planning tool. This letter provides your original comments and each is followed by the LCRWPG's response.

LEVEL 1

General Comments

1. *Population, demand, and water availability figures in various tables and text are slightly different than the amounts in the online planning database. These differences may be due to rounding or reallocation between river basins. Please revise or coordinate with TWDB staff to ensure that the data in the plan is consistent with the database (e.g. pages 2-1 and 2-5; total population projections are off by 1 from TWDB projections for 2020, 2030 and 2050). [Title 31 Texas Administrative Code (TAC 357. 7(d)(1),(2); p357. 5(a)(3)]*

   We have made multiple changes to ensure that the data in the plan is consistent with the database in relation to the rounding of population numbers and discrepancies in water demands or water availability numbers.

2. *Please include one-page summaries of the region-specific studies performed during phase I of this third round of planning including a description of whether and/or how each region-specific study was incorporated into the regional water plan. [Contract Exhibit "C" Section 11.1]*

   These summaries are included in *Appendix 10E*.

Executive Summary

3. *Page ES-b, Table ES-4: Water supply from the Lower Colorado River Authority/San Antonio Water System Project is shown as available beginning in 2020. Table 4-28 on page 4-23 shows this supply becoming available in 2010. Please reconcile the two tables.*

   These tables have been reconciled. The 2010 strategy quantity was deleted from *Table ES-4*.

Chapter 3

4. *Please provide a statement regarding any water availability requirements promulgated by a county commissioners court pursuant to TWC §35.019, which in Region K applies to the Hill Country Priority Groundwater Management Area. [31 TAC 357.5(k)(1)H)]*

   A statement discussing the Hill Country Priority Groundwater Management Area and its water availability requirements has been included in Chapter 3 on page 3-19.

Chapter 4

5. *Please describe how the planning group explored opportunities and benefits of regional water supply facilities or providing regional management of regional facilities. [31 TAC 357.5(e)(6)]*

   A description of how the planning group explored opportunities and benefits of regional water supply facilities or regional management of regional facilities is included in Chapter 4 on page 4-18.

6. *Please describe how publicly available plans of major agricultural, municipal, manufacturing, and commercial water users were considered. [31 TAC 357.5(k)(1)(E)]*

   Region K has limited major manufacturing and commercial water users. Major agricultural users are mentioned in the LCRA Water Management Plan, which is discussed in Chapter 4. The LCRA Water Supply Resource Plan was used to determine LCRA WWP water management strategies as referenced in Chapter 4. The Water Conservation Plan for the City of Austin is discussed in Chapters 4 and 6 and used to develop the City of Austin water conservation strategy. Groundwater Management Plans for various Groundwater Conservation Districts are referenced in Chapters 1 and 3 and used for determining water availabilities. Discussions with various municipal WUGs took place to help determine water management strategies.

7. *Please include a discussion of how information from water loss audits of water users in the region was considered in the development of water management strategies in the final plan. [31 TAC 357.7(a)(7)(A)(iv)]*

   A discussion of how information from water loss audits of water users in the region was considered in the development of water management strategies is included in Chapter 1 on page 1-60.

8. *Please ensure that the final plan includes quantitative reporting of impacts of potentially feasible water management strategies on agricultural resources, as appropriate. [31 TAC 357.7(a)(8)(A)(iii)]*

For most of the strategies, the text provides an analysis of the impacts to agricultural resources based on a quantification designation of high, medium, or low. Quantification beyond that level would require detailed groundwater modeling that was not provided for in the scope and budget of this plan. For nearly all of the strategies, the anticipated impact is "low" due to the fact that many of the strategies will provide improvements to the existing infrastructure at no cost to agricultural water users, and due to the fact that alternative water supplies are provided in the plan that will take the place of water previously being used by the agricultural industry within this region. Strategies that are designated specifically for agriculture or irrigation-related uses would have impacts equal to the quantity of water and cost of water being provided by the strategy, and those quantities are outlined in the text. Finally, there is one strategy which reduces the amount of interruptible water available to the rice irrigators over time. Specific impact data is included for the LCRA WMP Interruptible Water Strategy for irrigation management showing how the increase in municipal and industrial demands and their associated expansion or development of water management strategies reduces the amount of interruptible water available to the rice irrigators.

Chapter 6

9. *Please ensure that specific factors for each water supply source to initiate a drought response are included in the final plan. [31 TAC 357. 7(a)(3)]*

Section 6.2.4 has been added to Chapter 6 to address this comment. Specific factors which are used to initiate a drought response for the various water sources in the region are discussed in this section.

Appendix 3

10. *Appendix 3-D: the total water available to Region K is different for each decade than the amounts shown in tables 3-23 (page 3-49) and ES-2 (page ES-6). Please reconcile these totals.*

All three tables have been reconciled to match.

Appendix 4

11. *Appendix 4-B: Please confirm that water management strategy costs are based on September 2008 dollars. [Contract Exhibit "C"]*

The water management strategy costs in *Appendix 4B* have been checked and adjusted, if necessary, to September 2008 dollars. Any discrepancies with the TWDB database have been adjusted as well. All cost document pages in *Appendix 4B* have had the confirming statement added to them.

12. *(Attachment B) Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.*

    A copy of the Attachment B spreadsheet is attached to this letter with an added comment column containing notes regarding how the lack of reconciliation between the numbers in the plan and the numbers in the database was addressed for each item. In many cases, the numbers do not match because a comparison of the two numbers shown is not appropriate. We will work with the TWDB staff to resolve any issues potentially remaining with this attachment.

13. *(Attachment C) Based on the information provided to date by the regional water planning groups, TWDB has also attached a summary, in spreadsheet format, of potential interregional conflicts and apparent water source over allocations that were identified during the review of the online planning database and Initially Prepared Regional Water Plan. [Additional TWDB comments regarding the general conformance of the online planning database (DB12) format and content to the Guidelines for Regional Water Planning Data Deliverables (Contract Exhibit D) are being provided by TWDB staff under separate cover as Exception Reports]*

    The LCRWPG is aware of the water source "over-allocations" listed in Attachment C. The Gulf Coast Aquifer over-allocation is from the Conjunctive Use of Groundwater strategy that is part of the overall LCRA-SAWS Water Project (LSWP) Strategy. By conjunctively using surface water and groundwater, over-allocation of the aquifer may occur during drier years of a drought when not enough surface water is available, but the aquifer will be able to recharge during wetter years when sufficient surface water is available.

    The Queen City Aquifer over-allocation is a small amount only during extreme drought years during the 2010 and 2020 decades. Because the quantity is small and is not needed after the 2020 decade, it is not cost-effective to develop a new source of water at this time. Any changes to demands and supplies related to this strategy will be evaluated in the next planning cycle.

    The LCRWPG has met with the TWDB staff and Region L to resolve the potential interregional conflict regarding the over-allocation of the Carrizo-Wilcox Aquifer in Bastrop County. During this planning round, the LCRWPG worked diligently to avoid over-allocation of this water source within Region K. In fact, there is not sufficient availability of the Carrizo-Wilcox Aquifer supplies to meet all of the projected demands for those WUGS which currently rely on this aquifer for their municipal supplies; consequently, additional water management strategies in addition to expansion of groundwater supplies have been recommended during the latter decades of the plan to meet those needs. Bastrop County is an area of Region K that is growing very rapidly with growth rates exceeding previous projections. As a result, the 2011 Region K Water Plan includes significantly revised population and water demand numbers for this round of planning which reflect that projected high growth rate. Many of the municipal WUGs in Bastrop County currently rely on the Carrizo-Wilcox Aquifer as their sole or primary water source. In addition, these WUGs already have existing groundwater permits that currently meet or exceed the annual amount of water identified as needed for their future system demands within the fifty-year planning period of the 2011 Region K Water Plan. Unfortunately, the amount of Carrizo-Wilcox Aquifer water currently permitted to WUGs in Bastrop County by the Lost Pines GCD is 43,486 ac-ft/yr, which is already greater than the 28,000 ac-ft/yr that is currently estimated to be the maximum availability of this source. Because these WUGs in Bastrop County already have existing permits that meet or exceed the quantities of water shown as water management strategies in the 2011 Region K Water Plan, and because Region K itself has not over-allocated the Carrizo-Wilcox Aquifer in Bastrop County, it does not appear reasonable to propose plans for these WUGs to develop new water management strategies in order to accommodate export of the groundwater supplies to another County and planning region of the state.

LEVEL 2

Chapter 1

1. *Page 1-28: Footnote 12 states that populations for partial Region K counties were estimated by determining the percent decreases in projections from the Census and TWDB; these decreases were then averaged and applied to (previous decades) partial county projections. Please consider revising this statement to more completely describe and clarify the methodology used for the projections.*

   This footnote is referencing historical projections (1950-1970) that have no bearing on the methodology used to determine the population projections for 2010 through 2060 in this plan. This information is from the first round of planning and no additional methodology detail is available at this time.

Chapter 4

2. *Please consider presenting quantitative reporting of and impacts of voluntarily redistributing water in Chapter 5, instead of Chapter 4 in accordance with TWDB guidance.*

   The water allocation water management strategy, discussed in Chapter 4, is a supply adjustment strategy so that the groundwater source is used by those who need it. There is limited impact because all entities' demands are met. It seems reasonable to discuss this minor strategy in Chapter 4 with the other water management strategies. The LCRA-SAWS Water Project (LSWP) strategy, which does have an impact on moving water from rural and agricultural areas, is discussed in Chapter 5.

3. *Page 4-113, last paragraph: states that there is "one unique reservoir and twelve unique stream segments within ten miles of the proposed pipeline alignment." Please consider clarifying the basis for these tallies.*

   No additional clarification is available at this time. The Chapter 4 statement addressed by this comment was quoted from an outside study conducted for LCRA and is referenced in the Plan. If this strategy remains a recommended strategy in future plans, additional detail can be developed for inclusion in the Plan at that time.

We appreciate your comments to us on the Initially Prepared Region K Water Plan, and recognize and support the goal of the TWDB to continue to improve on the information provided in this plan. If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

TWDB Attachment B Comment Response

IPP DB12 REVIEW (do not modify columns)

insert non-matching numbers ONLY

Reviewer Initials	Region IPP	General Comment	IPP document reference: page number	IPP document reference: table number	IPP document number: non-decadal number	IPP 2010	IPP 2020	IPP 2030	IPP 2040	IPP 2050	IPP 2060	DB12 number: non-decadal number	DB12 2010	DB12 2020	DB12 2030	DB12 2040	DB12 2050	DB12 2060	Region K Comment Response
vs	K	Total Available supply does not match, should also check individual sources against DB12	ES-6	ES.2		1,330,805		1,301,070			1,288,229		1,432,667	1,422,381	1,446,164	1,488,925	1,552,999	1,508,804	Inconsistencies have been corrected. Total available supply in database includes amounts generated by certain strategies in order to balance, but are discussed as strategies in the IPP. Therefore, DB12 quantities should be greater than IPP quantities.
vs	K	Identified shortages could nto be reconciled with DB12	ES-7			297,000					367,000								These were estimates, based on shortages only (no surplus), and were based on the IPP available supplies, which have been determined not to match the DB12 available supplies, as explained above.
vs	K	Purchase Water from LCRA (steam electric)		ES.4							26,895							26,885	Typo has been corrected in IPP.
vs	K	LCRA contract amendments		ES.4		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911	Quantities have been reconciled.
vs	K	LCRA-SAWS Water Project could not be reconciled with DB12		ES-4			201,950	201,950	201,950	201,950	201,950								LCRA-SAWS Water Project is listed as a recommended WMS in the plan (table 4.28) - In DB12, it was broken into 4 components and listed as 4 individual WMSs. The 4 WMSs have been tagged in the IPP indicating that they are the components of LCRA-SAWS Water Project.
vs	K	TRINITY AQUIFER		ES.5		428		988	937	1,147	1,121		478		1,063	1,137	1,448	1,524	Numbers reconciled.
vs	K	Transfer Water Strategy, Lee County WSC is not shown in DB12		ES.7			48	117	171	232	319								Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
vs	K	transfer Water Strategy, Manville is not reflected in DB12, Manville WSC is shown but numbers are very different than shown in Table ES.7		ES.7						7	52								Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
vs	K	Allocate Water Strategy, Cimarron Park and Irrigation are shown in DB12 as "Water Allocation", however the Llano strategy that matches the supply numbers is labeled as "Development of Hickory Aquifer" in DB12		ES.8		512	488	406	331	261	196								This strategy was changed after discussions with TWDB staff and will be reflected in the final plan.
vs	K	temporary Drought Period Use of Gulf Coast Aquifer in Matagorda is not reflected in DB12		ES.9		-	-	-	-	-	47								This strategy is in DB12
vs	K	Municipal Water Conservation for Travis county (and thus Total) could not be reconciled with DB12		ES-11		12,477	22,300	28,970	31,793	38,298	45,775		1,549	3,035	4,547	5,998	7,389	8,802	The amount in the IPP includes City of Austin conservation for Travis County (at COA's request), but the City of Austin conservation strategy is its own strategy...they are separate in the database and in the IPP. A note is provided in Table ES.11
vs	K	Purchase Water From COA is shown in DB12, but also shown as -1100 for Austin, might impact totals in DB12		ES.12															This is appropriate.
vs	K	Rice Irrigation WMS, Downstream Return Flows		ES.13		-	-	238	950	1,781	2,125		0	0	213	850	1,594	2,125	Quantities have been reconciled.
vs	K	manufacturing WMS differ from DB12		ES.14		146	298	452	605				310	344	454	612			Quantities have been reconciled.
vs	K	COA Steam Electric WMS - strategies and totals do not reconcile with DB12, only totals shown here but individual strategies are off somewhere		ES.15		29,409	27,409	29,409	56,384	60,384	67,294		2,508	41,320	43,320	83,575	89,075	96,187	Changing table title to "COA Steam-Electric Supplies and Water Management Strategies", since the table includes both. Not sure how the DB12 numbers in this spreadsheet were calculated, but I cannot replicate them.
vs	K	Rice irrigation alternative WMS do not reconcile (totals and individual strategies) with DB12		ES.16		-	50,000	85,000	120,000	165,200	165,200		112,777	145,500	152,099	167,541	171,777	165,200	Cannot determine how DB12 totals were calculated. One difference may be the inclusion of the "Alternative LCRA WMP Interruptible Supply". While this is not actually an Alternative strategy, the total quantity was reallocated among counties and basins for the LSWP-replacement "alternative" strategies and therefore, had to be considered a different strategy in DB12. The total, however, is the same as the recommended version.
vs	K	LCRA Alternative WMS Totals are not correct (added incorrectly in table and different than DB12)		ES.17					47,400	47,400	47,400					57,400	57,400	57,400	Quantities have been reconciled.
vs	K		App 4A																No comment appears.
		WMS Supply Review																	
yc	K	LCRA Contract Amendment Total	4-23	4.28		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911	Quantities have been reconciled.
yc	K	Amend LCRA Contract	4-23	4.28		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911	Quantities have been reconciled.
yc	K	AMENDMENT TO IRRIGATION WATER RIGHTS FOR MUNICIPAL AND INDUSTRIAL NEEDS				43,000	47,000	55,000	65,000	65,000	106,600		-27,265	-42,769	-50,769	-57,769	-67,769	-90,487	The IPP quantity is the maximum amount that can be amended and is shown as an increase in supply for municipal and industrial. The DB12 quantity is the actual amount assumed to be amended and is shown as a negative for irrigation WUGs.
yc	K	HB 1437 FOR WILLIAMSON COUNTY not listed in the IPP.	4-23	4.28		no data	no data	no data	no data	no data	no data		126	246	349	426	536	645	See Section 4.8.5
yc	K	HB 1437 ON-FARM CONSERVATION not listed in the IPP.	4-23	4.28		no data	no data	no data	no data	no data	no data		4,000	4,000	4,000	4,000	14,800	25,000	See Section 4.9.5
yc	K	IRRIGATION SUPPLY REDUCTION DUE TO LSWP not listed in the IPP.	4-23	4.28		no data	no data	no data	no data	no data	no data		0	0	0	0	0	-71,381	See Table 4.84 in IPP
yc	K	LCRA CONTRACT REDUCTIONS not listed in the IPP.	4-23	4.28		no data	no data	no data	no data	no data	no data		0	-15,000	-17,000	0	0	0	Included in Appendix 4A in IPP, and included in Section 4.6.1.4 in final plan.
yc	K		4-23	4.28	LCRA-SAWS Water Project	201,950	201,950	201,950	201,950	201,950	201,950	DEVELOPMENT OF NE	0	40,800	40,800	40,800	40,800	40,800	Footnote added to Table 4.28 listing strategy components of LSWP and Section their descriptions are in.
yc	K											CONJUNCTIVE USE OF	0	62,000	62,000	62,000	62,000	62,000	Footnote added to Table 4.28 listing strategy components of LSWP and Section their descriptions are in.
yc	K											IRRIGATION DISTRICT	0	65,000	65,000	65,000	65,000	65,000	Footnote added to Table 4.28 listing strategy components of LSWP and Section their descriptions are in.
yc	K	LCRA-SAWS Water Project is listed as a recommended WMS in the plan (table 4.28) - In DB12, it was broken into 4 components and listed as 4 individual WMSs. Please tag those 4 WMSs indicating that they are the components of LCRA-SAWS Water Project.										ON-FARM CONSERVA	0	34,150	34,150	34,150	34,150	34,150	Footnote added to Table 4.28 listing strategy components of LSWP and Section their descriptions are in.
yc	K	Amendment to Irrigation for Municipal and Industrial WMS	4-23	4.28		43,000	47,000	55,000	65,000	65,000	106,600		-27,265	-42,769	-50,769	-57,769	-67,769	-90,487	The IPP quantity is the maximum amount that can be amended and is shown as an increase in supply for municipal and industrial. The DB12 quantity is the actual amount assumed to be amended and is shown as a negative for irrigation WUGs.
yc	K	Kingsland WSC is listed under LCRA Contract Amendments in Table 4.31 in the IPP but listed under New LCRA Contracts in DB12	4-30 4-31	4.31 & 4.32															Corrections made.
yc	K	LCRA Contract Amendment Total (due to Kingsland WSC)	4-30	4.31		2,862	4,340	5,176	7,488	9,965	11,953		2,852	4,329	5,164	7,475	9,951	11,936	Corrections made.
yc	K	New LCRA Contracts Total (due to Kingsland WSC)	4-31	4.32		300	35,864	37,082	59,722	60,477	70,210		310	35,875	37,094	59,735	60,491	70,227	Corrections made.
yc	K	DOWNSTREAM RETURN FLOWS not listed in the IPP	4-41	4.36		no data	no data	no data	no data	no data	no data		0	0	238	950	1,781	2,375	See Section 4.5.1.2
yc	K	LCRA CONTRACT REDUCTIONS not listed in the IPP.	4-41	4.36		no data	no data	no data	no data	no data	no data		-27,188	-24,954	-25,930	-34,499	-35,044	-41,903	Included in Appendix 4A in IPP, and included in Section 4.6.1.4 in final plan.
yc	K	PURCHASE WATER FROM COA not listed in the IPP	4-41	4.36		no data	no data	no data	no data	no data	no data		1,100	1,100	1,100	1,100	1,100	1,100	See Section 4.8.3
yc	K	Name inconsistent: Llano - Allocate Water Strategy in the IPP vs. Llano - Development of Hickory Aquifer in DB12	4-71	4.71															This strategy was changed after discussions with TWDB staff and will be reflected in the final plan.
yc	K	Water Transfer - Manville not in DB12	4-71	4.71							52		no data	no data	no data	no data	no data	no data	Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
yc	K	Water Transfer - Lee County WSC not in DB12	4-71	4.71			48	117	171	232	319		no data	no data	no data	no data	no data	no data	Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
yc	K	Municipal Water Needs	4-75	4.75		-6,912	-14,229	-29,519	-44,924	-85,673	-133,044		-6,895	-19,593	-29,637	-44,550	-88,385	-135,895	Quantities have been reconciled.
yc	K	Manor MUN Conservation Savings (also the total)	4-77	4.76			705	780	900	1,030	1,160		102	235	393	490	522	557	Quantities have been reconciled.
yc	K	Continued Use of Downstream Return Flows	4-87	4.84				238	950	1,781					213	850	1,594		Quantities have been reconciled.
yc	K	WMS Name inconsistent (Transfer ROR Supply to Municipal and Industrial in IPP vs. AMENDMENT TO IRRIGATION WATER RIGHTS FOR MUNICIPAL AND INDUSTRIAL NEEDS in DB12)	4-87	4.84															WMS name made consistent
yc	K	Steam Electric Needs	4-103	4.101		-2,493	-55,305	-55,475	-78,730	-84,230	-91,342		-193	-53,005	-53,175	-76,430	-81,930	-89,042	Quantities have been reconciled.
yc	K	Bastrop Co Total WMS	4-109	4.106						21,217	28,429						21,210	28,377	Negative strategies from surplus were not included in the table, as mentioned in the paragraph before the table.
yc	K	Fayette Co Total WMS	4-109	4.106			643	999	22,300	22,661	29,069			595	882	22,129	22,429	28,750	Negative strategies from surplus were not included in the table, as mentioned in the paragraph before the table.
yc	K	Llano Co Total WMS (LCRA CONTRACT REDUCTIONS is not included?)	4-109	4.106			2,913	3,313						-9,087	-8,687				Negative strategies from surplus were not included in the table, as mentioned in the paragraph before the table.
yc	K	Travis Co Total WMS (LCRA CONTRACT REDUCTIONS is not included?)	4-109	4.106		50,059	72,911	94,662	116,950	134,646	156,063		20,926	42,932	59,601	80,526	97,868	112,578	Negative strategies from surplus were not included in the table, as mentioned in the paragraph before the table.
yc	K	TOTAL WMS	4-109	4.106		349,862	575,664	549,663	545,477	529,725	610,750		320,729	533,637	502,485	508,882	492,708	566,893	The DB12 numbers may include LCRA WWP strategies, some of which are not applied to certain counties. They are not specifically reflected in Table 4.106. Negative strategies are also not reflected in Table 4.106
yc	K	On-Farm Conservation	4-111	4.109					30,000							35,000			Quantities have been reconciled.
yc	K	Total	4-111	4.109					12,000							12,500			Quantities have been reconciled.
yc	K	LCRA Alternative WMS name consistency - "Brackish Desalination of the Gulf Coast Aquifer" in the IPP vs. "Desalination" in DB12	4-113	4.110															(Desalination) will be added to name in IPP
yc	K	Mills C-O Alternative WMS name consistency - "Desalination of Brackish Ellenburger-San Saba Strategy" in the IPP vs. Desalination" in DB12	4-115	4.111															(Desalination) will be added to name in IPP
yc	K	WMS name: Purchase water from LCRA in the IPP is sometimes referred as New LCRA Contract and sometimes Amended LCRA Contract in DB12. Please make them consistent.	Appendix A																Appendix 4A will be revised to make them consistent
yc	K	Colorado Co. Mining in Colorado basin(Expansion of Gulf Coast Aquifer)	Appendix A	4		3,626	3,626	2,803	1,650	214	373		4,181	3,656	2,803	1,650	214	373	The DB12 numbers are adding strategies from different basins together (Colorado + Lavaca). The IPP column is only showing the Colorado Basin amount. These numbers shouldn't be compared.
yc	K	Colorado Co. Mining in Lavaca basin (Expansion of Other Aquifer)	Appendix A	4		100	132	151	168	184	199		no data	no data	no data	no data	no data	no data	This strategy is Expansion of Gulf Coast Aquifer (not Other) and matches in the IPP and DB12
yc	K	Colorado Co. Mining in Lavaca basin (Expansion of Gulf Coast Aquifer)	Appendix A	4		555	30						100	132	151	168	184	199	These are confusing the basin the strategy is coming from and the basin it's providing for. These numbers shouldn't be compared.
yc	K	Hay C-O Water Allocated to Cimarron Park Water	Appendix A	6		-17	-110						no data	no data	no data	no data	no data	no data	TWDB staff requested elimination of negative strategies, if possible. Final plan will reflect this.
yc	K	Llano C-O Water Allocated to City of Llano	Appendix A	6		-512	-488	-406	-331	-261	-196		no data	no data	no data	no data	no data	no data	This strategy was changed after discussions with TWDB staff and will be reflected in the final plan.
yc	K	Llano WMS name inconsistent (Allocate from Llano C-O in IPP vs. Development of Hickory Aquifer in DB12)	Appendix A	6															This strategy was changed after discussions with TWDB staff and will be reflected in the final plan.
yc	K	Matagorda Co Steam Electric Reduction in LCRA Commitment	Appendix A	8				-1,000	-1,000	-1,000	-1,000				-1,009	-1,036	-1,068	-1,090	Numbers are consistent. In IPP Appendix 4A, total numbers are separated into two rows
yc	K	Matagorda Co Steam Electric WMS Name inconsistent (Pump brackish water to blend in reservoir in IPP vs. Blend Brackish Surface water in STPNOC Reservoir in DB12)	Appendix A	8															Names will be made consistent.
yc	K	Mills C-O Water allocated to Irrigation not in DB12	Appendix A	8		-50							no data						TWDB staff requested elimination of negative strategies, if possible. Final plan will reflect this.
yc	K	Manville WSC Transfer Water to Manville not in DB12	Appendix A	10						-7	-52						no data	no data	Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
yc	K	Lee County WSC WMS - Water Transfer not listed in DB12	Appendix A	1			-48	-117	-171	-232	-319		no data	no data	no data	no data	no data	no data	Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan

IPP DB12 REVIEW (do not modify columns)

insert non-matching numbers ONLY

			IPP document reference:		IPP document number							DB12 number							
Reviewer Initials	Region IPP	General Comment	page number	table number	non-decadal number	2010	2020	2030	2040	2050	2060	non-decadal number	2010	2020	2030	2040	2050	2060	Region K Comment Response
yc	K	Lee County WSC WMS - Water Transfer not listed in DB12	Appendix A	5			48	117	171	232	319		no data	no data	no data	no data	no data	no data	Transfer strategy was revised after request from TWDB staff, so that quantity was instead added to supply and strategy was removed. This will be reflected in the final plan
yc	K	"Alternative WMS Development of Ellenburger-San Saba Aquifer" should be listed as "Desalination of Ellenburger-San Saba Aquifer" name consistency	Appendix A	Alternative WMS															Name will be changed.
yc	K	"ALTERNATIVE LCRA WMP INTERRUPTIBLE SUPPLY" is not listed in the IPP	Appendix A	Alternative WMS		no data	no data	no data	no data	no data	no data		112,777	95,500	67,099	42,541	6,577	0	This isn't really an alternative strategy. It's the same as the recommended version, but the total amount had to be distributed slightly differently to the various counties and basins if the LSWP strategy was replaced, so the revised numbers had to be listed under a different name.
		WMS Cost Review																	
lb	K		Appendix 4B	cost breakdown								cap cost							No comment appears.
lb	K	DEVELOPMENT OF CARRIZO-WILCOX AQUIFER	'	'						856,991	881,392	5,434,871	0	0	0	0	834,654	859,055	Costs reconciled. 2060 annual costs includes $11,318 from strategy two rows below.
lb	K	EXPANSION OF CARRIZO-WILCOX AQUIFER			4,280,640	-	763,900	1,022,730	1,269,214	1,244,736	1,410,336	4,280,640	0	755,734	1,014,564	1,261,048	1,236,570	1,402,170	Costs reconciled.
lb	K	new Carrizo/Wilcox well field									11,318	no entry here maybe in Reg L							Annual costs included in roll-up of development of carrizo-wilcox strategy two rows up.
lb	K	DROUGHT MANAGEMENT				no entry this table												13,250	Cost will be added to Appendix
lb	K	Manville - New LCRA Contract			Manville transfer	-	-	-	-	-	-	0	0	0	114,678	301,392	356,592	418,692	Should be comparing Manville WSC in Travis County, not Bastrop County
lb	K	Smithville -DROUGHT MANAGEMENT				not in tbl												14,400	Cost will be added to Appendix
lb	K	Manufacturing-bastrop-Col-bsn-expand Carrizzo					262	636	935	1,197	1,646	0	299	636	1,047	1,421	1,721	2,244	DB12 numbers are combining Colorado Basin annual costs with Guadalupe Basin annual costs. Cost roll-up removed in database.
lb	K	Co other- Blanco-new well field ellenbergr -san saba			1,977,110	273,910	273,910	273,910	273,910	275,444	276,304	1,977,110	0	0	0	0	0	275,444	Costs reconciled.
lb	K	Bertram -expansion ellenbrgr-san saba, new wells				-	-	-	-	-	-	0	0	0	0		0	898	Table matches DB12. Disagree with comment.
lb	K	Chism Trail SUD hb 1431				3,105	5,348	7,590	10,005	12,248	14,835	not included in db12							Region G cost. Removed from table.
lb	K	Kempner WSC- brunet-brzs-conservatn				14,201	22,484	28,993	34,910	39,643	49,702	not included in db12							Cost removed from table.
lb	K	Kingsland WSC-new LCRA contract			not in IPP								1,380	1,518	1,656	1,794	1,932	2,346	listed under Amended LCRA Contract in IPP and DB12
lb	K	Livestock - col &lavaca added together																	Will set roll-up to "no"
lb	K	mining-Colorado Brzs-col+lavaca+colo			number rolled up but match														Will set roll-up to "no"
lb	K	Cimmaron Park Water Co-hays expand Edwards thru desal			says see edwards BFZ desal cost table							1,669,349	0	0	244,667	342,534	489,335	587,200	Will add costs to Appendix 4B
lb	K	Llano-New ellenbergr-san saba			5,551,613	1,001,966	1,001,966	1,001,966	1,001,966	1,001,966	1,001,966	3,624,413	736,897	736,897	736,897	736,897	736,897	736,897	Costs revised due to addition of Hickory Aquifer development strategy. Costs reconciled.
lb	K	Llano-Dev Hickory Aquifer			entry not found in tabl							4,697,200	876,077	866,336	833,057	802,618	774,209	747,829	Added strategy. Cost added to final plan.
lb	K	Livestock-Llano - expand Hickory suppy			611,320	306,436	306,436	306,436	306,436	306,436	306,436	611,320	297,729	297,729	297,729	297,729	297,729	297,729	Costs reconciled.
lb	K	Co other- Mills-Expand Trinity supply								1,496	1,945					1,496	1,982	337	Costs reconciled.
lb	K	Austin			125,394,337.00							125,394,337	21,000,843	21,000,843	21,000,843	21,000,843	21,000,843	21,000,843	Costs reconciled.
lb	K					no totals shown in IPP but multi lines						Total Shows	23,368,971	23,368,971	23,368,971	23,368,971	23,368,971	23,368,971	Is total required to be shown?
lb	K	Elgin-Expansion of Carrizo-Wilcox			2,082,880		385,048	472,222	600,201	700,216	367,214		0	0	0		37	112	See costs for Elgin strategy in Bastrop County in DB12
lb	K	West Travis Co Regional WS							59,478	146,142	223,422	0	0	0	0		0	0	Cost removed from table.
lb	K	Steam Electric power - Travis direct reuse COA						89,912	618,807	2,734,388	3,263,284	302,250,510	1,970,065	2,821,065	6,225,065	7,076,065	10,480,065	11,331,065	Annual costs reconciled. Capital costs are included in Austin - Travis County strategy row
lb	K	Irr-Wharton -hb 1437 on farm conserv		rollup	610,897	total doesn't match there are three sets of hb 1437 #'s						610,863	53,258	53,258	53,258	53,258	53,258	53,258	Totals match. Disagree with comment.
lb	K	Steam-electric power Wharton - dev gulf Aquifer			164,000	26,319	26,319	26,319	26,319	26,319	30,825	164,000	0	0	0	0	0	30,825	Costs reconciled.
lb	K																		
lb	K	LCRA Contract amendments	4-23	4.28		2,862	4,340	5,176	7,488	9,965	11,953		3,708	5,265	6,165	8,503	10,955	12,911	Numbers reconciled.
lb	K	reuse	4-40	4.35	3,566,000						610,500	costs bot in db12							Reuse by Highland Lake Communities WMS does have costs. Cost figures in Table 4.35 are an example cost provided by the referenced document. Costs equivalent to those in DB12 will be added to Appendix 4B.
lb	K	COA reclaimed water option - associated with steam electric costs in wwp-cost	4-40	4.38	302,250,510.00	is tabl named correctly						302,250,510							(Direct Reuse for Municipal, Mfg., and Steam-Electric) will be added to table title. The capital costs for the two types of COA direct reuse are lumped together.
lb	K	County other bastrop	4-47	4.41	4,280,640.00						1,410,336	4,280,640						1,402,170	Numbers appear to match. Disagree with comment.
lb	K	Manufacturing - Bastrop carrizzo, Wilcox	"	"							1,646					2,244			Numbers appear to match. Disagree with comment.
lb	K	mining Colorado-gulf coast aquifer expand	4-51	4.45							228	32,853	33,160	26,116	16,159	3,710	5,246		Comparing just the Brazos-Colorado Basin cost to the sum of costs of all three basins in Colorado County. Comparison is not accurate.
lb	K	livestock-colo-gulf coast aquifer	"	"	138,040						45,615	246,500	80,297	80,297	80,297	80,297	80,297	80,297	Comparing just the Colorado Basin cost to the sum of costs of Colorado and Lavaca Basins in Colorado County. Comparison is not accurate.
lb	K	mining-colorado-gulf coast aquifer	'	'							31,809		32,853						Not sure what is being compared here, but the costs for the Expansion of Gulf Coast Aquifer strategy for Mining in the Colorado Basin of Colorado County appear to match in the IPP and DB12.
lb	K	Livestock-colorado-gulf coast aquifer expan			108,460						34,682	246,500	80,297	80,297	80,297	80,297	80,297	80,297	Comparing just the Lavaca Basin cost to the sum of costs of Colorado and Lavaca Basins in Colorado County. Comparison is not accurate.
lb	K																		
lb	K	livestock-Llano-Hickory expansion	4-53	4.47	611,320			largest annual cost			306,436	611,320	297,729	297,729	297,729	297,729	297,729	297,729	Costs have been reconciled.
lb	K	Irr-Bastrop Queen City aquifer expansion						largest annual cost			1,569		1,946	794	794	616	477	338	Costs have been reconciled.
lb	K	Dev Ellenberger-san saba-Llano	4-65	4.63	5,551,613			largest annual cost			1,001,966	3,624,413	736,897	736,897	736,897	736,897	736,897	736,897	Numbers have been revised based on updated WMS and are reflected in final plan.
lb	K	Temporary Drought use Queen City	4-72	4.73				largest annual cost			594	0	417	199	0	0	0	0	Costs have been reconciled.
lb	K	Temporary Drought use Gulf Coast Aquifer	""	""							820							1,758	Costs have been reconciled.
lb	K	Goldthwaite channel dam	4-83	4.80	1,841,800	414,787	414,787	414,787	414,787	414,787	414,787	1,405,950	317,203	317,203	317,203	317,203	317,203	317,203	Costs have been reconciled.
lb	K	Co Other Mills-Desalination of Brackish Elleburger-san saba	4-116	4.112	6,285,000						1,216,400	no entry for Co Other Mills-Desalination of Brackish Elleburger-san saba							Alternate strategy - no costs showed in DB12 for any of the alternate strategies entered. Downloaded Excel spreadsheet from DB12 shows entered costs under "Desalination" strategy
lb																			

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June 25, 2010

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

Re: Review of Lower Colorado Region Initially Prepared Regional Water Plan

Dear Mr. Burke:

Thank you for seeking review and comment from the Texas Parks and Wildlife Department (TPWD) on the 2010 Initially Prepared Regional Water Plan for the Lower Colorado Region (IPP).

As you may know, the Texas Parks and Wildlife Commission recently issued a new and updated Land and Water Resources Conservation and Recreation Plan. One of the cornerstones of the Land and Water Plan calls for TPWD to promote and protect healthy aquatic ecosystems including the establishment of cooperative strategies to incorporate long-term plant, fish and wildlife needs in all statewide, regional and local watershed planning, management and permitting processes.

TPWD understands that regional water planning groups are required by TAC §357.7(a)(8)(A) to perform quantitative reporting of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effects of upstream development on bays, estuaries and arms of the Gulf of Mexico when evaluating water management strategies. TPWD believes this quantification is a critical step in the process of planning for our state's future water needs while also protecting environmental resources. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it provides long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy? Reuse?
- Does the IPP recommend any stream segments be nominated as ecologically unique?
- If the IPP includes strategies identified in the 2006 regional water plan, does it address concerns raised by TPWD in connection with the 2006 Water Plan?

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The IPP includes a brief description of natural resources in the Lower Colorado Region including areas with vegetation, lists of species of special concern, and information on environmental flows for the lower Colorado River as identified in the LCRA's Water Management Plan (WMP). Although used in evaluations of new selected water supply strategies, the recommendations from studies conducted in support of the LCRA-SAWS Water Supply Project (LSWP) are not thoroughly discussed except in conjunction with the evaluations. The IPP includes limited information on characteristic fish and wildlife species, spring systems, and groundwater/surface water interactions in the region. Such information would be useful in understanding the impacts of selected water supply strategies on fish and wildlife species, water quality, and water-based recreation in the region.

The Lower Colorado Region IPP addresses quantitative reporting of environmental factors as required by 31 T.A.C. §357.7(a)(8)(A) by analyzing potential impacts from water supply strategies to flow levels identified in the LCRA Water Management Plan or LSWP studies for providing for environmental needs. However, understanding the analyses is difficult and would benefit from more thorough explanation and interpretation. Future refinement of the methodology employed to quantitatively examine changes to environmental flows under the supply strategies and more detailed discussion will help to better understand and explain potential flow impacts from the proposed strategies.

While a number of water supply strategies are evaluated for potential environmental impacts, a new suite of alternative strategies have been proposed for the region. Identification of the strategies is appropriate considering the current status of the LSWP. However, for many of the alternative strategies sufficient detail is lacking to conduct a meaningful environmental assessment, even for planning purposes. TPWD recommends that more information be developed for the alternative strategies so that their true environmental effects can be evaluated. Though not an alternative strategy, a similar observation and recommendation is made for the proposed Aquifer Storage and Recovery project listed as an LCRA water management strategy.

Municipal water conservation and reuse are identified as water management strategies. The IPP includes conservation as a water management strategy for all WUGs that have a shortage. TPWD agrees that conservation and reuse strategies must be a part of future water planning. In general, these strategies are preferred alternatives to large-scale water development projects. TPWD commends the regional planning group for incorporating conservation strategies that reflect the state recommendation to reduce water use by 1% per year until the 140 gpcd goal is met. Acknowledging the time constraints inherent in preparation of the IPP, TPWD notes that recent water conservation initiatives by the City of Austin and LCRA are not included in the IPP.

For the 2006 IPP, TPWD commented that the use of drought contingency plans should be addressed as a potential supply strategy in conjunction with conservation. TPWD commends Region K for including drought management as a strategy in the current IPP. This strategy should be expanded to apply to other WUGs in the future and to account for a larger portion of water supply strategies.

Although the IPP does not recommend nomination of any stream segments as ecologically unique, it does state that further study may be warranted in future Lower Colorado Regional Water Plans. If the Region decides to pursue designation of a stream segment as ecologically unique, TPWD would be willing to assist with the preparation of a recommendation packet as identified in T.A.C. §357.8.

Once again, TPWD agrees with many of the policy recommendations included in the IPP. The recommendations consistently recognize the importance of instream flows and freshwater inflows in planning for the management of water resources in Texas. The policies are not only explicitly related to environmental flows, but also to groundwater/surface water interaction and modeling, groundwater and conjunctive use, interbasin transfers, reuse, and education. It is important that fish and wildlife resources and the environment are acknowledged as users of water and are not relegated to the category of afterthought.

Thank you for your consideration of these comments. TPWD looks forward to continuing to work with the planning group to develop water supply strategies that not only meet the future water supply needs of the region but also preserve the ecological health of the region's aquatic resources. Please contact Cindy Loeffler at (512) 389-8715 if you have any questions or comments. Thank you.

Sincerely,

Ross Melinchuk
Deputy Executive Director, Natural Resources

RM:CL:ch

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

July 28, 2010

Mr. Ross Melinchuk
Deputy Executive Director, Natural Resources
Texas Parks & Wildlife
4200 Smith School Road
Austin, TX 78744-3291

Subject: Response to Comments on Lower Colorado Region Initially Prepared Plan (June 25, 2010)

Dear Mr. Melinchuk:

We received and thank you for your comments on the 2010 Region K Initially Prepared Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the promotion and protection of healthy aquatic ecosystems and how their needs are included in Region K Water Plan. This letter provides your original comments and each is followed by the LCRWPG's response.

The IPP includes a brief description of natural resources in the Lower Colorado Region including areas with vegetation, lists of species of special concern, and information on environmental flows for the lower Colorado River as identified in LCRA's Water Management Plan (WMP). Although used in evaluations of new selected water supply strategies, the recommendations from studies conducted in support of the LCRA-SAWS Water Supply Project (LSWP) are not thoroughly discussed except in conjunction with the evaluations. The IPP includes limited information on characteristic fish and wildlife species, spring systems, and groundwater/surface water interactions in the region. Such information would be useful in understanding the impacts of selected water supply strategies on fish and wildlife species, water quality, and water-based recreation in the region.

We agree. We would be happy to work with you in the next planning cycle to expand on the descriptions and information presented in this plan.

The Lower Colorado Region IPP addresses quantitative reporting of environmental factors as required by 31 T.A.C. §357.7(a)(8)(A) by analyzing potential impacts from water supply strategies to flow levels identified in the LCRA Water Management Plan or LSWP studies for providing environmental needs. However, understanding the analyses is difficult and would benefit from more thorough explanation and interpretation. Future refinement of the methodology employed to quantitatively examine changes to environmental flows under the supply strategies and more detailed discussion will help to better understand and explain potential flow impacts from the proposed strategies.

We agree that more explanation and discussion of the methodology and results of the quantitative environmental flow impacts is desirable and will work to expand on that in the next planning cycle. Changes and/or refinements to the methodology as a result of the ongoing SB 3 program may be warranted in the next round of planning as well.

While a number of water supply strategies are evaluated for potential environmental impacts, a new suite of alternative strategies have been proposed for the region. Identification of the strategies is appropriate considering the current status of the LSWP. However, for many of the alternative strategies sufficient detail is lacking to conduct a meaningful environmental assessment, even for planning purposes. TPWD recommends that more information be developed for the alternative strategies so that their true environmental effects can be evaluated. Though not an alternative strategy, a similar observation and recommendation is made for the proposed Aquifer Storage and Recovery project listed as an LCRA water management strategy.

We understand that more evaluation of potential environmental impacts may be helpful in future analysis of some of the newly identified alternative strategies and will recommend and support that additional evaluation in the next round of planning. Unexpected status changes for certain recommended strategies (primarily the LSWP) required the creation and evaluation of most of these alternative strategies. Time and budget constraints for this planning cycle did not allow the level of analysis desired for a few of the alternative strategies; however, many of the alternative strategies are similar in nature (other than size and cost) to those recommended strategies presented in Section 4.9 as part of the LSWP irrigation strategies. Potential environmental impacts for those recommended strategies are discussed in detail in Section 4.9 and these details were referenced in the discussion of the alternative strategies.

The next planning cycle will likely see changes to the recommended plan with respect to many of these strategies, especially for the LSWP, and further evaluation and analysis of potential environmental impacts should be scoped and appropriately budgeted for this next round. Many of the current alternative strategies are expected to comply with strict environmental flow requirements prior to permitting any additional flow diversion for the strategy. Additional environmental evaluation of these strategies, especially in light of the ongoing SB3 environmental flow process, will likely be recommended in the next planning cycle.

The Aquifer Storage and Recovery project listed as an LCRA water management strategy was incorporated into the plan using data and analysis from a recent study conducted for LCRA for the development of their 2010 Water Supply Resource Plan. The environmental flow impacts for this strategy were quantified and presented within this Plan in *Appendix 4G*. In addition, a preliminary screening evaluation of all of the potential recommended and alternative strategies was conducted as a part of this planning effort. This screening included various qualitative environmental factors and the results of this screening process were shown in the back of *Appendix 4A*.

We look forward to working with the TPWD in the next planning cycle to help determine what additional analysis would be valuable for the further assessment of environmental impacts of the recommended strategies.

Municipal water conservation and reuse are identified as water management strategies. The IPP includes conservation as a water management strategy for all WUGs that have a shortage. TPWD agrees that conservation and reuse strategies must be a part of future water planning. In general, these strategies are preferred alternatives to large-scale water development projects. TPWD commends the regional planning group for incorporating conservation strategies that reflect the state recommendation to reduce water use by 1% per year until the 140 gpcd goal is met. Acknowledging the time constraints inherent in preparation of the IPP, TPWD notes that recent water conservation initiatives by the City of Austin and LCRA are not included in the IPP.

Thank you. Updated statements regarding these recent water conservation initiatives have been added to the final version of the 2011 Region K Water Plan.

For the 2006 IPP, TPWD commented that the use of drought contingency plans should be addressed as a potential supply strategy in conjunction with conservation. TPWD commends Region K for including drought management as a strategy in the current IPP. This strategy should be expanded to apply to other WUGs in the future and to account for a larger portion of water supply strategies.

Thank you. It is likely that further consideration of drought management strategies will be recommended for analysis in future planning cycles to apply to additional WUGs.

Although the IPP does not recommend nomination of any stream segments as ecologically unique, it does state that further study may be warranted in future Lower Colorado Regional Water Plans. If the Region decides to pursue designation of a stream segment as ecologically unique, TPWD would be willing to assist with the preparation of a recommendation packet as identified in T.A.C. §357.8.

Thank you. We would appreciate your assistance with any future designations.

We appreciate your taking the time to review and provide these comments to us on the 2010 Region K IPP. We hope to carry your comments over to the next planning cycle so that we can continue to improve on the information provided in the plan. If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

June 18, 2010

John Burke, Chair
Region K Water Planning Group
c/o Aqua Water Supply
P.O. Drawer P
Bastrop, Texas 78602

Chairman Burke and Planning Group Members,

The Lone Star Chapter of the Sierra Club and National Wildlife Federation appreciate the opportunity to review and provide comments on the Initially Prepared 2010 Lower Colorado Regional Water Plan (Region K IPP). We consider the development of reasonable, comprehensive regional water plans to be a high priority for ensuring a healthy and prosperous future for Texas.

We wish to acknowledge several positive steps taken in the development of the 2010 Region K IPP. These include the incorporation of drought management and additional conservation as water management strategies as well as the work performed by the planning group and consultants to quantify the environmental impacts of water management strategies. These steps represent notable improvements over the 2006 Region K Plan.

<u>Drought Management and Water Conservation</u>
The Sierra Club and National Wildlife Federation have always been troubled that regional water plans are designed to meet all levels of use that people might choose to exercise for water during normal times even during a drought as bad as the historic "drought of record" in the 1950's.

This does not make sense, especially when much of this water will be used for outdoor watering to keep lawns and landscapes green. We simply cannot afford to provide the same amount of water for these purposes during a repeat of the drought of record.

Drought Management is an economically viable long-term water management strategy that reduces the need for development and maintenance of new sources by reducing non-essential water use during times of drought.

We commend Region K for including Drought Management as a strategy in this plan. This strategy should be expanded to apply to other WUGs in the future and to account for a larger portion of water supply strategies. We appreciate the inclusion of the table in Appendix 4D that shows the potential for water savings with Drought Management.

Water conservation is almost always the most cost effective and least environmentally destructive water management strategy available to meet water demands. Regional water plans must pursue efficient water use to the maximum extent reasonable. The Region K plan includes conservation as a water management strategy for all WUGs that have a shortage. The conservation strategies mirror the state recommendation to reduce water use by 1% per year until 140 gpcd is met. We commend Region K on the extent of the inclusion of water conservation strategies in its plan.

The City of Austin accounts for the largest portion of municipal water use in Region K. Austin is the regional leader in water conservation and have augmented their programs since the 2006 Region K plan. The Austin City Council approved a suite of water conservation recommendations in 2007. The goal of those recommendations is to reduce peak day water use by at least 25 million gallons per day.

In addition, the Austin City Council recently established the goal of decreasing per capita water use from 170 to 140 gpcd by 2020. The implementation of this program is currently in the planning stages. Austin Water Utility is expected to have a plan in place to achieve this goal by the end of 2010. The Region K Water Plan should reflect this additional conservation commitment.

The Lower Colorado River Authority undertook an extensive process to revise their water conservation plan in 2008-2009. The text in section 4.6.1.10 (page 4-37) states that LCRA is currently developing this plan. This plan was completed in 2009. The up to date information should reflected in the regional plan. The LCRA water conservation plan is available on the LCRA website at http://www.lcra.org/library/media/public/docs/savewater/2009_LCRA_Water_Conservation.pdf.

LCRA-SAWS Water Project

There are several strategies in the Region K IPP that are based on the LCRA-SAWS Water Project. It seems virtually certain that this project will not pan out. The inclusion of the defunct LSWP in the Region K Plan limits the value of the plan and may necessitate amendment of the plan once the final status of the project is formally determined. The planning group will need to assess whether the individual components of the LSWP are cost effective and realistic for implementation without SAWS footing the bill. The environmental impacts of each LSWP component will need to be thoroughly vetted.

Aquifer Storage and Recovery

There is very little information provided on this strategy in the Region K IPP (Section 4.6.1.11) other than the projected amount of water and approximate location of the diversion point and storage aquifer. We are troubled to see strategies that include few detail included in the recommended strategies for Region K. It is unclear how a useful environmental analysis can be performed for this strategy based on the information provided. The text states that the "assumed junior nature of this water right creates a strategy that has limited impacts to" environmental flows. This is a invalid assumption. A junior water right certainly has the potential to impact environmental flows.

Alternative Water Management Strategies
Several alternative water management strategies presented in section 4.16 of the Region K IPP are troubling. The strategies "off-channel storage in reservoirs' and "enhanced recharge of groundwater" in particular send up red flags. Both of these strategies rely on diverting "excess flow" from the Colorado River for storage in either an off-channel reservoir or in the Gulf Coast aquifer via a recharge basin or injection well. Both of these strategies are costly and have great potential to affect environmental flows negatively. We would prefer strategies that do not rely on removing even more of the supposed "excess water" in the Colorado River. Additionally, this strategy is unfeasible due to the prohibitively high cost for rice producers. This strategy is almost 7 times the cost of on-farm water conservation.

The LCRA's strategy to import 35,000 afy of groundwater from the Simsboro Aquifer was presented to the planning group at the end of the planning cycle. We think that it is imperative to have more information presented with these strategies and more time to deliberate them. The Sierra Club and National Wildlife Federation support sustainable use of groundwater resources. It is impossible to determine if this proposed strategy would fall under that category or not because of the limited information presented.

Environmental Impacts of Water Management Strategies
We appreciate the time and resources that Region K devoted to requests by the our organizations, planning group members and other stakeholders to provide a more quantitative evaluation of the environmental impacts of water management strategies in the 2010 plan. The RWPG and their consultants worked out a methodology that compares changes in the quantity of environmental flows (instream flow and bay and estuary freshwater inflows) based on whether a strategy ***is*** implemented or not. Unfortunately, not much was done with the results to help inform decision-making and many planning group members remarked that they were difficult to interpret. The analysis performed was a positive step and we look forward to improving the conclusions drawn from a more robust assessment in the next round of planning.

Thank you for your consideration of these comments. Please feel free to contact us if you have any questions.

Sincerely,

Jennifer Walker	Myron Hess
Water Resources Specialist	Manger, Texas Water Program
Sierra Club, Lone Star Chapter	National Wildlife Federation
512/477-1729	512/476-9805

Cc: Jaime Burke, AECOM

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

July 28, 2010

Ms. Jennifer Walker
Water Resources Specialist
Sierra Club, Lone Star Chapter
1202 San Antonio Street
Austin, TX 78701

Mr. Myron Hess
Manager, Texas Water Program
National Wildlife Federation
44 East Avenue
Austin, TX 78701

Subject: Response to Comments on Lower Colorado Region Initially Prepared Plan (June 18, 2010)

Dear Ms. Walker and Mr. Hess:

We received and thank you for your comments on the 2010 Region K Initially Prepared Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the development of comprehensive regional water plans and their role in Texas's future. This letter displays your original comment and follows it with the LCRWPG's response.

<u>Drought Management and Water Conservation</u>
The Sierra Club and National Wildlife Federation have always been troubled that regional water plans are designed to meet all levels of use that people might choose to exercise for water during normal times even during a drought as bad as the historic "drought of record" in the 1950's.

This does not make sense, especially when much of this water will be used for outdoor watering to keep lawns and landscapes green. We simply cannot afford to provide the same amount of water for these purposes during a repeat of the drought of record.

Drought Management is an economically viable long-term water management strategy that reduces the need for development and maintenance of new sources by reducing non-essential water use during times of drought.

We commend Region K for including Drought Management as a strategy in this plan. This strategy should be expanded to apply to other WUGs in the future and to account for a larger portion of water supply strategies. We appreciate the inclusion of the table in Appendix 4D that shows the potential for water savings with Drought Management.

Water conservation is almost always the most cost effective and least environmentally destructive water management strategy available to meet water demands. Regional water plans must pursue efficient water use to the maximum extent reasonable. The Region K plan includes conservation as a water management strategy for all WUGs that have a shortage. The conservation strategies mirror the state recommendation to reduce water use by 1% per year until 140 gpcd is met. We commend Region K on the extent of the inclusion of water conservation strategies in its plan.

The City of Austin accounts for the largest portion of municipal water use in Region K. Austin is the regional leader in water conservation and have augmented their programs since the 2006 Region K plan.

The Austin City Council approved a suite of water conservation recommendations in 2007. The goal of those recommendations is to reduce peak day water use by at least 25 million gallons per day.

In addition, the Austin City Council recently established the goal of decreasing per capita water use from 170 to 140 gpcd by 2020. The implementation of this program is currently in the planning stages. Austin Water Utility is expected to have a plan in place to achieve this goal by the end of 2010. The Region K Water Plan should reflect this additional conservation commitment.

The Lower Colorado River Authority undertook an extensive process to revise their water conservation plan in 2008-2009. The text in section 4.6.1.10 (page 4-37) states that LCRA is currently developing this plan. This plan was completed in 2009. The up to date information should reflected in the regional plan. The LCRA water conservation plan is available on the LCRA website at http://www.lcra.org/library/media/public/docs/savewater/2009_LCRA_Water_Conservation.pdf.

Thank you. It is likely that the drought management strategy will be expanded to other WUGs in the next planning cycle. We appreciate the information you have provided regarding the updates to the conservation plans. Updated statements regarding these recent water conservation initiatives have been added to the final version of the 2011 Region K Water Plan.

LCRA-SAWS Water Project
There are several strategies in the Region K IPP that are based on the LCRA-SAWS Water Project. It seems virtually certain that this project will not pan out. The inclusion of the defunct LSWP in the Region K Plan limits the value of the plan and may necessitate amendment of the plan once the final status of the project is formally determined. The planning group will need to assess whether the individual components of the LSWP are cost effective and realistic for implementation without SAWS footing the bill. The environmental impacts of each LSWP component will need to be thoroughly vetted.

The status change of the LSWP strategy occurred after the scoping and funding process for the plan had been finalized. In addition, due to the litigation situation and in order to keep the Region K Plan consistent with the Region L Plan, the LCRWPG agreed to keep the LSWP strategy in the plan as a recommended strategy and to develop alternative strategies that could take its place, if needed. The LCRWPG made a strong attempt to determine reasonable alternative strategies and did take cost into consideration in their determination during this round of planning. The next planning cycle will include additional effort to evaluate these alternative strategies as well as potential additional strategies.

Aquifer Storage and Recovery
There is very little information provided on this strategy in the Region K IPP (Section 4.6.1.11) other than the projected amount of water and approximate location of the diversion point and storage aquifer. We are troubled to see strategies that include few detail included in the recommended strategies for Region K. It is unclear how a useful environmental analysis can be performed for this strategy based on the information provided. The text states that the "assumed junior nature of this water right creates a strategy that has limited impacts to" environmental flows. This is a invalid assumption. A junior water right certainly has the potential to impact environmental flows.

We agree that this strategy could use additional development. This strategy is one of several that the LCRA is currently evaluating as part of their Water Supply Resource Plan. The strategy is recommended to meet needs beginning in 2040, and assuming that LCRA will keep this strategy in the plan during the next planning cycle, either as a recommended or alternative strategy, further detail of the strategy will be developed and additional analysis of impacts will occur. The quantitative environmental flow impacts of this strategy are tabulated in *Appendix 4G* where the results show limited impacts.

<u>*Alternative Water Management Strategies*</u>
Several alternative water management strategies presented in section 4.16 of the Region K IPP are troubling. The strategies "off-channel storage in reservoirs' and "enhanced recharge of groundwater" in particular send up red flags. Both of these strategies rely on diverting "excess flow" from the Colorado River for storage in either an off-channel reservoir or in the Gulf Coast aquifer via a recharge basin or injection well. Both of these strategies are costly and have great potential to affect environmental flows negatively. We would prefer strategies that do not rely on removing even more of the supposed "excess water" in the Colorado River. Additionally, this strategy is unfeasible due to the prohibitively high cost for rice producers. This strategy is almost 7 times the cost of on-farm water conservation.

The LCRA's strategy to import 35,000 afy of groundwater from the Simsboro Aquifer was presented to the planning group at the end of the planning cycle. We think that it is imperative to have more information presented with these strategies and more time to deliberate them. The Sierra Club and National Wildlife Federation support sustainable use of groundwater resources. It is impossible to determine if this proposed strategy would fall under that category or not because of the limited information presented.

The LCRWPG desired to look at as many alternative strategy options to LSWP as possible within the limited time available during this round of planning. Both groundwater and surface water strategies were evaluated. Many of these strategies will require creative financing and institutional innovation to meet the cost constraints of the local rice irrigation market. We would be happy to work with you in the next planning cycle to develop additional strategies that address your concerns.

The groundwater importation strategy is another strategy that LCRA is in the process of evaluating as part of its Water Supply Resource Plan. This strategy is an alternative strategy to meet needs beginning in 2040, and if LCRA continues to consider this strategy, further detail of the strategy will be developed and additional analysis of impacts will occur during the next planning cycle. The details of the strategy were provided by a water supply options analysis conducted to assist LCRA in the development of their 2010 Water Supply Resource Plan. It is acknowledged that due to time constraints, the LCRWPG was not able to verify that the quantified volume of water would be available for permit or purchase. The LCRWPG fully supports sustainable use of groundwater resources and would adjust the amount of a recommended strategy so as not to over-allocate a source outside of the region.

<u>*Environmental Impacts of Water Management Strategies*</u>
We appreciate the time and resources that Region K devoted to requests by the our organizations, planning group members and other stakeholders to provide a more quantitative evaluation of the environmental impacts of water management strategies in the 2010 plan. The RWPG and their consultants worked out a methodology that compares changes in the quantity of environmental flows (instream flow and bay and estuary freshwater inflows) based on whether a strategy ***is*** *implemented or not. Unfortunately, not much was done with the results to help inform decision-making and many planning group members remarked that they were difficult to interpret. The analysis performed was a positive step and we look forward to improving the conclusions drawn from a more robust assessment in the next round of planning.*

Agreed. Due to time constraints, written analysis of the modeling results was not nearly as thorough as the LCRWPG would have liked. We look forward to expanding this area of the plan in the next planning cycle.

We appreciate your taking the time to review and provide these comments on the 2010 Region K IPP. We hope to further address your comments during the next planning cycle so that we can continue to improve on the information provided in the plan. If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

State of Texas
House of Representatives

VALINDA BOLTON
DISTRICT 47

June 21, 2010

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

Sent via e-mail to jburke@aquawsc.com

Re: Comment on LCRWPG 2011 Draft Initially Prepared Plan

Dear Mr. Burke:

Please consider this letter as public comment on the Lower Colorado Regional Water Planning Group's 2011 Draft Initially Prepared Plan (IPP) for Region K. I recognize the time and work each member of the planning group has invested in the development of this plan and I thank you for the opportunity to submit comment.

As the state representative for a fast-growing, diverse constituency that includes large and small water suppliers, surface water and groundwater customers, well owners, and businesses that rely on the Highland Lakes, I have a strong interest in both water supply and water quality issues. Lake Travis, the Edwards Aquifer, and the Hays-Trinity Aquifer each lie partly within my district.

The following are my comments on some specific issues addressed by the plan:

1) Drought Management: I am glad to see the use of drought management strategies in the IPP for the first time in developing water supply strategies for a drought-of-record (DOR) scenario. Prior to the consideration of expensive water supply infrastructure projects, we should adjust demand expectations during drought. Especially during a DOR, outreach and education for user groups and mandatory restrictions should be expected to reduce usage. For example, in the most recent 2008-09 drought, the City of Austin demonstrated that drought management strategies like outdoor watering restrictions can have significant impacts on demand. Our planning should account for modifications in human behavior through demand adjustment, and through the

planning process, we have an opportunity to make clear that user groups and suppliers will be expected to participate in drought demand reduction strategies.

2) Conservation: Conserved water is the least expensive, most efficient, and most environmentally sound source of new water supply available. I encourage the planning group to continue to prioritize conservation as the first strategy pursued in considering new supply development. I commend the efforts of Region K's major water suppliers to aggressively pursue conservation strategies. Unfortunately, in light of the expected $18 billion budget shortfall legislators will encounter next session, I am not optimistic about the level of financial support that the state can provide for implementing these measures in the near future. However, funding conservation measures will continue to be a priority for me and any water supply development funds that the state makes available should prioritize conservation. A failure to work together in areas of identified shortage to strongly embrace conservation measures does a disservice to both taxpayers and the environment.

3) Data Analysis and Collection: Adequate data is one of the most critical requirements for sound planning. I fully support efforts to expand data collection and develop water availability models that can integrate groundwater and surface water sources to provide as full a picture of water availability and hydrologic variance across the state as possible. As identified shortages intensify, it is critical for the success of the regional planning process that planning groups have accurate information in regard to availability determinations. I am glad to see that Region K members included the development of joint availability modeling as a policy recommendation in the IPP and I support efforts to develop this modeling.

4) Environmental Needs: Although Region K has strong participation by environmental groups, I am concerned that regional planning groups do not have an appropriate mechanism for evaluating environmental needs. Particularly in basins that are stressed for supplies, a recognition of the importance of environmental flows in the planning process is needed. I am hopeful that the results of the environmental flows process established under SB 3 will be integrated into the regional plans during the next round of planning and I fully support efforts to ensure that environmental needs (including water quality requirements) are considered alongside human needs in each basin. I am also hopeful that the SB 3 process will help lawmakers recognize weaknesses in the available environmental data tools and ways that the state might contribute to improving this data.

5) Sustainable Groundwater Use: The IPP includes a number of proposed water supply strategies that involve the expansion of groundwater resources. Moving forward, each of these potential projects must be evaluated independently, taking into account the economic feasibility of the project and

the desired future conditions of the relevant aquifer to ensure that our planning documents reflect the best possible prediction of project outcomes. Conjunctive use is a tool that may be available to reduce reliance on groundwater when surface water is available to meet needs, especially in low-recharge aquifers. Mining aquifers endangers our long-term water supply and I encourage the planning group to consider conjunctive use as a water supply strategy where it does not negatively impact environmental flows.

6) The Water-Energy Nexus: I commend the planning group for recommending that the state require that new energy generation facilities use water-efficient technology and develop a sustainable water supply prior to construction. Huge amounts of water are required to produce energy and increased demand for energy during the summer months exacerbates existing water shortages. Although the state has a limited ability to ensure that conservation goals are met at the individual user level, power generation is an area where state policies in regard to water requirements can have a significant impact. I support the adoption of these requirements at the state level.

I would also like to comment on the outstanding level of communication between stakeholders in Region K. In my conversations with individual planning group members and other regional stakeholders, each one has commented on the high level of engagement and cooperation that participants bring to the table. Stakeholder-driven planning processes have been demonstrated to work well in Texas and much of that success is due to this commitment to cooperation. Effective communication between governmental entities, planners, suppliers, and customers helps to ensure that we are managing our water resources as effectively as possible.

I thank you for considering my comments. I hope that the LCRWPG members find my participation helpful and I look forward to continuing to work with the planning group members to implement thoughtful, science-based water policy at the state level.

Sincerely,

Valinda Bolton

Valinda Bolton
State Representative
District 47

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

July 28, 2010

Ms. Valinda Bolton
State Representative
District 47
P.O. Box 2910
Austin, TX 78768

Subject: Response to Comments on Lower Colorado Region Initially Prepared Plan (June 21, 2010)

Dear Representative Bolton:

We received and thank you for your comments on the 2010 Region K Initially Prepared Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your taking time to review the draft plan and provide us with feedback. As a State Representative, you have a great deal of influence over the future of water planning in Texas.

Response to Comments #1 and #2:

We agree with your comments regarding water conservation and drought management. We hope to continue and expand these water management strategies in future water planning cycles. Any support you can provide would be much appreciated.

Response to Comment #3:

We appreciate your support for expanded data collection efforts and the development of joint water availability modeling that integrates both groundwater and surface water.

Response to Comment #4:

We appreciate your comments regarding the evaluation of environmental needs. The LCRWPG has included quantitative analysis of environmental flows for this region within its plan and hopes to continue expanding the analysis of environmental impacts of water management strategies as part of future water planning cycles.

Response to Comment #5:

The LCRWPG fully supports sustainable groundwater use and recommends that responsible conjunctive use of groundwater be used when possible to avoid the over-allocation of aquifers.

Response to Comment #6:

We appreciate your support of the LCRWPG's policy recommendation regarding efficient water use for new energy generation facilities. The continued use of water as a means to generate electricity must be done so responsibly and as efficiently as possible.

We appreciate your comments regarding the communication level within Region K stakeholders and the planning group. The LCRWPG takes its responsibilities seriously and appreciates your encouragement and support. We look forward to working with you during future planning cycles so that we can continue to improve on the information provided in the plan. If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

Environmental Stewardship
A Sustainable Ecosphere

June 28, 2010

John Burke, Chairman
Lower Colorado Region Water Planning Group
P.O. Drawer P
Bastrop, TX 78602

Re: 2011 Draft Initial Prepared Water Plan

Dear Chairman Burke and Members,

Thank you for the opportunity to comment on the 2011 draft initially prepared water plan for Region K. The regional water planning process is crucial for the State of Texas and the residents of our region. Your work in combination with the individual water user groups, the river authorities, and the groundwater conservation districts form the backbone of knowledge that enables informed planning for the beneficial use of both surface and groundwater resources into the future. We commend you, and thank you for you work.

Any planning process of this magnitude, with the political and public pressure brought about by our rapid growth, will have flaws. Hopefully the checks and balances that allow for public comment and agency reviews will catch the major discrepancies in time to avoid any serious unexpected consequences. We would like to take this opportunity to raise our concern about one such potential discrepancy. **We believe that, upon further examination you will agree there is likely an over-dependence on, and an unrealistic comfort in the environmental impacts associated with use of groundwater from the Carrizo-Wilcox Aquifer in Bastrop County.** Whether or not this is an indicator of other similar situations throughout the region has not been evaluated.

Section 4.7.1.1 *Environmental Impacts* concludes: "The environmental impacts of expanded groundwater use will vary depending upon site characteristics. Some impacts may occur from the expansion of existing groundwater infrastructure, but well sites are generally small in areal extent, and the disturbance from pipeline construction is temporary. <u>Availability numbers were developed by the Lost Pines Groundwater Conservation District for this aquifer in Bastrop County, and they attempt to limit the groundwater use to the amount that can be replenished on an annual basis. If this is the case, then the impact on the environment should be low</u> (emphasis added)."

The fundamental assumption above is that the groundwater availability and withdrawal numbers in this section of the water plan comply with the Lost Pines Groundwater Conservation District's (LPGCD) desire stated in their 2004 Management Plan "to maintain the aquifers in the District on a sustainable basis. The LPGCD considers 'sustainability' as development and use of groundwater in a manner that can be maintained in perpetuity." To this end they have chosen to use, for purpose of achieving a determination of administrative completeness, a quantity of 28,000 ac-ft/yr of water as the amount of groundwater ostensibly available within the District. The LPGCD states in their Management Plan that they believe that this estimate of groundwater availability within Bastrop County is reasonably conservative and defensible. They base this volume on other direct estimates which were even yet more conservative. (LPGCD Management Plan pages 1, 11 and 12).

Environmental Stewardship's analysis of this assumption compares the available quantity, as estimated by the LPGCD, to the regional water management strategies to 1) expand the current groundwater supplies and 2) develop new groundwater supplies from the Carrizo-Wilcox in Bastrop

County. When compared to the available groundwater estimate, the expansion and new supplies strategies over-produce the aquifer by 1,258 ac-ft/yr in 2010 and 11,066 ac-ft/yr in 2060. When compared to available groundwater, planned water demand (less steam-electric surface water demand) exceeds available groundwater in the aquifer by 2,878 ac-ft/yr in 2030 and 17,766 ac-ft/yr in 2060. Of even greater concern, when compared to the "Initially Prepared Plan" which was not accepted by the Texas Water Development Board (See section ES.3), water demand exceeds available water in the aquifer by 7,167 ac-ft/yr in 2030 and 21,264 ac-ft/yr in 2060 (see Table 1: *Environmental Impact Assumption Test* attached).

Comparing available groundwater estimates for the Carrizo-Wilcox aquifer to actual pumping and permitted pumping provides another view of this relationship. Though actual pumping in 2000, 2007 and 2009 in Bastrop County was below the 28,000 ac-ft/yr estimate of available groundwater, the volume of permitted pumping in 2007 (46,079 ac-ft/yr) exceeds available groundwater by 18,079 ac-ft/yr. Table 2 provides pumping and permitted pumping data for 2007, a wet year. Pumping in dry years generally exceeds pumping in wet years so a comparison with 2008 and 2009 would better inform of the potential drought of record demand in Bastrop County relative to projected demands.

It is Environmental Stewardship's view that this potential imbalance (discrepancy) needs to be considered in light of the LCRWPG's stated threat to the Colorado River raised in both the 2006 (page 1-44) and 2011 Water Plan (page 1-53) which concludes that: *"The relationships that currently exist between surface and groundwater may also change. Simulations indicate that the Colorado River, which currently gains water from the Carrizo-Wilcox aquifer, may begin to lose water to the aquifer by the year 2050".*

As a result of this concern *"the LCRWPG passed a resolution regarding the "mining of groundwater" on February 9, 2000, which strongly opposes the over-utilization of groundwater, including the mining of groundwater, within its region at rates that could lead to eventual harm to the groundwater resources, except during limited periods of extreme drought. They define groundwater mining as "the withdrawal of groundwater from an aquifer at an annualized rate, which exceeds the average annualized recharge rate to an aquifer where the recharge rate can be scientifically derived with reasonable accuracy."*

Comment 1: Based on the above resolution and the data presented, it would appear appropriate for LCRWPG to re-consider 1) whether the environmental impact assessment is accurate and adequate, and 2) whether this management strategy meets the criteria of the resolution.

Beyond the quantitative assessment of potential environmental impact, Environmental Stewardship believes that potential ecological impacts need to be considered. Senate Bill 3 (Environmental Flows) establishes the legal principal and mandate to protect the "sound ecological environment" of rivers, streams, bays and estuaries in Texas. Attachment A to this document poses the following question:

QUESTIONS: Will a shift in the groundwater-surface water relationship in the Colorado River (and tributaries) from "gaining" to "losing" reaches impact water quality and habitat characteristics in the blue sucker spawning habitat (or other important species and ecological functions) in a way that significantly alters the ecological relationships for the species and/or the region? Would this shift have an adverse impact on the "sound ecological environment" of the Colorado River as envisioned by Senate Bill 3?

Comment 2: Based on the information provided in Attachment A, it would appear appropriate for the LCRWPG to consider expanding the environmental impact analysis to include a determination of the impacts of these proposed management strategies on the soundness of the ecological environment in the region.

Finally, we further believe that this threat needs to be viewed in the broader context of multi-regional water planning. In addition to Region K, both Regions L and G are looking to Groundwater Management Area 12 (which includes Bastrop County) for substantial quantities of water that greatly exceed the recharge rates. The desired future conditions for GMA-12, along with the water demands of Regions G, K, and L, will likely bring greater pressure on the Carrizo-Wilcox Aquifer which will result in even greater quantities of water being planned for withdrawal from the Central Carrizo-Wilcox Aquifer. These planned and future withdrawals of groundwater likely exceed the annualized recharge rate of the aquifer and have the potential for damaging the groundwater-surface water relationship that currently exists.

Comment 3: Environmental Stewardship urges LCRWPG to take such actions as are appropriate and available to the group to ensure that there is a balance between the water planning demands of the Regional Water Planning Groups seeking to utilize the groundwater and surface water resources Central Texas and the water needed to provide and protect a sound ecological environmental.

Environmental Stewardship is pleased to be able to provide these comments to the Lower Colorado Regional Water Planning Group and stands ready to work with the Group to resolve the concerns expressed in this letter.

Yours very truly,

SWB

Steve Box
Executive Director
Environmental Stewardship

Please route to:

Environmental Stewardship is a charitable nonprofit organization whose purposes are to meet current and future needs of the environment and its inhabitants by protecting and enhancing the earth's natural resources; to restore and sustain ecological services using scientific information; and to encourage public stewardship through environmental education and outreach. We are a Texas nonprofit 501(c) (3) public charity headquartered in Bastrop, Texas. For more information visit our website at Environmental-Stewardship.org.

Table 1.

Environmental Impact Assumption Test

Section 4.7.1.1 Carrizo-Wilcox Pumping

4.7.1.1 Carrizo-Wilcox Pumping - Environmental Impacts (Assumptions testing)

From 2010 CRWPG Water Plan

					Carrizo-Wilcox (Bastrop County)						
Description	**Reference Section; page**	**2000**	**2007***	**2009**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**	**Comments**
AVAILABLE GROUND WATER											
Available GW	Table 3.11: p3-25				24,916	24,916	24,916	24,916	24,916	24,916	
Expansion of Current CW GW Supplies	Section 4.7.1.1; p4-46				4,342	5,805	8,465	9,766	12,936	12,904	Allocated to meet WUG's individual shortage
Develop New CW GW Supplies	Table 4.58; p4-61								975	1,230	County-Other WUG, Guadelupe to Colorado
Develop New CW GW Supplies	Table 4.58; p4-61									16	County-Other WUG, Guadelupe
TOTAL AVAILABLE					**29,258**	**30,721**	**33,381**	**34,682**	**38,827**	**39,066**	
PUMPED (Actual)											
Pumped in Bastrop & Fayette	Section 3.2.2.1.2; p 3-24	10,533									In study area (2 counties)
Acutal Pumped in Bastrop County (Commercial Wells)	LPGCD		9,500	15,250							Excluding ALCOA, Exempt
Permitted Pumping	LPGCD		46,079								Excluding ALCOA, Exempt & Irrigation
CW Recharge											
Direct precipiation estimates	LPGCD Management Plan p 10	21,284	21,284	21,284	21,284	21,284	21,284	21,284	21,284	21,284	
Central CW GAM (exclued leak/surface water)	LPGCD Management Plan p 10	27,616	27,616	27,616	27,616	27,616	27,616	27,616	27,616	27,616	
TWDB Compliant to be administratively complete	**LPGCD Management Plan p 12**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	
WATER DEMAND											
2006 Plan		12,781			19,936	22,837	26,241	25,286	30,481	37,168	Less Steam Electric (Surface Water Demand)
2011 Plan					21,532	26,695	30,878	32,821	38,523	45,766	Less Steam Electric (Surface Water Demand)
2011 Initially Prpared Plan					21,553	27,166	35,167	41,722	45,273	49,264	
Difference					1,596	3,858	4,637	7,535	8,042	8,598	
Assumption: Availability numbers ... (LPGCD) attempt to limit the grondwater use to the amount that can be replenished on an annual basis. **If this is the case**, then the impact on the environment should be low.	4.7.1.1; p4-48										
DIFFERENCE - TWDB Compliant Recharge - Total Available					(1,258)	(2,721)	(5,381)	(6,682)	(10,827)	(11,066)	**Assumption DOES NOT appear to be correct**
DIFFERENCE - TWDB Compliant Recharge - 2011 Plan Water Demand (less steam-electric)					**6,468**	**1,305**	(2,878)	(4,821)	(10,523)	(17,766)	**Assumption DOES NOT appear to be correct**
DIFFERENCE - TWDB Compliant Recharge - 2011 Initilly Prepared Plan Water Demand (less steam-electric)					**6,447**	**834**	(7,167)	(13,722)	(17,273)	(21,264)	**Assumption DOES NOT appear to be correct**

NOTES: * 2007 was a wet year

Table 2

Wet Year Pumping in Bastrop County

Provided by
Lost Pines Groundwater
Consservation District

Wet Year

2007	County	Total Amount Permitted	% of Total Pumped	Amt Pumped
Aqua WSC	Bastrop	26,405	23.6	6,232
Bastrop Co. WCID 1	Bastrop	323	14.6	47
Bastrop Co. WCID 2	Bastrop	1,671	18.2	304
City of Bastrop	Bastrop	5,455	23	1,255
City of Elgin	Bastrop	6,551	17.2	1,127
City of Giddings	Lee	4,461	18.7	834
City of Lexington	Lee	2,668	8	213
City of Smithville	Bastrop	5,607	9.5	533
Manville WSC	Lee	7,379	17.5	1,291
Lee Co. WSC	Lee	10,991	6.7	736
Lee Co. FWSD	Lee	100	34.1	34
Lincoln WSC	Lee	856	7.4	63
Forestar(Sabine)	Bastrop	67	4.2	3
OTHER				
TOTAL		**72,534**	**17%**	**12,673**
ALCOA		15,000	100%	15,000
TOTAL w/ALCOA		**87,534**	**32%**	**27,673**
Exempt Wells (Est.)			#DIV/0!	5,500
Irrigation Wells		2811	100%	2,811
TOTAL ALL WELLS		**90,345**	**40%**	**35,984**

AQUIFERS

Recharge:		**AcreFt/Yr**	**% Permitted**	**% Pumped**
Carrizo-Wilcox	Bastrop	28,500		
	Lee	7,500		
	Total	**36,000**	**251%**	**100%**

BASTROP TOTAL wo/ALCOA	**46,079**	**9,500**

ATTACHMENT A

Ecological Significance of Groundwater-Surface Water Relationship in the Carrizo-Wilcox Segment of the Colorado River near Bastrop, Texas

SUMMARY – The blue sucker, *Cycleptus elongatus*, a threatened fish species in Texas, has been documented to spawn in the lower Colorado River between Utley and Altair (LSWP 2006[7]). The upper segment between Utley and below Bastrop is the segment where the Carrizo-Wilcox Aquifer provides base-flow (groundwater outflows) to the Colorado River by way of the Colorado River Alluvium and aquifer outcrops. The spawning period for the blue sucker appears to be February – March, a low-flow period for the river between irrigation releases from the Highland Lakes. To accommodate this critical spawning period, the subsistent instream flow recommended by the LSWP 2007[8] study for the Bastrop reach is 265 cfs. Low (Dry) base-flows for the reach are 304 and 265 cfs for February and March respectively. Flow contributions of 30 – 50 cfs reported by Saunders[3,4] represent 11-19% of recommended minimum subsistence and low base-flows during the spawning season. Though this may not be quantitatively significant, is it is qualitatively significant?

The Colorado River is currently a "gaining" river as demonstrated by Dutton[1,2] and Saunders[3,4]. However, groundwater availability modeling and resulting water budgets predict that increased pumping in the Carrizo-Wilcox Aquifer has, and will continue, to take water from surface water thereby decreased outflows to surface waters. If these trends are continuing as predicted by Dutton[1] as groundwater withdrawals accelerating in the period 2000 – 2050 as prescribed by the GMA-12 desired future conditions, it is likely that a reversal in the groundwater-surface water relationship will occur making the Colorado River a "losing" river in the segment between Utley and below Bastrop which includes blue sucker spawning habitat.

Realizing the social, economic and ecological value of these surface water and wildlife resources to Bastrop and Lee counties, it seems important that the ecological significance of this change in relationship be better understood before unintended adverse impacts occur in the ecology of the river and the region.

QUESTIONS: Will a shift in the groundwater-surface water relationship in the Colorado River (and tributaries) from "gaining" to "losing" reaches impact water quality and habitat characteristics in the blue sucker spawning habitat (or other important species and ecological functions) in a way that significantly alters the ecological relationships for the species and/or the region? Would this shift have an adverse impact on the "sound ecological environment" of the Colorado River as envisioned by Senate Bill 3?

BACKGROUND

"Gaining" river groundwater-surface water relationship - Historical records and recent studies indicate that the Colorado River has been, and remains, a gaining river as it passes through the river segment associated with the Carrizo-Wilcox aquifer group, especially the Simsboro outcrop.

Historic records – The historical low-flow studies conducted by the USGS[1] in1918 and flow-duration curve generated by Dalton[1] in 2003 indicate that these groundwater formations contribute a volume of water that approximates 25,000 – 32,000 acre-feet per year to the Colorado River (26,100 acre-feet per year was used to calibrate the Carrizo-Wilcox groundwater availability model).

Recent studies – The LCRA has conducted studies on the Colorado River to assist in their management of water releases from the highland lakes to meet water rights and environmental flows obligations. These studies include information on the gains/losses of the river as it flows through Bastrop County and may provide some additional quantification the amount of base flow the river gains during the dry period such as has occurred in 2005 and 2006.

In a study related to the LCRA Operations Project released in 2006[3] the author concluded that "the lower Colorado River is a gaining stream that receives groundwater contributions from major and minor aquifers." Analysis of USGS data contained in the report (Table 19.1), though inconclusive, shows a gain of about 50 cubic feet per second (cfs) in the reaches passing over the Carrizo-Wilcox between Utley and Smithville; about 99 ac-ft/day. Limited field work in 2005 also suggested that the Colorado

ATTACHMENT A

River has some stream flow gain from groundwater in these reaches; however, since the data were not adjusted for all known gains and losses, the gains cannot be attributed solely to groundwater (Table19.2).

The following tables were created from data included in the study:

From Table 19-1 USGS 1999-2000 Streamflow data.

Reach	Median adjusted gain/loss from groundwater cfs*	ac-ft/day*
Austin-Bastrop	-9	-18
Bastrop-Smithville	59	117
Austin-Smithville	50	99

From Table 19-2 LCRA low flow investigation**

	November 2005 flow measurement		
	Flow	Gain/loss**	
Reach/location	cfs*	cfs*	ac-ft/day*
Utley	332		
Utley-Bastrop	430	98	194
Bastrop-Smithville	382	-48	-95
Utley-Smithville		50	99

* 1 cfs (cubic feet per second) = 1.9835 ac-ft/day

** flows are un-adjusted for all known gains and losses therefore cannot be attributed solely to groundwater

In a follow-up study, Saunders 2009[4] concluded "the total net gain to the Colorado River from the Carrizo-Wilcox aquifer in Bastrop County was estimated to be 30 cfs during the November 2008 low flow event. This compares to the USGS 1918 estimate of 36 cfs, and the LCRA estimate of 50 cfs in November 2005."

"Thus, the potential ground water contribution of flow to the Colorado River from the Carrizo-Wilcox aquifer may be significant, particularly when compared to more well-known sources such as Barton Springs in Austin, which was flowing at 19 cfs during the field investigation in November 2008. Such contributions to the base flow from these sources can be important during critical low-flow conditions."

"Although ground water flow in sand aquifers is generally considered to be slow and steady, it is possible that ground water contributions to the lower Colorado River may be variable from one time period to another. However, a study of ground water – surface water interaction prepared as part of development of the Central Carrizo-Wilcox groundwater availability model (GAM) indicated that base-flow rates of rivers crossing the aquifer outcrop have not decreased over time, and seasonal variability in base flow for perennial streams may not fluctuate significantly (Dutton, et al., 2003[1b]). In addition, flow from bedrock aquifers through the alluvium to the river is a complicated system and deserves more understanding. As demands on ground water resources increase with future growth in the Central Texas region, ground water – surface water interactions may need to be periodically monitored to assess water availability in the decades to come."

Reverse in groundwater-surface water relationship to "losing" river - The Lower Colorado Regional Water Planning Group (Region K) estimates that over-pumping of these aquifers could cause this historical relationship to change from a "gaining" to a "losing" river by 2050[5], and recent GAM studies[6] of the region have shown a recent decline in surface water outflows.

According to the Region K 2006 Water Plan[5], "The Carrizo-Wilcox aquifer's primary water quantity concern is the water-level declines anticipate through the year 2060 due to increased pumping. Groundwater withdrawals increased an estimated 270 percent between 1988 and 1996, from 10,100 to 37,200 acre-feet per year (ac-ft/yr), from the mostly porous and permeable sandstone aquifer. The area

ATTACHMENT A

in and around the Carrizo-Wilcox aquifer is expected to see continued population growth and increases in water demand. The TWDB co-sponsored a study of the Central Texas portion of the Carrizo-Wilcox aquifer using a computer model to assess the availability of groundwater in the area. Six water demand scenarios were simulated in the model, which ranged from considering only the current 1999 demand, to analyzing all projected future water demands through the year 2050. On the basis of the calibrated model, all withdrawal scenario water demands appear to be met by groundwater from the Carrizo-Wilcox aquifer through the year 2050. The simulations indicate that the aquifer units remain fully saturated over most of the study area. The simulated water-level declines in the Carrizo-Wilcox aquifer mainly reflect a pressure reduction within the aquifer's artesian zone. Some dewatering takes place in the center of certain pumping areas. In addition, simulations indicate that drawdown within the confined portion of the aquifer will significantly increase the movement of groundwater out of the shallow, unconfined portions to the deeper artesian portions of the aquifer. **The relationships that currently exist between surface and groundwater may also change. Simulations indicate that the Colorado River, which currently gains water from the Carrizo-Wilcox aquifer, may begin to lose water to the aquifer by the year 2050** (emphasis added)."

Region K cites Dutton 1999[1] as the source of their information. Based on this study it would appear that the magnitude of the shift from "gaining" to "losing" river could be in the order of about 40,000 ac-ft/year or greater. The pumping in the Dutton study increased to 188,700 ac-ft/yr in Scenario 5, whereas the pumping currently being modeled in the desired future conditions of GMA-12 could exceed 300,000 ac-ft/yr.

The following table was extracted from Table 5 page 29 of original study.

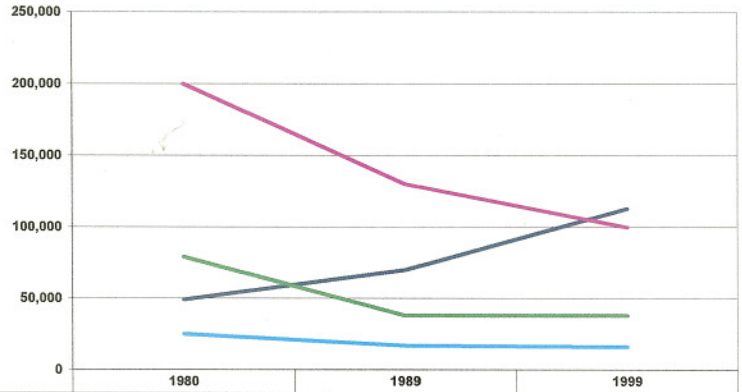
	Recharge to Outcrop	Discharge to River	Discharge to Wells	Increase in Storage
Carrizo				
1996	31.6	12.8	4.2	2.2
2050	31.6	10.4	53.0	**-15.8**
Simsboro				
1996	30.4	9.7	31.8	-17.4
2050	30.4	**-28.3**	**188.7**	**-45.2**

Study area = Carrizo-Wilcox aquifer between the Colorado and Brazos Rivers including parts of Bastrop, Lee, Burleson, and Milam counties.

In calibration studies for GMA-12 presented to the Lost Pines Groundwater Conservation District, Hutchison[6] reveals that the outflows from the aquifers in the region to surface waters decreased by 50% between 1980 and 1999 while pumping increased 31%.

ATTACHMENT A

GMA-12 GAM Calibration Results
(Data from Bill Hutchison Presentation to LPGCD November 18, 2009)



	1980	1989	1999
Pumping	49,000	70,000	113,000
Surface Water Outflow	200,000	130,000	100,000
Evapotranspiration Outflow	79,000	38,000	38,000
Springs Outflow	25,000	17,000	16,000

Hutchison identified captured water in the water budget for the same period as being 60,500 – 70,500 ac-ft/year as increased inflows and decreased outflows (see table below).

Increased Inflows		Ac-ft/yr
	Inflow GMA 13	500
	Inflow GMA 14	3,000
Decreased Outflows		
	Surface Water Discharge (Rivers & Streams)	50,000
	Spring Flow	5,000
	Evapotranspiration (Plants & Trees)	0-10,000
	Younger Formations	500
	GMA 11	500
	GMA 15	1,000
TOTAL CAPTURE		60,500 – 70,500

1.Dutton, Alan R. 1999. Groundwater Availability in the Carrizo-Wilcox Aquifer in Central Texas – Numerical Simulations of 2000 through 2050 Withdrawal Projections.

2. Dutton, Alan R., Bob Harden, Jean-Philippe Nicot, and David O'Rourke. February 2003. Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas, Appendix B – Surface Water- Groundwater Interaction in the Central Carrizo-Wilcox Aquifer.

3. Saunders, Geoffrey P. 2006. Aquifers of the Gulf Coast of Texas. TWDB publication 365.

4. Saunders, Geoffrey P. June 2009. Low-Flow Gain-Loss Study of the Colorado River in Bastrop County, Texas.

5. Lower Colorado Regional Water Planning Group. January 2006. Adopted Region "K" Water Plan for the Lower Colorado Regional Water Planning Group.

6. Hutchinson, Bill. November 18, 2009. Presentation to the Lost Pines Groundwater Conservation District Board: Joint Planning in Groundwater Management Area 12.

7. LSWP. December 14, 2006 Activities Report. Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker. Prepared by BIO-WEST, Inc.,1812 Central Commerce Court, Round Rock, Texas 78664.

8. LSWP. April 23, 2007. Guidelines Development Colorado River Flow Relationships to Aquatic Habitat and State Threatened Species: Blue Sucker. Prepared by BIO-WEST, Inc., 1812 Central Commerce Court, Round Rock, Texas 78664

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

July 28, 2010

Mr. Steve Box
Executive Director
Environmental Stewardship
P.O. Box 1423
Bastrop, TX 78602

Subject: Response to Comments on Lower Colorado Region Initially Prepared Plan (June 28, 2010)

Dear Mr. Box:

We received and thank you for your comments on the 2010 Region K Initially Prepared Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the demands put on the Carrizo-Wilcox Aquifer in Bastrop County and how the aquifer's availability and environmental impacts from recommended water management strategies involving the source are included in the Region K Water Plan. This letter provides your original comments and each is followed by the LCRWPG's response.

Based on the above resolution and the data presented, it would appear appropriate for LCRWPG to re-consider 1) whether the environmental impact assessment is accurate and adequate, and 2) whether this management strategy meets the criteria of the resolution.

The LCRWPG fully supports the sustainable use of groundwater, especially in a growing area such as Bastrop County, where projected municipal demands are expected to triple over the planning period. The LCRWPG developed additional water management strategies for water user groups in Bastrop County who depend on the Carrizo-Wilcox Aquifer so as to deliberately avoid over-allocation of the source. The LCRWPG appreciates the time and effort spent to provide backup data in support of your comments; however, the assumptions made in your calculations are not entirely correct. The volumes from the water management strategies should not be added to the available groundwater. Rather, the listed existing supplies, shown in Appendix 3C in the Region K Water Supply Table, page 1 of 12, were subtracted from the available groundwater quantity to determine how much additional water remained for future strategies. Water management strategies using the Carrizo-Wilcox Aquifer were then developed without exceeding that amount. The LCRWPG believes the environmental impact assessment is accurate and adequate and that the criteria of the resolution is met for strategies involving this water source.

Based on the information provided in Attachment A, it would appear appropriate for the LCRWPG to consider expanding the environmental impact analysis to include a determination of the impacts of these proposed management strategies on the soundness of the ecological environment in the region.

We thank you for the information provided in the attachment. The LCRA Water Management Plan has instream flow levels for the Colorado River that must be met. It is likely that if the Lower Colorado River were to become a "losing" river due to increased groundwater withdrawal, the Highland Lakes would make additional releases in order to meet the instream flow needs. This is an interesting issue and may warrant specific study in future water planning cycles.

Environmental Stewardship urges LCRWPG to take such actions as are appropriate and available to the group to ensure that there is a balance between the water planning demands of the Regional Water Planning Groups seeking to utilize the groundwater and surface water resources of Central Texas and the water needed to provide and protect a sound ecological environment.

This is an issue of great concern to the LCRWPG. The LCRWPG is currently coordinating with TWDB and Region L to resolve the potential inter-regional conflict involving the Carrizo-Wilcox Aquifer in Bastrop County. The LCRWPG hopes that the Groundwater Management Area (GMA) process and the resulting determination of the Maximum Available Groundwater (MAG) will have a positive impact on responsible permitting and pumping in the area and encourage regions to look within their own boundaries prior to importation from other regions.

We appreciate your taking the time to review and provide these comments on the 2010 Region K IPP. If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

KIMBLE COUNTY

KIMBLE COUNTY COURTHOUSE
501 MAIN STREET
JUNCTION, TEXAS 76849
(325) 446-2724 TELEPHONE **(325) 446-2986 FACSIMILE**

May 19, 2010

FIRST CLASS MAIL
VIA ~~FACSIMILE~~ ~~(888) 806-7027~~

RECEIVED
MAY 24 2010
AQUA WATER SUPPLY CORP

Mr. John Burke
Chairman, Region K Regional Water Planning Group
General Manager, Aqua Water Supply Corporation
P.O. Drawer P
Bastrop, Texas 78602

RE: **Inclusion of Water Rights of the City of Junction, Kimble County, Texas, in Region K's Colorado River Surface Water Modeling Study and Water Plan**

Dear Chairman Burke:

As you are aware, Kimble County participates in Region F for regional water planning purposes in the State of Texas. However, our county's major surface waters – namely the North Llano River, South Llano River, and (main) Llano River – are considered tributaries of the Colorado River, the major source of surface water in Region K. It has been brought to my attention that Region K's Colorado River Surface Water Modeling Study (the "Study") omits the City of Junction's water rights to use water from the South Llano River (importantly, the primary source of water for city residents). Regardless of Region K's omission, the subordination assumptions for the City of Junction have been and continue to be included in Region F's Water Plan.

I hope that future studies and plans developed by Region K will account for the water rights of the City of Junction. Moreover, I look forward to inter-regional cooperation and coordination between Region K and Region F regarding this matter, as suggested and requested by Region F Chairman John Grant's December 22, 2008 letter.

If we can assist Region K and Region F or their consultants in any way in the future, please don't hesitate to give myself or our community's voting member, Charles Hagood, a call.

Sincerely,

Andrew Murr

Andrew S. Murr
County Judge

cc: Chairman John Grant, Region F Regional Water Planning Group
Mr. Charles Hagood, Voting Member from Kimble County representing Small Businesses
Hon. Larry Maddux, Mayor, City of Junction
(*Via First Class Mail*)

sent to Burke

Texas Water Development Board
Regional Water Planning
Region F Regional Water Planning Group

c/o Colorado River Municipal Water District - P.O. Box 869, Big Spring, Texas 79721-0869
Phone: 432-267-6341 - Fax: 432-267-3121

June 2, 2010

RECEIVED
JUN 04 2010
AQUA WATER SUPPLY CORP

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

Re: Comments on Lower Colorado Region Initially Prepared Plan

Dear Chairman Burke

Region F would like to express its concern of the exclusion of Brady Creek Lake and the City of Junction water right from the upper basin portion of the Cutoff Model employed by the Lower Colorado Region for the water availability analysis for the 2011 regional plan. In the Cutoff Model, these two rights do not have a reliable supply.

The 2011 Region F water plan recognizes the supply that is available from these sources in accordance with the assumptions agreed on by the two regions for regional water planning. Region F has not changed its position regarding Brady Creek Lake and the City of Junction water rights. Supplies from these two rights must be included in the Region F Subordination Strategy for Region F to develop a viable regional water plan for the users of these water rights.

Shortages in Region F are largely the result of the perfect application of the priority system employed in the Texas Commission on Environmental Quality's Water Availability Models, which are required for use by Texas Water Development Board rules. In practice it would be impossible to operate the basin the way that it is assumed in the TCEQ models.

Region F acknowledges that both the No Call (2006 Colorado Basin model) and the Cutoff Models were developed for planning purposes only. The assumptions adopted for these models do not require the owners of affected water rights to implement the modeled policies or operations.

At this time Region F is not requesting that the Lower Colorado Region modify its water availability analysis for the 2011 regional water plan. However, Region F does request that the Lower Colorado 2011 Regional Water Plan acknowledge the available supply for these rights as reported by the Region F Subordination Strategy and that these two water rights be included in the modeling of the upper basin in future regional water plans.

Sincerely

John Grant
Chair, Region F Water Planning Group

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

July 28, 2010

Mr. John Grant
Chairman, Region F Regional Water Planning Group
c/o Colorado River Municipal Water District
P.O. Box 869
Big Spring, TX 79721-0869

Subject: Response to Comments on Lower Colorado Region Initially Prepared Plan (May 19 and June 2, 2010)

Dear Chairman Grant:

We received and thank you for your comments on the 2010 Region K Initially Prepared Water Plan. The Lower Colorado Regional Water Planning Group (LCRWPG) appreciates your concern for the City of Junction and Brady Creek Lake water users and how they are included in both the Region F and Region K Water Plans.

Based on discussions that occurred between the Region K and Region F consultants at a meeting that was held on May 12, 2009, the LCRWPG believes it is not appropriate to apply the subordination assumptions to Brady Creek Lake and the City of Junction in the Region K Cutoff Model at this time. We have attached a copy of our meeting minutes from that discussion for your reference.

The LCRWPG realizes that the City of Junction and Brady Creek Lake water rights are included under the subordination assumption in the "No-Call" model used by Region F for strategy modeling and understands the importance of this strategy for the water users associated with these water rights. The LCRWPG uses the Texas Water Development Board approved Region K Cutoff Model for water availability modeling. The Region K Cutoff Model reflects the fact that certain subordination type agreements are in place for certain water rights in the upper basin above Ivie Reservoir. For the City of Junction and Brady Creek Lake water rights to be included in the Region K Cutoff Model under a similar type subordination assumption, similar agreements would need to be in place, which they currently are not.

The LCRWPG does not object to the use of this strategy by Region F and acknowledges that Region K has existing supplies and recommended strategies that can make available the water necessary to meet the needs of this strategy for these two water right holders. A statement of this fact will be provided in the final version of the 2011 Region K Water Plan.

Since the Region F Initially Prepared Plan shows that the water users depending on these water rights have immediate need for this strategy, it is assumed that the City of Junction and the City of Brady will soon begin the necessary institutional and legal steps to establish formal agreements with the appropriate entities to ensure that this strategy is available to meet these needs in the near future. Once agreements are in place, the LCRWPG will revise the Region K Cutoff Model appropriately to include Brady Creek Lake and the City of Junction based on these agreements.

If you have any additional questions, please contact me at 512-914-3474.

Sincerely,

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

Attached: Meeting minutes from May 12, 2009 meeting between Region K and Region F consultants

cc: Andrew S. Murr, Kimble County Judge
James Kowis, LCRA

AECOM

AECOM
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.aecom.com

Meeting Minutes

Subject	Region F / Region K Coordination
Project reference	Region K 2011 Regional Water Plan
Place	HDR
Meeting date	May 12, 2009
Attendees	Jon Albright (FNI), Richard Hoffpauir (Hoffpauir Consulting), and David Parkhill, Bill Thaman, Jaime Burke (AECOM)
Date prepared	May 12, 2009
Prepared by	Jaime Burke

Two main discussion topics: The Brady Creek Lake / City of Junction subordination issue
The Pecan Bayou Watershed natural order vs. priority order

The Brady Creek Lake / City of Junction subordination issue:

David Parkhill indicated that since LCRA does not have a subordination agreement for the Brady Creek Lake and the City of Junction reservoir, it is not appropriate to subordinate the senior rights in the lower basin to them within the water availability model.

Jon Albright explained that Region F uses the No-Call model as an overall "strategy" that shows all proposed subordination, whether current subordination agreements exist or not. Region F does not plan to change their current strategy model or to use that model for its base water availability condition analysis.

Bill Thaman added that TWDB suggested that there is no conflict between the two regions since Region F is using the different model for their future strategy rather than for base availability.
It was also suggested that Region K does not oppose Region F using the subordination of Brady Creek Lake and the City of Junction reservoir as a strategy in the 2006 Region F Water Plan or the 2011 Region F Water Plan, but Region K would recommend that necessary institutional and legal steps be taken in the future to work out the required agreements with appropriate entities who maintain senior rights in the lower basin before implementing such a strategy.

The Pecan Bayou Watershed natural order vs. priority order:

Jon Albright explained that the natural order (upstream to downstream order) for the Pecan Bayou Watershed only applies to reservoirs, and that all other water rights stay in priority order. This model scenario is a <u>potential</u> strategy for the 2011 Region F Water Plan and is not currently used for the water availability analysis since there are no identified shortages in this basin at this time. At most, this strategy may be considered as an additional strategy for the 2011 Plan. Simulation of

Region F major reservoirs and the Junction water right in natural order was used in the No-Call model used in the 2006 Region K and Region F Plans. Other rights in Region F were simulated in priority order.

Richard Hoffpauir ran a similar scenario using the Region K Cutoff model with a few differing assumptions from FNI's model. The table of results Richard prepared was discussed. The results showed some impacts to LCRA's firm yield and potentially to environmental flows.

Overall, it was determined that no changes to either region's model needs to occur at this time. If one of the scenarios in the Pecan Bayou study is adopted by Region F, further modeling and discussions with Region K and/or with lower basin senior rights holders may need to take place.

Public Comments received at the April 28th, 2010 Public Hearing on the Lower Colorado Regional Water Planning Group - "Region K" - Initially Prepared Plan (IPP) – held at the Thompson Conference Center on the University of Texas at Austin campus.

Chairman John Burke asked if there were any public comments on the IPP.

Mr. Pat Dixon, City Council Liaison for the City of Lago Vista came to the microphone and stated his name and comment: Mr. Dixon had looked at a detailed study several months ago on methods to increase water availability and one of those methods was brush removal and it seemed to be a large contributor. However Mr. Dixon did not see any reference in the IPP to brush control and was curious as to whether he had missed it or if it was considered not beneficial.

Chairman Burke responded that brush control is controversial as to the amount of water it does save and difficult to quantify how much is actually saved. Chairman Burke mentioned having seen first hand the impressive results at the Bamberger Ranch but that it is hard to obtain funding for brush removal adding that some ranchers do it on their own and they may have access to some federal funding but it is hard to put an acre-foot amount to it. Chairman Burke said it is a viable option but that it is expensive.

There were no further public comments.

LOWER COLORADO REGIONAL WATER PLANNING GROUP

Public Meeting Registration Card

Name: Wade Hibler Date: 3-31-10

Representing: Texas AgriLIFE Extension Svc. - Burnet Co.

Address: 1701 E. Polk Suite A City, St., Zip: Burnet, Tx. 78611

Phone Number: (512) 756-5463 Fax Number: (512) 715-5220

Do you wish to make a statement? ☑ Yes ☐ No

Are you an elected official? ☐ Yes ☑ No Describe: County Extension Agent

Written Comments: Brush Control (Ashe Juniper) in relation to water "capture"

Basically we are looking at continued encrochment of Ashe Juniper (a.k.a. Cedar) which has the capability of capturing up to 2/3'rds of our rainfall and allow it to be evaporated before making it into our water table, ponds, streams and river.

Cost share assistance such as Creekside, EQUIP and others need to be increased. Landowner education on Brush mngmt needs to be increased by Extension Svc., NRCS and others.

There are research project that show this impact as well and results of increased water flow when Brush control measures are implemented.

Region K Comment Response to Wade Hibler's written comment, dated March 31, 2010:

The Lower Colorado Regional Water Planning Group (LCRWPG) agrees with your comments related to brush management. Cost assistance and education to landowners are important tools for this potential water management strategy. The 2011 Region K Water Plan contains a section on brush management in Chapter 4 as a potential future water management strategy for the region. In Chapter 8 of the plan, the LCRWPG recommends additional studies and funding assistance related to brush management. The LCRWPG did not recommend brush management as a water management strategy in this plan due to the fact that it is difficult to quantify the impact on water quantities during a severe drought.

LOWER COLORADO REGIONAL WATER PLANNING GROUP

Public Meeting Registration Card

Name: Joanie Abou-Samra Date: 3/31/10

Representing: Self

Address: 3838 RR 2147 east City, St., Zip: Marble Falls, TX 78654

Phone Number: (830) 693 4429 Fax Number: (805) 644 1100

Do you wish to make a statement? ☐ Yes ☑ No

Are you an elected official? ☐ Yes ☒ No Describe: ____________

Written Comments:

I farm. My farm has been there for more than 100 years. It has been very diffucult farming the last 20 years. Two years we mortaged everything to install $120,000 of the lastest irrigation equipment. We are only one farm, but we exist because of our 144 acre feet water from the lake.

We are open to any help or information → to produce more with our water.

Region K Comment Response to Joanie Abou-Samra's written comment, dated March 31, 2010:

Farming under drought conditions is extremely difficult. One option would be to add groundwater as a source by installing a well. This option would be costly, but would potentially provide the ability to conjunctively use both groundwater and surface water when available. Another option may be wastewater reuse. The City of Marble Falls may be one area in the future that is looking to reuse their wastewater effluent and irrigation of farmland is a potential use for this type of water.

PUBLIC COMMENTS ON

POPULATION AND WATER DEMAND PROJECTIONS

DEVELOPED FOR THE 2011 REGION K WATER PLAN

AECOM

AECOM
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.aecom.com

Memorandum

Date	April 2, 2009
To	Region K Planning Group Members
From	Population and Water Demand Committee
Subject	Public Comments received on the Initially Prepared Region K Population and Water Demand Projections

The population and water demand committee has held two meetings to hear public comments on the initially prepared Region K population and water demand projections for the 2011 Region K Plan, one on March 19, 2009, and the second on April 2, 2009. A period of time has also been given to receive written comments on the projections.

Letters were sent to each individual water user group (WUG) with their initially prepared population and water demand projections and a request for feedback if the WUG had data that suggested alternative projections.

The attached documents are a summary of the oral comments received at the two meetings as well as the written comments received from the WUGs. The public has until April 16, 2009, to submit comments, so we may receive additional feedback, but this is what we have received to date.

The summary of the March 19, 2009, meeting is broken down by category into Questions, Comments regarding the population and water demand projections, and Comments regarding the water supply analysis and water management strategies. Although the last category is not necessarily applicable to the task at hand, the comments are acknowledged and will be considered when reviewing the Initially Prepared Plan.

Questions Received from the Public on the Population and Water Demand Projections:

1. What is the Gallon Per Capita per Day number for Region K?

   There are different numbers for each WUG. Look at the 2006 Plan for the numbers used.

2. Are you incorporating information from the Groundwater Conservation Districts in regards to water availability?

   Determining supply is the next step. We use information received from the GCDs in the Plan.

3a. If an entity disagrees with the population or water demand projections, what is the process for arguing against the numbers?

   Offer us comments and data. TWDB requires data and information. Provide written comments to us with data backup. Submit the information as soon as possible.

3b. If the entity is unable to convince the Planning Group, what are the consequences (such as to the entity's contract with a water provider)?

   The Committee takes the information, considers it, and presents it to the RWPG for final decision. All comments go to the TWDB which gives the final blessing on the numbers. This process is done every five years. Contracts with a water provider will not be reduced based on the population projections estimated in this process.

4. What other alternative sources for water usage could Region K have looked at using?

   The individual WUGs could be looked at individually for their water use. There is not enough time in this round of planning to perform that analysis.

Comments Received from the Public on the Population and Water Demand Projections:

1. David Gavenda, Lake Travis resident, retired UT Physics Professor

   The methodology used to create the population projections does not take into account the declining availability of water resources, therefore is not accurate. Reservoir firm yield should be tied to a sophisticated and powerful climatological model such as the ones used to analyze the Southwestern U.S. region, making the projections more meaningful and valid. The projections would be better since they would take into consideration the impact limited resources will have on growth. Once the resources are used up, growth will stop. If you don't assume that the future is like the past, models show that water availability decreases. The future trend for the Southwestern U.S. region, shown by the models, is towards hotter, drier climates. This is not being taken into consideration when determining water availability.

2. Richard Bowers, Central Texas Groundwater Conservation District

   The largest use in Burnet County is domestic. The large difference in Gallon per Capita per Day (GPCD) numbers for the different cities in Burnet County doesn't make sense. City of Bertram is 156 GPCD. Meadowlakes is 336 GPCD. Meadowlakes is likely not using that much water. The odd GPCD numbers should be relooked at.

Comments Received from the Public on Water Supply Analysis and Water Management Strategies:

1. Donald Oren, Cottonwood Shores, Burnet County

   The ban on discharging wastewater effluent into the Highland Lakes causes the effluent to be used for watering golf courses and cedar trees. Technology exists for converting wastewater into drinking water. What is Region K's stance on the ban? It is ridiculous to water cedar trees because that water can never be recaptured as groundwater. We should take advantage of the technology available.

2. Connie Ripley, President of DELTA (Don't Empty Lake Travis Association)

   Concerned that Region K is using the Drought of Record for determining firm yields, but LCRA is using the Simulated Drought of Record for determining what elevation new intake pipes should be placed at around the lake.

3. Judy Graci, DELTA (Don't Empty Lake Travis Association)

   Drought of Record Lake Travis Elevation is 614 feet.
   Simulated Drought of Record Lake Travis Elevation is 578 feet.
   For determining firm water yield, which should we be using? When LCRA is telling water users to put intakes at the bottom of Lake Travis, what does that say? What amount of water used to meet firm contracts comes from Lake Buchanan? What percentage of water contracts are used in the summer? When determining a water management strategy, a water right permit should be obtained before the strategy can be included in the Plan.

4. Ralph Hendricks, Assistant City Manager of Marble Falls, TX

   The ban on wastewater effluent discharge to the Highland Lakes is bypassing valuable conservation by not using the effluent effectively.

Comments Received from the Public on the Population and Water Demand Projections:

1. David Fowler, CAPCOG

   The water demand projections seem conservative. Is there no expectation of future conservation efficiency gains?

City of Goldthwaite

"Gateway to the Hill Country"

1218 Fisher St. – P. O. Box 450 - Goldthwaite, TX 76844
325/648-3186 FAX: 325/648-2570 city@centex.net

April 1, 2009 Sent Via Email

Mr. James Kowis
Region K Population and Water Demand Committee Chair
Lower Colorado River Authority
PO Box 220, Mail Stop R325
Austin, Texas 78676

Re: Comments on Population and Water Demand

Dear Mr. Kowis,

We appreciate your work with Region K with respect to the regional water planning process. The purpose of this letter is to provide our comments and thoughts regarding the future population and demand forecasts for our City and County. We expect both population and demand to exceed the proposed plan numbers currently forecasted. Our basis for our projection of greater demand and population is predicated upon our current water use demand for both surface and ground water.

While the past census and the coming census count will define current full time residents it does not take into account our weekend and recreational user population. With over half the land owned in the County being secured by non-resident land owners we see a significant increase in both population and water demand during weekends and holidays or hunting season. We also experience a significant increase in non-landowner visitors and sportsmen during peak recreational use periods. In addition, the types of homes being built, both in the City and County, individually use more water.

The City provides municipal water service to a fairly limited portion of the County, mostly within the City limits. With the construction of the City's new micro filter water treatment plant we have made a significant capital investment to serve the City users primarily with surface water. Our access to ground water is limited and the ground water resources in our County are marginal at best. Our dependence on the Colorado River to supply the needs of City and County will be critical to meeting the populations, both full-time and part-time, demand for water.

The prior legislation naming the Goldthwaite in-channel dam as a priority project continues to be a key opportunity for our City in securing reliable access to water for the City river pump station. We also believe that the over health and availability of water in the upper portions of the basin will not only benefit the City but will also provide additional water supply and security for the downstream water user operations as well. We hope Region K will take both our comments regarding demand and potential surface water solutions into account when developing the updated regional water plan. If you have any questions or wish to discuss our comments please contact me.

Respectfully,

Robert E. Lindsey III
City Manager

Cc: Mayor Mike McMahan
Judge Kirkland T. Fulk

TRAVIS COUNTY WATER CONTROL & IMPROVEMENT DISTRICT 17

3812 ECK LANE • AUSTIN, TEXAS 78734
PHONE (512) 266-1111 • FAX (512) 266-2790

March 26, 2009

James Kowis
Population and Water Demand Committee Chair
Lower Colorado River Authority
P O Box 220, Mail Stop R325
Austin Texas 78767

Re: LCRA Regional Water Plan (Region K) Revisions to Population and Water Demand Projections for the 2011 Regional Water Plan; Travis County WC & ID 17

Dear Mr. Kowis,

I have reviewed the initial revisions to the population and water demand figures for Travis County WC & ID 17. District 17 serves some customers in the cities of Lakeway, Austin and Bee Cave as well as in the ETJ's of these cities and in the unincorporated areas of Travis County.

The attached sheet shows actual figures for WCID 17 for 2008 population as well as my projections for 2010 through 2060. Population is estimated by multiplying the number of accounts by 3.

Please feel free to contact me at (512) 266-1111 ext. 13 or debbiegernes@wcid17.org if I can be of further assistance.

Sincerely,

Deborah S. Gernes

Deborah S. Gernes
General Manager

Attachment

Travis County Water Control and Improvement District No. 17

Year	Estimated Accounts	Estimated Population*	Estimated LUE's	Estimated Water Pumped
2008**	8,612	25,836	11,615	6,193 Ac Ft
2010	9,332	28,000	12,130	6,700 Ac Ft
2020	12,332	37,000	16,030	8,850 Ac Ft
2030	15,300	46,000	19,800	11,000 Ac Ft
2040	18,300	54,900	23,700	13,000 Ac Ft
2050	18,500	55,500	24,050	13,200 Ac Ft
2060	18,900	56,700	24,570	13,500 Ac Ft

*Population is estimated by multiplying the number of accounts by 3
**Actual figures for 2008

CWS Region K Response to James Kowis (LCRA)

First, I would like to give some references:

1. The City of Cottonwood Shores (CWS) is located in on of the fastest growing portions of the State of Texas – The Hill Country between Marble Falls (six miles)and Horseshoe Bay (two miles).
2. CWS has recently reached agreements with Marble Falls doubling our "uncontested" ETJ to 900 acres (almost doubling the existing area).
3. Within the city limits, CWS has approximately 2500 lots. Almost 2000 are 50 feet by 100 feet. Our water system presently serves 490 connections; therefore, there is an expansion capability of almost 400 % in internal city limits connections before we reach the limit.
4. CWS is a Low to Moderate Income community (2006 median income of $56,000) with one of the few affordable housing areas in the Hill country (2006 median house value of $65,000 and a 2009 average Property Tax roll house value of $75,000).
5. We have averaged, internal to the city limits of CWS, building 12 to 15 new homes over the last ten years. This number has been on the increase over the last several years.
6. Region K has for some reason skewed the area population growth figures:
   a. Region K has projected Marble Fall's population growth at 67.7% from 2010 to 2020 and 95.2% from 2020 and 2030. Region K has projected CWS at 37% and 31% in these respective decades.
   b. Region K has projected Horseshoe Bay population growth at 94.1% from 2010 to 2020 and 106.3% from 2020 and 2030. Region K has projected CWS at 37% and 31% in these respective decades.
   c. Region K has projected Marble Fall's population growth at 67.7% from 2010 to 2020 and 95.2% from 2020 and 2030. Region K has projected CWS at 37% and 31% in these respective decades.
   d. We don't understand why Region K doesn't believe the growth in the Low to Median Income and Affordable Homes community will not grow at similar rates to the more affluent communities we are between? Where are the working families going to live?
7.

The data CWS will use for its presently evolving Comprehensive Plan follows:

1. TOTAL population growth to be:
   a. This is based on the following assumptions:
      i. Internal growth at 15 houses per year – same as last 10 years – increasing at 5% per year.
      ii. Adding Houses and annexation in the ETJ at 200 houses/LUEs per decade.
      iii. Additional household řesidents at 3.5 per home (which we believe to be low).

Item	Units	Source	2000	2009	2010	2020	2030	2040	2050	2060
Cottonwood Shores	Population	Region K	877	-	1,169	1,599	2,088	2,570	2,817	3,089
10Yr Growth - Internal CWS (3.5/LUE)	Population	CWS	-	-	1,169	1,825	2,646	3,671	4,953	6,555
CWS Annexation Growth Cumulative	Population	CWS	-	-	60	760	1,460	2,160	2,860	3,560
Total estimated CWS Crowth	**Population**	**CWS**			**1,229**	**2,585**	**4,105**	**5,830**	**7,812**	**10,114**

2. LUE and AC-Ft growth to be:
   a. Based on the same assumptions as above.
   b. Based on the additional assumptions – 310 Gal/Day per LUE (approximately 1/3 of the TCEQ new plant requirements).

Item	Units	Source	2000	2009	2010	2020	2030	2040	2050	2060
2009 Region K Water Usage Projection	AC-Ft	Region K	-	-	156	208	266	326	353	387
CWS Cumulative from Internal Growth	LUEs	CWS	-	-	500	688	922	1,215	1,581	2,039
CWS Internal Growth (310 G/LUE/Day)	AC-Ft	CWS	-	-	174	239	320	422	549	708
CWS Annexation & LUE Growth Cumulative	LUEs	CWS	-	-	-	217	417	617	817	1,017
Water Cumulative Annexation	AC-Ft	CWS	-	-	6	75	145	214	284	353
CWS Total Internal & ETJ Cumulative	**AC-Ft**	**CWS**	-	-	**180**	**314**	**465**	**636**	**833**	**1,061**

3. The Spread Sheet below (and attached) shows the calculations that derived the above data.

CWS Conclusions:

As can be seen, we believe the Region K data to be significantly short based on what we believe to be reasonable and very <u>conservative</u> facts and assumptions. Our figures indicate that the projection Region K is using is about one third of our projections. CWS would like to recommend that Region K adopt data that is more closely associated with what we believe to be a more accurate projection of our growth and water usage in the future.

EVALUATION OF COTTONWOOD SHORES GROWTH IN POPULATION, LUES AND WATER USAGE

Item	Units	Source	2000	2009	2010	2020	2030	2040	2050	2060
Cottonwood Shores	Population	Region K	877		1,169	1,599	2,088	2,570	2,817	3,089
10Yr Growth - Region K	Population	CWS			33%	37%	31%	23%	10%	10%
10Yr Growth - Internal CWS (3.5/LUE)	Population	CWS			1,169	1,825	2,646	3,671	4,953	6,555
CWS Cumulative from Internal Growth	LUEs	CWS			500	688	922	1,215	1,581	2,039
CWS Internal Growth (310 G/LUE/Day)	AC-Ft	CWS			174	239	320	422	549	708
CWS Internal Growth by Decade	Population	CWS				656	820	1,025	1,282	1,602
CWS Internal Growth by Decade	LUEs	CWS			17	188	234	293	366	458
CWS Annexation & LUE Growth	LUEs	CWS			17	200	200	200	200	200
CWS Annexation & LUE Growth Cumulative	LUEs	CWS				217	417	617	817	1,017
Water requirements @310 Gal/Day	Gal/Day	CWS			5,270	62,000	62,000	62,000	62,000	62,000
CWS Annexation Growth by Decade	Population	CWS			60	700	700	700	700	700
CWS Annexation Growth Cumulative	Population	CWS			60	760	1,460	2,160	2,860	3,560
CWS Water requirements Annexation	AC-Ft	CWS			6	69	69	69	69	69
CWS Water Cumulative Annexation	AC-Ft	CWS			6	75	145	214	284	353
CWS Total Internal & ETJ Cumulative	**AC-Ft**	**CWS**			**180**	**314**	**465**	**636**	**833**	**1,061**
% Change		CWS				75%	48%	37%	31%	27%
2009 Region K Water Usage Projection	**AC-Ft**	**Region K**			**156**	**208**	**266**	**326**	**353**	**387**
% Change		Region K			6.3%	17.4%	28.1%	36.3%	30.2%	24.1%
CWS Population Internal & ETJ Cumulative	**Population**	**CWS**			**1,229**	**2,585**	**4,105**	**5,830**	**7,812**	**10,114**
% Change		CWS				110%	59%	42%	34%	29%
Marble Falls	Population	Region K	4,959		7,796	10,664	13,927	17,141	18,789	20,602
10Yr Growth - Region K		CWS			57%	37%	31%	23%	10%	10%
2009 Region K Water Usage Projection	AC-Ft	Region K			2,497	3,380	4,368	5,338	5,829	6,393
% Change		Region K			39.1%	67.6%	95.2%	117.7%	116.5%	114.2%
Meadowlakes	Population	Region K			2,331	3,188	4,164	5,125	5,618	6,160
10Yr Growth - Region K		CWS				37%	31%	23%	10%	10%
2009 Region K Water Usage Projection	AC-Ft	Region K			879	1,197	1,558	1,912	2,096	2,297
% Change		Region K			28.0%	30.7%	35.5%	39.3%	29.5%	20.7%
Horseshoe Bay	Population	Region K			7,168	9,352	9,942	10,527	11,112	11,696
10Yr Growth - Region K		CWS				30%	6%	6%	6%	5%
2009 Region K Water Usage Projection	AC-Ft	Region K			1,992	2,577	2,707	2,831	2,974	3,131
% Change		Region K			48.7%	94.1%	106.3%	118.4%	130.6%	142.7%

Cottonwood Shores 2010 to 2020 growth Case
City-Data Statistical Data

Low to moderate income = 2006 median income is $56,000
Affordable Housing = 2006 median house value is $65,000 - 2009 tax roll date = $75,000 house value.
City-Data listed the 2006 population at 1130, the US Census listed 2006 population at 1156.
CWS has built an average of 15 houses per year over the last ten years. That growth alone will account for the projected growth WITHOUT any other developments. We presently have about 900 acres in our ETJ which will be developed over the next 15 to 20 years. These will completely build out at least 1200 to 1500 LUEs and require over 1200 Acre-Feet per year.

DATA Sheet

	LUE =	620	Gal/Day		250,000	Gal/Day	250		156		
					30				^^^^^^^^^^		
			•		7,500,000	Gal/Mo	G/D to A-F	1.10	141,202	Gal/Day	
I Acre-Feet =		325,851	Gal/Ac-Ft		23.02	Ac-Ft/Mo		LCRA Cont	2000	2,210	Ac-Ft
					276.20	AC-Ft/Yr					
	2008	2009	2010	2020	2030	2040	2050	2060			
Cottonwood Shores											
LCRA Projected AF			156	208	266	326	353	387			
% Change			6.3%	17.4%	28.1%	36.3%	30.2%	24.1%			
CWS Annexation & LUE Growth			17	200	200	200	200	200	200		
Water requirements @310 Gal/Day			5270	62000	62000	62000	62000	62000	62000		
CWS Water requirements Annexation	AC-Ft / Yr		5.90	69.45	69.45	69.45	69.45	69.45	69.45		
CWS Proposed requirements			162	283	711	1,037	1,390	1,777			
CWS New House Population		3.5									
New House Internal		15		187.5	234.4	293.0	366.2	457.8			
Growth in House building		5%		18.8	23.4	29.3	36.6	45.8			

AECOM
400 West 15th Street, Suite 500, Austin, Texas 78701
T 512.472.4519 F 512.472.7519 www.aecom.com

Memorandum

Date	June 1, 2009
To	Region K Planning Group Members
From	Jaime Burke
Subject	Public Comments received on the Adopted Region K Population and Water Demand Projections

Region K adopted their revised population and water demand projections on May 5, 2009. No oral comments were received at the meeting. A period of 14 days after the meeting was given to receive written comments from the public.

Letters were sent to each individual water user group (WUG) with their adopted population and water demand projections and a request for feedback.

The attached documents are a summary of the written comments received from the WUGs during the 14-day comment period.

GDF SUEZ

May 12, 2009

Mr. James Kowis
Region K Water Demand Committee
Lower Colorado River Authority
P.O. Box 220
Austin, TX. 78767
james.kowis@lcra.org

Dear Mr. Kowis:

GDF SUEZ Energy North America (GDF SUEZ) owns the Newgulf Power Generation Facility, located on the San Bernard River in southeastern Wharton County. The 2007 Region K plan shows a demand for this facility of 245 acre-feet per year in 2010, increasing to 679 acre-feet per year in 2060. This letter is a request for two modifications to the steam-electric demands in Wharton County for use in the 2011 Region K Water Plan.

- *Change of demand location.* The 2007 plan locates the demand for this plant in the Colorado Basin. However, the facility is actually in the Brazos-Colorado Coastal Basin. (The current water supply is correctly identified as Certificate of Adjudication 13-3421 in the Brazos-Colorado Coastal Basin.)

- *Increase in projected demands for 2020 through 2060.* GDF SUEZ plans to expand the Newgulf facility in the near future. We estimate that the water needs for the plant will be 3,500 acre-feet per year beginning in 2020. The projected demand is expected to remain at that level through 2060. A source of water to meet the future demand is being studied at this time.

Please let me know if you have any questions or require additional information regarding the Newgulf facility.

Thank you very much.

W. W.

Wendell Wakeham
Vice President, Business Development

SUEZ Energy North America, Inc.
1990 Post Oak Boulevard, Suite 1900
Houston, Texas 77056-3831
Tel. 713-636-1248 - fax 713-636-1859
Email – Wendell.wakeham@gdfsuezna.com

Cc: Jon Albright – Freese & Nichols

FACSIMILE TRANSMITTAL SHEET

TO: James Kowis	FROM: Doug Cones
COMPANY: Dripping Springs Water Supply Corp.	DATE: 05/18/09
FAX NUMBER: 512-473-3551	TOTAL NO. OF PAGES INCLUDING COVER: 4 to follow
PHONE NUMBER:	SENDER'S PHONE NUMBER: (office) 512-858-7897 – (fax) 512-858-0607
RE: Water Demand	YOUR REFERENCE MONTH:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Steve Harris, *President*
Travis Garnett, *Vice President*
Gilbert Wolf, *Secretary-Treasurer*

DRIPPING SPRINGS WATER SUPPLY CORP.

Jim Walden, *Board Member*
Larry Brewer, *Board Member*
Doug Cones, *General Manager*

May 18, 2009

VIA EMAIL AND FIRST CLASS MAIL

Mr. James Kowis
Population and Water Demand Committee Chair
Lower Colorado Regional Water Planning Group
C/o Lower Colorado River Authority
P.O. Box 220, Mail Stop R325
Austin, TX 78767

Re: Comments to population and water demand projections for the 2011 Regional Water Plan adopted May 5, 2009, by the Lower Colorado Regional Water Planning Group ("Region K")

Dear Mr. Kowis:

This Comment letter is submitted by Dripping Springs Water Supply Corporation ("DSWSC") in response to the letter dated May 7, 2009, and enclosed herein. DSWSC hereby requests that the following comments be considered by Region K and submitted to the TWDB along with Region K's adopted projections.

DSWCS contests and requests amendment to the projections for DSWSC and the City of Dripping Springs ("City"). Although the basis of the distinction between DSWSC and the City in the above-referenced water demand projections is unclear, DSWSC seeks to clarify by this letter that the City does not supply its water; rather, DSWSC, as the exclusive supplier of water to the City, provides water to City residents, commercial properties, and DSISD facilities. [1] As such, DSWSC requests that the Region K projections submitted to the TWDB and included in the 2011 Regional Water Plan combine the City's projected growth and demand under DSWSC or otherwise clearly identify DSWSC as the supplier for the City's demand. To be clear, DSWSC notes that the City may serve water to certain designated areas east of R.R.12 pursuant to a contract with the City; however, the City does not currently provide water service and has no water infrastructure to provide such services.

If you have any questions regarding these comments or the implementation thereof, please do not hesitate to call me directly at (512) 858-7897.

Very truly yours,

Doug Cones
Doug Cones
General Manager

Enclosure

cc: Mr. John Burke, Lower Colorado
Mr. Joel Wilkinson, DSWSC engineer
Mr. Phil Haag, DSWSC counsel

---

[1] As of the date of this letter, DSWSC has more that 1,330 residential connections and more that 35 commercial connections, which provide 100% of the public water service to DSISD and the City.

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

May 7, 2009

DRIPPING SPRINGS WATER SUPPLY CORP
C/O DOUG CONES - MANAGER
PO BOX 354
DRIPPING SPRINGS, TX 78620-0354

**Re: Lower Colorado Regional Water Plan (Region K)
Adopted Revisions to Population and Water Demand Projections for the 2011 Regional Water Plan**

Dear Sir or Madam:

The Lower Colorado Regional Water Planning Group (Region K) sent you a letter in March of this year that contained Region K's initially prepared revisions to the population and water demand projections for the 2011 Regional Water Plan.

After receiving comments from the public, water user groups, and the Texas Water Development Board (TWDB), Region K made changes to these revised projections, and adopted a new set of population and water demand projections on May 5, 2009.

Region K is providing the adopted projections to you for your information and review. If you would like to provide comments to Region K on the adopted projections, you may provide written comments (by mail or email) until Tuesday, **May 19, 2009**.

Please send comments by **email** to the Population and Water Demand Committee Chair, James Kowis, at James.Kowis@lcra.org.

Please send comments by **mail** to the following address:

James Kowis
Population and Water Demand Committee Chair
Lower Colorado Regional Water Planning Group
c/o Lower Colorado River Authority
P.O. Box 220, Mail Stop R325
Austin, TX 78767

Please allow sufficient delivery time for comments sent by mail.

The comments received will be submitted along with Region K's adopted projections to the TWDB for their final review and approval. We appreciate your assistance in providing feedback to the TWDB.

Sincerely,

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

JB
Attachment

REVISION TO INITIALLY PREPARED REGION K POPULATION AND MUNICIPAL WATER DEMAND PROJECTIONS BASED ON COMMENTS RECEIVED FROM TWDB, THE PUBLIC, AND VARIOUS WATER USER GROUPS

REVISED POPULATION USING TWDB RECOMMENDATION AS GUIDANCE

HAYS COUNTY		2010	2020	2030	2040	2050	2060
BUDA		9,338	13,971	17,341	20,728	24,797	27,997
	2006 Plan	8,042	13,971	17,341	20,728	24,797	27,997
	Difference	1,296	0	0	0	0	0
	% change	16.1%	0.0%	0.0%	0.0%	0.0%	0.0%
CIMARRON PARK WATER COMPANY		2,417	3,013	3,631	4,252	4,998	5,584
	2006 Plan	2,417	3,013	3,631	4,252	4,998	5,584
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
COUNTY-OTHER		22,722	33,658	43,641	53,675	65,729	75,207
	2006 Plan	24,018	33,658	43,641	53,675	65,729	75,207
	Difference	-1,296	0	0	0	0	0
	% change	-5.4%	0.0%	0.0%	0.0%	0.0%	0.0%
DRIPPING SPRINGS		5,325	9,308	11,651	14,005	16,834	19,058
	2006 Plan	5,325	9,308	11,651	14,005	16,834	19,058
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DRIPPING SPRINGS WSC		2,487	3,639	4,832	6,031	7,471	8,604
	2006 Plan	2,487	3,639	4,832	6,031	7,471	8,604
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HILL COUNTRY WSC		3,117	5,051	7,054	9,067	11,485	13,387
	2006 Plan	3,117	5,051	7,054	9,067	11,485	13,387
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MOUNTAIN CITY		737	737	737	737	737	737
	2006 Plan	737	737	737	737	737	737
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HAYS COUNTY TOTAL		46,143	69,377	88,887	108,495	132,051	150,574
	2006 PLAN TOTAL	46,143	69,377	88,887	108,495	132,051	150,574

REVISED MUNICIPAL WATER DEMAND (AC-FT/YR) USING TWDB RECOMMENDATION AS GUIDANCE

HAYS COUNTY		2010	2020	2030	2040	2050	2060
BUDA		1,454	2,128	2,603	3,088	3,666	4,140
	2006 Plan	1,252	2,128	2,603	3,088	3,666	4,140
	Difference	202	0	0	0	0	0
	% change	16.1%	0.0%	0.0%	0.0%	0.0%	0.0%
CIMARRON PARK WATER COMPANY		403	489	582	676	789	882
	2006 Plan	403	489	582	676	789	882
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
COUNTY-OTHER		3,359	4,864	6,206	7,576	9,277	10,615
	2006 Plan	3,551	4,864	6,206	7,576	9,277	10,615
	Difference	-192	0	0	0	0	0
	% change	-5.4%	0.0%	0.0%	0.0%	0.0%	0.0%
DRIPPING SPRINGS		1,080	1,856	2,297	2,745	3,300	3,736
	2006 Plan	1,080	1,856	2,297	2,745	3,300	3,736
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DRIPPING SPRINGS WSC		348	501	660	817	1,013	1,166
	2006 Plan	348	501	660	817	1,013	1,166
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HILL COUNTRY WSC		440	702	980	1,249	1,582	1,844
	2006 Plan	440	702	980	1,249	1,582	1,844
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MOUNTAIN CITY		118	116	116	115	115	115
	2006 Plan	118	116	116	115	115	115
	Difference	0	0	0	0	0	0
	% change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
HAYS COUNTY TOTAL		7,202	10,656	13,446	16,266	19,742	22,498
	2006 PLAN TOTAL	7,192	10,656	13,446	16,266	19,742	22,498

From: Thompson, Jon [mailto:jthompson@cityofdrippingsprings.com]
Sent: Tuesday, May 19, 2009 1:15 PM
To: James Kowis
Subject: Adopted Revisions

James,
Looking at the information that you guys sent to us, a few questions arise.

1. What was the population based upon? The city limits, or the general area around Dripping Springs?
2. How am I to understand the purpose of the amount of acre-feet/year demand as it would apply to the City's future planning needs?
3. If anything the numbers are higher than perhaps need be, though I would hesitate to say to change anything until I have had a chance to discuss with you the differences that it would make, and what some of this data means practically to the City.

I am always available via e-mail, or if you could meet me to go over the information (or an associate if you're unavailable) I would appreciate the chance to go through the data to understand how this impacts not only the City but the area surrounding the City for future development and the need water.

If any questions please contact me at your convenience.
Best regards,

Jon Thompson
Development Coordinator
City of Dripping Springs

Tel: 512.858.4699
Fax: 512.858.5646

CITY OF BEE CAVE

May, 12, 2009

James Kowis
Population and Water Demand Committee Chair
Lower Colorado Regional Water Planning Group
c/o Lower Colorado River Authority
P.O. Box 220, Mail Stop R325
Austin, Texas 78767

RE: Population Projection – City of Bee Cave

Mr. Kowis,

I received a letter dated May 7, 2009 from Mr. John E. Burke, Chairman – Lower Colorado Regional Water Planning Group regarding population and water demand projections for the 2011 Regional Water Plan. The City of Bee Cave has just completed an update of the 2009 Comprehensive Plan. I have enclosed the related pages regarding "Existing Population and Housing Characteristics" for your reference. As you can see, Mr. Dan Sefco, with Freese-Nichols, estimated the 2008 population at 4,509.

With the downturn in the economy and lay-offs occurring in Central Texas, staff would agree that the 91% occupancy rate is a little high. We currently estimate the single family housing units at approximately 90% occupancy and multi-family at approximately 72% occupancy. This would put the current population estimate for the City of Bee Cave at 3,904.

Please review the information provided and let me know if you have any questions or concerns. I look forward to hearing from you. You may contact me at (512) 767-6611 or fsalvato@beecavetexas.gov.

Sincerely,

Frank Salvato

Frank Salvato
City Administrator
City of Bee Cave, Texas

4000 Galleria Parkway Bee Cave, Texas 78738
512/767-6600 office 512/767-6619 fax

EXISTING POPULATION AND HOUSING CHARACTERISTICS

Quality of housing and the appreciation of housing values are important planning considerations. Among the factors influencing the desirability of the City of Bee Cave as a place to live is the condition of existing housing and the quality of the residential neighborhoods they form.

The quality of housing within Bee Cave and its ETJ is an important consideration in the evaluation of the adequacy of the existing housing stock, and in estimating future housing requirements. Many of the elements that are utilized to assess the housing characteristics in a community are not applicable to the City of Bee Cave. The City is a relatively young community, and its overall housing stock is, therefore, relatively new. Due to the fact that most of the housing units were built within the last two decades, a discussion of the current quality of the housing stock is not useful. The City of Bee Cave does not have any blighted areas or aging neighborhoods that need to be addressed.

However, it is important to consider the current standards within the City, and thereby determine the ways in which Bee Cave can continue to grow in a positive manner. The issues will be addressed further in later sections of the Comprehensive Plan. For the purposes of the *Baseline Analysis*, however, the current housing characteristics are as follows.

In 2000, it was determined by the U.S. Census that there were 246 housing units within the City of Bee Cave. During the update of the land use survey, the current number, as shown in **Table 2-3**, was estimated to be about 1,563. It should be noted that this housing unit increase has also been impacted by the acreage increase of 1,665 acres within the City limits since the 2000 Census.

Table 2-3

2008 Housing Units

City of Bee Cave and ETJ

Housing Type	City Limits	ETJ
Single Family	712	1,079
Manufactured Homes	1	
Multiple Family	850	
Total Units	1,563	1,079

Source: Sefko Planning Group/Freese and Nichols, Inc.

It was also determined by the U.S. Census that there were 656 people living in the City of Bee Cave in 2000 and that there were on average approximately 3.17 persons per household. Based on the number of housing units currently within the City (1,563), the average number of persons per household (3.17), the occupancy rate (91%), the number of people living within the City limits in 2008 can be estimated to be approximately 4,509 people (see **Table 2-4**).

The number of housing units in the extraterritorial jurisdiction (ETJ) of the City is also important in helping to determine future growth. In 1999, there were 641 housing units counted in the ETJ during the land use survey, all of which were single family dwelling units. As shown in **Table 2-3**, it is estimated in 2008 there were approximately 1,080 single family dwelling units, which using the same calculations as previously explained would result in an ETJ population of about 3,115 residents. Thus, the total 2008 population of the City and its ETJ area is about 7,600 residents.

Table 2-4

POPULATION ESTIMATE

City of Bee Cave and ETJ

Type of Development	Housing Units	Persons per Household (1)	Occupancy Rate (1)	Households	Population
City					**4,509**
Single family Lots	712	3.17	91%	648	2,054
Manufactured Home Lots	1	3.17	91%	1	3
Multiple-Family Units	850	3.17	91%	774	2,452
ETJ					**3,115**
Single family Lots	1,080	3.17	91%	983	3,115
Total					**7,624**

(1) Data from 2000 U.S. Census

Source: Sefko Planning Group/Freese and Nichols, Inc.

From: Frank Robbins [mailto:frobbins@lago-vista.org]
Sent: Tuesday, May 19, 2009 11:23 AM
To: James Kowis
Cc: Bill Angelo
Subject: Lago Vista Population Forecast

Reference Lower Colorado Regional Water Planning Group letter dated May 7, 2009.

Thank you for the opportunity to comment on the forecasts.

The forecasts for Lago Vista are extremely low.

In the last three years, the city has approved more than 8000 living unit equivalents in residential and commercial development.

While the last 18 months of development in terms of permitting have dropped off considerably from past years, we do not expect that trend to continue. However that is essentially what the TWDB population forecast shows. It shows declining growth in the future.

Census population growth between 1990 and 2000 was 2308. The TWDB numbers show less than 2200 population growth in any 10 year period. TWDB declines from 2175 population increase between 2010 to 2020 to 1255 from 2030 to 2040.

Based on an analysis of proposed development and current trends, we are using a 4% annual increase for the next 10 years. The rate if growth is more likely to be higher than that, if the new developments actually build and the city expands its limits to that new development. The city limit boundaries will expand principally to provide water and wastewater service.

Forecasting beyond 10 years is very problematic, but we do not believe it will decline as shown in the TWDB forecasts.

Frank H. Robbins
Assistant City Manager
512-267-1993 (O)
830-660-4669 (C)

From: Hal Lanham [mailto:hal@awrservices.net]
Sent: Tuesday, May 19, 2009 2:17 PM
To: James Kowis
Subject: LCRA Regional Water Plan (Region K) - Travis County WCID #19

James, Travis Co. WCID #9 is an upscale development in the Austin area (Barton Creek);
We estimate the population to be 189 customers X 2.25 persons per household = 425 residents
Build out is 196 lots and should occur by 2020 (196 X 2.25 = 441 residents)

If we can provide any further information, please let me know.

Hal Lanham
General Manager

MATAGORDA COUNTY

NATE MCDONALD
COUNTY JUDGE

May 14, 2009

Mr. James Kowis, Chairman
Population and Water Demand Committee
Lower Colorado Regional Water Planning Group
P.O. Drawer P
Bastrop, TX 78602

Re: Region K Population and Water Demand Projection Revisions

Dear Mr. Kowis:

We reviewed the Revised Region K population projections for Matagorda County that were adopted on May 5, 2009. We believe the revised population projections that Region K submitted in March 2009 **were a much more accurate reflection of what we see happening in Matagorda County** than the revisions adopted on May 5th. We do not understand how Region K can project Matagorda County to **only grow 13.4 percent in the next 30 years** and then have **no growth** for the following 20 years. **That is unrealistic**. We do not want our future water demands based on such unrealistic projections. If for no other reason, our proximity to the expanding Houston metropolitan area will insure that we grow more than 13 percent (4,427 persons) over the next 50 years. But we have much stronger reasons for feeling that your projects seriously short change Matagorda County's future population projections.

Matagorda County currently has two large industrial projects in federal and state permitting processes– expansion of the South Texas Project nuclear plant and the White Stallion power generation plant. These projects will bring large numbers of temporary construction workers and create about 1,000 permanent new positions. Two more industrial projects, whose names are currently confidential, are approaching permitting stages. These two projects would also bring hundreds of temporary construction workers and about 200 more permanent positions into Matagorda County. These current projects and their resulting growth will occur by 2017.

A set of graphs and a chart are attached that provide the latest projections of construction workers and new permanent employees that have been provided by the companies mentioned above.

The South Texas Project (STP) will begin site preparation work in 2009. New reactor construction will begin in 2012 and be completed in 2017. STP will have a peak construction workforce of 5,700 for two of those years. The expansion will create 800+ new permanent positions.

The White Stallion Energy Center (WSEC) project is currently in permitting, with the final permit expected in early 2010. This project will require 1,500 construction workers from 2010 until 2015. The WSEC project will create 150 permanent new positions.

Two confidential industrial projects are moving toward permit applications and would require another 800+ construction workers from 2010 until 2012. They would create an additional 175+ permanent positions in Matagorda County.

We expect most new industrial positions will be filled by persons moving into Matagorda County from other locations, because we do not yet have a surplus workforce with the education and skills to fill these technical jobs. We are tying local incentives to these companies having their new employees live in Matagorda County. If we have 80% of the new employees move into Matagorda County, with household sizes equal to our year 2000 average household size of 2.73 persons, we will be looking at 900 new workers and 1,557 new family members living here for a total of 2,457 new residents from direct industrial job creation.

New industrial job and population growth will also bring secondary job growth to Matagorda County. Using a conservative ratio of 0.57 secondary jobs created for each new industrial employee moving here creates 513 additional permanent jobs. If 50 percent are filled by local residents, 257 new persons will still move into the County. Again, using 2.37 persons as an average household size ratio, these 257 new employees will bring 447 new family members with them. This results in a total of 704 new residents from indirect and induced growth.

The totals of projected industrial job creation and family member growth of 2,457, plus the 704 new residents projected from secondary growth results in a projection of 3,161 new residents from the four mentioned industrial projects. That does not consider any other new companies locating here. And we have others that are exploring opportunities for locating here.

These numbers exceed your 2020 projections by the year 2017. That would leave only 2,258 more people to move into Matagorda County in the next 43 years according to your revised May projections. That is not a realistic projection.

We strongly feel that your March projections were much more realistic for Matagorda County's growth. We strongly urge you to return to the March projections in determining our future population and water needs projections. We do not want our future to suffer because you short changed our future water needs based on unrealistic population projections.

Sincerely,

Nate McDonald

Nate McDonald
County Judge

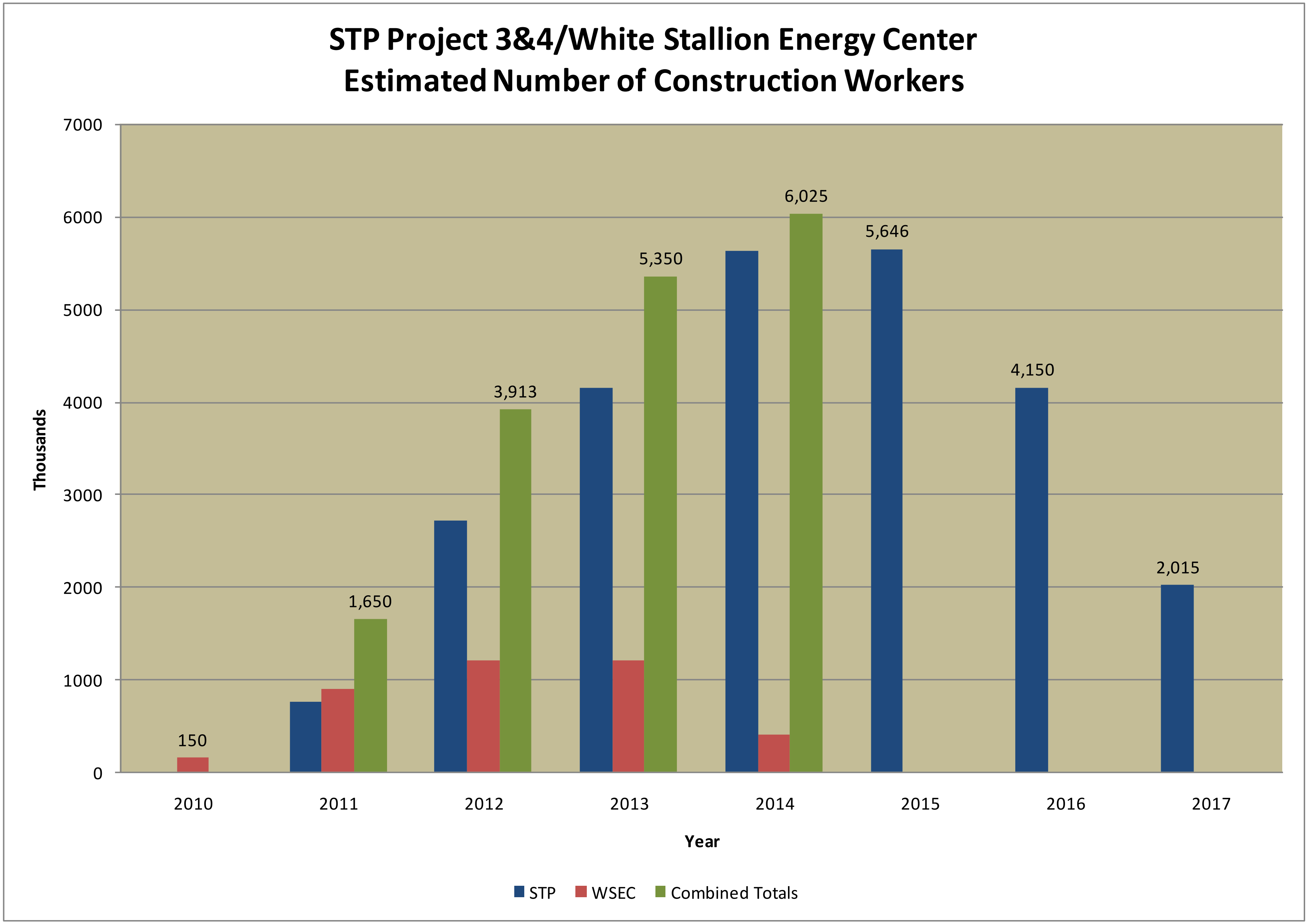
Encl.

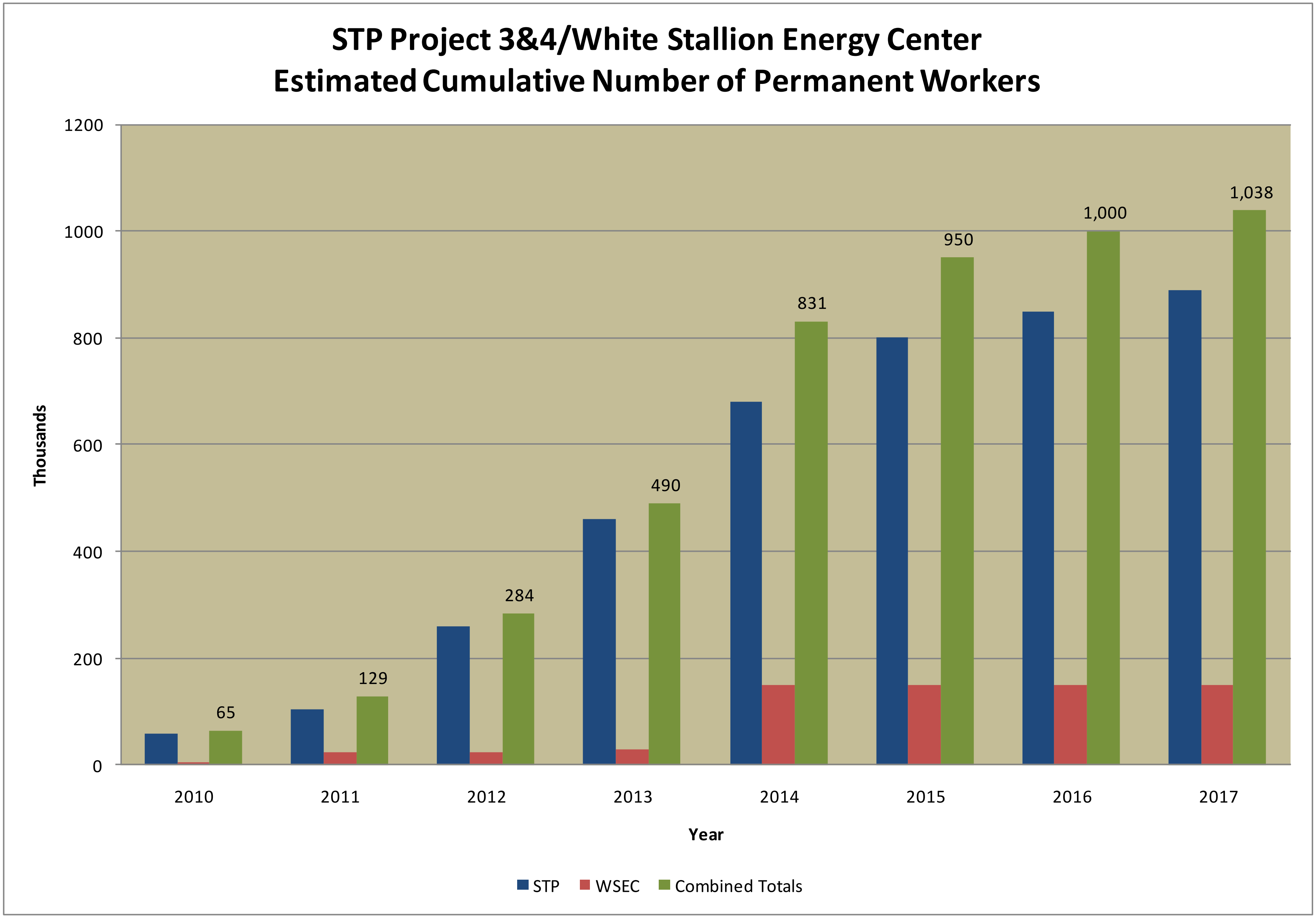
REVISED REGION K POPULATION PROJECTIONS - MAY 5, 2009
MATAGORDA COUNTY

2006 Projections	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
County total	**40,506**	**43,295**	**44,991**	**45,925**	**45,793**	**45,377**
% Increase per Decade	0	6.89%	3.92%	2.08%	-0.29%	-0.91%
Revised **March** Projections	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
County total	**41,924**	**45,431**	**47,701**	**48,365**	**52,300**	**54,900**
% Increase per Decade	0	8.37%	5.00%	1.39%	8.14%	4.97%
% Difference from 2006 Projections	3.50%	4.93%	6.02%	5.31%	14.21%	20.99%
Revised **May** Projections	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
County total	**40,506**	**43,295**	**44,991**	**45,925**	**45,925**	**45,925**
% Increase per Decade	0	6.89%	3.92%	2.08%	0.00%	0.00%
% Difference from 2006 Projections	0.00%	0.00%	0.00%	0.00%	0.29%	1.21%
% Difference from March Projections	-3.50%	-4.93%	-6.02%	-5.31%	-13.88%	-19.54%

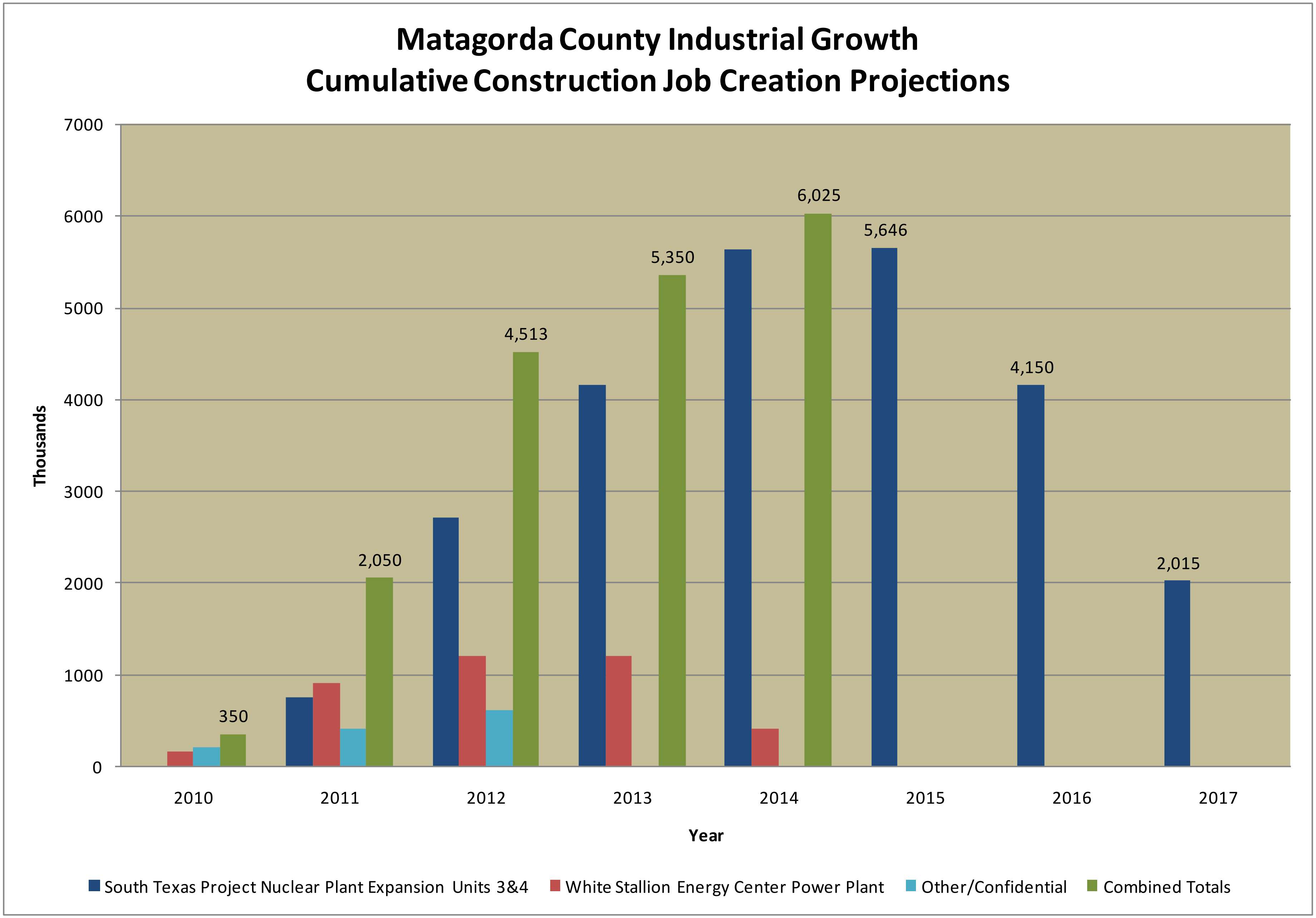
MATAGORDA COUNTY NEW CONSTRUCTION & PERMANENT EMPLOYEE PROJECTIONS				
Projects Now in Permitting or Expected to Locate Here	**Construction Start Year**	**Construction End Year**	**Projected # Temporary Construction Workers**	**Projected # New Permanent Employees**
South Texas Project Units 3 & 4 expansion	2011	2017	5,646	888
White Stallion Energy Center	2010	2014	1,200	150
Confidential synthetic gas production company	late 2010	2011	200	25
Not committed yet - cellulosic ethanol production company	late 2010	2013	600	150
SUB-TOTALS			7,646	1,213
Projected Indirect & Induced jobs created in retail and support services @ ratio of 0.57 per direct job	2010	2017		x 0.57 = 691
TOTALS				1,904

Source:
Matagorda County Economic Development Corporation 5/1/2009

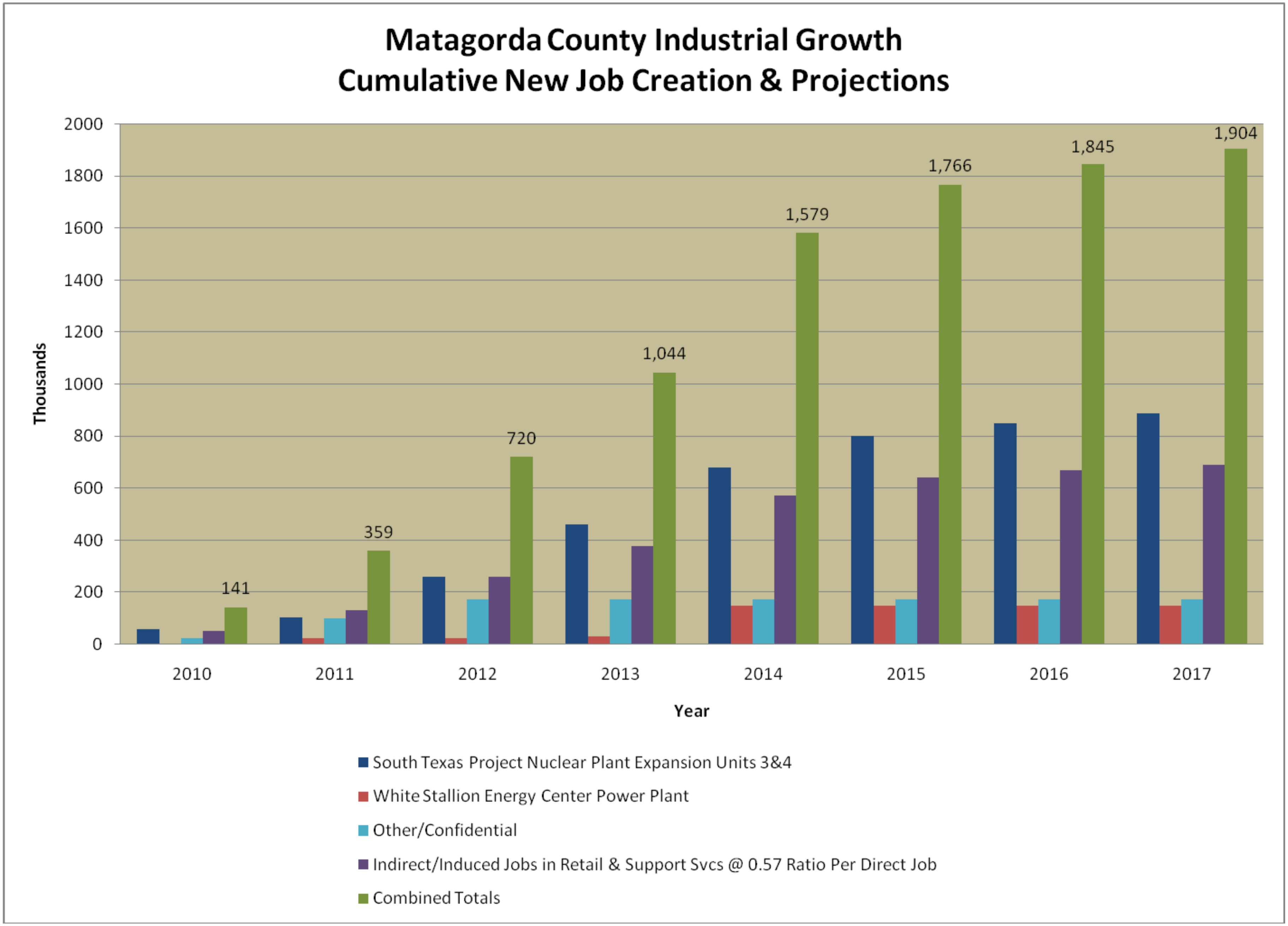

STP Project 3&4/White Stallion Energy Center
Estimated Number of Construction Workers
Thousands
7000
6000
5000
4000
3000
2000
1000
0
150
1,650
3,913
5,350
6,025
5,646
4,150
2,015
2010
2011
2012
2013
2014
2015
2016
2017
Year
STP
WSEC
Combined Totals

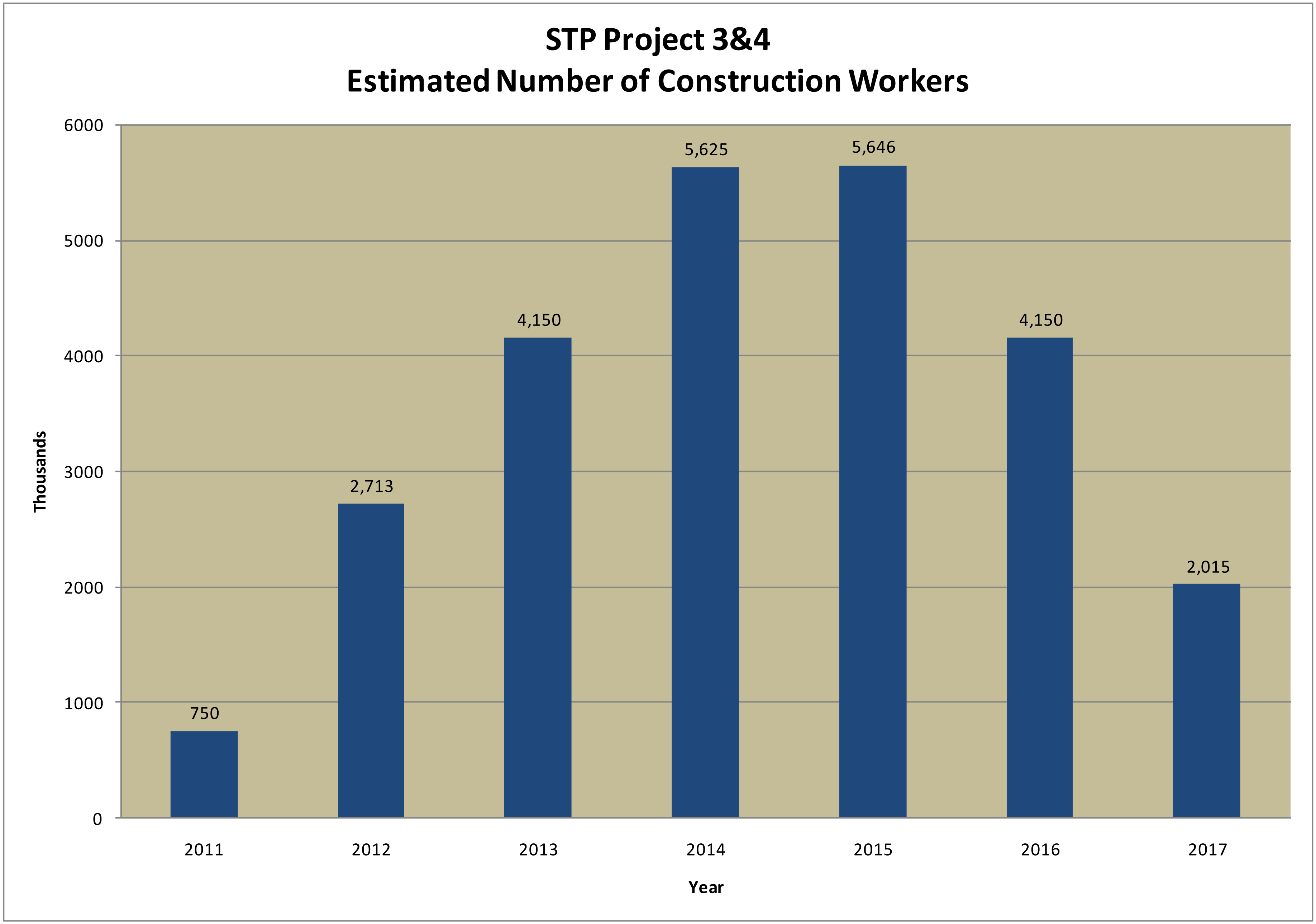


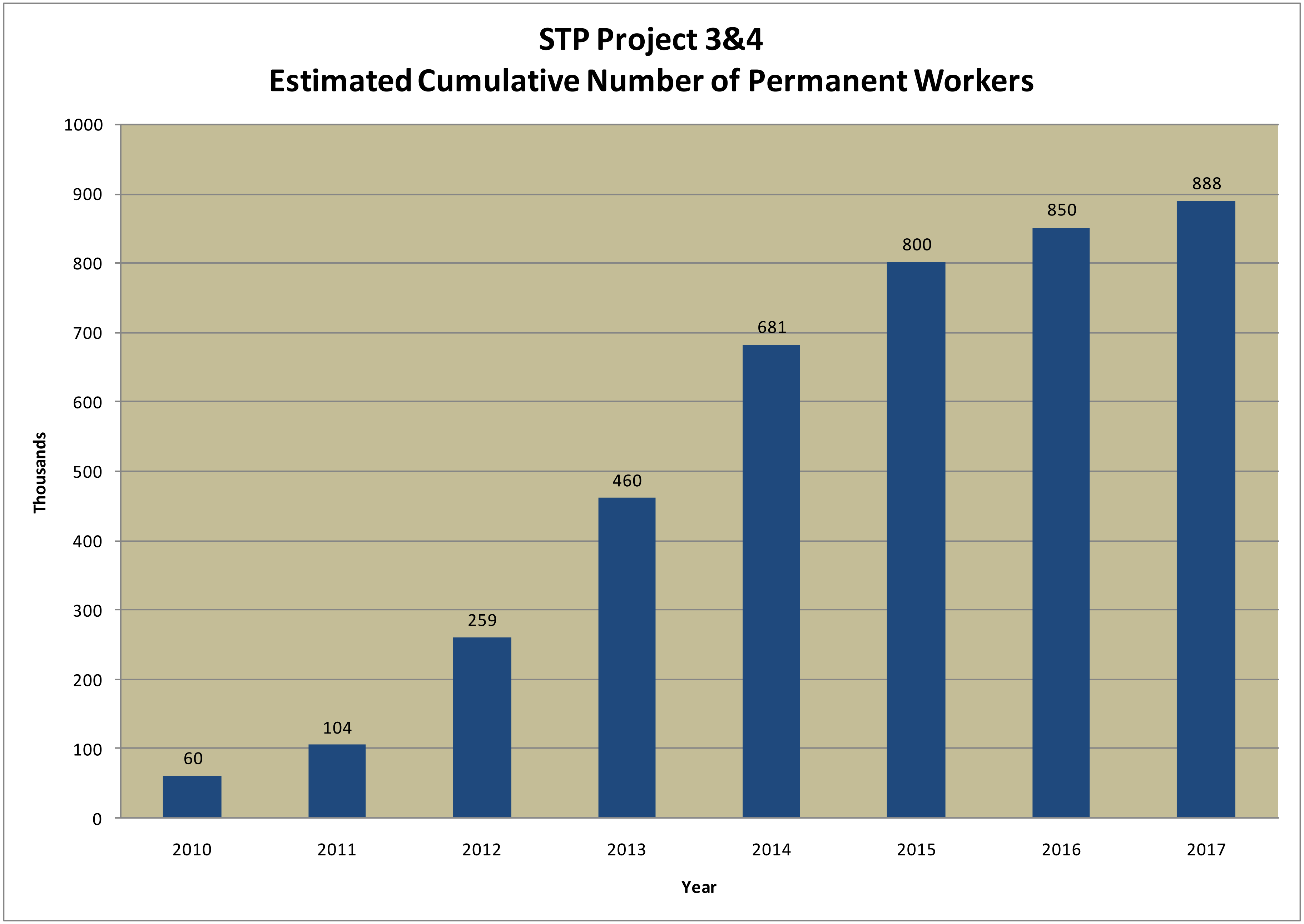
STP Project 3&4/White Stallion Energy Center
Estimated Cumulative Number of Permanent Workers
Thousands
1200
1000
800
600
400
200
0
65
129
284
490
831
950
1,000
1,038
2010
2011
2012
2013
2014
2015
2016
2017
Year
STP
WSEC
Combined Totals



Matagorda County Industrial Growth
Cumulative Construction Job Creation Projections
7000
6000
5000
4000
3000
2000
1000
0
Thousands
350
2,050
4,513
5,350
6,025
5,646
4,150
2,015
2010
2011
2012
2013
2014
2015
2016
2017
Year
South Texas Project Nuclear Plant Expansion Units 3&4
White Stallion Energy Center Power Plant
Other/Confidential
Combined Totals


Matagorda County Industrial Growth
Cumulative New Job Creation & Projections
Thousands
Year
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2010
2011
2012
2013
2014
2015
2016
2017
141
359
720
1,044
1,579
1,766
1,845
1,904
South Texas Project Nuclear Plant Expansion Units 3&4
White Stallion Energy Center Power Plant
Other/Confidential
Indirect/Induced Jobs in Retail & Support Svcs @ 0.57 Ratio Per Direct Job
Combined Totals


STP Project 3&4
Estimated Number of Construction Workers
Thousands
6000
5000
4000
3000
2000
1000
0
750
2,713
4,150
5,625
5,646
4,150
2,015
2011
2012
2013
2014
2015
2016
2017
Year


STP Project 3&4
Estimated Cumulative Number of Permanent Workers
Thousands
1000
900
800
700
600
500
400
300
200
100
0
60
104
259
460
681
800
850
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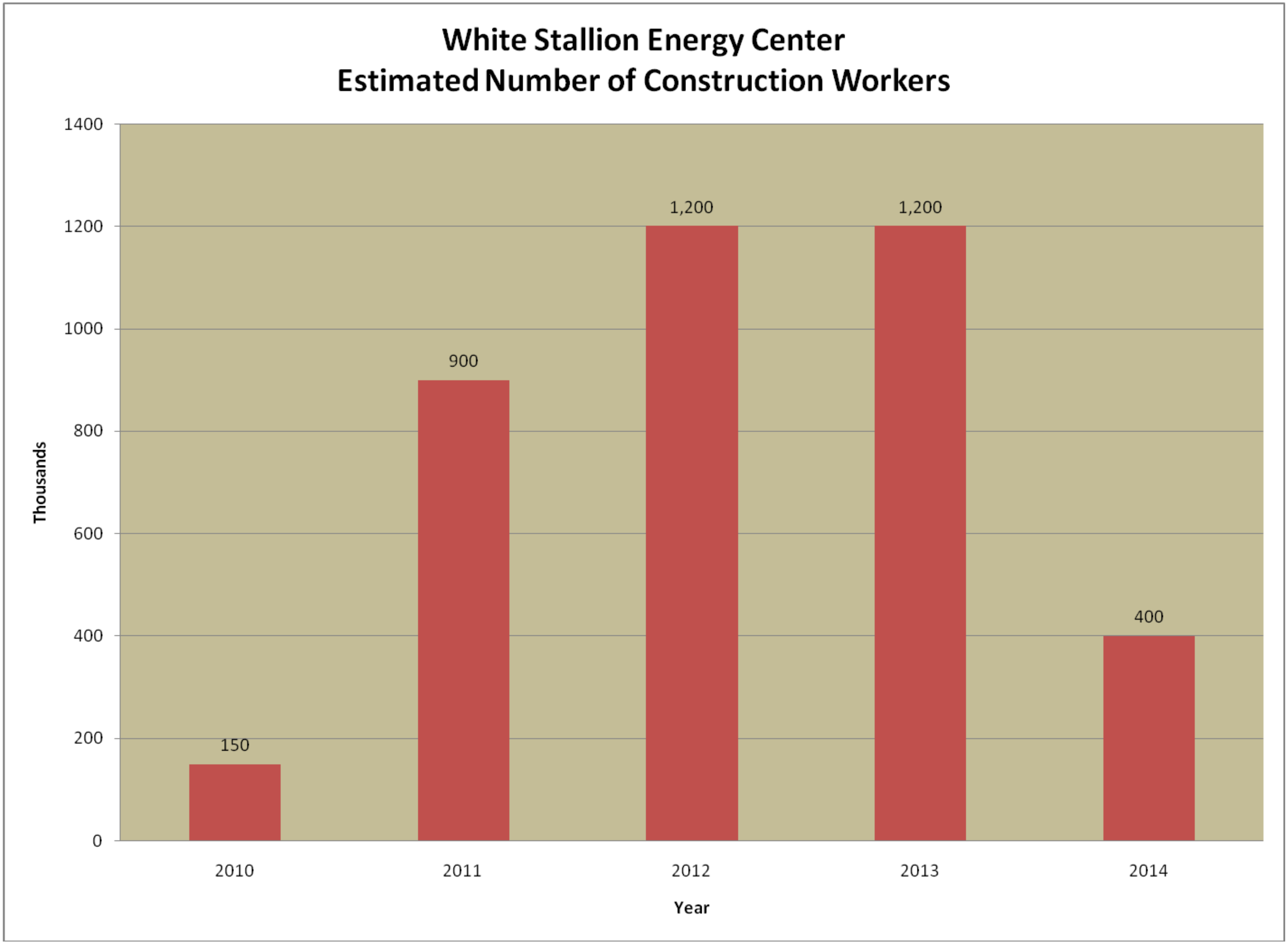
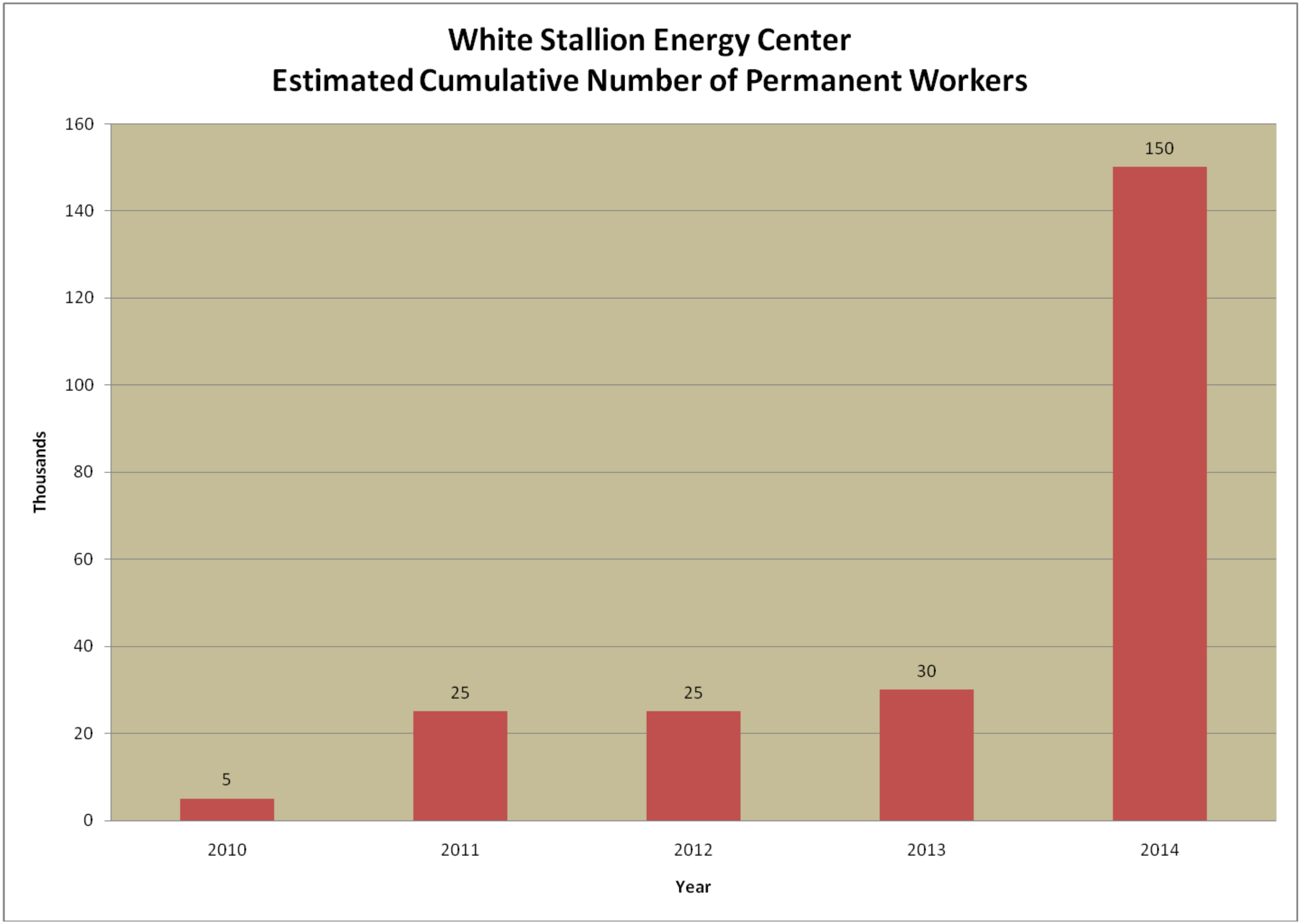
2010
2011
2012
2013
2014
2015
2016
2017
Year


White Stallion Energy Center
Estimated Number of Construction Workers
Thousands
1400
1200
1000
800
600
400
200
0
150
900
1,200
1,200
400
2010
2011
2012
2013
2014
Year


White Stallion Energy Center
Estimated Cumulative Number of Permanent Workers
Thousands
160
140
120
100
80
60
40
20
0
5
25
25
30
150
2010
2011
2012
2013
2014
Year

APPENDIX 10E

SUMMARIES OF FIRST BIENNIUM STUDY REPORTS

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 versus demand numbers for livestock, manufacturing, and mining uses did not change at all. The supply versus demand 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 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.

How the study is incorporated into the 2011 Region K Water Plan

The model is used in Chapter 3 of the 2011 Region K Water Plan to determine surface water availability numbers.

EXECUTIVE SUMMARY

Purpose of Study

The purpose of this study was to conduct a quantitative evaluation of the potential environmental impacts of the proposed water management strategies for the 2006 Lower Colorado Regional Water Plan as related to instream flows and freshwater inflows to Matagorda Bay. During the initial development of the Plan, each strategy was evaluated qualitatively in sufficient detail to address its potential overall impact on wildlife and general natural resources; however, the water availability assumptions which were incorporated into the model for the 2006 Plan did not allow for practical model adjustments needed to obtain information on environmental flow impacts. Therefore, the quantitative analyses included a large amount of uncertainty with regard to simulated changes in instream and bay and estuary flows. As a part of the studies for the 2011 Lower Colorado Regional Water Plan, the TWDB provided additional funding for this study to conduct these further analyses in order to better quantify the potential changes to these flows which may result over time as a result of the various strategies contained in the 2006 Plan. If, as a result of this study, a particular water management strategy is determined to create changes to the historical flow regimes, the Lower Colorado Regional Water Planning Group (LCRWPG) may consider other strategies during the 2011 phase of planning.

Methodology

The WAM Run 3 Cutoff Model (cutoff model) was used for the surface water availability modeling in other tasks completed under this phase of the planning program. A description of the model is provided in *Appendix A*. Please see the task report entitled *Draft LCRWPG 2011 Water Plan, First Biennium Studies, Surface Water Availability Modeling Study*, for further explanation of this cutoff model and the results of the availability modeling. In order to use the cutoff model for analysis of the environmental flow impacts, a few adjustments were required, including:

1. turning off the environmental flow caps ("caps" are upper limits on the amount of flow released – turning them off allows more water to be released to the environment, if available) ,
2. using the 2006 FINS Criteria for the bay and estuary inflow requirements (the supply model used the 1997 FINS),
3. using weather-variable irrigation demands for the run-of-river irrigation rights, owned by LCRA
4. using the curtailment of LCRA interruptible water to satisfy LCRA municipal and industrial firm demands, and
5. using projected decadal demands versus authorized demands.

The adjusted Region K WAM Run 3 Cutoff model is used in this study to quantifiably measure the impact that certain water management strategies could potentially have on the Colorado River and its major tributaries, as well as Matagorda Bay, by comparing the regulated stream flow in the base model without the strategy to the regulated stream flow in the model with the strategy in place. The instream flow results were also compared to the seven-day, two-year low-flow (7Q2 flows) obtained from the *Texas Administrative Code (TAC) 307.10(2) – Appendix B – Low Flow Criteria*. It should be noted that the 7Q2 flow information is provided simply as information and should not be used to determine whether or not a strategy is reasonable based on whether the strategy causes the instream flows to go above or below a particular value. Again, the main comparison for this study is the flow with and without the strategy implemented. The bay and estuary inflow results were also compared to the target and critical bay and estuary monthly inflows as presented in the 2006 Matagorda Bay Freshwater Inflow Needs Study. The frequency of the flows meeting the target and critical levels at certain control points were analyzed for each strategy, as well as duration and flow volume statistics in order to provide a more complete picture of the impacts of each strategy. Thirteen proposed water management strategies from the 2006 Region K Plan were chosen as potentially impacting the Colorado River or its major tributaries in a way that could be quantifiably determined using the adjusted Region K WAM Run 3 Cutoff model. The strategies were analyzed for the years 2010 and 2060 if they were expected to be implemented by 2010, as dictated by the 2006 Plan. If a strategy was expected to be implemented after 2010, it was analyzed only for 2060.

The thirteen proposed water management strategies are as follows:

1. Transfer/allocation/purchase water from Water User Groups (WUGs) with surplus. (Sections 4.6.1.4 and 4.7.3 in 2006 Region K Plan)
2. Treated water purchase from Canyon Lake Water Supply. (Section 4.8.2 in 2006 Region K Plan)
3. Guadalupe-Blanco River Authority (GBRA) Hays County Pipeline. (Section 4.8.3 in 2006 Region K Plan)
4. Recharge Edwards BFZ Aquifer with Onion Creek recharge structure. (Section 4.8.4 in 2006 Region K Plan)
5. Construct Goldthwaite channel dam. (Section 4.8.7 in 2006 Region K Plan)
6. Construct additional Goldthwaite off-channel reservoir. (Section 4.8.6 in 2006 Region K Plan)
7. HB 1437. (Section 4.8.8 in 2006 Region K Plan)
8. Desalination of seawater or brackish groundwater. (Section 4.13.3.1in 2006 Region K Plan)
9. LCRA-SAWS Water Sharing Project (LSWP). (Section 4.6.1.9 in 2006 Region K Plan)
10. City of Austin return flows for downstream needs. (Section 4.5.1.1 in 2006 Region K Plan)
11. City of Austin reuse. (Section 4.6.2.2 in 2006 Region K Plan)
12. Amendment of LCRA irrigation water rights. (Section 4.6.1.3 in 2006 Region K Plan)
13. LCRA excess flows permit and off-channel storage. (Section 4.6.1.8 in 2006 Region K Plan)

The strategies were also all combined into a comprehensive model to determine the overall effects of all of the strategies together. This one is referred to as:

14. Comprehensive model containing all of the strategies.

Each strategy was compared to a base model run (without the strategy in place) at six different control points downstream of the strategy location. Five of the control points are for comparing instream flows, and the sixth control point is M10000, which compares the bay and estuary freshwater inflows. Many of the control points chosen for analysis are the same for all of the strategies, but depending on the location of the strategy, some of the control points differ in order to analyze the impacts immediately downstream of each strategy.

The methodology for Strategy 3 (GBRA Hays County Pipeline Strategy) is shown below as an example:

The GBRA has constructed a treated water transmission pipeline in the I-35 Corridor that extends to the City of Buda. The City of Buda has a commitment with GBRA for 1,120 ac-ft/yr of treated water from the pipeline. An additional 1,680 ac-ft/yr of treated water is available through the pipeline and is allocated to the Region K portion of Hays County-Other for a total of 2,800 ac-ft/yr through 2050. By

2060, this total is increased to 2,982 ac-ft/yr of additional supply to meet projected increased need for the City of Buda.

To determine the impacts of this strategy on both the environment and on existing water rights, a constant inflow card was used to insert the simulated return flows from this strategy. The Buda WWTP is located on Onion Creek, which contributes to the Colorado River Basin. A constant inflow was inserted at Control Point J40120 (Onion Creek) in the model. For the 2010 model, an assumed 60 percent return flow was calculated from the City of Buda portion of strategy (1,120 ac-ft/yr in 2010) to be 672 ac-ft/yr. For the 2060 model, an assumed 60 percent return flow was also calculated for the City of Buda portion of the strategy (1,302 ac-ft/yr in 2060) which amounts to 702 ac-ft/yr. Because there are no existing permitted discharge locations for the Hays County-Other portion of the strategy, it was assumed that these municipal/domestic supplies will be disposed of through individual on-site sewage facilities (OSSF) and therefore there are no return flows that were modeled for the 1,680 ac-ft/yr allocated to it.

The model output was used to determine the change in regulated stream flow (instream flows and bay and estuary inflows) at certain control points within the river basin. Control Points J40060 (Onion Creek), I10000 (Austin), J10000 (Colorado County), K20000 (Wharton County), and K10000 (Matagorda County) were used to evaluate the impact on the instream flows downstream of the strategy, and Control Point M10000 (Entrance to Matagorda Bay) was used to evaluate the impact on the bay and estuary inflow.

Results

The water management strategies that can show quantitative environmental impacts to instream flows and bay and estuary freshwater inflows by comparing the water availability model with and without the strategy are discussed with tabular and graphic results. If the strategy is expected to be implemented throughout the planning period, then a comparison is shown for both 2010 and 2060. If the strategy is not needed throughout the entire planning period, then the comparison is only made for the year 2060. The tables of results for each strategy show a comparison of the 10th percentile flows, meaning that the flows shown are larger than 10 percent of all the monthly results for the years 1940 through 1998, as calculated by the model. This percentile was chosen because the strategies are likely to be incorporated during periods of drought, and therefore the 10th percentile was a more likely representation of the proposed situation than the median flows.

The flows are compared for a model run with and without the strategy and show the percent change, either positive if the strategy has a positive effect on the downstream regulated streamflows, or negative if the strategy has a negative effect on the downstream regulated streamflows. Tables showing the frequency that target and critical instream flow and freshwater inflow levels are met are provided, as well as tables showing duration and volume statistics related to occurrences where the instream flows and freshwater inflows fall below the target and critical levels. Graphs showing the results at Control Point M10000 (Entrance to Matagorda Bay) are also provided for each strategy.

Figure ES.1 below shows a graphic of the locations of several of the control points along the Colorado River that were analyzed as part of this study.

Figure ES.1 Location of Selected Control Points

The majority of the strategies had modeled impacts that can be considered minimal. The following *Table ES.1* is a summary of the strategy results for both 2010 and 2060 (see page ES-2 for strategy names). It includes the results for the bay and estuary inflows, as well as the average result for the instream flow control points analyzed for each strategy. The numbers shown in the table are the percent difference from the model run without the strategy, or in other words, the percent impact the strategy has on the environmental flows. Strategies with no numerical results were either not applicable to the decade being modeled, or the strategy itself was not able to be modeled. A negative number means that the instream flows or freshwater inflows decreased as a result of incorporating the strategy. A positive number means that the instream flows or freshwater inflows increased as a result of incorporating the strategy. In some cases, the results can be attributed to other strategies as well, which is explained in more detail on pages ES-7 and ES-9.

Table ES.1 Summary of Strategy Results Showing Percent Difference as Compared to Base Model

	2010						2060					
	Instream Flow			Bay and Estuary Inflow			Instream Flow			Bay and Estuary Inflow		
Strategy #	Monthly High (%)	Monthly Low (%)	Annual Average (%)	Monthly High (%)	Monthly Low (%)	Annual Average (%)	Monthly High (%)	Monthly Low (%)	Annual Average (%)	Monthly High (%)	Monthly Low (%)	Annual Average (%)
1	0	-0.3	0	0	0	0	13.8	-18.4	-0.3	3.1	-17.6	0.1
2	-	-	-	-	-	-	-	-	-	-	-	-
3	0.5	-0.3	0.1	2.1	-0.9	0.2	0.7	-0.5	0.2	4.1	-0.6	0.2
4	-	-	-	-	-	-	24.4	-6.9	-0.1	469.3	-2.7	0.2
5	2.7	0	0.1	1.4	0	0	1.4	-0.5	0.1	1.2	-0.1	0.3
6	2.1	-14.7	-0.5	6.5	-9.1	0.6	1.5	-0.1	0.1	300	0	0.5
7	0	-0.3	0	0	-0.2	0	0.5	-0.8	0	0.1	-0.7	-0.3
8	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	902.9	-37.2	36.3	156,039	6.1	138.1
10	79.9	-15.8	15.9	385.8	-27.6	23	123.8	0.5	42.5	5,776	-57.4	82.7
11	9.3	-24.7	-2.6	17.5	-28.1	-3.8	20.8	-18	-6.3	202.3	-58.3	-6.7
12	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	0.5	-0.5	-0.1	1.1	-0.1	0.1
14 (Comp)	-	-	-	-	-	-	939	-37.6	36.7	156,499	6.2	139.1

The City of Austin reuse strategy (Strategy 11) shows a downward bias in environmental flows at the control points below the reuse diversion point. However, further investigation is warranted to determine if the impacts of downstream reuse are being balanced by other changes in the model, such as increased upstream storage which would otherwise have been released to meet the downstream demands, or by a change in the long term frequency of the river being managed in target instream flow mode. Reusing a portion of the wastewater effluent reduces the amount of water that can be returned to the river, but also offsets an equal amount of water that would otherwise have been consumed from upstream storage. *Table ES.2A* shows an example of the instream flow impact results at CP J10000 for the City of Austin reuse strategy.

Table ES.2A Strategy 11 (COA Reuse) Comparison of 10th Percentile Flows at CP J10000 (Colorado County) for 2010 and 2060

Month	7Q2 Flow	2010			2060		
		Base Model	Strategy	% Change	Base Model	Strategy	% Change
	ac-ft	ac-ft	ac-ft		ac-ft	ac-ft	
JAN	18,081	22,501	22,207	-1.3	28,432	26,531	-6.7
FEB	18,081	22,459	22,379	-0.4	28,869	27,424	-5.0
MAR	18,081	30,275	30,275	0.0	32,554	31,374	-3.6
APR	18,081	34,962	34,318	-1.8	33,269	30,570	-8.1
MAY	18,081	70,354	69,131	-1.7	53,021	50,670	-4.4
JUN	18,081	75,969	75,612	-0.5	57,235	54,093	-5.5
JUL	18,081	55,512	54,427	-2.0	40,141	39,942	-0.5
AUG	18,081	42,948	43,479	1.2	35,985	29,885	-17.0
SEP	18,081	40,001	38,187	-4.5	34,686	33,754	-2.7
OCT	18,081	27,269	26,854	-1.5	28,561	24,076	-15.7
NOV	18,081	21,994	21,820	-0.8	27,909	25,975	-6.9
DEC	18,081	24,190	24,091	-0.4	29,343	28,201	-3.9
Annual	216,972	468,433	462,781	-1.2	430,005	402,495	-6.4

Table ES.2B shows an example of the bay and estuary freshwater inflow impact results at CP M10000 for the City of Austin reuse strategy.

Table ES.2B Strategy 11 (COA Reuse) Comparison of 10th Percentile Flows at CP M10000 (Entrance to Matagorda Bay) for 2010 and 2060

Month	Target B&E	Critical B&E	2010			2060		
			Base Model	Strategy	% Change	Base Model	Strategy	% Change
	ac-ft	ac-ft	ac-ft	ac-ft		ac-ft	ac-ft	
JAN	205,600	36,000	21,388	21,388	0.0	27,830	25,894	-7.0
FEB	194,500	36,000	22,030	21,388	-2.9	30,903	29,575	-4.3
MAR	63,200	36,000	23,976	23,956	-0.1	28,148	27,013	-4.0
APR	60,400	36,000	9,810	9,167	-6.6	14,721	12,782	-13.2
MAY	255,400	36,000	18,976	13,652	-28.1	7,196	8,660	20.3
JUN	210,500	36,000	5,018	5,301	5.6	3,078	1,284	-58.3
JUL	108,400	36,000	2,851	3,284	15.2	479	1,447	202.3
AUG	62,000	36,000	2,358	2,772	17.5	714	1,465	105.1
SEP	61,900	36,000	1,331	1,392	4.6	881	668	-24.2
OCT	71,300	36,000	10,737	10,002	-6.8	13,466	9,092	-32.5
NOV	66,500	36,000	21,388	21,350	-0.2	25,648	24,184	-5.7
DEC	68,000	36,000	21,524	21,524	0.0	27,824	26,697	-4.1
Annual	1,427,700	432,000	161,388	155,175	-3.8	180,887	168,760	-6.7

Table ES.2C Strategy 11 (COA Reuse) Frequency of Meeting Target and Critical Needs for 2060

Month	COA Reuse Strategy at CP J10000 (Colorado County)						COA Reuse Strategy at CP M10000 (Matagorda Bay)					
	% of Time Flow Meets or Exceeds **Target Needs**			% of Time Flow Meets or Exceeds **Critical Needs**			% of Time Flow Meets or Exceeds **Target Needs**			% of Time Flow Meets or Exceeds **Critical Needs**		
	Without Strategy	With Strategy	Difference	Without Strategy	With Strategy	Difference	Without Strategy	With Strategy	Difference	Without Strategy	With Strategy	Difference
JAN	98.3%	98.3%	0.0%	100.0%	100.0%	0.0%	20.3%	20.3%	0.0%	81.4%	79.7%	-1.7%
FEB	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	23.7%	23.7%	0.0%	84.7%	84.7%	0.0%
MAR	94.9%	91.5%	-3.4%	94.9%	91.5%	-3.4%	49.2%	47.5%	-1.7%	79.7%	79.7%	0.0%
APR	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	49.2%	47.5%	-1.7%	69.5%	66.1%	-3.4%
MAY	93.2%	89.8%	-3.4%	100.0%	98.3%	-1.7%	23.7%	23.7%	0.0%	79.7%	79.7%	0.0%
JUN	98.3%	98.3%	0.0%	100.0%	100.0%	0.0%	30.5%	30.5%	0.0%	69.5%	67.8%	-1.7%
JUL	100.0%	98.3%	-1.7%	100.0%	100.0%	0.0%	18.6%	16.9%	-1.7%	40.7%	39.0%	-1.7%
AUG	100.0%	98.3%	-1.7%	100.0%	100.0%	0.0%	10.2%	8.5%	-1.7%	37.3%	27.1%	-10.2%
SEP	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	32.2%	28.8%	-3.4%	59.3%	59.3%	0.0%
OCT	93.2%	89.8%	-3.4%	100.0%	100.0%	0.0%	39.0%	35.6%	-3.4%	72.9%	69.5%	-3.4%
NOV	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	47.5%	45.8%	-1.7%	81.4%	81.4%	0.0%
DEC	98.3%	98.3%	0.0%	100.0%	100.0%	0.0%	49.2%	47.5%	-1.7%	83.1%	83.1%	0.0%
Annual	100.0%	100.0%	0.0%	100.0%	100.0%	0.0%	44.1%	40.7%	-3.4%	79.7%	79.7%	0.0%

Table ES.2C above demonstrates the impacts the City of Austin Reuse strategy has on the frequency of meeting target and critical instream flows and freshwater inflows. The table does not show the frequency of years in which Lakes Travis and Buchanan are engaged in Critical or Target environmental flow mode in accordance with LCRA's Water Management Plan. The reuse strategy is compared to the full return flow strategy.. The impacts are generally less than four percent, although the largest impact occurs at the Matagorda Bay control point where the frequency of meeting the critical freshwater inflows decreases by 10 percent for the month of August.

Table ES.2D Strategy 11 (COA Reuse) Flow Duration Below Target and Critical Needs for 2060

Condition	COA Reuse Strategy at CP J10000 (Colorado County)			COA Reuse Strategy at CP M10000 (Matagorda Bay)		
	Without Strategy	With Strategy	Difference	Without Strategy	With Strategy	Difference
Number of Times Flow Falls Below **Target** Level	14	20	6	94	92	-2
Maximum Duration Below **Target** Level (months)	1	3	2	39	39	0
Total Duration Below **Target** Level (months)	14	22	8	476	486	10
Average Duration Below **Target** Level (months)	1	1	0	5	5	0
Average Volume of Flow Per Event Below **Target** Level (Ac-Ft)	4,402	5,024	623	407,864	432,524	24,660
Number of Times Flow Falls Below **Critical** Level	3	6	3	72	77	5
Maximum Duration Below **Critical** Level (months)	1	1	0	11	11	0
Total Duration Below **Critical** Level (months)	3	6	3	213	226	13
Average Duration Below **Critical** Level (months)	1	1	0	3	3	0
Average Volume of Flow Per Event Below **Critical** Level (Ac-Ft)	469	3,117	2,648	64,654	66,304	1,650

Table ES.2D above provides statistics related to the instream flow and freshwater inflow falling below their respective target and critical levels over the 58-year period of record. Information on the number of times the flow falls below the target/critical level, the longest amount of time in months that the flow is below the target/critical level, the total amount of time in months that the flow is below the target/critical level, the average amount of time in months per occurrence that the flow is below the target/critical level, and the average volume of flow for each occurrence of the flow falling below target/critical levels is provided. The information is looked at both with and without the strategy, and the difference between the two is shown. In this table, a negative value in the Difference column means that the strategy causes fewer or shorter occurrences below the target/critical level than without the strategy.

Table ES.2D shows that the reuse strategy increases the number of times the instream flows fall below target and critical levels, the number of times freshwater inflows fall below critical levels, the maximum duration below the target level for the instream flows, the total duration below the target and critical levels for the instream flows and freshwater inflows, and the average volume of flow per occurrence for the instream flows and freshwater inflows. The reuse strategy is compared to the full return flow strategy (Strategy 10), at control points below the reuse diversion point. Effects of retaining stored water upstream in lieu of a release to meet downstream demands are not explored here.

The strategy result with the largest positive impact was the LSWP strategy (Strategy 9). Although at CP I10000, immediately downstream of Austin, the impacts on the instream flows are negative, at control points further downstream, the strategy causes large increases to the instream flows and bay and estuary freshwater inflows. This result is due to a decrease in the amount of water being released downstream, but conservation measures taken by irrigation farmers in the lower portion of the basin mean less water is taken out of the river at the downstream control points, thus allowing for a positive impact in the lower part of the basin. It should be noted that the City of Austin and LCRA reuse agreement, as detailed in their 2007 Settlement Agreement, is a part of the LSWP model used in this study to analyze the LSWP strategy, and may contribute to the positive impact as well. The City of Austin anticipates proposing to the Region K Planning Group an updated reuse strategy for consideration in the 2011 Region K Plan. This updated reuse strategy is expected to be considerably different than Strategy 11, which is presented in this study and is included in the approved 2006 Region K Plan.

Table ES.3A shows the negative impact results from the LSWP strategy at CP I10000 (Austin), while *Table ES.3B* shows the positive impact results further downstream at CP K10000 (Matagorda County).

Table ES.3A Strategy 9 (LSWP) Comparison of 10th Percentile Flows at CP I10000 (Austin) for 2060

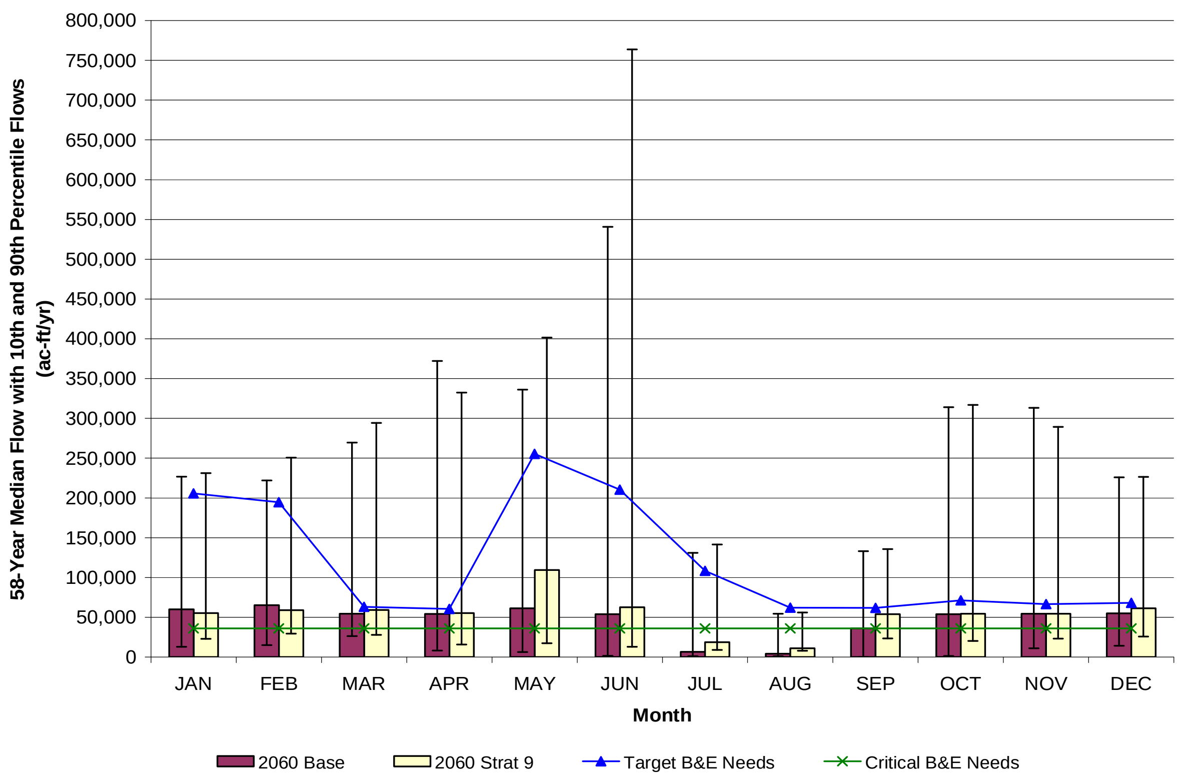
Month	7Q2 Flow ac-ft	Base Model ac-ft	Strategy ac-ft	% Change
JAN	11,547	8,785	8,125	-7.5
FEB	11,547	8,886	8,775	-1.2
MAR	11,547	17,696	13,851	-21.7
APR	11,547	19,782	13,643	-31.0
MAY	11,547	31,805	32,530	2.3
JUN	11,547	26,996	28,167	4.3
JUL	11,547	20,204	17,021	-15.8
AUG	11,547	27,245	20,718	-24.0
SEP	11,547	17,181	10,784	-37.2
OCT	11,547	12,000	13,011	8.4
NOV	11,547	9,409	10,654	13.2
DEC	11,547	10,382	10,889	4.9
Annual	138,564	210,371	188,168	-10.6

Table ES.3B Strategy 9 (LSWP) Comparison of 10th Percentile Flows at CP K10000 (Matagorda County) for 2060

Month	7Q2 Flow ac-ft	Base Model ac-ft	Strategy ac-ft	% Change
JAN	12,374	15,015	30,299	101.8
FEB	12,374	18,782	35,112	86.9
MAR	12,374	32,712	30,107	-8.0
APR	12,374	12,388	19,234	55.3
MAY	12,374	10,349	24,785	139.5
JUN	12,374	6,701	17,113	155.4
JUL	12,374	4,063	12,830	215.8
AUG	12,374	4,205	10,962	160.7
SEP	12,374	2,694	27,015	902.9
OCT	12,374	11,468	25,898	125.8
NOV	12,374	16,617	29,067	74.9
DEC	12,374	18,127	30,078	65.9
Annual	148,488	153,121	292,500	91.0

Figure ES.2 below shows a bar graph of the median flows, as well as lines showing the range of 10th percentile to 90th percentile flows both with and without the LSWP strategy at CP M10000 (Entrance to Matagorda Bay) for 2060, along with the target and critical bay and estuary freshwater inflows.

Figure ES.2 Strategy 9 (LSWP) 2060 Comparison of Freshwater Inflow Results at CP M10000 (Entrance to Matagorda Bay)



The comprehensive strategy model combines all of the individual strategies into a single model, to determine the overall impact on the flows in the Colorado River. Because the LSWP model (used in the LSWP strategy analysis - Strategy 9) contains several strategies that have large impacts, the results for the comprehensive strategy model are very similar to the results shown for the LSWP strategy, in this report.

Conclusions

A major goal of the regional water planning process is planning for future water supplies while protecting the State's environmental, agricultural, and natural resources. This goal has been considered throughout the planning process by the LCRWPG when selecting strategies to meet water needs for the future. One of the specific objectives of this study was to determine if the impacts of the water management strategies are reasonable, consistent with protection of environmental flows, and consistent with long-term protection of the state's water resources, natural resources, and agricultural resources. Comparisons of the predicted environmental instream flows and bay and estuary flows for basin conditions both with and without water management strategies are but one tool used by the LCRWPG to accomplish these goals. However, these comparisons also provide additional insight into the impacts of these strategies and allow additional future consideration of operational and design modifications for those strategies which might better mitigate any identified undesirable consequences.

Overall, based upon the modeling assumptions developed as a part of this study, the individual water management strategies evaluated appear reasonable and consistent with the long-term protection of the state's water resources, natural resources, and agricultural resources. Likewise, the cumulative impacts of all of these strategies are generally within expected ranges and are similar to the results generated by the LSWP model, which contains the LSWP strategy along with other strategies, which have larger positive impacts on the basin than the rest of the strategies. The LCRWPG will continue to consider all of these strategies in further detail during future regional water planning updates, as well as examine potential alternative strategies for selected areas and for changed conditions.

The results of this study have also created concern among planning group members that freshwater inflows to Matagorda Bay are meeting the Critical amounts detailed in the 2006 Matagorda Bay Freshwater Inflow Needs Study only 76 percent of the time, even prior to the implementation of any strategy. This is an area that the planning group may want to evaluate in future studies to determine whether the frequency of the freshwater inflows meeting the Critical level can be increased towards 100 percent.

Note: The Modeling and Environmental Flows Committees of the Lower Colorado Regional Water Planning Group reviewed the draft Task 2 Report. While the work was performed to the limits of the scope of work, the planning group members were concerned that they were not aware of how the results would be presented in the report when the scoping was done. Upon review of the report some committee members expressed concern that the comparisons of the predicted environmental flows for basin conditions both with and without water management strategies contained inherent inconsistencies that jeopardize the report's usefulness for drawing conclusions about the viability of each strategy for accomplishing the long-term protection of the state's water resources, natural resources, and agricultural resources. Some adjustments were made to the Draft Final Task 2 Report that improved the overall report; however, it was agreed that the concerns could not be fully addressed due to scheduling and budgetary constraints. It was further agreed that this note would be added as a qualifier to underscore the need for additional refinements on this section in a future plan.

Please see *Appendix D* for the types of concerns that members of the regional planning group had in relation to the Task 2 Report.

How the study is incorporated into the 2011 Region K Water Plan

The environmental impact modeling from this study is presented in Chapter 4 of the 2011 Region K Water Plan for water management strategies that were in the 2006 Region K Plan and had no changed conditions in the 2011 Region K Plan. For changed condition or new strategies, a revised methodology for evaluating environmental impacts was developed during phase II of this round of planning.

EXECUTIVE SUMMARY

Purpose of Study

Certain areas within Region K continue to have high growth. These areas center around the City of Austin and include Travis County, Hays County, Bastrop County, and Williamson County. In addition to the high growth, many of the water user groups (WUG), especially in Hays County, currently have water supply shortages as well as reduced water availability, according to updated data.

The construction of State Highway 130 (SH 130) is another cause of growth in the area. The Lower Colorado Regional Water Planning Group (LCRWPG) had concerns during the last round of planning that perhaps the population and demand numbers did not accurately reflect the growth that would occur due to the SH 130 Corridor, especially in the County-Other areas.

Based on these two changed conditions, it is necessary to evaluate the impacts of the revised availability numbers in Hays County and Travis County as well as to determine the effects of the construction of the SH 130 Corridor on the surrounding WUGs in Travis and Bastrop Counties.

Methodology

At the very end of the last round of planning, Barton Springs/Edwards Aquifer Conservation District (BS/EACD) reported revisions to their water availability. At that point, it was too late in the planning cycle to include it in the 2006 Region K Plan. As part of this study for this phase of the third round of planning, one of the first task items was to request the revised availability numbers (if any) from both BS/EACD and the Hays-Trinity Groundwater Conservation District (Hays-Trinity GCD).

Hays-Trinity GCD had no updated availability numbers to provide, but will most likely have updated numbers in time for the next phase of this round of planning. BS/EACD provided their updated permittee list for Hays County and Travis County within Region K. The total availability was calculated for each county and for specific WUGs. Once the revised availabilities were determined, a revised shortage analysis was performed to determine the impacts on the WUGs within the BS/EACD service area.

One water management strategy of particular concern that was presented in the 2006 Region K Plan as a strategy for Hays County-Other is the Onion Creek Recharge Structure. This strategy involved the construction of two channel dams across Onion Creek to temporarily retain runoff. In the 2006 Region K Plan, it was determined based on a study performed by the BS/EACD that the recharge dams constructed on Onion Creek may not perform as well as previously expected, due to the strong connection between Onion Creek recharge and Barton Springs. In this phase of study, the updated opinions of both BS/EACD and the City of Austin Watershed Protection department are presented and discussed to further analyze the viability of the strategy.

A third issue in this study is the question of whether the current County-Other population projections for 2010 through 2060 in the 2006 Region K Plan are sufficient for handling the growth due to SH 130 as well as the population of County-Other elsewhere in Travis County. Two methods of determining the population projections within the County-Other portion of the SH 130 Corridor were used. The first used population density, which was provided by the SH 130 report written by the Greater Austin Chamber of Commerce. The second method used mid-census data provided by the State as well as growth estimates for several WUGs within the Corridor area that were provided in a study done by the Capital Area Metropolitan Planning Organization (CAMPO), entitled *Revised Draft CAMPO 2035 Regional Growth Concept*.

Results

The results from the revised availability calculation for BS/EACD showed a revised availability of 2,576 ac-ft for Hays County and a revised availability of 1,673 ac-ft for Travis County. The 2006 Region K Plan showed BS/EACD availabilities of 5,140 ac-ft for Hays County and 2,100 ac-ft for Travis County. This is a reduction of 2,564 ac-ft for Hays County and 427 ac-ft for Travis County. The overall availability of the Edwards Aquifer (BFZ) is reduced to 5,384 ac-ft in this study from 8,375 ac-ft in the 2006 Region K Water Plan. As a result, there are some changes in the shortage/surplus analysis for the affected WUGs in Hays County and Travis County.

In Travis County, only Creedmoor-Maha WSC and Goforth WSC have larger shortages based on the revised availabilities. In Hays County, the City of Buda, Cimarron Park Water Supply, Mountain City, and Manufacturing have larger shortages based on the revised availabilities. Mountain City did not have a shortage in the 2006 Region K Water Plan. County-Other continues to have a shortage, but it is a smaller shortage than it had in the 2006 Plan. These results do not reflect revised population and demand numbers, which will be looked at during the next phase of planning.

In this phase of study, the updated opinions of both BS/EACD and the City of Austin Watershed Protection department were presented and discussed to further analyze the viability of the Onion Creek Recharge Structure strategy. Letters of opinion were written by both entities. In general, it is the opinion of the BS/EACD that the Onion Creek recharge structure strategy is not feasible and would not be effective. The basis for this is three different viewpoints consisting of infrastructure and land-use compatibility, use of water resources, and relative recharge effectiveness. The District has some suggestions for alternative recharge enhancement strategies to consider. These include a number of smaller-scale recharge enhancement structures and facilities on Onion Creek and adjacent recharge streams. The City of Austin also believes that the proposed in-channel reservoirs are ineffective and cause additional concerns, and offers discussion of four alternative projects as replacements for the in-channel reservoirs. These projects include expanding the CenTex quarry, based on current data; protection of riparian corridors along major Colorado River tributaries; protection and maintenance of existing individual in-channel recharge features; and purchasing conservation zones in the contribution zone of Onion Creek. In addition, the City of Austin staff feels that there is an underestimate in the current Region K plan of the long-term benefits of recharge enhancement, and that additional analysis should be done to assess the volume of water available and the aquifer residence time of water resulting from recharge enhancement.

The SH 130 growth analysis used two methods for determining whether the County-Other population projections in the 2006 Region K Plan were sufficient. The first method used population density and calculated the percentage of County-Other population within the SH 130 Corridor to be 19 percent of the total County-Other population of Travis County for both 2007 and 2060. The second method looked at mid-census data that was provided by the State as well as 2035 growth estimates for various “activity centers” surrounding the SH 130 Corridor that were provided by the Capital Area Metropolitan Planning Organization (CAMPO). Using that method calculated the percentage of County-Other population within the SH 130 Corridor to be 24 percent of the total County-Other population of Travis County for 2035. The results of both methods show that it is likely the County-Other population projections in the 2006 Region K Plan are sufficient. Population projections for other WUGs in the Corridor will be updated during the next Phase of planning.

Recommendations

The revised shortages occurring as a result of the reduction in availability from the Edwards (BFZ) Aquifer mean that it is likely that expanded or alternative water management strategies will be needed for several of the WUGs in Travis County and Hays County.

It appears from the information presented by BS/EACD and the City of Austin that the Onion Creek Recharge Structure strategy for Hays County may not be a feasible strategy. There are several alternatives that have been suggested, and these alternatives will be looked at more closely in the next phase of planning.

In the SH 130 potential high growth study, the main question was whether the current County-Other population projections for 2010 through 2060 in the 2006 Region K Plan are sufficient for handling the growth due to the SH 130 Corridor, as well as the population of County-Other elsewhere in Travis County. The results of both methods showed that the County-Other population projections for Travis County that were listed in the 2006 Region K Plan are reasonable and sufficient. Some of the other WUGs within the SH 130 Corridor have had growth that was not on target with the 2006 Region K Plan projections. These WUGs will need to have their population and demand numbers evaluated and adjusted during the next phase of planning.

How the study is incorporated into the 2011 Region K Water Plan

The BS/EACD permit information was included in Chapter 3 of the plan as part of the water supply information. The population and water demand information was revised in Chapter 2 for the entire planning region, which somewhat incorporated the SH130 Corridor portion of the study. The Onion Creek Recharge study continued to be evaluated in the second phase of this round of planning and was finally determined to no longer be feasible and is no longer a recommended strategy in the 2011 Region K Water Plan.