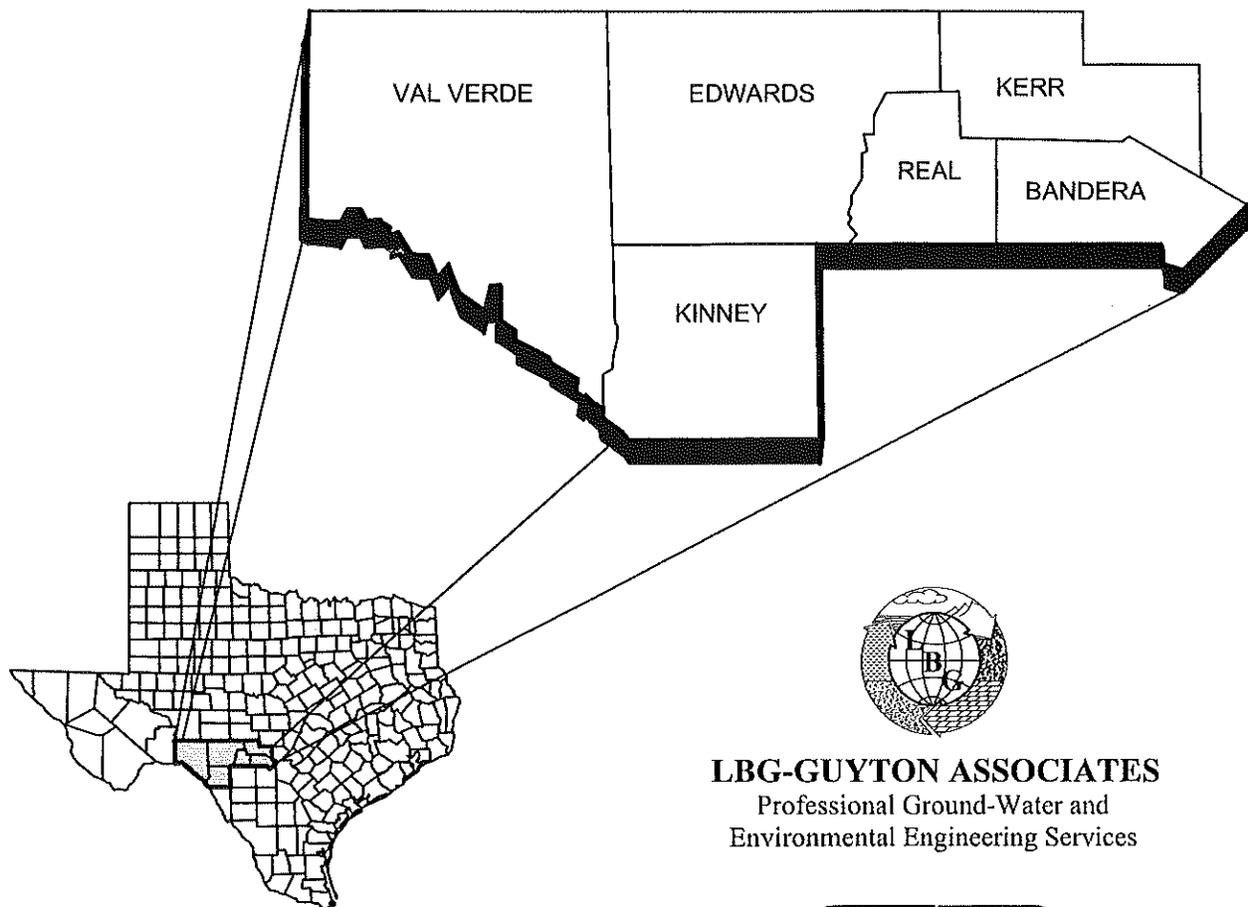


PLATEAU REGIONAL WATER PLAN APPENDICES

January 2001

Prepared for
Texas Water Development Board



LBG-GUYTON ASSOCIATES
Professional Ground-Water and
Environmental Engineering Services

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FREESE - NICHOLS

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CHAPTER 1 APPENDICES

APPENDIX 1A WATER MANAGEMENT STUDIES

Trans-Texas Water Program - West Central Study Area

Summary Report of Water Supply Alternatives

-March 1998-

The following is a summary of the water management plans listed in Trans-Texas Water Program - West Central Study Area - Summary Report of Water Supply Alternatives. From this Trans-Texas report the areas of study that pertain to Region J are the Nueces River Basin, San Antonio River Basin and Guadalupe River Basin. Bandera and Kerr Counties are the Region J counties that are part of the Nueces Basin, San Antonio River Basin and the Guadalupe River Basin. Thus, the portions of the Summary Report of Water Supply Alternatives, which pertain to Region J, are 2.4.1, 2.4.2 and 2.4.3, which apply to those river basins. Water supply options of Appendix A, also apply to Region J.

The water supply options, which apply to Region J and are found in Appendix A Option Data Sheets, are as follows:

- 1) L-10 Demand Reduction (Water Conservation)
- 2) L-12 Exchange Reclaimed Water for BMA Medina Lake Water (Included with Option S-13)
- 3) S-13A Medina Lake—Divert and inject to aquifer; 1947-56 Drought Average
- 4) S-13B Medina Lake—Divert to aquifer recharge zone; 1947-56 Drought Average
- 5) S-13C Medina Lake—Divert to WTP; Firm Yield with 20,200 ac-ft/yr recharge
- 6) S-13D Medina Lake—Buy rights and release to Applewhite; Firm yield with 22,600 ac-ft recharge
- 7) S-14D Applewhite Reservoir—Operated in conjunction with Medina Lake; Firm yield to WTP
- 8) G-19 Guadalupe River Dam 7—Raw water at reservoir; Firm yield (Consensus Environmental Criteria)
- 9) G-30 Guadalupe River Diversion Near Comfort to Recharge Zone via Medina Lake—Drought Ave

Within Appendix A the Option Data Sheets provide much option descriptions, time to implement, unit cost of water, quantity of water, land impacted, comparison of options relative to other options studied and factors affecting cost, quantity and land impacted. The following is a description of the water options from the Option Data Sheets.

Water option L-10 Demand Reduction provides municipal and irrigation water conservation programs and practices to reduce per capita water use in cities and to reduce the quantity of water used per acre irrigated. Relative to the other Region J water options studied, L-10 provides the highest volume of water at the lowest cost and with the least amount of land impacted.

Water option L-12 uses reclaimed municipal wastewater for irrigation, and it obtains an equivalent quantity of Medina Lake water for other uses, such as aquifer recharge and/or direct municipal use.

Water option S-13A diverts, treats to drinking water standards and injects to Edwards Aquifer through injection well field in eastern Medina County.

S13-B water option diverts Medina Lake water to the Edwards Aquifer recharge structures in northwestern Bexar County (structures located on Recharge Zone).

Water option S13-C diverts Medina Lake firm yield to a water treatment plant located in northwest San Antonio near FM 1604 and then distribute treated water directly to municipal customers. It includes taking credits for extra 20,200 ac-ft/yr estimate to recharge Edwards Aquifer during drought at Medina Lake due to reduced irrigation demands.

Water option S-13D will operate Medina Lake as a System with Applewhite, with releases to Applewhite when needed for diversion to water treatment plant. It includes taking credits for extra 22,600 ac-ft/yr estimate to recharge Edwards Aquifer during drought at Medina Lake due to reduced irrigation demands.

Water option S-14D is the combined yield of Medina Lake and Applewhite Reservoir would be diverted from Applewhite to a water treatment plant located in south San Antonio, treated to drinking water standards and then put into the San Antonio distribution system (same as option S-13D without credit for increased recharge to aquifer).

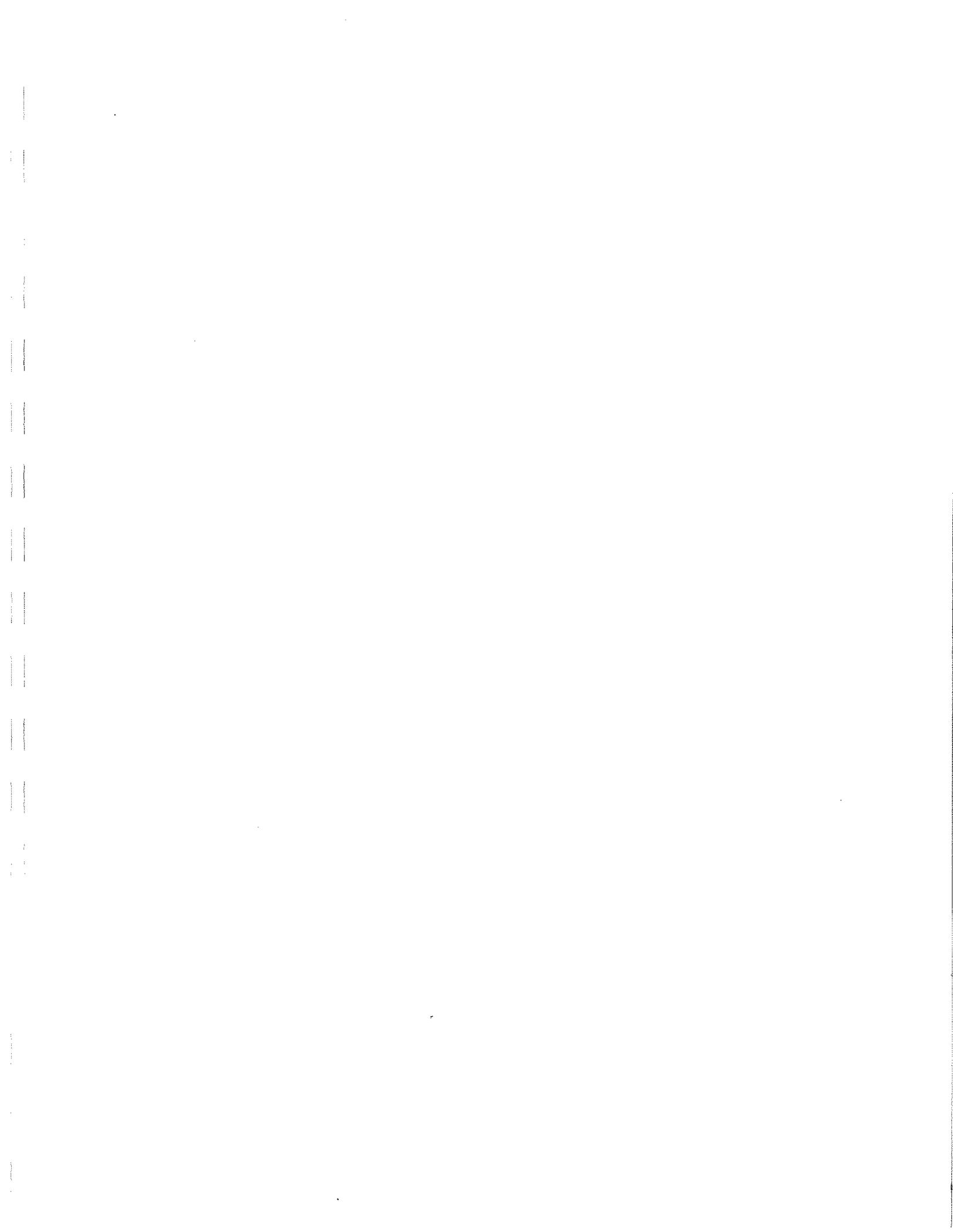
Water option G-19, Guadalupe River Dam 7—Raw Water at the Reservoir is located in Kendall County on the Guadalupe River upstream of Canyon Lake. The conservation storage capacity at elevation 1,242 ft amsl is 600,000 ac-ft. Firm yield was computed using the TWDB/TNRCC/TPWD consensus environmental criteria, Edwards Aquifer pumpage of 400,000 ac-ft/yr, full use of all water rights of the basin, full subordination of hydropower rights at Lake Dunlap and a Canyon Lake firm yield of 78,600 ac-ft/yr.

Option G-30 would divert water from the Guadalupe River in the reach between Comfort and Center Point and pump it to the watershed divide, where it would flow via Mason Creek and the Media River to Medina Lake/Diversion Lake. Then, the water would be pumped to the Edwards Aquifer recharge zone in northeastern and northern Medina and northern Bexar Counties to increase the quantity of Edwards Aquifer water available for pumpage.

See the following table for a comparison of the quantity of water, cost and land impacted regarding water options for Region J. All of the information in the table comes from the Option Data Sheets in Appendix A of Trans-Texas.

Trans-Texas Water Supply Options for Region J

Option Number	Quantity of Water (ac-ft/yr)	Unit Cost (\$/ac-ft)	Land Impacted (acres)
L-10	90,000	276	0
S-13D	37,500	619	2,717
G-19	30,927	804	12,830
S-13C	29,000	451	298
S-14D	14,900	1,518	2,717
S-13A	26,700	896	172
S-13B	26,700	614	172
G-30	9,900	720	300
L-12	N/A	N/A	N/A



Springhills Water Management District

Regional Water Supply Study

-August 1991-

Springhills Water Management District, once known as Bandera County Water Authority, covers all of Bandera County. Groundwater provides the municipal water to Bandera County from mainly Trinity Group Aquifer and also Edwards Plateau Aquifer. The Trinity Group Aquifer, which underlies the entire Bandera County, provides 6,500 acre-feet per year to Bandera County. Edwards Plateau Aquifer, which is in higher elevations of Bandera County in the northwestern part, provides 700 acre-feet per year. According to this report, there is a water deficiency especially for eastern Bandera County in relation to the water projections through the year 2040. Most of Bandera County operates on wells. Note that Medina River originates in north central Bandera County, but the flow mostly goes to downstream demands.

Ten water supply alternatives were studied for Bandera County in this report, and one alternative was recommended. The ten alternatives are briefly described in the following paragraphs.

Alternative No. 1 uses groundwater production wells to pump groundwater from the western and central areas of Bandera County, where water is more plentiful, and disperses it to eastern Bandera County.

Alternative No. 2 pumps surface water from Medina River. This alternative uses an off-channel dam, a reservoir on an unnamed creek east of Town Mountain, a pump station on Medina River, a package-type water treatment plant east of the City of Bandera, and pipelines connecting the components. Pumping would take place when water is plentiful, and it would be stored. The water would be saved for dry times.

Alternative No.3 provides for a dam and reservoir on Bandera Creek, a pump station, a package-type water treatment plant and pipeline from Medina River at City Park Lake. Water would be pumped from Medina River and stored on a tributary of Medina River, Bandera Creek.

Alternative No. 4 would pump water from the Guadalupe River and discharge it into headwaters of Mason Creek in Bandera County. Water would be transferred from Mason Creek to the reservoir located on Bandera Creek, below the confluence with Mason Creek. Alternative No. 4 is more costly than Alt. No. 3, due to pumping and transferring water from the Guadalupe River.

Alternative No. 5 is the same as Alt. No. 3, except that the storage reservoir is on Mason Creek above the confluence with Bandera Creek. There is a smaller drainage area at the Mason Creek site compared to the Bandera Creek site. Thus, there is a less water contribution from natural inflow for this alternative compared to Alt. No. 3.

Alternative No. 6 is similar to Alt. No. 5, except it pumps water from the Guadalupe River. The storage reservoir is on Bandera Creek, below the confluence with Mason Creek. This alternative is more costly than previous alternatives due to a larger pump station pipeline to deliver water from the Guadalupe River.

Alternative No.7 consists of a tributary dam and reservoir on Privilege Creek above the confluence with Bear Creek, and it uses natural flows from the 18-square mile drainage area at this site and pumps from the Medina River below the confluence with

Privilege Creek. For this alternative a diversion dam is needed across Medina River to provide pump submergence and suction head. The following are also required for this alternative: a 2mgd water treatment plant, a pump station at the diversion dam with a pipeline to the reservoir and a pump station at the dam with a pipeline to the treatment plant.

Alternative No. 8 is similar to Alt. No. 7, except the dam is located downstream of the Bear Creek confluence to enhance the natural drainage area contribution.

Alternative No. 9 consists of constructing a dam and reservoir on Middle Verde Creek, below its confluence with West Verde Creek near S.H. 173 in Medina County just south of the Bandera County line. No supplemental pumping would be needed with this alternative. Raw water would be delivered over the basin divide to the water treatment plant in Bandera via a main pump station at the dam, 13.5 miles of pipeline and a booster pump station near the Medina River.

Alternative No. 10 purchases treated water from the city of Boerne. This alternative is based on the assumption that either the City of Boerne or the District would enter into an agreement with GBRA to divert water from the Guadalupe River to supplement their existing lake and expand their water treatment plant capacity. This alternative requires construction of two pump stations and 16 miles of pipeline to deliver water from Boerne to the storage tank near Pipe Creek.

Other alternatives for water planning are hydrogeologic studies of the Lower Trinity Aquifer to assess the feasibility of groundwater injection/recovery and the use of the aquifer as an underground distribution system. Another area being researched that may provide higher yield from rangeland watersheds is brush control management.

The recommended alternative for water supply to meet Bandera County's future municipal water needs is Alternative No. 2 – Town Mountain Dam with Pumping from the Medina River. This alternative would provide treated surface water to the distribution system in eastern Bandera County.

As of April 1999, a contract between Springhills Water Management District and Bexar-Medina-Atascosa Water Control Improvement District No. 1 (BMA) has been secured for 5,000 acre-feet of water from Medina Lake. Before the 5,000 acre-feet contract, there was a 3,500 acre-feet contract. As of April 1999, the recommended Alternative No. 2 has not been implemented.¹

Val Verde County

Regional Waterworks and Wastewater Systems Study

-June 1990-

Del Rio is the only incorporated city in Val Verde County, and as of 1990 it contains approximately 90% of Val Verde's population. Other communities studied in this report were Comstock, Langtry, Loma Alta and Pandale. Due to vast expanses of land between Val Verde's cities, there is no intention of regional water services for the entire county. However, there is consideration for regionalization of Del Rio's existing systems by extending adequate water and sanitary sewer facilities to the existing subdivisions developed immediately adjacent to the City Limits of Del Rio. The city of Del Rio and its extraterritorial jurisdiction (ETJ) area is a growth center and is expected to increase at an average annual rate of 1.72%. The other areas are considered static with respect to potential growth.

Water supply for Val Verde County is as follows. The City of Del Rio provides water service to the public. The communities of Comstock and Langtry and some developments around Lake Amistad have small water systems that serve the public. Water supply for the balance of the rural areas in Val Verde County is developed from the groundwater resources. Sources of water for Del Rio and rural areas within Val Verde County are groundwater and surface water. The surface water source that Del Rio receives water from is San Felipe Springs. As of July 1990 Del Rio receives 10.19mgd annually from San Felipe Springs. The maximum diversion rate from San Felipe Springs was 17.42mgd. Del Rio's other sources of water include two deep wells in the northern part of the City and three shallow wells west of the San Felipe Springs pump station. The City of Del Rio has about 22.33mgd total of surface and ground water for average daily use. For rural areas groundwater is the sole source of water.

The principal aquifer in Val Verde County is the Edwards and Associated Limestones. From the aquifer, water is produced from wells developed at varying depths and yield small to large quantities of fresh to slightly saline water.

Cienegas Terrace Addition and the Val Verde Park Estates, which are outside Del Rio's city limits need improvements to upgrade the water quality. From recommended capital improvements, only some include water distribution system improvements for Del Rio, Cienegas Terrace Addition and Val Verde Park Estates. Other subdivisions of concern are Payne Village, Chapparel Hills, Los Campos, Escondido Estates, Rio Verde, Rio Vista, Comalia and the Rough Canyon Recreational Area.

The following paragraph pertains to recommendations and findings regarding water supply for Val Verde County. The City of Del Rio will require 91%, or 16.66mgd of the County's water by the year 2010 and 25.08mgd by the year 2040. Laughlin Air Force Base will require about 7%, or 1.39mgd of the projected water supply needs of the County with the remaining percentage going to rural communities. Groundwater provides water to rural communities and the City of Del Rio obtains water from five wells (ground water) and the San Felipe Springs (surface water). Through the year 2030 Del Rio seems to have adequate water supply. The rural areas are recommended to continue their use of groundwater resources as their primary water supply. The City of Del Rio should actively seek surface water rights from other permittees out of the

Amistad/Falcon water storage account. It is recommended that there is a study of the groundwater resources that may be available for development as a supplemental supply.

The following is recommended for water distribution improvements within Val Verde County. The smaller water distribution systems in the County shall continue to operate as they have in the past, except that an elevated tank may be utilized in the future instead of the pressure tank. The City of Del Rio should initiate a water system study to determine how the system can be operated more efficiently and effectively. The City of Del Rio shall initiate a capital improvements program to include additions to the major transmission main system and replace substandard mains. Del Rio shall continue to investigate sources of unaccounted-for or "lost water" and meter the unsold water used for construction, parks and other municipal operations. Del Rio shall seek grant funds as necessary for improvements within the developments outside the City.

San Felipe Springs and the existing wells will satisfy the requirements of the 20-year water usage projections for Del Rio. However, by the year 2030 there needs to be an additional 2.11 mgd of water supply.

A possible source for the additional water is developing well field(s) and collection system(s), through subsurface testing. Several water wells can be drilled near Del Rio, and the wells could be interconnected with a piping system for collection and delivery to a storage reservoir. The reservoir could be an existing Del Rio tank or a new tank developed at or near the well field location.

Another source of water could be to utilize existing wells now serving the developments of San Pedro and Lake Ridge Additions, which are around Lake Amistad for water supply service to for the North Del Rio area. Additional wells would need to be developed as growth increased between North Del Rio and Lake Amistad.

Also, for a source of water there could be a continual search to purchase water rights from other cities, industries, irrigation districts or individuals that have permits for Amistad/Falcon Reservoirs.

There are three major accounts of the Amistad/Falcon Reservoirs. One account is a reserve of 225,000 acre-ft of water for domestic, municipal and industrial uses. Another account is an operating reserve, which is to fluctuate between 380,000 acre-ft and 270,000 acre-ft of water based on the monthly levels of the Amistad-Falcon Reservoir system. The other account is for irrigation used and all other cases.

Kerr County

Regional Water and Wastewater Planning Study -October 1997-

Kerr County is in the Edwards Plateau Region of Texas. The county consists of parts of four river basins. The central two-thirds of Kerr County is in the Guadalupe River Basin. Other parts of the county are in the Colorado, Nueces and San Antonio River Basins. Forty-eight percent of Kerr County's population is in Kerrville, which is in the Guadalupe River Basin. Kerrville's water is supplied from surface water from the Guadalupe River and groundwater from aquifers below the city. The Nueces, San Antonio and Colorado River Basin areas all obtain drinking water from local aquifers and livestock water from local streams and on-site watering tanks.

Partial conversion from groundwater supply to surface water occurred in 1981 with construction of the UGRA Water Treatment Plant.

The following are options for increasing the water supply for Kerr County:

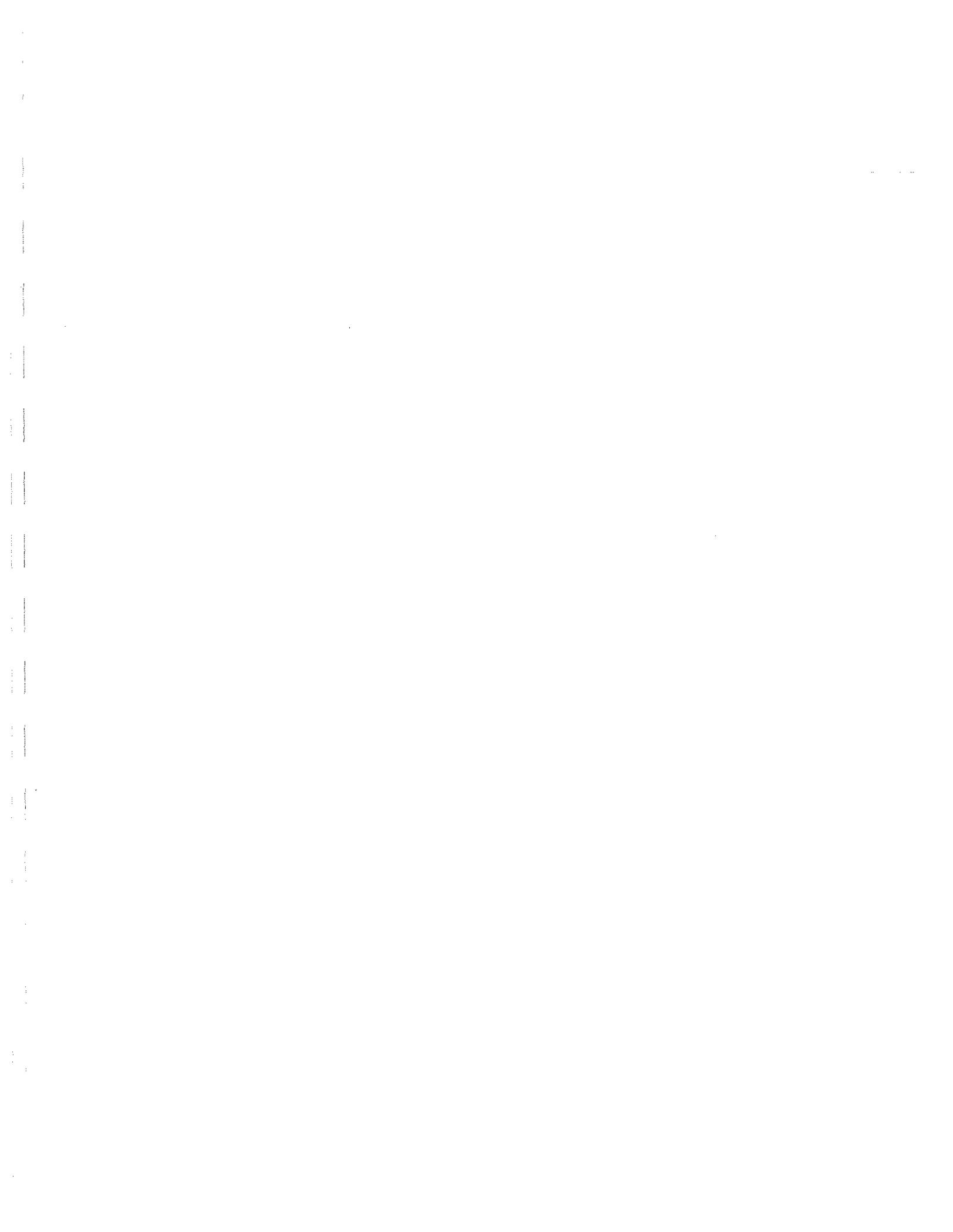
1. Acquiring supplementary surface water rights or contracting for additional surface water from the Guadalupe River
2. Studying the potential use of off-channel surface storage to allow for capture of surface water during periods of high river flows. The water could be stored via ASR (aquifer storage recovery) or used subsequently.
3. Revising the TNRCC surface water permits to allow for more diversions during times of greater flows in the off-peak demand months.
4. Wells could be developed in remote locations, based on ground water availability.

From the above options a plan needs to be derived which is effective in meeting the water supply needs and one that is cost effective. Well sizes and spacing shall be controlled in the plan.

There is particular concern for Kerr County's water supply during times of drought. According to this report projected demands for the City of Kerrville with extended service area would exceed drought condition supply on an annual average basis in approximately the year 2017, and projected demands for Kerr County would exceed drought condition supply on an annual average basis in about 1999.

There are six entities that could construct, own and operate a regional water supply system. The entities are Conservation and Reclamation Districts, River Authorities, Water Control and Improvement Districts, Municipal Utility Districts, Fresh Water Supply Districts and Underground Water Conservation Districts.

It is recommended that the water treatment plant increase from 5mgd to 10mgd by 2005 to meet regional demands.



Kerr County

Regional Water Plan Phase I for Upper Guadalupe River Authority -January 1992-

The Guadalupe River is the main surface water source in Kerr County, however the Guadalupe River water rights are all fully appropriated. The only easily attainable water rights are those through subordination of hydroelectric rights.

Kerr County's sources for groundwater are the Edwards, Upper Trinity, Middle Trinity and Lower Trinity Aquifers.

Section 5, Water Resource Management Options, of this report explains the ways for Kerr County's water to be managed. The water supply options considered were water reuse, the role of ASR (aquifer storage recovery) in the City of Kerrville and the role of conjunctive management in Kerr County.

In regards to water reuse, Kerrville needs to consider reuse of at least 1.2mgd of treated wastewater, or will need to upgrade its wastewater treatment plant to improve phosphorous removal during periods of low flow in the Guadalupe River. The City of Kerrville's discharge is expected to increase wastewater discharge into the Guadalupe River to 5.2mgd by 2040. Since discharge needs to be kept at or below 4.0mgd at current water quality limits, water reuse needs to be considered. Potential uses for the reclaimed water are for orchards, public facilities and some for city farms.

The ASR (Aquifer Storage Recovery) was planned to provide stored water for drought protection. Since this report was written, the ASR has been implemented.

Through a conjunctive management approach, two scenarios were studied. Scenario one assumes that no additional surface water rights are being obtained. Scenario two assumes 4,760 ac-ft/yr of additional surface water rights are obtained before 2000. With 4,760 ac-ft/yr additional surface water, the Middle Trinity will not reach critical drawdown until nearly 2040.

Section 7, Water Supply Alternatives, gives an overview of Kerr County's water supply options.

1. Option 1 would continue present policies and no action would be taken. The City of Kerrville would continue to solely use treated surface water from UGRA. Long-range demands of Kerrville would be met, but groundwater users outside of Kerrville would continue to overdraft their water supply aquifers. The Middle Trinity Aquifer is most used in Kerr County, and as it becomes dewatered the Lower Trinity wells will be deepened.
2. Option 2 develops a regional system to transport treated surface water through pipelines to the general area of demands in Kerr County's Economic Development Corridor (EDC). ASR wells would be used to recharge the Middle Trinity during the winter months when surplus treated water is available. Another way of developing a regional system is to treat the water and transport it via pipelines to the demand centers where the water goes to existing utility distribution systems.

3. Option 3 provides a distributed surface water supply system, which means the water is diverted, treated and available at more than one location. Small lakes at Center Point and Ingram could be diversion points, thus allowing for a distributed system in three ways. Water could be attained from one of the following scenarios:
 - The UGRA Ponding Lake and New Lake Ingram
 - The UGRA Ponding Lake and Lake Center Point
 - The UGRA Ponding Lake, New Lake Ingram and Lake Center Point

4. Option 4 is a regional surface water supply system using off-channel storage for additional surface water from the Guadalupe River. The UGRA's Riverside Treatment Plant would be enlarged to meet the region's peak demands. The distribution system would originate in Kerrville.

UGRA/ City of Kerrville

Aquifer Storage Recovery Feasibility Investigation – Prepared for the Upper Guadalupe River Authority
-December 1989-

Due to the City of Kerrville's projections to exceed its Upper Guadalupe River Authority's water demand supply by the year 1992, this feasibility study was done to evaluate Aquifer Storage Recovery (ASR). ASR stores excess waters from wet times in an aquifer and allows for recovery during dry periods. This report proved that the Hosston-Sligo Aquifer formation is suitable for moving on to Phase II of testing for it to be an ASR storage zone.



Nueces River Basin

Regional Water Supply Planning Study

-May 1991-

This water supply planning study is for the Nueces River Basin. Even though the Nueces River Basin contains parts of Region J counties, this report mainly focuses on the counties that are not Region J counties. The report is also focused on recharge to the Edwards Aquifer, which barely extends to the boundary of Region J at Bandera County. If the report had addressed groundwater-surface water exchange at Medina Lake, this information would have been of interest to Region J; however, this report does not address this issue.



Real and Edwards County Conservation and Reclamation Water District

Management Plan

-1999 to 2009-

The Real and Edwards County Conservation and Reclamation Underground Water District was created by House Bill 447 in the 56th Texas Legislature in 1959. The district was created to provide the conservation, preservation, protection, recharge and prevention of waste of the underground water reservoirs located under the district. The district strives to bring about conservation, preservation, and the efficient, beneficial, and wise use of water for the benefit of the citizens and the economy of the district through monitoring and protecting the quantity and quality of the groundwater. The district also strives to maintain groundwater ownership and rights of the landowners.

The district will manage the supply of groundwater within the district in order to conserve the resource while seeking to maintain the economic viability of all resource user groups, public and private. In consideration of the economic and cultural activities occurring within the district, the district will identify and engage in such activities and practices, that if implemented would result in the most efficient use of groundwater. The district will monitor an on-going TWDB and USGS observation network in order to gain additional information regarding changing storage conditions of groundwater supplies within the district. The district will work cooperatively with investigations of the groundwater resources within the district and will make the results of the investigation available to the public upon adoption by the Board. The district will employ all technical resources at its disposal to evaluate the groundwater resources available within the district and to determine the effectiveness of conservation measures.

Management Goals

- 1) To control and prevent the waste of groundwater.

The objective is to provide education materials to the newspapers and general public concerning waste that is prohibited under district rules. The district will furnish at least six newspaper articles and/or public service announcements annually and will investigate all reports of waste of groundwater within 24 hours.

- 2) Address natural resource issues that impact the use and availability of groundwater and are impacted by the use of groundwater.

Each year the district will work with all interested parties and appropriate agencies to develop additional information on aquifer storage and recovery projects and will require permits for all aquifer storage and recovery projects. The district will also make information on such projects available to the general public and permit applicants.

The district will also require issuance of a well construction permit prior to drilling all new wells. All well construction permits will be issued within 5 working days. Permits not in compliance will be considered at the next regular board meeting.

3) Provide for the efficient use of groundwater within the district.

Each year the district will provide water-measuring devices to the public in response to all requests in an effort to increase the efficiency of irrigating lawns. Also, the district will provide informative speakers to schools and civic groups to raise public awareness of practices that insure the efficient use of groundwater.

4) Address conjunctive surface water management issues.

The district will annually work and meet with at least one other district to discuss the surface water management issues.

APPENDIX 1B DROUGHT CONTINGENCY PLANS

City of Del Rio

The City's Drought Contingency Plan was passed and approved under Ordinance No. O: 2000-01 on January 11th, 2000. Safe, high quality drinking water is a precious resource in the Del Rio area. The Drought Contingency and Water Emergency Plan requires that the available water resources of the City of Del Rio be put to maximum beneficial use to the maximum extent possible. The plan also requires that the waste or unreasonable use, or unreasonable method of use of water be prevented, and the conservation of water be practiced with reasonable and beneficial use in the interests of the people of the Del Rio community and for the public health and welfare. The purpose of the plan is to establish temporary methods and procedures to respond with situations of critical water supply, such as drought conditions or water supply emergencies. The plan will be reviewed and updated as necessary at a minimum of once every five years. Trigger conditions are based on the fact that the city uses a combination of surface water and groundwater and will likely be constrained by system transmission and delivery capacity before a shortage of water occurs.

Stage 1 - Mild Conditions:

The goal is to raise public and customer awareness of water demand conditions. Customers will be encouraged to voluntarily comply with non-essential water use restrictions annually between May 1 and September 1, or when water levels in the Bedell Street Storage Reservoirs are less than 20 feet at 5:00 a.m. and have not begun to rise by 6:00 a.m. on three consecutive days this trigger is initiated. This stage may be terminated at any time by the City Manager. City operations will prohibit non-essential uses.

Voluntary response measures include:

- 1) limiting outdoor water use to once every five days and between the hours of 7 PM and 10 AM using a bucket or hose-end sprayer that shuts off automatically
- 2) practicing water conservation

Stage 2 - Moderate Conditions:

The goal is to maintain daily water demand at less than 90 percent of system capacity. Customers shall be required to comply with restrictions on non-essential use when water levels in the Bedell Street Storage Reservoirs are less than 20 feet and have not begun to rise by 11:00 a.m. on 3 consecutive days, or when water levels in the Bedell Street Storage Reservoirs are less than 15 feet at any time on any given day. Predicted weather conditions are to be considered in any drought impact analysis. This stage can be terminated when all triggering conditions have ceased to exist for 3 consecutive days. Stage 1 is then operative.

Mandatory restrictions include:

- 1) participation in the 5-day watering schedule
- 2) the limitation of outdoor watering between 7 PM and 10 AM unless a bucket or hose-end sprayer that shuts off automatically is used
- 3) the restriction of vehicle washing to same schedule and equipment as outdoor watering unless done at a commercial facility
- 4) the limitation of pool filling to the 5-day watering schedule
- 5) the operation of any fountain or pond is prohibited unless to support aquatic life or if equipped with a recirculation system
- 6) the limitation of fire hydrant use for reasons of public safety unless by special permit
- 7) restaurants are restricted from serving water unless it is requested by the patron
- 8) the limitation of golf course irrigation to designated watering days unless using reclaimed water, groundwater, or water from an outside source
- 9) the following uses are considered wasteful and are prohibited: pavement washing, dust control, runoff to a street, inefficient or broken irrigation/sprinkler systems, failure to repair a leak after being given notice, vehicle washing with an unrestricted hose.

Stage 3 - Severe Conditions:

The goal is to maintain daily water demand at less than 95 percent of system capacity. Customers shall be required to comply with restrictions on non-essential use when

- 1) water levels in the Bedell Street Storage Reservoirs are less than 20 feet and have not begun to rise by 3:00 p.m. for 3 consecutive days
- 2) water levels in the Bedell Street Storage Reservoirs are less than 10 feet at any time on any given day
- 3) water supply is contaminated either accidentally or intentionally - severe conditions are reached immediately upon detection
- 4) water system fails – from acts of God, i.e. nature or man - severe conditions are reached immediately upon detection
- 5) mechanical failure of system requires more than 12 hours to repair, or
- 6) monitoring of the San Felipe Springs (surface water supply) or the Edwards-Trinity aquifer production well levels indicate a shortage is imminent.

The City will discontinue the flushing of mains and landscape irrigation. This stage can be terminated when all triggering conditions have ceased to exist for 3 consecutive days. Stage 2 is then operative.

Stage 2 requirements remain in effect except:

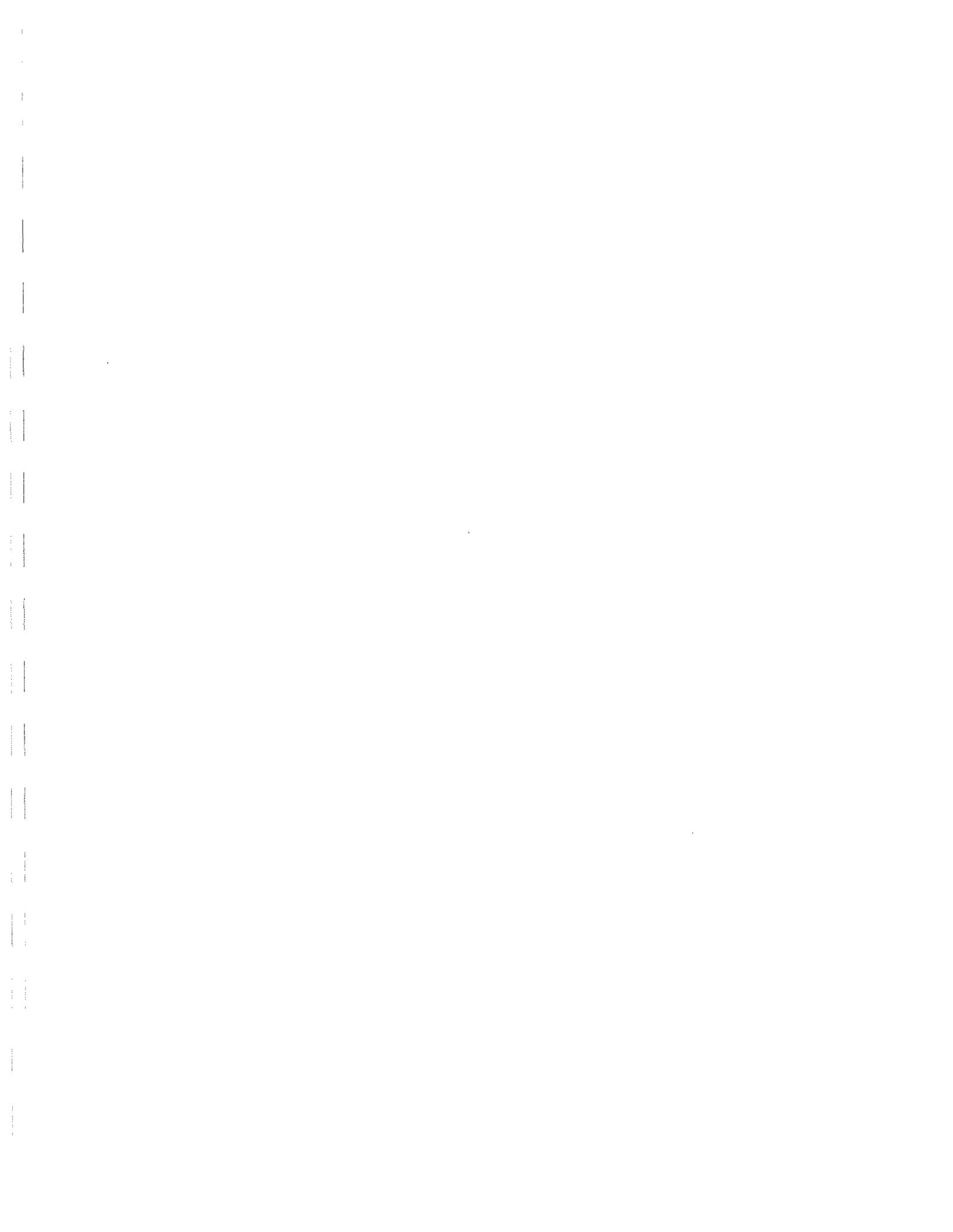
- 1) outdoor watering is restricted to between the hours of 6 AM and 10 AM and between 7 PM and 10 PM on designated days and only with unless a bucket or hose-end sprayer that shuts off automatically. Irrigation systems are prohibited.
- 2) no restrictions exist for water that originates from a source other than the city

- 3) vehicle washing is prohibited unless at a commercial facility
- 4) commercial nurseries may water with a bucket or hose-end sprayer that shuts off automatically
- 5) pool filling is prohibited
- 6) no new landscapes can be installed
- 7) use of fire hydrants under special permit discontinued

During persistent severe conditions, water rationing and/or service termination may occur in the following order:

- 1) recreational users
- 2) commercial users
- 3) industrial users
- 4) school users
- 5) residential users
- 6) hospital, public health, and safety facilities.

Violators of these restrictions may be fined (no less than \$10 or more than \$200 per day), and/or have their service disconnected, and/or be issued a warrant for arrest.



City of Brackettville

Ordinance No. 206, Brackettville's Drought Contingency Plan, was passed and approved on July 21, 1980. The City of Brackettville, located in Kinney County, actually developed a water conservation plan combined with the drought contingency plan. The City's plan is based on monitoring its actual supply source groundwater. Listed below is the stage number and triggering criteria for the City's water conservation plan/drought contingency plan.

Stage 1 – Awareness: Monitor well level 50 feet or less, based on 10 day moving average. (From ground surface when pumping)

Stage 2 – Watch: Monitor well level 65 feet or less, based on 10 day moving average.

Stage 3 – Alert: Monitor well level 85 feet or less, based on a 10-day average.

Stage 4 – Risk: Monitor well level 110 feet or less, based on 10 day moving average.

Stage 5 – Emergency: Water quality deterioration, as determined by the City of Brackettville Utilities Department Superintendent and City Manager.

Drought Response Measures

Stage 1

Public (compliance is voluntary)

- a) water lawns only once every five days
- b) do not water or hose off curbs, gutters, driveways, or sidewalks
- c) repair any leaking faucets, valves, or toilets
- d) use washing machines and dishwashers only when fully loaded

The City's response for Stage 1 is to report pumpage to City Utilities Department and City Manager on a weekly basis and encourage supervisors to comply with the advice to the public.

Stage 2

Public (compliance is voluntary)

- a) water lawns only ONE INCH every five days
- b) try and reduce shower time
- c) do not water or hose off curbs, gutters, driveways, or sidewalks
- d) repair any leaking faucets, valves, or toilets
- e) use washing machines and dishwashers only when fully loaded
- f) wash vehicles only once every two weeks

The City's response for Stage 2 is to report pumpage to City Utilities Department and City Manager on a weekly basis and encourage supervisors to comply with the advice to the public as under Stage 1. Additionally, a reverse rate structure, drought-condition ordinance should be prepared and may be enacted in order to make excessive water use more expensive.

Stage 3

Public compliance with measures listed under Stage 2 is voluntary. However, the following items are prohibited and will result in the issuance of a warning citation by the Police Department.

- a) wasteful use (as defined by the City)
- b) filling of swimming pools
- c) installation of new landscape
- d) washing of vehicles with a spray nozzle that does not shut off automatically. Use of a commercial car wash facility is permitted.

In addition to responses initiated under Stage 2, under Stage 3 the City must enact the ordinance prepared under Stage 2, if it is not already in effect. City employees are instructed to report prohibited water use to the Police Department, which is instructed to issue warning citations. Also, the city must prepare and pass ordinance for legal enforcement of all items prohibited in Stages 3, 4, and 5.

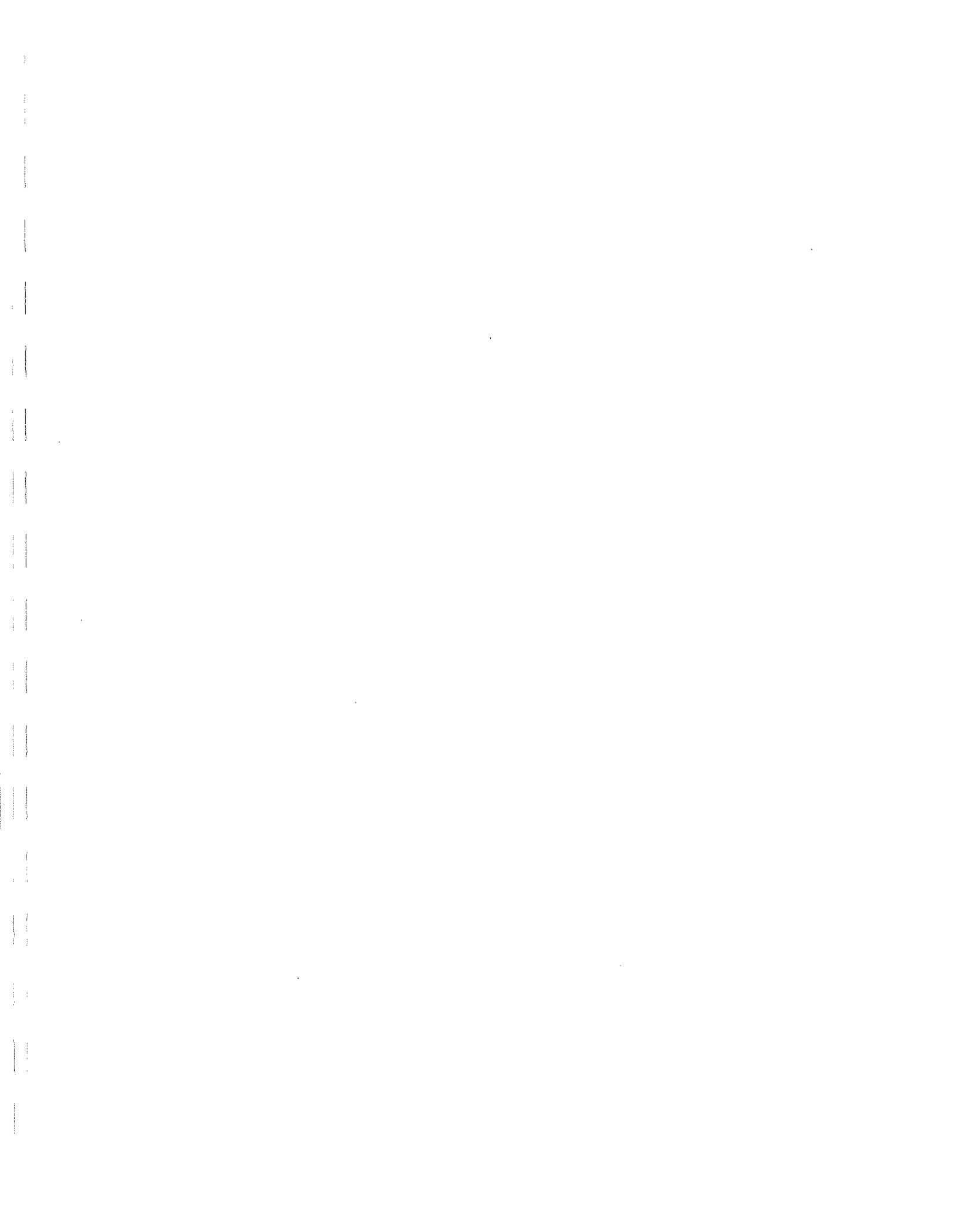
Stage 4

Responses for this stage are the same as for Stage 3 for both sectors. However, under Stage 4, actual citations are issued and fines are levied for violations of the uses prohibited under Stage 3.

Stage 5

The public is subject to the same conditions as Under Stage 4. Additionally, washing of vehicles and lawn watering of any kind is prohibited. In addition to citations and fines, water service may be disconnected for violations.

The City must declare a WATER EMERGENCY, prepare and implement a water rationing plan, reduce city water pressure by maximum allowed (10 psi) and enforce any City, State, or Federal Laws necessary.



City of Kerrville

The City of Kerrville had several ordinances and resolutions providing for their Drought Contingency Plan. Ordinance No. 91-05, originally calling for a drought contingency plan, was passed and approved on February 12th, 1991. On June 25th, 1996, Resolution No. 96-141 readopted the City's Drought Contingency Plan.

Located in Kerr County, the City of Kerrville's water system has nine operational wells. These wells are actually the City's secondary source of water. The primary water source for the City is the Upper Guadalupe River Authority (UGRA) and surface water from the Guadalupe River via the City's own permitted diversions. Furthermore, Kerrville is the UGRA's only customer.

With the City's drought contingency plan came some changes. The triggering criteria during the drought period were changed to include the Guadalupe River flow as a monitored source of supply, as well as the water level in the Aquifer Storage Recovery (ASR). Outlined below is the drought contingency plan for the City of Kerrville. The plan will be initiated depending on the river flow and the water level of the aquifer.

Mild Drought: When the flow of the Guadalupe River falls below 25 cubic feet per second (cfs), which passes through at the UGRA dam.

Moderate Drought: When the flow of the Guadalupe River falls below 15 cfs, which passes through at the UGRA dam.

Severe Drought: When water cannot be pumped from the Guadalupe River and the mean sea level (msl) in the aquifer supplying the City's wells drops to 1260 feet msl.

Drought Response Measures

Mild Drought: The City shall adhere to the following restrictions:

- a) Irrigation of landscaped areas with a hose-end sprinkler or automatic (non-drip) system will be limited to between the hours of 8 PM and 10 AM. Less consumptive watering methods are allowed anytime.
- b) Operation of ornamental fountains or ponds are prohibited unless is necessary to support aquatic life of is equipped with a recirculation system.
- c) Use of water from fire hydrants is restricted to activities necessary to maintain public health and safety, unless allows by special permit.
- d) Irrigation of golf facilities is restricted to between 8 PM and 10 AM unless the facility utilizes a reclaimed water source.
- e) The following uses are considered non-essential and are therefore prohibited:
 - 1) washing of pavement;
 - 2) washing of buildings or structures other than for fire protection;
 - 3) dust control;
 - 4) gutter flushing, or runoff to gutter or street;

- 5) failure to repair a leak within a reasonable period after having been given a notice to repair.

The public is asked to voluntarily restrict lawn watering to between 8 PM and 10AM, practice water conservation, and minimize or discontinue non-essential use.

Moderate Drought:

All persons are subject to the above restrictions, under threat of penalty.

Severe Drought:

The City will discontinue irrigation using potable water, and will not wash City vehicles.

Restrictions are the same as above, with the following exceptions:

- a) Irrigation of landscaped with hose-end sprinkler or automatic (non-drip) system is prohibited. Less consumptive methods are allowed between 8 PM and 10 AM.
- b) Use of water from fire hydrants by special permit will not be allowed.

Critical Drought:

The City will discontinue all non-essential uses. Water restrictions remain the same as above, with the following exceptions:

- a) Irrigation of landscaped areas shall be limited to designated days between the hours of 6 AM and 10 AM, and between 8 PM and 12 midnight, using less-consumptive watering techniques only. No hose-end sprinklers or automatic (non-drip) systems may be used.
- b) Vehicle washing is prohibited if unnecessary for public health. Commercial car wash facilities can be open between 6 AM and 10 AM and 6 Pm and 10 Pm only.
- c) Filling of pools is prohibited.
- d) Operation of ornamental fountains or ponds are prohibited unless is necessary to support aquatic life of is equipped with a recirculation system.
- e) No new or increased service connections will be allowed.

Emergency Drought:

All restrictions as stated above remain in effect, except:

- a) Irrigation of landscaped areas with potable water is prohibited.
- b) Washing of any vehicle is prohibited.

Restrictions will be enforced with fines (\$25 to \$500), and citations.

Springhills Water Management District

HDR Engineering, Inc prepared the Drought Contingency Plan for the Springhills Water Management District. on August 29th, 1991. The plan, found in a draft report of a regional water supply study, was presented at the third advisory committee meeting of that study process.

The area to which this drought contingency plan applies is Bandera County. Within the planning area, there are 16 public water systems having a total of 1,853 water service connections. The drought contingency plan for the Springhills Water Management District is outlined below.

Mild Conditions:

- A) Daily water demand reaches the level of 90 percent of system capacity for three consecutive days.
- B) Distribution pressure remains below normal for more than six consecutive hours.

Moderate Conditions:

- A) Daily water demand reaches 100 percent of system capacity for three days.
- B) The supply of water is continually decreasing on a daily basis and the water supply utility is advised to conserve by the Springhills WMD, the Texas Water Commission, or the Texas Department of Health.
- C) Decrease in water pressures in the distribution system as measured by the pressure gages and customer complaints.

Severe Conditions:

- A) The imminent or actual failure of a major component of the system which would cause an immediate health or safety hazard.
- B) Water demand is exceeding 100 of system capacity for three consecutive days.
- C) The full allotment of raw water is being pumped from the systems supply source.

Drought Response Measures

Mild Conditions:

- a) inform public;
- b) recommend conservation; and
- c) advise public daily of conditions.

Moderate Conditions:

- a) inform public and request voluntary reduce water use;
- b) notify major commercial users and request voluntary reductions;

- c) implement lawn watering schedule allowing watering every fifth day dependant on street address; and
- d) recommend that users insulate pipes rather than run water to prevent freezing during winter months.

Severe Conditions:

- a) continue previous restrictions;
- b) prohibit car washing, window washing, and pavement washing unless a bucket is used;
- c) prohibit the following uses:
 - 1) street washing;
 - 2) water hydrant flushing;
 - 3) filling swimming pools;
 - 4) athletic field watering;
 - 5) park watering; and
 - 6) golf course watering.
- d) prohibit water uses not essential to community health and safety; and
- e) advise public daily of trigger conditions.

Fort Clark Municipal Utility District

The "Fort Clark Municipal Utility District Drought/Emergency Management Plan" was approved on October 17th, 1996.

Drought Management Plan

Stage 1 – Voluntary Conditions: Well number one reaches 35 feet from ground surface when pumping as measured by the District.

Stage 2 – Mild Conditions: Well number one reaches 50 feet from the ground surface when pumping as measured by the District.

Stage 3 – Moderate Conditions: Well number one reaches 75 feet from the ground surface when pumping as measured by the District.

Stage 4 – Severe Conditions: Well number one reaches 100 feet from the ground surface when pumping as measured by the District.

Drought Response Measures

Stage 1

Customers are requested to voluntarily limit the amount of water used.

Stage 2

Customers who use in excess of 20,000 gallons of water will be charged the base rate plus \$1.75 per 1,000 gallons.

Stage 3

Customers who use in excess of 20,000 gallons of water will be charged the base rate plus \$3.75 per 1,000 gallons.

Stage 4

Customers who use in excess of 20,000 gallons of water will be charged the base rate plus \$6.75 per 1,000 gallons.

This plan applies only to meters that are charged at the residential rate. All commercial users will be notified of the conditions and required to conserve water usage at all commercial establishments.

Any time the well level is within 5 feet of the trigger condition, the general manager will initiate a public notification process. This process will be a combination of door-to-door and mailing notification of all customers.

In the event the plan is put into effect, it will cover the entire billing period.

Emergency Plan

Stage 1 – Mild Emergency Condition: Exists if a system failure results in the inability to supply 80 percent of the projected water demand. Customers are requested to voluntarily limit the amount of water used.

Stage 2 – Moderate Emergency Condition: Exists if a system failure results in the inability to supply 70 percent of the projected water demand. Customers will be prohibited from watering lawns.

Stage 3 – Critical Emergency Condition: Exists if a system failure results in the inability to supply 50 percent of the projected water demand. All uses of the public water supply will be banned except in cases of emergency. In these cases, water use will be limited, and water should be boiled prior to use.

City of Bandera

In order to conserve the available water supply and 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 City of Bandera has adopted regulations and restrictions on the delivery and consumption of water.

Water uses regulated or prohibited under the 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 and is subject to penalty. Penalties include fines (not less than \$200 or more than \$2000), and/or water service termination.

Non-essential uses include:

- 1) irrigation of landscape areas, including parks, athletic fields, and golf courses;
- 2) washing of any vehicle;
- 3) washing of pavement;
- 4) washing of any building, except for fire protection;
- 5) flushing of gutters;
- 6) allowing runoff into any gutter or street;
- 7) filling pools or fountains, unless to support aquatic life;
- 8) failure to repair a controllable leak after being given notice;
- 9) using fire hydrants for anything other than fire fighting.

The triggering criteria are based on static well levels of the Dallas Street Well, measuring from ground level to water level.

In the event of rationing, single-family dwelling units will be limited to 5000 gallons per month.

Stage 1: Mild Water Shortage Conditions (Green Flag)

This stage is triggered annually between May 1 and September 30. The City will reduce water demand by discontinuing the flushing of mains, repairing leaks immediately, and using reclaimed water for non-potable purposes. The City will also voluntarily adhere to Stage 2 restrictions. Customers are requested to voluntarily conserve water and adhere to restrictions on non-essential water use.

Voluntary restrictions:

- 1) limit irrigation of landscaped areas between 9 PM and 6 AM.
- 2) practice water conservation and minimize non-essential uses.

Stage 2: Moderate Water Shortage Conditions (Blue Flag)

This stage is triggered when the static water level in the well is between 516 and 531 feet. It is terminated when the triggering events cease to exist for 3 days, at which point Stage 1 restrictions become operative. The goal is to reduce daily use by 20 percent. Customers are required to comply with restrictions on non-essential water use under threat of penalty.

Mandatory restrictions for all persons:

- 1) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems are limited to Sundays and Thursdays between midnight and 6 AM and between 10 PM and midnight. Watering with bucket or drip irrigation is permitted anytime.
- 2) Vehicle washing is restricted to same schedule and equipment restrictions as landscape irrigation. Vehicle washing is allowed at commercial facilities.
- 3) Pool filling is restricted to the same watering schedule.
- 4) Pond and fountain operation is prohibited unless necessary to support aquatic life.
- 5) Use of fire hydrants is limited to uses intended to protect public health, or for construction uses with a special permit.
- 6) Restaurants are prohibited from serving water to patrons except when requested.
- 7) The following are prohibited: pavement washing, building washing, use of water for dust control, flushing of gutters, allowing runoff to street, and failure to repair leak once notified.

Stage 3: Severe Water Shortage Conditions (Yellow Flag)

This stage is triggered when the static water level in the well is between 532 and 546 feet. It is terminated when the triggering events cease to exist for 3 days, at which point Stage 2 restrictions become operative. The goal is to reduce daily use by 35 percent. Customers are required to comply with restrictions on non-essential water use.

All requirements of Stage 2 remain in effect except:

- 1) Irrigation of landscaped areas are limited to designated days between midnight and 6 AM and 10 PM and midnight by any means except hose-end sprinklers which are prohibited at all times.
- 2) Use of water from fire hydrants for construction purposes under special permit will be discontinued.

Stage 4: Critical Water Shortage Conditions (Orange Flag)

This stage is triggered when the static water level in the well is between 547 and 566 feet. It is terminated when the triggering events cease to exist for 3 days, at which point Stage 3 restrictions become operative. The goal is to reduce daily water use by 50 percent. Customers are required to comply with restrictions on non-essential water use.

All requirements of Stages 2 and 3 are in effect except:

- 1) Irrigation of landscaped areas is limited to designated days between 10 PM and 6 AM by any means except hose-end sprinklers and automatic systems, which are prohibited.
- 2) Vehicle washing is prohibited except at commercial facilities between 9 AM and 4 PM and between 10 PM and 4 AM.
- 3) Pool filling is prohibited.
- 4) Pond and fountain operation is prohibited unless necessary to support aquatic life, or if equipped with a recirculation system.

Stage 5: Emergency Water Shortage Conditions/Water Rationing (Red Flag)

This stage is triggered when there is a major system failure, or, the static water level in the well is greater than 567 feet. It is terminated when the triggering events cease to exist for 3 days, at which point Stage 4 restrictions become operative. The goal is to reduce daily use by 90 percent. Customers are required to comply with restrictions on non-essential water use.

All requirements of Stages 2, 3, and 4 are in effect except:

- 1) Irrigation of landscape areas is absolutely prohibited.
- 2) Vehicle washing is absolutely prohibited.

Stage 6: Complete Water Loss (Black Flag)

This stage is triggered when there is a total shut down of all pumps due to power failure or loss of water source, or there is a natural or manmade contamination of all water sources. The public will be notified that no water from the system will be available. It is terminated when the triggering events cease to exist for 3 days.

APPENDIX 1C

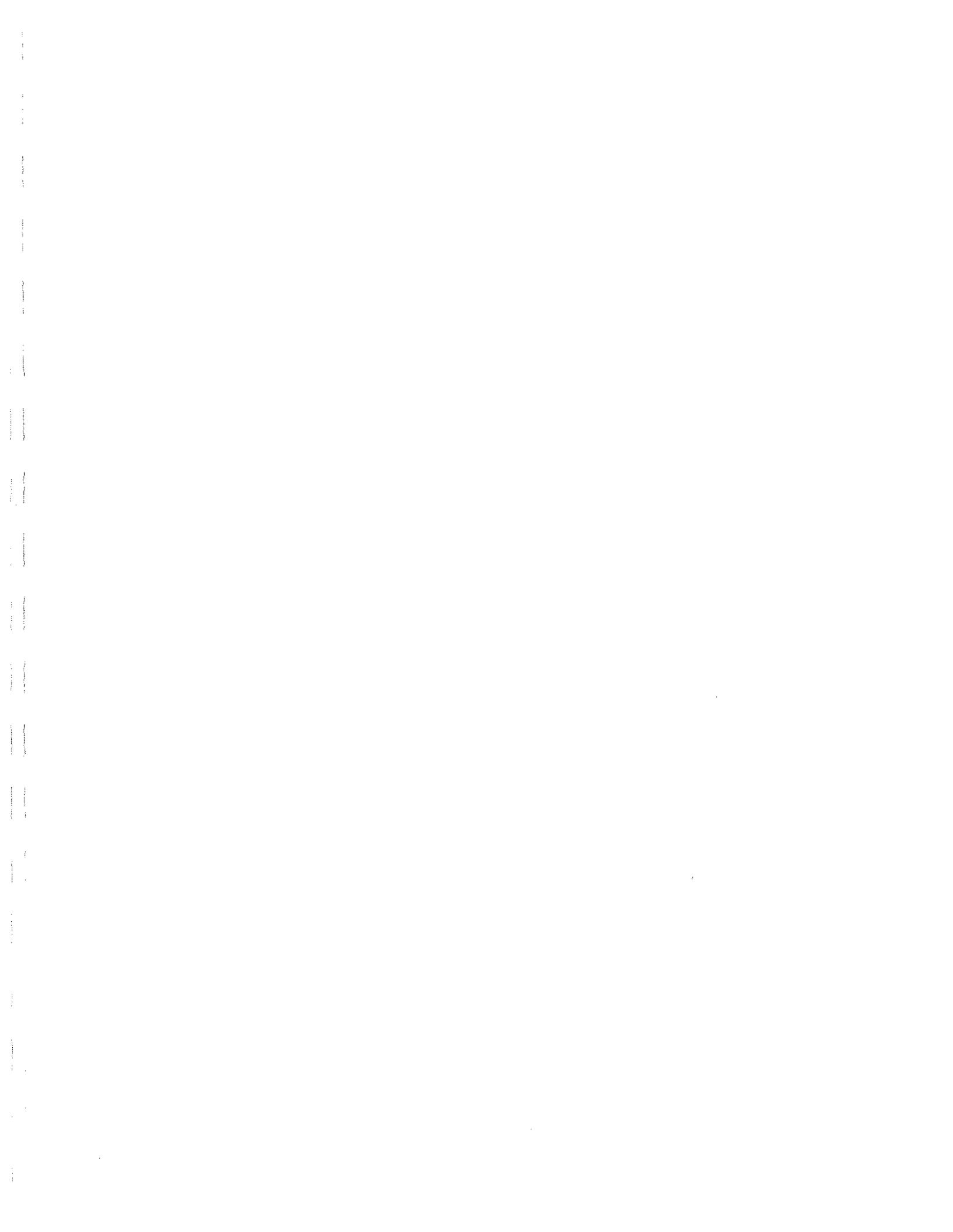
DROUGHT CONTINGENCY PLANNING GUIDANCE DOCUMENT

An important distinction to understand is the difference between a water conservation plan and a drought contingency plan. A water conservation plan includes a set of measures that an entity follows on a regular basis. A conservation plan can be a crucial tool if drought is foreseen as a possibility and measures are taken to increase the amount of water on reserve against such a possibility. A water conservation plan may include:

- Provisions for the recycling (reuse) of effluent,
- Restrictions on the use of water for irrigation of lawns, and public and private facilities,
- Installation of low-use plumbing fixtures in private and public buildings, and
- Pricing strategies that discourage excessive water use,
- Provisions for an unexpected increase in public demand that stresses the delivery capability of a water provider.

A drought contingency plan, by contrast, includes more stringent procedures than does associated with a water-contingency plans. The procedures may be implemented, either entirely or in stages, when certain operational early indicators are identified. These may include one or more of the following:

- A specified period of recorded below-normal rainfall,
- Decreasing flow in streams that normally flow because of the discharge of ground water,
- Decreasing water levels in surface reservoirs,
- Declining water levels in municipal supply and/or observation wells, and
- Specified increasing levels of stress in plant and in animal communities that are considered to be indicators of “normal” semi-arid conditions.



Examples of Drought Contingency Plans

It is critically important that a drought contingency plan be implemented before the onset, or in the earliest identified stages, of drought in order to avoid the necessity of imposing water-use restrictions that may have unnecessarily harsh consequences for the community, as well as disparate impacts within the community. The TNRCC currently has drought contingency plan templates for three types of water suppliers: retail public, wholesale, and irrigation water suppliers.

Retail Public Water Suppliers

An example of a drought contingency plan for retail public water suppliers contains the following provisions:

- (1) Minimum requirements
 - A) Public involvement. The public shall be notified of the proposed plan as well as have the opportunity for input into the implementation of the plan.
 - B) Public education. The public shall be educated and informed with regard to the drought contingency plan.
 - C) Coordination. Coordination with the Regional Water Planning Groups must be documented to insure consistency with the regional water plans.
 - D) Criteria. Initiation and termination specific criteria of response stages along explanation of the triggering criteria.
 - E) Drought or emergency response stages. Stages providing for the implementation of measures in response to various situations, such as, reduction of available water supply, production or system limitations, contamination, and system outage.
 - F) Assessment of water management strategies. Strategies to be used when flows are 50 and 75 percent of normal.
 - G) A description of information monitored by the supplier and procedures to be followed.
 - H) Public procedure notification. Procedures for the public notification of the end of drought response stages.
 - I) Specific water supply or demand management measures to be implemented during each stage of the plan. Examples of these measures are curtailment of non-essential water use, utilization of alternative water sources/ alternative delivery mechanisms, variance granting procedures, and enforcement procedures.
- (2) Privately owned water utilities. A drought contingency plan shall be prepared for all privately owned water utilities in accordance with the aforementioned criteria.

- (3) Wholesale water customers. Any water supplier receiving any water from another supplier shall contact that supplier, as well as include appropriate provisions to the drought contingency plan in regard to reductions in the given water supply.
- (4) The water supplier will notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan.
- (5) At least every five years, the retail water supplier shall review and update the drought contingency plan.

Wholesale and Irrigation Water Suppliers

TNRCC's drought contingency plan templates for wholesale and irrigation water suppliers are quite similar to the drought contingency plan for retail public water suppliers. The parameters are modified to fit the appropriate contingency plan, i.e. the drought contingency plan parameters from the retail public template were changed to fit the specifications applicable to wholesale and irrigation suppliers.

**CHAPTER 3
APPENDICES**



APPENDIX 3A WATER QUALITY

The State of Texas Water Quality Inventory of 1996, published by TNRCC's Surface Water Quality Monitoring Program, gives water quality facts on every mapped water quality stream segment in Texas. This publication gives valuable information on such issues as designated water uses and any water quality problems that may exist in the stream segments. The Plateau Region has many beautiful streams, some of which are almost pristine in that they do not have any known water quality problems. Parameters that the TNRCC Surface Water Quality Monitoring staff investigates in the context of "water quality problems" include elevated levels of fecal coliform bacteria, total suspended solids, and total dissolved solids. Turbidity and nutrient levels are also investigated. A summary from the Water Quality Inventory for each of the mapped water quality segments within the Plateau Region follows.

Segment 1816 of the Guadalupe River Basin

NAME: Johnson Creek

DESCRIPTION: from the confluence with the Guadalupe River in Kerr County to a point 1.2 kilometers (0.7 miles) upstream of the more upstream crossing of SH 41 in Kerr County.

LENGTH/SURFACE AREA: 21 miles (34 kilometers)

DESIGNATED WATER USES: Contact Recreation
Exceptional Aquatic Life
Public Water Supply

PERMITTED FACILITIES (FINAL):

There are no permitted facilities that discharge to this segment.

SEGMENT SUMMARY:

There are no known water quality problems in the segment.

Segment 1817 of the Guadalupe River Basin

NAME: North Fork Guadalupe River

DESCRIPTION: from the confluence with the Guadalupe River in Kerr County to a point 18.2 kilometers (11.3 miles) upstream of Boneyard Draw in Kerr County.

LENGTH/SURFACE AREA: 29 miles (47 kilometers)

DESIGNATED WATER USES: Contact Recreation
Exceptional Aquatic Life
Public Water Supply

PERMITTED FACILITIES (FINAL):

Domestic	1 outfall	0.04 MGD
Industrial	0 outfalls	0.00 MGD
Agricultural	0 outfalls	0.00 MGD
Total	1 outfall	0.04 MGD

SEGMENT SUMMARY:

There are no known water quality problems in the segment.

Segment 1818 of the Guadalupe River Basin

NAME: South Fork Guadalupe River

DESCRIPTION: from the confluence with the Guadalupe River in Kerr County to a point 4.8 kilometers (3.0 miles) upstream of FM 187 in Kerr County.

LENGTH/SURFACE AREA: 27 miles (43 kilometers)

DESIGNATED WATER USES: Contact Recreation
Exceptional Aquatic Life
Public Water Supply

PERMITTED FACILITIES (FINAL):

Domestic	1 outfall	0.01 MGD
Industrial	0 outfalls	0.00 MGD
Agricultural	0 outfalls	0.00 MGD
Total	1 outfall	0.01 MGD

SEGMENT SUMMARY:

There are no know water quality problems in the segment

Segment 1904 of the San Antonio River Basin

NAME: Medina Lake

DESCRIPTION: from Medina Lake Dam in Medina County to a point immediately upstream of the confluence of Red Bluff Creek in Bandera County, up to the normal pool elevation of 1064.2 feet (impounds Medina River)

LENGTH/SURFACE AREA: 17 miles (27 kilometers)/5,575 acres

DESIGNATED WATER USES: Contact Recreation
High Aquatic Life
Public Water Supply
Aquifer Protection

PERMITTED FACILITIES (FINAL):

Domestic	2 outfalls	0.11 MGD
Industrial	0 outfalls	0.00 MGD
Agricultural	0 outfalls	0.00 MGD
Total	2 outfalls	0.11 MGD

SEGMENT SUMMARY:

Elevated concentrations of manganese have been observed in the sediment in the upstream portion of the reservoir. Otherwise, water quality is generally good.

Segment 1905 of the San Antonio River Basin

NAME: Medina River above Medina Lake

DESCRIPTION: from a point immediately upstream of the confluence of Red Bluff Creek in Bandera County to the confluence of the North Prong Medina River and the West Prong Medina River in Bandera County.

LENGTH/SURFACE AREA: 34 miles (54 kilometers)

DESIGNATED WATER USES: Contact Recreation
Exceptional Aquatic Life
Public Water Supply

PERMITTED FACILITIES (FINAL):

Domestic	2 outfall	0.39 MGD
Industrial	0 outfalls	0.00 MGD
Agricultural	0 outfalls	0.00 MGD
Total	2 outfall	0.39 MGD

SEGMENT SUMMARY:

Contact recreation use is only partially supported through a four-mile reach near Bandera due to elevated fecal coliform bacteria levels. Otherwise, water quality generally is good.

Currently Identified Water Quality Problems

Section 314 of the Federal Clean Water Act of 1987 requires all states to classify lakes and/or reservoirs according to that water body's trophic state (essentially its nutritional status). Poorly nourished reservoirs are referred to as oligotrophic, whereas over-nourished reservoirs are termed hyper-eutrophic. Typically, phosphorous is the nutrient of concern, as an increase in its concentration may trigger a responding increase in the amount of algae (estimated by the level of chlorophyll *a*). With increased algal biomass, water transparency would be expected to decrease.

To classify trophic states of major Texas reservoirs, the Texas Natural Resource Conservation Commission uses Carlson's Trophic State Index (TSI) system. This system measures chlorophyll *a* concentration, total phosphorous concentration and reservoir transparency. These three variables are highly correlated; although chlorophyll *a* is the most direct measure of algal biomass, the Carlson system uses Secchi disk depth measuring reservoir transparency as the primary indicator of algal biomass. In the case of some reservoirs, factors other than algal biomass may decrease the reservoir's transparency (e.g., excessive sedimentation). However, the TNRCC also notes these factors.

The reservoirs within Plateau Region J – Amistad Reservoir, Medina Lake and Medina Diversion Lake - happen to be some of the clearest (most transparent) water bodies in the state of Texas. Amistad Reservoir has the third lowest Secchi disk value, and is the third clearest water body in Texas. Medina Lake is the fifth clearest, while Medina Diversion Lake is the ninth clearest water body.¹

The relationship between chlorophyll *a* and Secchi disk values is nonlinear and inverse. TNRCC compared chlorophyll *a* values for 104 Texas reservoirs from the 1994 and 1996 reporting cycles. Of these, reservoirs which showed the most improvement in nutrient status - as evidenced by decreases in algal biomass measured by Carlson TSI chlorophyll *a* values - included Medina Lake.²

However, TNRCC also identified the levels of diazinon in Medina Lake as exceeding both the chronic and acute criteria for protection of aquatic life.³ These criteria are defined in terms of toxic substances in ambient water; the TNRCC has also defined criteria in terms of toxic substances found in fish tissue harvested from water bodies. In Plateau Region J, the water quality segment of concern for toxic substance found in fish tissue is the Rio Grande above Amistad Reservoir; selenium is the toxin identified.⁴

GENERAL REFERENCE:

The State of Texas Water Quality Inventory, 13th edition, 1996, TNRCC, Volume 1, Surface Water and Groundwater Assessments and TNRCC Water Quality Management Programs.

¹ Table 41, page 171 of the general reference

² page 177 of the general reference

³ Table 52, page 217 of the general reference

⁴ Table 55, page 222 of the general reference



**TABLE 3B-1
SURFACE WATER USE REPORTED TO TNRC WATERMASTER
ANNUAL DIVERSIONS 1990 THROUGH 1999**

COA/Permit	Auth Amt.	Owner	Basin	Stream	County	River Order Permit	Use	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1969-400	15	TOMMIE SMITH BLACKBURN	18	GUAD & KELLY	Kerr	9260000000	IND	DR	DR	DR	DR	DR	DR	DR	DR	DR	1.096
1970-400	10	CARL M. HAWKINS ET UX	18	GUADALUPE RIV	Kerr	9220000000	MUN	DR	DR	DR	DR	DR	DR	DR	DR	DR	0.35
1996-400	150	KERRVILLE CITY OF	18	GUADALUPE RIV	Kerr	8287000000	MUN	DR	149.956	101.798	150	150	DR	DR	0.746	152.25	150
1996-401	75	KERRVILLE CITY OF	18	GUADALUPE RIV	Kerr	8287000000	IRR	DR	2.708	0.994	3.536	2.283	1.855	0.102	1.988	2.631	8.318
2000-400	350	RIVERHILL COUNTRY CLUB INC.	18	GUADALUPE RIV	Kerr	8260010000	IRR	DR	100.338	246.994	291.903	219.624	274.95	299.65	249.04	281.23	347.07
2001-400	295	CARL D. MEEK	18	GUADALUPE RIV	Kerr	8255000000	IRR	DR	35.614	15.244	54.88	71.302	84.957	175.274	17.206	87.186	116.594
2002-400	136	COMANCHE TRACE RANCH AND GOLF CLUB	18	GUADALUPE RIV	Kerr	8230000000	IRR	DR	DR	DR	DR	DR	DR	DR	DR	DR	49.945
2003-400	42	WHEATCRAFT INC.	18	GUADALUPE RIV	Kerr	8250000000	IRR	DR	DR	DR	DR	11	2.561	DR	DR	0.061	DR
2003-401	10	WHEATCRAFT INC.	18	GUADALUPE RIV	Kerr	8250000000	MUN	DR	DR	DR	DR	3	DR	DR	DR	DR	DR
2005-400	59	PEGGY & BILL BOCKHOFF	18	GUADALUPE RIV	Kerr	8185500000	IRR	DR	DR	DR	DR	DR	DR	21.709	DR	22.652	8.283
2006-400	263	FARM CREDIT BANK OF TEXAS	18	GUADALUPE RIV	Kerr	8174000000	IRR	DR	83.376	89.708	194.885	345.41	DR	3.296	1.16	50.487	DR
2006-420	150	KENNETH W. WHITEWOOD ET UX	18	GUADALUPE RIV	Kerr		IRR	DR	DR	DR	DR	DR	DR	8.618	27.417	22.777	19.088
2018-400	154	LEE ANTHONY MOSTY	18	GUADALUPE RIV	Kerr	8049500000	IRR	DR	6.009	DR	DR	DR	DR	DR	DR	12	DR
2020-400	60	ROBERT L. MOSTY ET AL	18	GUADALUPE RIV	Kerr	7970000000	IRR	DR	9.757	3.716	DR	DR	DR	DR	24	10	4
2021-400	102.66	SCOTT N. MOSTY ET AL	18	GUADALUPE RIV	Kerr	7940000000	IRR	0	13.944	18.386	32.781	21.351	32.096	56.293	26.245	44.128	55.445
2022-400	17	ROBERT L. MOSTY ET AL	18	GUADALUPE RIV	Kerr	7950000000	IRR	DR	DR	1.016	DR	DR	DR	DR	17	DR	8
2024-400	114	CARL E. RHODES	18	GUADALUPE RIV	Kerr	7950000000	IRR	DR	DR	DR	DR	DR	DR	DR	DR	11.322	18.977
2025-400	57.35	BYNO & IMA JEAN SALSMAN	18	GUADALUPE RIV	Kerr	7925000000	IRR	DR	DR	DR	DR	DR	2.543	19.397	7.423	10.262	14.047
2026-400	3.309	**SOLD AND COMBINED WITH 2024-440 T	18	GUADALUPE RIV	Kerr	7920000000	IRR	DR	DR	DR	DR	DR	0.663	DR	DR	DR	DR
2026-410	53.945	ZANE H. ROBINSON	18	GUADALUPE RIV	Kerr	7920000000	IRR	DR	DR	DR	DR	DR	5.627	DR	DR	DR	DR
2026-440	153.225	KENNETH W. WHITEWOOD ET. UX E. MARJ	18	GUADALUPE RIV	Kerr	7920000000	IRR	DR	DR	DR	DR	8.454	5.414	8.556	30.735	25.643	12.412
2031-400	115	JOSEPH PAUL MILLER	18	GUADALUPE RIV	Kerr	7701000000	IRR	DR	DR	DR	DR	DR	DR	37.704	13.198	49.635	61.689
2117-300	7	G. MILTON JOHNSON ET UX	19	MEDINA RIVER	Band	5889000000	IRR	DR	0.812	DR	1.631	2.79	3.689	4.364	0.65	1.95	3.6
2119-300	3	RAYMOND HICKS	19	MEDINA RIVER	Band	5888090000	IRR	DR	DR	0.948	5.722	DR	DR	1.157	DR	DR	DR
2120-300	2	BANDERA ELECTRIC COOPERATIVE INC.	19	MEDINA RIVER	Band	5888051000	IRR	DR	1.217	2.275	0.58	0.288	DR	0.271	DR	DR	DR
2121-300	31.03	ANN DARTHULA MAUDLIN	19	INDIAN CREEK	Band	5888087000	IRR	DR	1.436	0.092	DR	DR	DR	DR	DR	DR	DR
2121-310	69.47	TOLBERT S. WILKINSON ET UX	19	INDIAN CREEK	Band		IRR	DR	0.243	DR	0.353	DR	0.121	DR	DR	DR	DR
2121-320	49.5	JOHN W. DINSE ET UX	19	INDIAN CREEK	Band	5887150000	IRR	DR	DR	0.049	DR	DR	DR	DR	DR	DR	DR
2123-300	152	DON F. TOBIN	19	MEDINA RIVER	Band	5887130000	IRR	DR	5.862	DR	DR	DR	18.594	12.814	DR	114.085	10.674
2124-300	3	EVANGELINE RATCLIFFE WILSON	19	SAN JULIAN CR	Band	5887105000	IRR	DR	0.911	0.331	1.203	DR	DR	DR	DR	0.111	DR
2126-300	47.5	STANLEY D. ROSENBERG ET UX (SANDRA	19	MEDINA RIVER	Band	9310000000	IRR	DR	0.644	DR	DR	DR	DR	DR	DR	DR	DR
2449-400	17	BILLIE ZUBER ET AL	18	GUADALUPE RIV	Kerr	7999000000	IRR	DR	DR	DR	0.2	8.516	0.153	0.491	0.054	0.506	0.849
2450-400	158	ROBERT L. MOSTY ET AL	18	GUADALUPE RIV	Kerr	9195000000	IRR	DR	14.341	7.35	DR	DR	DR	91.941	25	23	DR
3023-100	108	DONALD P. TARPEY	21	NUECES RIVER	Edwa	9170000000	IRR	DR	3.325	12.996	DR	DR	DR	DR	DR	DR	33.138
3024-100	65	DOUGLAS B. & MARGARET C. MARSHALL	21	NUECES RIVER	Edwa	3420000000	IRR	DR	DR	DR	DR	3.314	DR	DR	DR	DR	DR
3155-100	164	FRIO PECAN FARM	21	FRIO RIVER	Real	2850500000	MUN	0.211	22.125	20.076	7.406	49.973	60.51	94.589	42.381	81.035	88.205
3177-100	4	BETTY F. LEIGHTON	21	SABINAL RIVER	Band	2850000000	IRR	0	2.95	2.788	3.46	3.75	4.2	4.1	3.8	4	4
3178-100	40	KING & JEWEL FISHER	21	SABINAL RIVER	Band		MUN	DR	DR	DR	DR	DR	9.205	7.023	22.984	5.692	14.424
3505-400	3603	CITY OF KERRVILLE TEXAS	18	GUADALUPE RIV	Kerr		SEC	DR	2510.591	1083.77	2212.253	3174.982	3158	3053.85	3404.999	3634	2466
3505-401	2450	CITY OF KERRVILLE TEXAS	18		Kerr		IRR	DR	DR	DR	410.8	DR	268	288	DR	DR	DR
3717-100	400	DOUGLAS B. & MARGARET C. MARSHALL	21	NUECES RIVER	Real	7701250000	IRR	DR	DR	DR	DR	2.651	DR	19.008	DR	DR	DR
5479-400	566	CITY SOUTH MANAGEMENT CORP.	18	GUADALUPE RIV	Kerr		IRR	DR	DR	DR	DR	0.884	0.238	DR	2.586	47.066	55.172
5531-100	80	LEE ROY COSPER AND WIFE JUDITH MC B	21	GUADALUPE RIV	Kerr		DR	DR	DR	DR	DR	DR	DR	3.143	DR	2.658	DR

** DR: did not report



**TABLE 3C-1
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE**

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreege	Res Cap in Ac-Ft	Remarks
2027-000	6	Bandera	7720000000	ROBERT L PARKER SR ET AL	VERDE CRK	IRRG	8	3		
2028-000	6	Bandera	7750000000	HOWARD E BUTT	PALMER CRK	OTHE			30	
2103-000	6	Bandera	5903000000	O S PETTY	HONEY CRK	IRRG	96	38		
2104-000	6	Bandera	5902000000	CLARENCE E LAUTZENHEISER ET	N PRONG MEDINA RIVER	IRRG	20.24	23.85		AMEND 9/29/88, 8/22/89
2105-000	6	Bandera	5901500000	STEVEN L PRICHARD TRUSTEE	MICKLE	IRRG	5.44	8.16	5	
2105-000	6	Bandera	5901500000	NEAL INCORPORATED	MICKLE	IRRG	7.32	10.99	5	
2106-000	6	Bandera	5901450000	BREWINGTON LAKE RANCH ASSN	BREWINGTON CRK	REC	190		190	
2107-000	6	Bandera	5901100000	JOEL HELD, TRUSTEE/JJJ RANCH	N PRONG MEDINA RIVER	IRRG	19	25		OUT OF A 1666.5 ACRE TRACT
2108-000	6	Bandera	5900100000	BEN & KAY MAYBERRY FAM PART	ROCKY CRK	IRRG	19.82	14.41		ALSO KERR CO
2108-000	6	Bandera	5900100000	WALTER A WILLOUGHBY	ROCKY CRK	IRRG	24.18	17.59		ALSO KERR CO
2109-000	6	Bandera	5897200000	NEVIN MARR	N PRONG MEDINA RIVER	IRRG	2	10		AMEND 1-21-83 INCREASE ACRES
2110-000	6	Bandera	5897000000	DONALD F & MARTHA M MEAD	N PRONG MEDINA RIVER	IRRG	21	12		
2111-000	6	Bandera	5896000000	TEXAS PETROLEUM COMPANY TR	COLLINS CRK	IRRG	4	2	16	
2112-000	6	Bandera	5894500000	MRS MARY WINKENHOWER	ELAM CRK	IRRG	27	27		JOINTLY OWNS 27 AF TO IRR 27 ACRES
2113-000	6	Bandera	5894000000	SUSAN CRAWFORD TRACY	W PRONG MEDINA RIVER	IRRG	35	45		OUT OF A 156 ACRE TRACT
2114-000	6	Bandera	5892000000	PHIL A GROTHUES ET UX	UNNAMED TRIB	IRRG	5.705	20.715		
2114-000	6	Bandera	5892000000	INMANN T DABNEY JR ET UX	UNNAMED TRIB	IRRG	6.542	23.756		
2114-000	6	Bandera	5892000000	RICHARD E WILSON	UNNAMED TRIB	IRRG	3.753	13.629		
2115-000	6	Bandera	5891500000	DAVID R SCHMIDT MD ET AL	BAUERLEIN CRK	IRRG	15	16		
2116-000	6	Bandera	5891000000	PAUL LAVON GARRISON	W PRONG MEDINA RIVER	IRRG	36	36		
2116-000	6	Bandera	5891000000	GEORGE C. YAX	W PRONG MEDINA RIVER	IRRG	15	15	162	
2117-000	6	Bandera	5889000000	G. MILTON JOHNSON, ET UX	MEDINA RIVER	IRRG	7	7		OUT OF A 175.5 ACRE TRACT
2118-000	6	Bandera	5888870000	DAVID J BRASK	UNNAMED TRIB	IRRG	16	16		
2119-000	6	Bandera	5888090000	RAYMOND HICKS	MEDINA RIVER	IRRG	3	8		
2120-000	6	Bandera	5888051000	BANDERA ELECTRIC COOP INC	MEDINA RIVER	IRRG	2	4		7/8/82 ADD DIV PT
2121-000	6	Bandera	5888087000	ANN DARTHULA MAULDIN	INDIAN CRK	IRRG	31.03	8.27		
2121-000	6	Bandera	5888087000	TOLBERT S WILKINSON ET UX	INDIAN CRK	IRRG	69.47	18.53		AMEND 7/30/90
2121-000	6	Bandera	5888087000	JOHN W DINSE ET UX	INDIAN CRK	IRRG	49.5	13.2		
2122-000	6	Bandera	5887330000	DON HICKS	MEDINA RIVER	MUNI	9			
2123-000	6	Bandera	5887150000	DON F TOBIN	MEDINA RIVER	IRRG	152	61		OUT OF A 452 ACRE TRACT
2124-000	6	Bandera	5887130000	EVANGELINE RATCLIFFE WILSON	SAN JULIAN CRK	IRRG	3	5		
2125-000	6	Bandera	5887129000	PETER K SHAVER ET UX	SAN JULIAN CRK	IRRG	18	30		
2126-000	6	Bandera	5887105000	STANLEY D ROSENBERG ET UX	MEDINA RIVER	IRRG	47	36		
2127-000	6	Bandera	5887100000	JERRY B PARKER ET AL	MEDINA RIVER	IRRG	16	8		
2128-000	6	Bandera	5887050000	JOE H BERRY	SADDLE CRK	IRRG	14	12	3	
2129-000	6	Bandera	5887000000	JOE H BERRY	PRIVILEGE CRK	IRRG	40	33	110	
2135-000	6	Bandera	5660000000	KITTIE NELSON FERGUSON	SAN GERONIMO CRK	IRRG	5	5	28	
3176-000	6	Bandera	2851020000	TEXAS PARKS & WILDLIFE DEPT	CAN CRK	MUNI	7			
3176-000	6	Bandera	2851020000	TEXAS PARKS & WILDLIFE DEPT	CAN CRK	IRRG		3		
3177-000	6	Bandera	2850500000	BETTY F LEIGHTON	SABINAL RIVER	MUNI	4			
3178-000	6	Bandera	2850000000	KING & JEWEL FISHER	SABINAL RIVER	IRRG	40	56	2	AMENDED 6/21/96
3179-000	6	Bandera	2825000000	JOHN K HARRELL	SABINAL RIVER	IRRG	28.196	95.257		
3179-000	6	Bandera	2825000000	BARBARA JEAN GROTH ET VIR	SABINAL RIVER	IRRG	8.804	29.743		
3184-000	6	Bandera	2675000000	ENRIQUE S PALOMO ET UX	SPRING CRK	IRRG	10	5	42	
3185-000	6	Bandera	2651700000	W H THOMPSON JR	WILLIAMS CRK	IRRG	15	5	2	CURRENT OWNER UNKNOWN, 5/98
3186-000	6	Bandera	2651500000	DOROTHY BAIRD MATTIZA	WILLIAMS CRK	IRRG	128	88	73	
3187-000	6	Bandera	2651000000	CHESTER N POSEY ET UX	WILLIAMS CRK	IRRG	23	21	15	
3188-000	6	Bandera	2650000000	W J SCHMIDT	HONDO CRK	IRRG	24	47	16	
3693-000	1	Bandera	5887260000	GERALD H PERSYN	UNNAMED TRIB BANDERA	REC			11	
3824-000	1	Bandera	5887295000	CITY OF BANDERA	MEDINA RIVER	REC			22	
3825-000	1	Bandera	7718000000	ROBERT L PARKER SR ET AL	VERDE CRK	REC			277	
3853-000	1	Bandera	5888230000	ROCK CLIFF RESERVOIR LAND ASSN	SPIRES CRK	REC			925.4	AMENDED 2/17/98: IMPOUNDMENT AND DOMESTIC, LIVESTOCK & REC
3909-000	1	Bandera	5888150000	MAUDEEN M MARKS	MONTAGUE HOLLOW	REC			500	
3944-000	1	Bandera	5887120000	CONOCO INCORPORATED	UNNAMED TRIB MEDINA	REC			180	
3949-000	1	Bandera	5886550000	CASTLE LAND & LIVESTOCK CO INC	BEAR CRK	REC	33		33	2 DAMS
4	1	Bandera	5887125000	HILL COUNTRY MANAGEMENT	SAN JULIAN	REC			3	DOM & LIVESTOCK - SC
5097-000	1	Bandera	5890300000	DON CODY ET UX	W PRONG MEDINA RIVER	IRRG	120	72		ALSO DOM & LIVESTOCK
5186-000	1	Bandera	2824000000	HILL COUNTRY SPRING WATER TX	SPRING	MUNI	161			EXP 2/2/2016 BY CONTRACT 1610:AMEND
5204-000	1	Bandera	2840000000	ROGER E. CANTER ET UX	SABINAL RIVER	IRRG	60	20		BOTTLED WATER, .049 RES
5305-000	1	Bandera	2621000000	UTOPIA SPRING WATER INC	W SECO CRK	MUNI	72			
5339-000	1	Bandera	5888089000	YMCA/GREATER HOUSTON AREA	INDIAN CRK	REC			30	
5342-000	1	Bandera	5890200000	RENE H GRACIDA	W PRONG MEDIA	REC			7	
5475-000	1	Bandera	2850600000	GALLERIA HOLDING, LTD	JERNIGAN CRK	IRRG	26	18	63	2 RESERVOIRS

TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreege	Res Cap in Ac-Ft	Remarks
5575-000	1	Bandera	2850900000	ALBERT R GAGE ET UX	MARLER CRK	IRRG	12	6		SC: FLOW RESTRICTIONS
1527-000	6	Edward	1750010000	ADDISON LEE PFLUGER	HUFFMAN SPRING	IRRG	32	20	1	
1528-000	6	Edward	1735000000	RUTH MCLEAN BOWERS	PAINT CREEK	IRRG	60	54	58	CO 134.2 RES
2451-000	6	Edward	1750000000	ADDISON LEE PFLUGER ET AL	S LLANO RIVER	IRRG	88	74	7	AMEND 5/9/83
3017-000	6	Edward	9520000000	RAY H EUBANK	RUTH DRAW	IRRG	50	50		AMEND 7/3/84
3023-000	6	Edward	9195000000	DONALD P TARPEY	NUECES RIVER	IRRG	108	27		
3024-000	6	Edward	9170000000	DOUGLAS B & MARGARET	NUECES RIVER	IRRG	65	43		
3038-000	6	Edward	8900000000	ROYCE I REID ESTATE	PULLIAM CRK	IRRG	48	20		
3039-000	6	Edward	8800000000	OLGA H. CLOUDT, ET AL	PULLIAM CRK	IRRG	75	50	8	
3039-000	6	Edward	8800000000	OLGA H. CLOUDT, ET AL	PULLIAM CRK	IRRG	30	20		
3040-000	6	Edward	8790000000	J R WILLIAMS ET AL	PULLIAM CRK	IRRG	34	17		
3041-000	6	Edward	8780000000	JOSEPH C WILLIAMS	PULLIAM CRK	IRRG	60	44		1/2 INTEREST IN 60 AF FOR IRR OF 44 AC
3042-000	6	Edward	8779000000	J R WILLIAMS ET AL	PULLIAM CRK	IRRG	22	13		
3043-000	6	Edward	8760000000	JOY JERNIGAN OWENS	PULLIAM CRK	IRRG	32	16		
3044-000	6	Edward	8700010000	SUSAN PETTY ARNIM ET AL	CEDAR CRK	IRRG	6	12		
3044-000	6	Edward	8700010000	SUSAN PETTY ARNIM ET AL	CEDAR CRK	IRRG	20			
3044-000	6	Edward	8700010000	SUSAN PETTY ARNIM ET AL	CEDAR CRK	IRRG	4	20		
3044-000	6	Edward	8700010000	NORMA JEAN EASLEY	PULLIAM CRK	IRRG	30	59		
3046-000	6	Edward	8460500000	BRUCE I HENDRICKSON ET UX	CLEAR CRK	IRRG	6	6	11	
3047-000	6	Edward	8400000000	L A MALACHEK ET AL	PULLIAM CRK	IRRG	27	14		
3048-000	6	Edward	8340000000	EDWARDS CO INVESTMENT	PULLIAM CRK	IRRG	250	400		
3049-000	6	Edward	7630010000	BRUCE I HENDRICKSON ET UX	PULLIAM CRK	IRRG	350	150		
3049-000	6	Edward	7630010000	BRUCE I HENDRICKSON ET UX	PULLIAM CRK	IRRG	200	184		
3070-000	6	Edward	7041600000	E B CARRUTH, JR, TRUST	W NUECES RIVER	IRRG			19	
3070-000	6	Edward	7041600000	E B CARRUTH, JR, TRUST	W NUECES RIVER	REC				
3957-000	1	Edward	8550000000	S A WILLIAMS	CEDAR CRK	IRRG	40	40		AMEND 1/13/87
4006-000	1	Edward	8790100000	BAY-HOUSTON TOWING CO	PULLIAM	IRRG	150	75		
4278-000	1	Edward	8920000000	BERRYMAN INVESTMENTS INC	PULLIAM CRK	IRRG	4.34	7.38		OWNS DAM & RESERVOIR
4278-000	1	Edward	8920000000	SAM P WORDEN ET UX	PULLIAM CRK	IRRG	5.66	9.62		
1930-000	6	Kerr	9570000000	HERSHEL REID ET UX	FLAT ROCK CRK	IRRG	69	66	35	
1932-000	6	Kerr	9560000000	PRESBYTERIAN MO-RANCH	N FRK GUADALUPE RIVER	MUNI	60			AMEND 6/7/94
1932-000	6	Kerr	9560000000	PRESBYTERIAN MO-RANCH	N FRK GUADALUPE RIVER	IRRG	14	7		AMEND 6/7/94
1932-000	6	Kerr	9560000000	PRESBYTERIAN MO-RANCH	N FRK GUADALUPE RIVER	REC	25		20	AMEND 6/7/94
1934-000	6	Kerr	9527000000	CHARLES K HICKEY JR ET AL	DRY CRK	IRRG	0.45	0.68		
1934-000	6	Kerr	9527000000	KATHY JAN FREEMAN	DRY CRK	IRRG	1.55	2.32		
1935-000	6	Kerr	9525100000	CHARLES K HICKEY JR ET AL	N FRK GUADALUPE RIVER	IRRG	8	8		
1936-000	6	Kerr	9523000000	WILLIAM H ARLITT JR ET UX	N FRK GUADALUPE RIVER	IRRG	17	6	5	
1936-000	6	Kerr	9523000000	WILLIAM H ARLITT JR ET UX	INDIAN CRK	IRRG	134	48		
1937-000	6	Kerr	9515200000	BOY SCOUTS- ALAMO AREA	BEAR CRK	REC			10	
1938-000	6	Kerr	9515000000	LOUIS H STUMBERG	N FRK GUADALUPE RIVER	IRRG	2	4		
1938-000	6	Kerr	9515000000	LOUIS H STUMBERG	N FRK GUADALUPE RIVER	IRRG	15	22		
1939-000	6	Kerr	9512000000	LOUIS H STRUMBERG	GRAPE CRK	IRRG	3	6	6	
1940-000	6	Kerr	9511000000	B E QUINN III ET AL	N FRK GUADALUPE RIVER	IRRG	32	16	10	
1941-000	6	Kerr	8154502000	DELMAR SPIER AGENT	TURTLE CRK	IRRG	6	9	5	
1943-000	6	Kerr	9505000000	J CONRAD PYLE, ET AL	N FRK GUADALUPE RIVER	MUNI	14			
1945-000	6	Kerr	9485010000	JOHN P HILL	N FRK GUADALUPE RIVER	IRRG	25	20		
1946-000	6	Kerr	9485000000	JOHN P HILL ADMINISTRATOR	N FRK GUADALUPE RIVER	IRRG	11	9		
1947-000	6	Kerr	9480000000	GUAD VALLEY LOT OWNERS ASSN	N FRK GUADALUPE RIVER	IRRG	6	10		AMEND 3/6/91
1947-000	6	Kerr	9480000000	GUAD VALLEY LOT OWNERS ASSN	N FRK GUADALUPE RIVER	MUNI	3			
1948-000	6	Kerr	9489000000	JOHN H DUNCAN	BRUSHY CRK	IRRG	7	7		
1949-000	6	Kerr	9488000000	WILLIAM O CARTER, TRUSTEE	HONEY CRK	IRRG	6	2		OUT OF A 80 ACRE TRACT
1949-000	6	Kerr	9488000000	WILLIAM O CARTER, TRUSTEE	HONEY CRK	IRRG	27	9		
1950-000	6	Kerr	9487000000	JOHN H DUNCAN	HONEY CRK	IRRG	6	20	13	ALSO USE 7
1953-000	6	Kerr	9476000000	LAURA B LEWIS ET VIR	N FRK GUADALUPE RIVER	IRRG	40	24		
1956-000	6	Kerr	9897000000	RIVER INN ASSOC OF UNIT OWNERS	S FRK GUADALUPE RIVER	REC			50	
1956-000	6	Kerr	9897000000	RIVER INN ASSOC OF UNIT OWNERS	S FRK GUADALUPE RIVER	MUNI	10			AMEND 4/19/84, 1/4/85
1957-000	6	Kerr	9880000000	BILLIE R VALICEK	S FRK GUADALUPE RIVER	REC			10	
1958-000	6	Kerr	9780000000	T J MOORE ESTATE	CYPRESS CRK	IRRG	20	10	100	
1961-000	6	Kerr	9670000000	LAVERNE CRIDER MOORE ET VIR	S FRK GUADALUPE RIVER	MUNI	3			
1961-000	6	Kerr	9670000000	LAVERNE CRIDER MOORE ET VIR	S FRK GUADALUPE RIVER	IRRG	1	3		
1963-000	6	Kerr	9620000000	LAWRENCE L GRAHAM ET AL	S FRK GUADALUPE RIVER	IRRG	2	12	21	AMEND 9/10/85
1963-000	6	Kerr	9620000000	LAWRENCE L GRAHAM ET AL	S FRK GUADALUPE RIVER	REC			16	AMENDS 5/26/83 CHG PUR USE & ADD RES
1964-000	6	Kerr	9400000000	VIRGINIA MOORE JOHNSTON	TEGENER	IRRG	10	10	12	
1967-000	6	Kerr	9305000000	SARAH HICKS BUSS	UNNAMED TRIB GUADALUPE	REC	20			ALSO USE 1, AMEND 3/19/91

TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreage	Res Cap in Ac-Ft	Remarks
1968-000	6	Kerr	9261000000	LOUIS DOMINGUES	GUADALUPE RIVER	IRRG	10	20		USE 2: MILLING USE 3 - DIVERTING FROM KELLY CREEK USE 3 - DIVERTING FROM GUADALUPE USE 5; NONCONSUMPTIVE
1969-000	6	Kerr	9260000000	TOMMIE SMITH BLACKBURN	GUADALUPE RIVER	INDU	15		15	
1969-000	6	Kerr	9260000000	TOMMIE SMITH BLACKBURN	KELLY CRK	IRRG	49	80		
1969-000	6	Kerr	9260000000	TOMMIE SMITH BLACKBURN	GUADALUPE RIVER	IRRG	59			
1969-000	6	Kerr	9260000000	TOMMIE SMITH BLACKBURN	GUADALUPE RIVER	HYDR				
1970-000	6	Kerr	9220000000	CARL HAWKINS	GUADALUPE RIVER	MUNI	10			
1970-000	6	Kerr	9220000000	CARL HAWKINS	GUADALUPE RIVER	IRRG	32	25		
1971-000	6	Kerr	9140000000	COUNTY OF KERR	GUADALUPE RIVER	REC			450	
1972-000	6	Kerr	9110000000	WESLEY ELLEBRACHT	WELSH BR	IRRG	0.8	0.8		
1972-000	6	Kerr	9110000000	WELCH CREEK PARTNERS LTD	WELSH BR	IRRG	5.15	5.15		
1972-000	6	Kerr	9110000000	ARANSAS BAY COMPANY	WELSH BR	IRRG	0.05	0.05		
1973-000	6	Kerr	9100000000	SHELTON RANCHES INC	SMITHS BR	IRRG	10	10	6	
1974-000	6	Kerr	9050000000	SHELTON RANCHES INC	SMITHS BR	IRRG	70	35	15	
1975-000	6	Kerr	9025000000	TEXAS PARKS & WILDLIFE DEPT	FESSENDEN BR	INDU	400			
1975-000	6	Kerr	9025000000	TEXAS PARKS & WILDLIFE DEPT	FESSENDEN BR	INDU	5780		72	
1976-000	6	Kerr	8950000000	F P ZOCH III TRUST & ZEE RANCH	FESSENDEN BR	IRRG	29	14		
1976-000	6	Kerr	8950000000	F P ZOCH III TRUST & ZEE RANCH	FESSENDEN BR	REC			184	
1977-000	6	Kerr	8839000000	TEXAS CATHOLIC BOYS' HOME	JOHNSON CRK	IRRG	23	23	23	
1978-000	6	Kerr	8815000000	A J RUST	JOHNSON CRK	IRRG	33	65		
1979-000	6	Kerr	8808000000	KEITH S MEADOW	BYAS CRK	IRRG	18	6	6	
1980-000	6	Kerr	8805000000	A L MOORE	JOHNSON CRK	IRRG	12	6	6	
1981-000	6	Kerr	8800000000	JACK D CLARK JR ET AL	JOHNSON CRK	IRRG	32	16		
1981-000	6	Kerr	8800000000	JACK D CLARK JR ET AL	JOHNSON CRK	IRRG	143	76		
1982-000	6	Kerr	8775000000	LOLA DEAN SMITH	JOHNSON CRK	IRRG	133	50	12	
1983-000	6	Kerr	8770000000	N V MAMIMAR	JOHNSON CRK	IRRG	32	17		
1983-000	6	Kerr	8770000000	N V MAMIMAR	JOHNSON CRK	IRRG	67	35		
1983-000	6	Kerr	8770000000	DAVID J COPELAND ET UX	JOHNSON CRK	IRRG				
1983-000	6	Kerr	8770000000	DAVID J COPELAND ET UX	JOHNSON CRK	IRRG				
1984-000	6	Kerr	8750000000	MICHAEL E & GAIL SEARS	JOHNSON CRK	IRRG				
1985-000	6	Kerr	8746000000	ROBERT B O'CONNOR JR ET UX	JOHNSON CRK	IRRG	1	2		
1987-000	6	Kerr	8744000000	REGINALD E WARREN JR	JOHNSON CRK	IRRG	80	31		
1988-000	6	Kerr	8720000000	JIMMIE L QUERNER SR ESTATE	FALL BR	IRRG	90	30		
1990-000	6	Kerr	8650000000	DOROTHY L JENKINS ET AL	JOHNSON CRK	IRRG	128	64		
1991-000	6	Kerr	8615001000	LAZY HILLS GUEST RANCH INC	HENDERSON BR	IRRG	3	1		
1992-000	6	Kerr	8600000000	MARK A RYLANDER ET AL	JOHNSON CRK	IRRG	21	28		
1993-000	6	Kerr	8550000000	ROY LITTLEFIELD	JOHNSON CRK	IRRG	23	15		
1994-000	6	Kerr	8500000000	M H & MARY FRANCES	GUADALUPE RIVER	IRRG	50	50	4	
1995-000	6	Kerr	8451000000	HENRY GRIFFIN CONSTRUCTION CO	GOAT CRK	IRRG	5	4		
1996-000	6	Kerr	8287000000	KERRVILLE, CITY OF	GUADALUPE RIVER	MUNI	11	11	6	
1996-000	6	Kerr	8287000000	KERRVILLE, CITY OF	GUADALUPE RIVER	IRRG	150			
1997-000	6	Kerr	8310000000	DARRELL G LOCHTE ET AL	GUADALUPE RIVER	IRRG	75	44	75	
1997-000	6	Kerr	8310000000	DARRELL G LOCHTE ET AL	GUADALUPE RIVER	MINE	143			
1998-000	6	Kerr	8295000000	C W SUNDAY	TOWN CRK	INDU	2			
1998-000	6	Kerr	8295000000	JOSE A LOPEZ ET UX	TOWN CRK	IRRG	22.3	22.3	10	
1999-000	6	Kerr	8297000000	KERRVILLE STATE HOSPITAL	TOWN CRK	IRRG	4.18	4.18		
2000-000	6	Kerr	8260010000	RIVERHILL COUNTRY CLUB INC	UNNAMED TRIB GUADALUPE	REC	44		44	
2001-000	6	Kerr	8255000000	CARL D. MEEK	GUADALUPE RIVER	IRRG	350	160	70	
2002-000	6	Kerr	8230000000	COMANCHE TRACE RANCH & GOLF	GUADALUPE RIVER	IRRG	295	194		
2003-000	6	Kerr	8250000000	WHEATCRAFT, INC.	GUADALUPE RIVER	IRRG	136	99		
2003-000	6	Kerr	8250000000	SHELTON RANCH CORPORATION	GUADALUPE RIVER	IRRG	42	21		
2004-000	6	Kerr	8200000000	COUNTY OF KERR	GUADALUPE RIVER	MINE	10			
2005-000	6	Kerr	8185500000	HARRIET BOCKHOFF ESTATE	GUADALUPE RIVER	REC			720	
2006-000	6	Kerr	8174000000	FARM CREDIT BANK OF TEXAS	GUADALUPE RIVER	IRRG	59	98		
2006-000	6	Kerr	8174000000	FARM CREDIT BANK OF TEXAS	GUADALUPE RIVER	IRRG	179.06	512.55		
2006-000	6	Kerr	8174000000	FARM CREDIT BANK OF TEXAS	GUADALUPE RIVER	IRRG	83.94			
2006-000	6	Kerr	8174000000	1967 SHELTON TRUSTS PART ET AL	GUADALUPE RIVER	IRRG	106.9	78.55		
2006-000	6	Kerr	8174000000	1967 SHELTON TRUSTS PART ET AL	GUADALUPE RIVER	IRRG	50.1			
2006-000	6	Kerr	8174000000	KENNETH W WHITEWOOD ET UX	GUADALUPE RIVER	IRRG	34.04			
2006-000	6	Kerr	8174000000	KENNETH W WHITEWOOD ET UX	GUADALUPE RIVER	IRRG	15.96			
2006-000	6	Kerr	8174000000	KENNETH W WHITEWOOD ET UX	GUADALUPE RIVER	IRRG	100	76		
2007-000	6	Kerr	8160000000	RAY ELLISON JR	SPRING CRK	IRRG	31	31	50	
2008-000	6	Kerr	8156160000	LUTHERAN CAMP CHRYSALIS	TURTLE CRK	MUNI	11		12	
2009-000	6	Kerr	8155750000	FRANCIS C & WILLADEAN BOLEN	BUSHWACK CRK	IRRG	5	5	5	
2010-000	6	Kerr	8155700000	G ROBERT SWANTNER JR ET UX	BUSHWACK CRK	IRRG	7	5	5	

TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreage	Res Cap in Ac-Ft	Remarks
2011-000	6	Kerr	8155000000	HJ GRUY	TURTLE CRK	IRRG	80	50	10	
2012-000	6	Kerr	8154501000	SANDRA BLAIR	TURTLE CRK	IRRG	1	1	5	
2013-000	6	Kerr	8154500000	FELIX R & LILLIAN STEILER REAL	WEST CRK	IRRG	11	12		
2014-000	6	Kerr	8152000000	LEAH MARTHA STEPHENS	TURTLE CRK	IRRG	6.36	5.63		
2014-000	6	Kerr	8152000000	BENNO OOSTERMAN ET UX	TURTLE CRK	IRRG	6.36	5.63		
2014-000	6	Kerr	8152000000	JOHN M LEBOLT TRUSTEE	TURTLE CRK	IRRG	9.02	7.98		
2015-000	6	Kerr	8151000000	JAMES E NUGENT	GUADALUPE RIVER	IRRG	27	21		
2016-000	6	Kerr	8150500000	DORIS J HODGES	GUADALUPE RIVER	IRRG	8	8		
2017-000	6	Kerr	8050000000	COUNTY OF KERR	GUADALUPE RIVER	REC			87	ALSO USE 8
2018-000	6	Kerr	8049000000	LEE ANTHONY MOSTY	GUADALUPE RIVER	IRRG	154	94		
2020-000	6	Kerr	7970000000	ROBERT LEE MOSTY	GUADALUPE RIVER	IRRG	60	30		
2021-000	6	Kerr	7940000000	RAYMOND F MOSTY ET AL	GUADALUPE RIVER	IRRG	103	45	5	
2022-000	6	Kerr	7950000000	ROBERT LEE MOSTY	GUADALUPE RIVER	IRRG	17	119	20	
2023-000	6	Kerr	7935000000	ROY A GREEN	GUADALUPE RIVER	IRRG	7	3		
2024-000	6	Kerr	7924990000	CARL E RHODES	GUADALUPE RIVER	IRRG	114	125		
2025-000	6	Kerr	7925000000	HARRY J WRAY	GUADALUPE RIVER	IRRG	155	80		JOINTLY OWNS 155 AF TO IRR 80 ACRES
2025-000	6	Kerr	7925000000	DAVID B WRAY	GUADALUPE RIVER	IRRG				JOINTLY OWNS 155 AF TO IRR 80 ACRES
2025-000	6	Kerr	7925000000	BYNO SALSMAN ET UX	GUADALUPE RIVER	IRRG				JOINTLY OWNS 155 AF TO IRR 80 ACRES
2026-000	6	Kerr	7920000000	ELGIN JUNG	GUADALUPE RIVER	IRRG	3.309	2.118		
2026-000	6	Kerr	7920000000	ZANE H ROBINSON ET UX	GUADALUPE RIVER	IRRG	53.945	34.52		
2026-000	6	Kerr	7920000000	RONNIE W SCHLOTTMAN ET UX	GUADALUPE RIVER	IRRG	17.83	11.41		
2026-000	6	Kerr	7920000000	KENNETH W WHITEWOOD ET UX	GUADALUPE RIVER	IRRG	149.916	44.72		AMENDED 11/22/96
2029-000	6	Kerr	7710000000	ROLAND WALTERS	PRISON CANYON	IRRG	25	200	420	& CO 010, 10/5/82 ADD DIV PT
2030-000	6	Kerr	7704000000	JAMES S ERNST	UNNAMED TRIB VERDE CRK	IRRG	247		120	
2030-000	6	Kerr	7704000000	PETE R SMITH	UNNAMED TRIB VERDE CRK	IRRG	19			
2031-000	6	Kerr	7701000000	JOSEPH PAUL MILLER ET UX	GUADALUPE RIVER	IRRG	115	80		AMEND 11/4/85
2032-000	6	Kerr	7700700000	DAVID M LEIBOWITZ ET UX	GUADALUPE RIVER	IRRG	10	6		
2033-000	6	Kerr	7699900000	JAVIER G REYES ET UX	GUADALUPE RIVER	IRRG	90	90		
2034-000	6	Kerr	7699500000	CHESTER P HEINEN ET AL	GUADALUPE RIVER	IRRG	2	6		
2037-000	6	Kerr	7652500000	GENE ARTHUR ALLERKAMP	CYPRESS CRK	IRRG	5	6.33		
2037-000	6	Kerr	7652500000	JANICE CHARLOTTE BULLARD	CYPRESS CRK	IRRG	5	6.34		
2037-000	6	Kerr	7652500000	ROMAN LUNA ET UX	CYPRESS CRK	IRRG	10	12.67		
2037-000	6	Kerr	7652500000	CURTIS BERNARD ALLERKAMP	CYPRESS CRK	IRRG	5	6.33		
2037-000	6	Kerr	7652500000	WERNER WAYNE ALLERKAMP	CYPRESS CRK	IRRG	5	6.33		
2038-000	6	Kerr	7652000000	HARRY E REEH	CYPRESS CRK	IRRG	15	15		
2039-000	6	Kerr	7650500000	FRED SAUR	CYPRESS CRK	IRRG	7	7		
2040-000	6	Kerr	7650000000	A C & DOROTHY PFEIFFER	CYPRESS CRK	IRRG	10	5		
2041-000	6	Kerr	7645000000	THOMAS L BRUNDAGE ET AL	CYPRESS CRK	IRRG	134	57		AMEND 2/1/85
2042-000	6	Kerr	7644800000	E J & VIRGINIA DOWER	CYPRESS CRK	IRRG	209	125		
2043-000	6	Kerr	7644600000	MARY LEE EDWARDS	CYPRESS CRK	IRRG	19.57	14.68		
2043-000	6	Kerr	7644600000	EDGAR SEIDENSTICKER ET UX	CYPRESS CRK	IRRG	16.85	12.63		
2043-000	6	Kerr	7644600000	L J MANNERING ET UX	CYPRESS CRK	IRRG	3.58	2.69		
2043-000	6	Kerr	9550000000	CHLOE CULLUM KEARNEY ET AL	N FRK GUADALUPE RIVER	REC			100	D&L. RESERVOIR JOINTLY OWNED BY
2437-000	6	Kerr	9550000000	DAN W BACON ET UX	N FRK GUADALUPE RIVER	REC				D&L. RESERVOIR JOINTLY OWNED BY
2437-000	6	Kerr	9528000000	LUTZ ISSLEB ET AL	N FRK GUADALUPE RIVER	IRRG	30	18	30	
2438-000	6	Kerr	9510000000	DALE B AND MARSHA G ELMORE	N FRK GUADALUPE RIVER	IRRG	8	8	20	AMEND 10/29/90
2439-000	6	Kerr	9507000000	L F SCHERER	N FRK GUADALUPE RIVER	IRRG	1	1		
2440-000	6	Kerr	9490000000	SILAS B RAGSDALE	N FRK GUADALUPE RIVER	IRRG	21	105		
2441-000	6	Kerr	9486000000	LUTHER GRAHAM	HONEY CRK	IRRG	28	14	17	
2442-000	6	Kerr	9476500000	JOHN H DUNCAN	HONEY CRK	IRRG	40	20	25	
2443-000	6	Kerr	9980000000	BRUCE F. HARRISON	S FRK GUADALUPE RIVER	IRRG	6	3	10	
2444-000	6	Kerr	9980000000	BRUCE F. HARRISON	S FRK GUADALUPE RIVER	REC			17	
2444-000	6	Kerr	9680000000	CAMP MYSTIC INC	CYPRESS CRK	IRRG	12	15		
2445-000	6	Kerr	9680000000	CAMP MYSTIC INC	CYPRESS CRK	MUNI	14		20	
2446-000	6	Kerr	9675000000	BOB/KAT INC	S FRK GUADALUPE RIVER	IRRG	10	10		
2446-000	6	Kerr	9675000000	BOB/KAT INC	S FRK GUADALUPE RIVER	MUNI	10			
2447-000	6	Kerr	9625000000	CAMP LA JUNTA INC	S FRK GUADALUPE RIVER	IRRG	26	15	30	
2447-000	6	Kerr	9625000000	CAMP LA JUNTA INC	S FRK GUADALUPE RIVER	MUNI	14			& RECREATION
2448-000	6	Kerr	9350000000	ALICE CYNTHIA SIMKINS	TEGENER CRK	IRRG	6	5		
2449-000	6	Kerr	9310000000	BILLIE ZUBER ET AL	GUADALUPE RIVER	IRRG	17	25.5		AMEND 9/24/93:ADD ACREAGE.JUNIOR
2450-000	6	Kerr	7999000000	ROBERT L MOSTY ET AL	GUADALUPE RIVER	IRRG	158	117		
3769-000	1	Kerr	8300010000	CITY OF KERRVILLE	GUADALUPE RIVER	MUNI	3603		840	
3769-000	1	Kerr	8300010000	CITY OF KERRVILLE	GUADALUPE RIVER	IRRG		192		USING 2450 AF WASTEWATER FROM

TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreage	Res Cap in Ac-Ft	Remarks
3846-000	1	Kerr	7715000000	T & R PROPERTIES	PALMER CRK	REC	322		322	
3896-000	1	Kerr	8276000000	KENNETH W & MARCIA C MULFORD	RATTLESNAKE	MUNI			13	
3904-000	1	Kerr	8275500000	CITY OF KERRVILLE	QUINLAN CRK	IRRG	80	56	10	
4007-000	1	Kerr	7703100000	PECAN VALLEY RANCH OWNERS	ELM CRK	REC			157	
4034-000	1	Kerr	9040000000	SHELTON RANCHES INC	JOHNSON CRK	REC			122	
4223-000	1	Kerr	9105000000	SHELTON RANCHES INC	JOHNSON CRK	IRRG	20	14	39	
4298-000	1	Kerr	8294800000	ALISON B MENCAROW LIVING	TOWN CRK	IRRG	12	18		
4486-000	1	Kerr	7644900000	JAY & HILDA POTH	CYPRESS CRK	IRRG	70	35		AMEND 12/10/91
5060-000	1	Kerr	8710000000	HORACE COFER ASSOCIATES, INC	FALL BR CRK	IRRG	10	12		RATE SEE 18-2041
5122-000	1	Kerr	8150800000	JAMES C STORM	GUADALUPE RIVER	IRRG	75	50	8	
5208-000	1	Kerr	7701500000	JAMES F HAYES & MARY K HAYES	VERDE CRK	IRRG	40	40		
5315-000	1	Kerr	8294000000	DANA G KIRK TRUSTEE	E TOWN CRK	OTHE				PRIVATE WATER
5322-000	1	Kerr	8705000000	E RAND SOUTHARD ET UX	FALL BR	REC				
5331-000	1	Kerr	9660000000	KATHLEEN B FLOURNOY, ET AL	S FRK GUADALUPE RIVER	MUNI	15		30	
5331-000	1	Kerr	9660000000	KATHLEEN B FLOURNOY, ET AL	S FRK GUADALUPE RIVER	IRRG	96	30		& RECREATION
5348-000	1	Kerr	9526000000	BRYON DONZIS	N FRK GUADALUPE RIVER	IRRG	5	4		
5352-000	1	Kerr	9650000000	BONITA OWNERS ASSOC INC	S FRK GUADALUPE RIVER	IRRG	2	2		
5394-000	1	Kerr	8300010000	UPPER GUADALUPE RIVER AUTH	GUADALUPE RIVER	MUNI	1661			FIRM YIELD BASIS. AMENDED 4/10/98.
5394-000	1	Kerr	8300010000	UPPER GUADALUPE RIVER AUTH	GUADALUPE RIVER	MUNI	339			FIRM YIELD BASIS. AMENDED 4/10/98.
5394-000	1	Kerr	8300010000	CITY OF KERRVILLE	GUADALUPE RIVER	MUNI	761			FIRM YIELD BASIS. AMENDED 4/10/98.
5394-000	1	Kerr	8300010000	CITY OF KERRVILLE	GUADALUPE RIVER	MUNI	339			RUN OF RIVER BASIS. AMENDED
5394-000	1	Kerr	8300010000	CITY OF KERRVILLE	GUADALUPE RIVER	MUNI	1069			RUN OF RIVER BASIS. AMENDED
5401-000	1	Kerr	8156130000	H E BUTT GROCERY CO	TURTLE CRK	REC			16	EXP 12/31/2012
5402-000	1	Kerr	8155300000	TURTLE CREEK INDUSTRIES INC	TURTLE CRK	REC				
5444-000	1	Kerr	8490000000	EUGENE D ELLIS ET UX	GUADALUPE RIVER	IRRG	10	25.5		
5479-000	1	Kerr	7701250000	CITY SOUTH MANAGEMENT CORP	GUADALUPE RIVER	IRRG	566	283		AMENDED 3/13/98
5495-000	1	Kerr	9800000000	LOIS & JOSEPH WESSENDORF ET AL	S FRK GUADALUPE RIVER	REC			9	
5521-000	1	Kerr	8300050000	DON D WILSON	GUADALUPE LAKE	IRRG	30	30		GUADALUPE RIVER
5531-000	1	Kerr	8185700000	LEE ROY COSPER ET UX	GUADALUPE RIVER	IRRG	80	40		
5536-000	1	Kerr	7701350000	ROBERT H & CHARLOTTE JENNINGS	GUADALUPE RIVER	IRRG	400	200		
5541-000	1	Kerr	9476150000	BASHARDT LTD	N FRK GUADALUPE RIVER	IRRG	14	15		
2671-000	6	Kinney	4950000000	MAVERICK CO WCID 1	RIO GRANDE	IRRG	134900	45000		& CO 162. AMEND 8/22/86.9/22/88.10/30/98
2671-000	6	Kinney	4950000000	MAVERICK CO WCID 1	RIO GRANDE	MUNI	2049			AMEND 8/22/86.9/22/88.10/30/98
2671-000	6	Kinney	4950000000	MAVERICK CO WCID 1	RIO GRANDE	REC	196			AMEND 8/22/86.9/22/88.10/30/98
2671-000	6	Kinney	4950000000	MAVERICK CO WCID 1	RIO GRANDE	HYDR	1085966			AMEND 8/22/86.9/22/88.10/30/98
2673-000	6	Kinney	4950000000	LENDELL MARTIN ET UX	MUD CRK	IRRG	52	35	16	
2674-000	6	Kinney	4950000000	CLYDE M BRADLEY	MUD CRK	IRRG	20	15		
2675-000	6	Kinney	4950000000	SHERWOOD GAINES TRUSTEE	MUD CRK	IRRG	60	30		RATE SEE 23-2673
2676-000	6	Kinney	4950000000	JEWEL FOREMAN ROBINSON	PINTO CRK	IRRG	252	126		RATE SEE 23-2673
2677-000	6	Kinney	4950000000	MARLIN E BRAUCHLE	PINTO CRK	IRRG	21	14		
2678-000	6	Kinney	4950000000	JOHNNY E RUTHERFORD	PINTO CRK	IRRG	135	90		
2679-000	6	Kinney	4950000000	CITY OF BRACKETTVILLE	LAS MORAS SPRING	MUNI	3			
2680-000	6	Kinney	4950000000	ELISE AULGUR HUNTSMAN ET AL	LAS MORAS CRK	IRRG	15	15		JOINT OWNER OF 15 AF TO IRR 15 ACRES
2680-000	6	Kinney	4950000000	ANN A LEGG & ERNESTINE A LOPEZ	LAS MORAS CRK	IRRG				JOINT OWNER OF 15 AF TO IRR 15 ACRES
2681-000	6	Kinney	4950000000	EARL H NOBLES	LAS MORAS CRK	IRRG	10	10		
2682-000	6	Kinney	4950000000	BERNARD C MEISCHEN ET AL	LAS MORAS CRK	IRRG	25	25		
2682-000	6	Kinney	4950000000	CHARLES W GAEBLER ET AL	LAS MORAS CRK	IRRG	75	75		
2683-000	6	Kinney	4950000000	ANDREW P MALINOVSKY JR	LAS MORAS CRK	IRRG	60	30		+50 AF FROM 7 RES FOR STOCK RAISING
2684-000	6	Kinney	4950000000	BEN S JONES	ELM CRK	IRRG	47	26	6	
2685-000	6	Kinney	4950000000	EARL A KELLEY	ELM CRK	IRRG	53	35	15	
2686-000	6	Kinney	4950000000	ROBERT H MEISCHEN, ET AL	LAS MORAS CRK	IRRG	300	300		
2686-000	6	Kinney	4950000000	ROBERT H MEISCHEN, ET AL	LAS MORAS CRK	MUNI	50			4 RESERVOIRS
2687-000	6	Kinney	4950000000	CELIA R DE PLAZA, ET AL	LAS MORAS CRK	IRRG	110	55		
2913-000	6	Kinney	4950000000	MOODY RANCHES INC	RIO GRANDE	IRRG	5500	3000	17	
2913-000	6	Kinney	4950000000	MOODY RANCHES INC	RIO GRANDE	IRRG	500	250		
3071-000	6	Kinney	7023010000	LLOYD L DAVIS	W NUECES RIVER	OTHE			25	IMPOUNDMENT
4365-000	1	Kinney	7028000000	ROBERT L MOODY JR	SPRING BR	REC	10		42	4 RES
4389-000	1	Kinney	4950000000	FORT CLARK SPRINGS ASSOC INC	LAS MORAS CRK	REC				
4517-000	1	Kinney	4950000000	FORT CLARK SPRINGS ASSOC INC	LAS MORAS CRK	REC			3	
1610-000	9	Medina	5700000000	L KEN EVANS	MEDINA RIVER	IRRG	20			LAKE MEDINA. EXP 2016
3016-000	6	Real	9615000000	JOHN H WATTS III ET UX	E PRONG NUECES RIVER	IRRG	4	2		SC. TWO PRIORITY DATES. AMEND 7/10/98
3016-000	6	Real	9615000000	JOHN H WATTS III ET UX	E PRONG NUECES RIVER	IRRG	54	27		SC. TWO PRIORITY DATES. AMEND 7/10/98
3018-000	6	Real	9450000000	LEWIS CLECKLER ET UX	SPRING CRK	IRRG	22.7	12.1		BULLHEAD HOLLOW

42

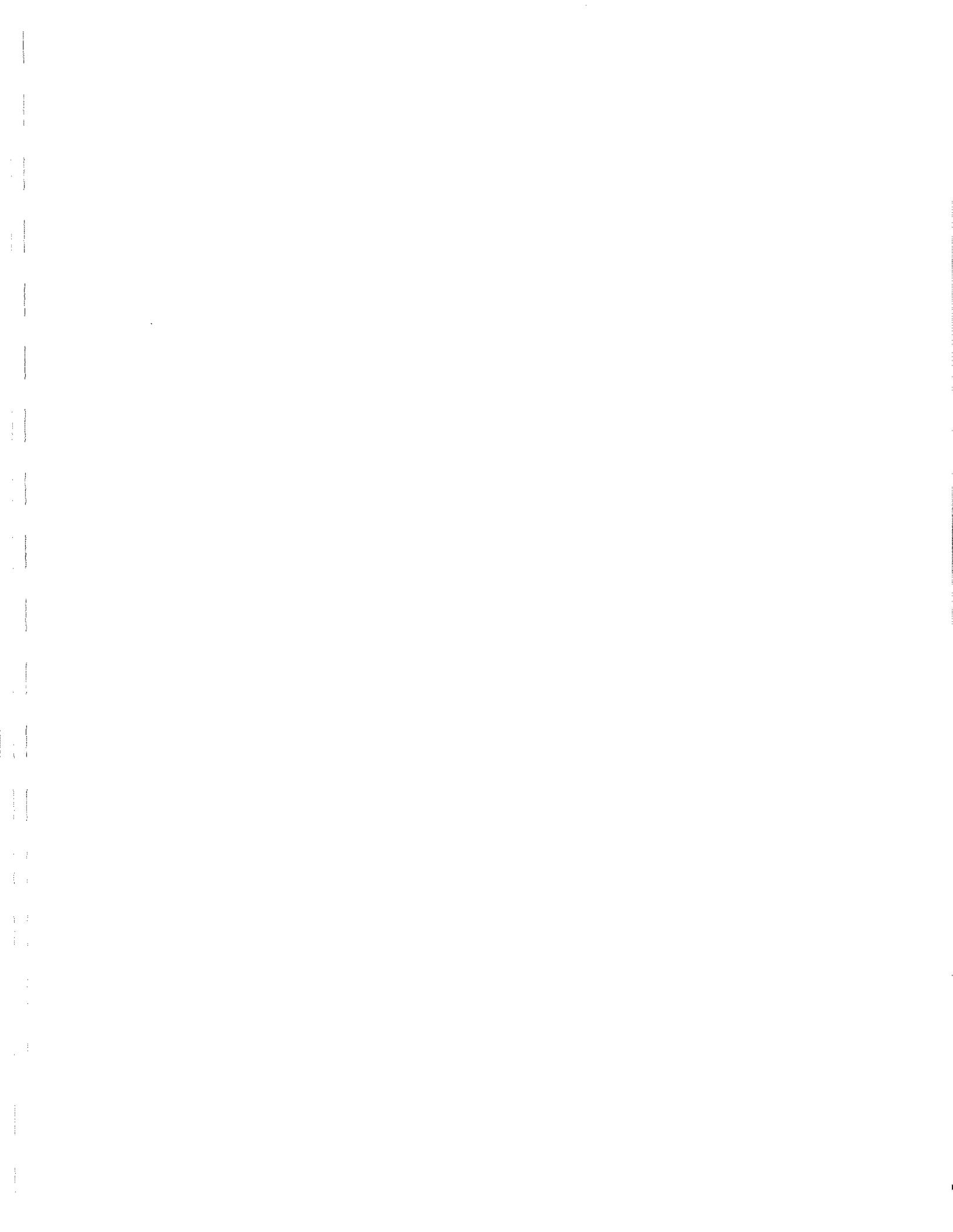
TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreage	Res Cap in Ac-Ft	Remarks
3018-000	6	Real	9450000000	EL CAMINO GIRL SCOUT COUNCIL	SPRING CRK	IRRG	7.3	3.9		BULLHEAD HOLLOW
3019-000	6	Real	9410000000	SARAH M DAVIS	BULLHEAD CRK	IRRG	80	40		
3019-000	6	Real	9410000000	SARAH M DAVIS	BULLHEAD CRK	IRRG		13		
3020-000	6	Real	9320000000	H C MCCARTY JR ET UX	BULLHEAD CRK	IRRG	34.736	17.368		
3020-000	6	Real	9320000000	F WALTER CONRAD JR ET UX	BULLHEAD CRK	IRRG	85.264	42.632		
3021-000	6	Real	9198500000	DSD, INC	BULLHEAD CRK	IRRG	418	210		
3022-000	6	Real	9190000000	MARVIN L BERRY	UNNAMED TRIB NUECES	IRRG	259	300	14	TRIB OF NUECES RIVER
3022-000	6	Real	9190000000	MARVIN L BERRY	UNNAMED TRIB NUECES	IRRG	485			
3025-000	6	Real	9150000000	WILLIAM C & WANDA LEA LANE	DRY CRK	IRRG	40	20	1	
3026-000	6	Real	9075000000	JOHN A DANIEL ET UX	DRY CRK	IRRG	16	8	90	
3027-000	6	Real	9050000000	J F ALSOP	DRY CRK	IRRG	20	10		
3028-000	6	Real	9040000000	CLARENCE W HARRISON ET UX	DRY CRK	IRRG	15.43	7.72	43	
3028-000	6	Real	9040000000	CLARENCE W HARRISON ET UX	DRY CRK	REC			4	
3028-000	6	Real	9040000000	W THOMAS TAYLOR ET UX	DRY CRK	IRRG	4.36	2.18		
3029-000	6	Real	9008000000	HENRY D ENGELKING	NUECES RIVER	IRRG	43	52		
3034-000	6	Real	9004000000	HERBERT C JEFFRIES ET UX	NUECES RIVER	IRRG		2		SEE ADJ 3030
3036-000	6	Real	9000000000	SALVADOR ORTIZ ET AL	NUECES RIVER	IRRG	125	50		
3037-000	6	Real	8950000000	DAVID WELDON TINDLE	NUECES RIVER	IRRG	25	25		
3050-000	6	Real	8000000000	W A MALEY	E CAMP WOOD CRK	IRRG	28	14		
3051-000	6	Real	7980000000	ROBERT J LLOYD ET UX	E CAMP WOOD CRK	IRRG	1.42	1.42		
3051-000	6	Real	7980000000	WANNA LOU LLOYD	E CAMP WOOD CRK	IRRG	4.08	4.08		
3052-000	6	Real	7970000000	BARRY BLANKS MCHALEK ET UX	E CAMP WOOD CRK	IRRG	5	5		SEE ADJ 3051
3053-000	6	Real	7960000000	BARRY BLANKS MCHALEK ET UX	E CAMP WOOD CRK	IRRG	1	1		SEE ADJ 3051
3054-000	6	Real	7950000000	JOHN CHAMBERS ET AL	E CAMP WOOD CRK	IRRG	10	10		SEE ADJ 3051
3055-000	6	Real	7900000000	WILLIAM C & PATRICIA K SUTTON	E CAMP WOOD CRK	IRRG	105	130	2	
3056-000	6	Real	7810000000	ROY GIBBENS	E CAMP WOOD CRK	IRRG	18	9	4	
3056-000	6	Real	7810000000	ROY GIBBENS	E CAMP WOOD CRK	IRRG	2			
3057-000	6	Real	7800000000	MAGELEE V SWIFT	E CAMP WOOD CRK	IRRG	21	16	8	SEE ADJ 3056
3057-000	6	Real	7800000000	MAGELEE V SWIFT	E CAMP WOOD CRK	IRRG	10	4	4	
3058-000	6	Real	7740000000	DOROTHY MERRITT ANDERSON	NUECES RIVER	IRRG	8	8		
3059-000	6	Real	7730000000	F L JR & CHARLOTTE HATLEY	NUECES RIVER	IRRG	11	7		
3060-000	6	Real	7631000000	E E GILDART	NUECES RIVER	IRRG	42	21		
3060-000	6	Real	7631000000	E E GILDART	NUECES RIVER	IRRG	54	26		
3060-000	6	Real	7631000000	E E GILDART	NUECES RIVER	IRRG	35	46		
3061-000	6	Real	7630000000	E E GILDART	NUECES RIVER	IRRG	31	31		
3062-000	6	Real	7550000000	JOANNE FRIEND	NUECES RIVER	IRRG	46	46		
3145-000	6	Real	3900000000	GEORGE S HAWN INTERESTS ET AL	S P/L P W FRIO RIVER	REC			27	
3145-000	6	Real	3900000000	GEORGE S HAWN INTERESTS ET AL	S P/L P W FRIO RIVER	REC			68	
3145-000	6	Real	3900000000	GEORGE S HAWN INTERESTS ET AL	S P/L P W FRIO RIVER	IRRG	156	78		
3146-000	6	Real	3850000000	JAMES W HALE ET AL	W FRIO RIVER	REC			16	
3147-000	6	Real	3810000000	DIAMOND J RANCH INC	W FRIO RIVER	IRRG	165	55		
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	3.5		10	UPPER SINGING HILLS RES:AMEND 3/91,
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	6.5	2		UPPER SINGING HILLS RESERVOIR
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	11		11	UNNAMED DOWNSTREAM RESERVOIR
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	34.8	12.9		UNNAMED RESERVOIR (D-0340)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	6.7	2.5		UNNAMED RESERVOIR (D-0340)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	25.08		25.08	LINNET'S WINGS DAM (D-0220);AMEND
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	3.2	1.2		LINNET'S WINGS DAM (D-0220)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	34		68.7	LAITY LODGE DAM (D-
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	4	2		LAITY LODGE DAM (D-0240)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	5.51		5.51	LOWER SINGING HILLS DAM (D-0280)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	IRRG	4.1	1.5		LOWER SINGING HILLS DAM (D-0280)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	2.64		2.64	SILVER CREEK DAM (D-0300)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	0.24		0.24	LOWER SILVER CREEK DAM (D-0320)
3148-000	6	Real	3750000000	H. E. BUTT FOUNDATION	E FRIO RIVER	REC	17.86		17.86	ECHO VALLEY DAM (D-0360)
3149-000	6	Real	3660000000	ORA L ROGERS ESTATE	E FRIO RIVER	IRRG	30	28		
3150-000	6	Real	3655000000	R F BINDOCK	E FRIO RIVER	IRRG	3	11		
3151-000	6	Real	3620000000	KATHERINE MAXINE MORELAND	E FRIO RIVER	IRRG	67	30		
3152-000	6	Real	3600000000	DAN AULD, JR	E FRIO RIVER	IRRG	324	162		
3153-000	6	Real	3490000000	JOHN J BURDITT, ET AL	UNNAMED TRIB E FRIO RIVER	IRRG	15	50		
3153-000	6	Real	3490000000	JOHN J BURDITT, ET AL	UNNAMED TRIB E FRIO RIVER	IRRG	23			
3154-000	6	Real	3430000000	JAMES TREES	YOUNGBLOOD SPRING	IRRG	2	6		
3155-000	6	Real	3420000000	LOTTIE N WRIGHT	FRIO RIVER	IRRG	164	43		

TABLE 3C-1 (continued)
AUTHORIZED SURFACE WATER RIGHTS
AS EXTRACTED FROM TNRCC'S ACTIVE WATER RIGHTS MASTER FILE

Water Right Number	Type	County	River Order Permit	Name	Stream	Use	Amount in Ac-Ft/Yr	Acreage	Res Cap in Ac-Ft	Remarks
3156-000	6	Real	3400000000	H P COOPER ET AL	FRIO RIVER	IRRG	20	22		
3156-000	6	Real	3400000000	H P COOPER ET AL	FRIO RIVER	IRRG	2			
3157-000	6	Real	3350000000	E F BAYOUTH, MD PENSION PLAN	FRIO RIVER	IRRG	250	125		
3158-000	6	Real	3375000000	LOMBARDY IRRIGATION CO	FRIO RIVER	IRRG	1600	800	6	AMEND 1/9/85. CURRENT OWNER ALSO COUNTY 232
3159-000	6	Real	3294000000	SAM G HARRISON	FRIO RIVER	IRRG	140	70		
3160-000	6	Real	3290000000	GRACIA BASSETT HABY	FRIO RIVER	IRRG	60	100		JOINTLY OWNS 60 AF TO IRR 100 ACRES
3160-000	6	Real	3290000000	THEODORE R REED TRUSTEE	FRIO RIVER	IRRG				JOINTLY OWNS 60 AF TO IRR 100 ACRES
3161-000	6	Real	3289500000	R L HUBBARD	DRY FRIO CRK	IRRG	17	21		
3162-000	6	Real	3287500000	CARL A. DETERING, JR., ET AL	UNNAMED TRIB BUFFALO	IRRG	5	25	15	
3180-000	6	Real	2799000000	LANA J STORMONT	UNNAMED TRIB W SABINAL	IRRG	5	10		
3878-000	1	Real	3645000000	C B SLABAUGH	CYPRESS CRK	IRRG	40	30		
3978-000	1	Real	9421000000	N M FITZGERALD JR ESTATE	FLYNN CRK	IRRG	187	63		
4008-000	1	Real	9172500000	DOUGLAS B & MARGARET	NUECES RIVER	IRRG	400	200		
4094-000	1	Real	3905500000	GEORGE S HAWN INTERESTS ET AL	W FRIO RIVER	IRRG	56	28	9	
4169-000	1	Real	7910000000	ROARING SPRINGS RANCH INC	CAMP WOOD CRK	IRRG	15	10	41	
4169-000	1	Real	7910000000	ROARING SPRINGS RANCH INC	CAMP WOOD CRK	MUNI	15			
4405-000	1	Real	7760000000	CITY OF CAMP WOOD	UNNAMED TRIB NUECES	MUNI	1000			
4405-000	1	Real	7760000000	CITY OF CAMP WOOD	UNNAMED TRIB NUECES	IRRG	83	16		
4413-000	1	Real	8240000000	WILLIAM C SUTTON ET UX	CAMP WOOD CRK	REC			2	
5009-000	1	Real	3830000000	JACKSON L BABB ET AL	W FRIO RIVER	IRRG	60			
2653-000	6	Val	4950000000	PHIL B FOSTER	CIENEGAS CRK &/OR THE RIO	IRRG	122.25	61.13		
2653-000	6	Val	4950000000	DAVID B TERK ET AL	CIENEGAS CRK	IRRG	27.75	13.87		
2654-000	6	Val	4950000000	THURMAN W OWENS	CIENEGAS CRK	IRRG	26	13		
2655-000	6	Val	4950000000	JOSE C OVIEDO ET UX	CIENEGAS CRK	IRRG	28	14		
2656-000	6	Val	4950000000	RANDOLPH J N & SHARON M ABBEY	CIENEGAS CRK	IRRG	68	43		
2657-000	6	Val	4950000000	RONALD J PERSYN ET UX	CIENEGAS CRK	IRRG	150	75		
2657-000	6	Val	4950000000	RONALD J. PERSYN, ET UX	CIENEGAS CRK	IRRG	150	68		
2657-000	6	Val	4950000000	RONALD J. PERSYN, ET UX	CIENEGAS CRK	IRRG		89		SEE 23-2653 RATE; AMEND 10/89
2659-000	6	Val	4950000000	JOHN F OUALIA	CIENEGAS CRK	IRRG	112	56		AMEND 8/2/94
2660-000	6	Val	4950000000	JOSE A CORTINAS ET AL	CIENEGAS CRK	IRRG	16	5		FOR RATE SEE 23-2653
2660-000	6	Val	4950000000	LJB ENTERPRISES	CIENEGAS CRK	IRRG	296	99		
2661-000	6	Val	4950000000	BARBARA GULICK RATHKE, ET AL	CIENEGAS CRK	IRRG	120	40	10	
2662-000	6	Val	4950000000	CAPITOL AGGREGATES INC	CIENEGAS CRK	MINE	166	17		
2663-000	6	Val	4950000000	ALFREDO GUTIERREZ JR	CIENEGAS CRK	IRRG	24	8		AMEND 11/2/87
2664-000	6	Val	4950000000	SAN FELIPE A MFG & I COMPANY	SAN FELIPE CRK	IRRG	4950	1700		
2664-000	6	Val	4950000000	SAN FELIPE A MFG & I COMPANY	SAN FELIPE CRK	IRRG	6		6	AMEND 12/16/88, 10/31/94
2664-000	6	Val	4950000000	SAN FELIPE A MFG & I COMPANY	SAN FELIPE CRK	IRRG	6		6	IMPOUNDMENT #1
2664-000	6	Val	4950000000	SAN FELIPE A MFG & I COMPANY	SAN FELIPE CRK	IRRG	6			IMPOUNDMENT #2
2664-000	6	Val	4950000000	SAN FELIPE A MFG & I COMPANY	SAN FELIPE CRK	INDU	50			AMENDMENT EXP 12/31/96
2665-000	6	Val	4950000000	JOSE OVIEDO JR ET UX	SAN FELIPE CRK	IRRG	60	40		AMENDED 9/13/96
2666-000	6	Val	4950000000	PETRA ABREGO MUNOZ	SAN FELIPE CRK	IRRG	23.56	7.85		
2669-000	6	Val	4950000000	RODOLFO MOTA	SAN FELIPE CRK	IRRG	6	2		
2670-000	6	Val	4950000000	VICTOR D BOLNER	SAN FELIPE CRK	IRRG	6	3		
2672-000	6	Val	4950000000	CITY OF DEL RIO	SAN FELIPE CRK	MUNI	4416			
2672-000	6	Val	4950000000	CITY OF DEL RIO	SAN FELIPE CRK	MUNI	7000			
2811-000	6	Val	4950000000	RIO BRAVO INC	CIENEGAS CRK &/OR THE RIO	IRRG	51.08	997.97	47	
2811-000	6	Val	4950000000	DAVID B TERK	CIENEGAS CRK	IRRG	114.64	95.38		& REC/DOM. AMEND 1/84,6/91
2912-000	6	Val	4950000000	MOODY RANCHES INC	SAN FELIPE CRK	IRRG	800	400	10	
3880-000	1	Val	4950000000	SOUTH TEXAS ELECTRIC CO-OP INC	RIO GRANDE	HYDR	1500000			AMEND 12/14/87. POWER POOL WITH
3880-000	1	Val	4950000000	MEDINA ELECTRIC CO-OP INC	RIO GRANDE	HYDR				AMEND 12/14/87. POWER POOL WITH
5306-000	1	Val	4950000000	DEL RIO, CITY OF	SAN FELIPE CRK	REC			0.19	WATER PARK LANDING POOL

CHAPTER 5 APPENDIX



APPENDIX 5A EMERGENCY TRANSFERS OF WATER RIGHTS

Under TWC 11.139, TNRCC may grant an emergency permit, order, or amendment to an existing water right after notice to the governor and for no more than 120 days. In order for the permit, order, or amendment to be authorized, TNRCC must find that emergency conditions - those that present an imminent threat to public health and safety – exist. The emergency action may be renewed only once for no longer than 60 days.

Anyone desiring to obtain emergency authorization must submit an application to the TNRCC. The application must include a description of the emergency condition, facts to support the emergency condition, estimated time when the authorization will begin and end, a description of the action being sought and the activity proposed to be allowed, and any other information required by the TNRCC.

If the TNRCC finds the applicant's statement to be valid, emergency authorization may be granted without notice and hearing. However, if emergency authorization is granted without a hearing, a time and place will be fixed for a hearing. The hearing may be held as soon as the emergency authorization is granted but no later than 20 days after the emergency authorization was granted.

The TNRCC may grant an emergency authorization to a retail or wholesale water supplier for the temporary transfer or use for all or part of water right(s) for other than domestic or municipal use. Emergency authorization, under Subsection (h) of TWC 11.139, may not be granted if the authorization would cause a violation of a federal regulation. The person or entity granted an emergency authorization is liable to the owner from whom the use is transferred for the fair market value of water transferred as well as any damages caused by the transfer.

The TNRCC provided some guidelines as to points of law contained within this statute: (1) the requesting entity has the burden of identifying the specific water right(s) that it wants transferred, and (2) in transferring the amount of water requested, TNRCC shall allocate the requested amount among two or more water rights for other than domestic or municipal use. Other than this statement, there is no distinction made between types of water uses – TNRCC will allocate “equitably.”

The TNRCC provided further clarification of the emergency transfers issue in an email letter from Todd Chenoweth, Water Rights and Uses Section Chief, addressed to Glynda Mercier of Freese and Nichols and dated April 11, 2000. Mr. Chenoweth stated that TNRCC's Rules provide some guidance as to how the Commission will select water rights for transfer, citing § 297.17(k) which says, in part, that: “. . . In determining the water rights from which the water will be transferred, the commission shall be guided by the applicable approved regional water plan and statutory preferences of use provided by Texas Water Code, § 11.024, and shall also look first to water rights that are unperfected or are not otherwise being used and for which the transfer would not jeopardize existing financial commitments made for the water to be transferred”. Mr. Chenoweth also stated that TNRCC will make a case-by-case determination for each application.

Mr. Chenoweth also pointed out that Texas Water Code Water Code § 16.053(e)(4)(I) provides that regional water plans are to identify what water rights may

be targeted in case there is a need for an emergency transfer, and that TNRCC rules in §297.17(k) indicates that the commission will be guided by this information.

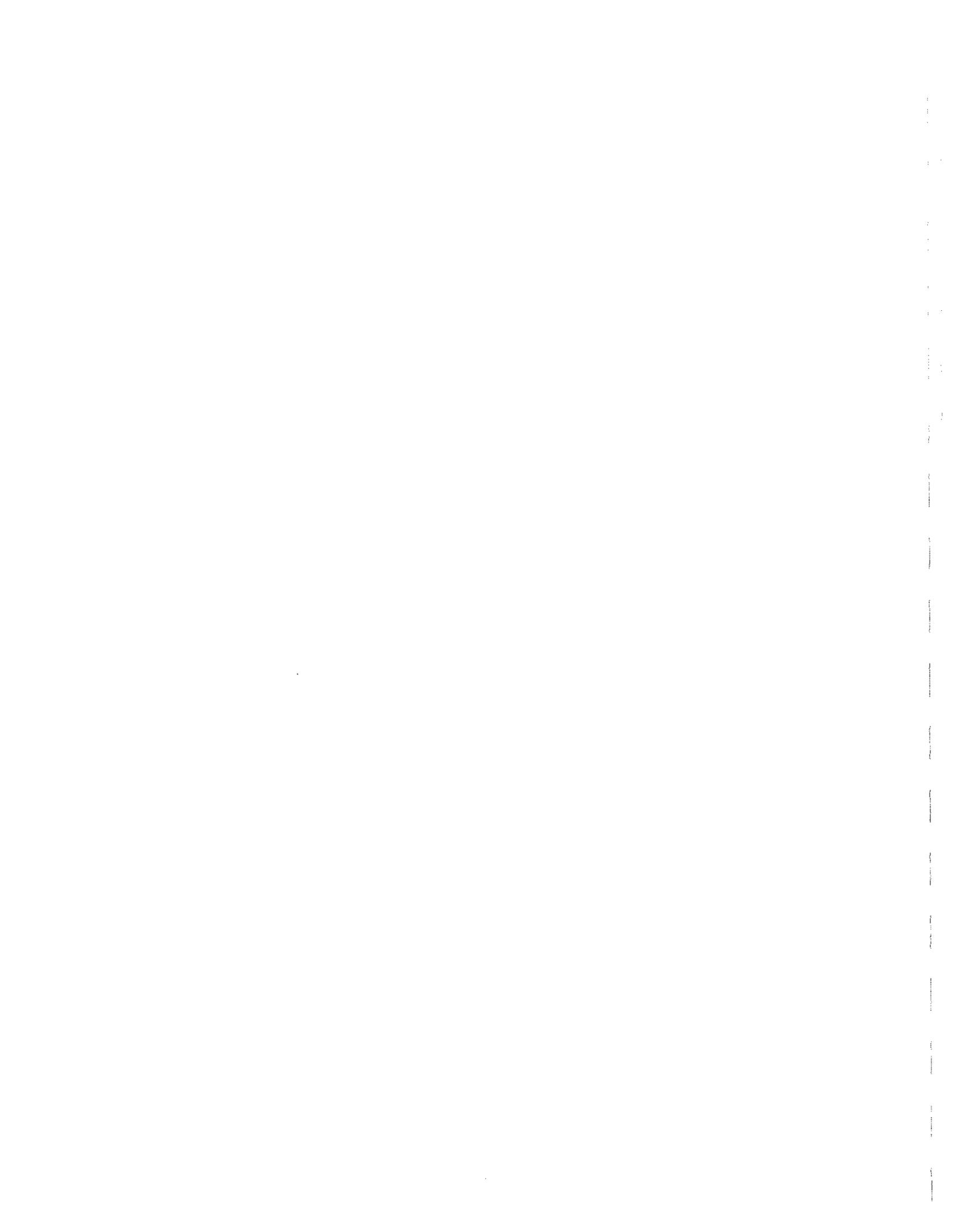
As of July 2000, the Texas Water Development Board Rules (31 Texas Administrative Code Chapter 357) have relaxed regional water planning groups' responsibility to identify specific water rights that may be transferred under TWC 11.139. According to the new TWDB Rules, the regional water planning groups now will consider emergency transfers but do not have to recommend specific emergency transfers.

During the planning process, the Regional Water Planning Group recognized that emergency transfers of surface water rights is NOT to be considered a water management strategy. The power to invoke such emergency transfers – if they were to occur – is to be used during emergencies only. Texas Water Code 11.139 does not define “emergency”; presumably this could be a severe drought as well as a hazardous waste spill contaminating a water source.

In accordance with Texas Water Development Board Rules 31 Texas Administrative Code Chapter 357, and with Texas Water Code Water Code §16.053(e)(4)(I), the Regional Water Planning Group has considered the issue of emergency transfers and identifies larger or more reliable water rights (i.e., where the water right holder has been able to divert a substantial part of his authorized amount for a number of years) as the water rights which may be targeted in case there is a need for an emergency transfer. These rights would be likely transferred to municipalities or other entities serving municipal users in the case of an emergency and if the requesting entities followed proper procedure outlined in Texas Water Code 11.139.

CHAPTER 6

APPENDIX



APPENDIX 6A

METHODOLOGY TO ASSESS POTENTIAL UNIQUE RESERVOIR CONSTRUCTION SITES

The Plateau Regional Water Planning Group's Technical Committee discussed and recommended a two-tiered "broad brush" approach to be used in evaluating potential unique reservoir construction site segments, and included a prioritization of the criteria. Important points of the recommended approach are as follows:

- The Technical Committee strongly supported a "broad brush" approach and instructed the consultants to perform a wide-sweep screening of many of the watercourses in the region, looking for sites that might pop up as fitting the criteria. This wide sweep or "broad brush" approach was emphasized. Minor streams as well as the more major watercourses were to be evaluated.
- The major criterion is whether a demand exists which would support the reservoir or requires its construction.
- The approach consists of two tiers, the first tier consisting of the most important criteria (those which receive the most "points" and which would cause many of the potential sites to be eliminated from further consideration).
- The second tier might prove to be a tiebreaker in some instances. The second tier is a "high – medium – low" type of evaluation.

The first tier is comprised of the following components in prioritized order:

- whether a nearby demand exists, whether unappropriated water exists,
- whether the reservoir would lose water to the channel,
- the number of months that unappropriated water exceeds median monthly naturalized streamflow, and
- whether topography is conducive to reservoir and dam construction.

The second tier is comprised of the following components in prioritized order:

- current development (number of houses that would be inundated by the reservoir),
- cultural (number of archeological or historic sites that would be inundated), and
- environmental (whether the site is on a segment of ecological significance or has some outstanding environmental characteristic).

The first and second tiers are discussed further below.

First Tier: Demand

Whether a nearby demand exists during the 50-year planning period is rather easily evaluated. This can be done by determining which county/basin combination shows a shortage according to the information contained in Chapter 4, which compares supplies and demands and identifies areas of shortage. Shortages are indicated for Kerr County within the Guadalupe Basin, Bandera County within the San Antonio Basin, Real County within the Nueces Basin and Kinney County within the Rio Grande Basin. Watercourses within or near these areas were identified, regardless of whether or not these watercourses are major watercourses discussed in Chapter 3. This is in keeping with the “broad brush” approach emphasized.

First Tier: Presence of Unappropriated Water

Whether unappropriated water exists on the watercourses can be evaluated using the TNRCC’s Water Availability Model Run No. 3 for the Guadalupe/San Antonio River Basins and for the Nueces River Basin. However, the Rio Grande River Basin is not modeled and reported use is the only means by which data on diversion reliability can be gleaned. For the watercourses identified in Kinney County within the Rio Grande, reported use was nonexistent or zero, so the assumption is that the watercourses are not viable candidates for reservoir construction site segments. These watercourses were assigned a rating of “-1” meaning no unappropriated water available.

Of the watercourses within a river basin modeled by a Water Availability Model, many of the watercourses did not contain any water rights of record and therefore did not appear in the Water Availability Models. It is assumed that these watercourses, although they may indeed support riparian rights that are not modeled, probably are not viable candidates for reservoir construction site segments. These watercourses were assigned a rating of “-1” meaning no unappropriated water available. For those watercourses within a river basin modeled by a Water Availability Model and containing water rights of record, unappropriated water amounts were extracted from the Water Availability Models at locations of the watercourses’ most downstream consumptive water right.

First Tier: Loss of Water to the Channel

This component actually has two subcomponents – the permeability of alluvial deposits (river channel bottom) and the permeability of bedrock underlying the channel. If both the alluvium and the bedrock is permeable, then any reservoir on the site would very likely lose water to the channel and is not a good supply reservoir site. (However, such a site has an excellent potential for aquifer recharge; see the discussion on Aquifer Recharge as a Regional Strategy in Chapter 5). If alluvium is permeable but bedrock is impermeable, then the site is not likely as a supply reservoir site, but perhaps could be used if the channel bottom were lined. If alluvium is impermeable, then the site will not lose water to the channel and is potentially a good supply reservoir site.

The permeabilities for alluvium and bedrock attributes within a Geographic Information System (GIS) maintained by LBG-Guyton Associates were used to evaluate the loss of water to the channel. The alluvial permeability was rated thus: <one inch/hr was assigned a rating point of “-1”, one to two inches per hour was assigned a rating point of “- 2 “, two to three inches per hour was assigned a rating point of “-3”, and > three inches per hour was assigned a rating point of “-4”. Note that the negative values are from the perspective of rating for a supply reservoir site; from an aquifer recharge perspective, permeability ratings would be positive.

The bedrock permeability was rated thus: very low permeability was assigned zero points, low permeability was assigned a rating point of “- 1”, moderate permeability was assigned a rating point of “- 2” and high permeability was assigned a rating point of “- 3”. Again, negative values are from the perspective of rating for a supply reservoir site, permeability being deleterious to supply reservoirs.

First Tier: Reliability of Unappropriated Water

The Water Availability Model results for unappropriated water are significant in the context of evaluating potential reservoir sites. Since the Consensus Environmental Guidelines require certain levels of water to be passed through a reservoir for instream flow/environmental maintenance purposes, not all unappropriated water at a site can be captured. The Consensus Environmental Guidelines specify that, at most, the median (50th percentile) naturalized streamflows should be passed; the amount of pass-through required lessens if the reservoir is less full. In the absence of a reservoir operation simulation and specific knowledge as to reservoir footprint, unappropriated water amounts exceeding median naturalized streamflow amounts are assumed to be generally synonymous with amounts contributing to reservoir yield. The frequency of this level of unappropriated water is an effective screening tool for purposes of the Potential Unique Reservoir Construction Site Evaluation.

Water Availability Model output for naturalized streamflow was statistically analyzed to find the value of the median, via Excel spreadsheet or by a capability of the “TABLES” subroutine associated with the WA Model. Another capability of the TABLES subroutine was then invoked to calculate the percentage of months that unappropriated water exceeds the value of the monthly median naturalized streamflow. This percentage then becomes the number of rating points assigned to the potential reservoir construction site segment for this criterion.

First Tier: Topography

Whether the topography at the potential reservoir site is conducive to dam and reservoir construction is also an important criterion of the first tier. Generally a narrow valley at the conceptual dam location is conducive to a high short dam (probably less expensive than the long dam required by a broad valley). A narrow valley at the potential sites was assigned a rating point of “1” and a broad valley was assigned a rating point of “-1”. A marginal assessment is assigned a rating point of zero.

Second Tier: Current Development

USGS topographic maps were used to count the number of structures likely to be inundated by a reservoir. In the absence of HEC-1 and HEC-2 studies, a generic reservoir footprint was assumed for all sites. The footprint covered an area from the conceptual dam location to a point approximately one-half mile upstream. The number of structures inundated was then evaluated on a simple “yes/no” basis. If no structures are in the area, the rating is “no;” if there appear to be one or more structures in the area of assumed inundation, the rating is “yes.”

Second Tier: Cultural

The Texas Historical Commission maintains data on the existence of sites containing archeological remains (i.e., prehistoric or Indian settlements) and other historical and cultural sites. The Commission’s website contains a database of sites of interest open to the public. However, data on the locations of actual archeological sites is confidential due to concern about scavengers of archeological treasures. Historical Commission staff will give generalized information about the total number of archeological sites present in a county and the nature of such sites, but will not provide locations or other specific information. Therefore this criterion, although identified and prioritized, unfortunately cannot be evaluated.

Second Tier: Environmental

The watercourses which were identified by Texas Parks and Wildlife as ecologically significant stream segments are also identified in this Potential Unique Sites for Reservoir Construction evaluation. As with the other Second Tier parameter, Current Development, this parameter is evaluated on a simple “yes/no” basis. If the potential reservoir construction site lies on a TPWD ecologically significant stream segment, then the rating is “yes;” otherwise the rating is “no.” It should be noted that the TPWD ecologically significant segment data is given for informational purposes. An ecologically significant stream segment is not necessarily an ecologically unique stream segment. The Plateau RWPG has not recommended any stream segments for designation as ecologically unique stream segments at this time. This may be an issue that will be revisited in the next planning cycle.

**TABLE 6A-1
RATING SYSTEM: POTENTIAL UNIQUE RESERVOIR CONSTRUCTION SITES**

Basin	County	Stream	Water Right Number	Demand Nearby ¹	Unappropriated Water ²	Loss to Channel Topsoil Alluvium ³	Bedrock ⁴	Percent of Months Unappropriated Water Exceeds Median Monthly Naturalized Streamflow	Topography ⁵	Inundated Structures ⁶	Potential Reservoir on TxPWD Segment ⁷	Numeric Rating ⁸
Guadalupe	Kerr	Cypress Creek	2043	1	1	-2	-2	5.51	-1	N	N	2.51
		Elm Creek	4007	1	1	-2	-1	NA	1	N	N	0
		Turtle Creek	2014	1	1	-2	-1	5.51	1	Y	N	5.51
		Verde Creek	5208	1	1	-2	-1	5.36	1	Y	N	5.36
		N Fork Guadalupe River	1953	1	1	-2	-1	5.36	1	Y	Y	5.36
		S Fork Guadalupe River	1963	1	1	-2	-1	5.36	1	Y	Y	5.36
		Johnson Creek (Henderson Br)	1993	1	1	-2	-1	5.36	1	Y	Y	5.36
		Johnson Creek (Highway 41)	1977	1	1	-1	-3	0.9	1	Y	Y	-0.1
		Bluff Creek	NA	1	-1	-2	-1	NA	1	N	N	-2
		Bruins Creek	NA	1	-1	-2	-1	NA	1	Y	N	-2
		Cherry Creek	NA	1	-1	-2	-1	NA	1	Y	N	-2
		Cloud (Indian) Hollow	NA	1	-1	-1	-1	NA	-1	N	N	-3
		Little Mason Creek	NA	1	-1	-1	-1	NA	1	Y	N	-1
		Mason Creek	NA	1	-1	-1	-1	NA	1	N	N	-1
		Nowlin Hollow	NA	1	-1	-2	-1	NA	-1	Y	N	-4
		Pass Creek	NA	1	-1	-2	-1	NA	1	Y	N	-2
		Privilege Creek	NA	1	-1	-1	-1	NA	1	N	N	-1
		Steel Creek	NA	1	-1	-2	-1	NA	1	Y	N	-2
		Wilson Creek	NA	1	-1	-2	-1	NA	1	Y	N	-2
		San Antonio	Bandera	Bear Creek	1937	1	1	-1	-2	5.51	1	Y
Privilege Creek	2129			1	1	-1	-2	8.04	1	Y	N	8.04
Bandera Creek	NA			1	-1	-1	-2	NA	0	Y	N	-3
Bear Springs Creek	NA			1	-1	-1	-1	NA	1	Y	N	-1
Bowl Spring	NA			1	-1	NA	NA	1	Y	N	1	
Cloud Hollow	NA			1	-1	-1	-2	NA	0	N	N	-3
Doe Creek	NA			1	-1	-1	-2	NA	1	Y	N	-2
Dry Hollow Creek	NA			1	-1	-1	-2	NA	1	N	N	-2
Elm Creek	NA			1	-1	-1	-1	NA	1	Y	N	-1
Little Mason Creek	NA			1	-1	-1	-2	NA	0	Y	N	-3
Mason Creek	NA			1	-1	-1	-2	NA	0	Y	N	-3
Mescal Creek	NA			1	-1	-1	-1	NA	1	Y	N	-1
Myrtle Creek	NA			1	-1	-1	-1	NA	0	Y	N	-2
Norton Spring	NA			1	-1	NA	NA	1	Y	N	1	
Pipe Creek	NA			1	-1	-1	-2	NA	1	Y	N	-2
Red Bluff Creek	NA	1	-1	-1	-2	NA	1	Y	N	-2		
Sabinal River	3179	1	1	-1	-1	0.93	-1	Y	Y	-0.07		

TABLE 6A-1 (continued)
RATING SYSTEM: POTENTIAL UNIQUE RESERVOIR CONSTRUCTION SITES

Basin	County	Stream	Water Right Number	Demand Nearby ¹	Unappropriated Water ²	Loss to Channel Topsoil Alluvium ³	Bedrock ⁴	Percent of Months Unappropriated Water Exceeds Median Monthly Naturalized Streamflow	Topography ⁵	Inundated Structures ⁶	Potential Reservoir on TxPWD Segment ⁷	Numeric Rating ⁸
Nueces	Real	Bullshead Creek	3021	1	1	-1	-3	5.29	-1	Y	N	2.29
		Camp Wood Creek	4169	1	1	-1	-3	2.51	-1	Y	N	-0.49
		Dry Frio River	3161	1	1	-1	-3	1.32	0	Y	N	-0.68
		East Frio River	3152	1	1	-1	-3	1.32	-1	Y	N	-1.68
		East Prong Nueces River	3016	1	1	-1	-3	5.29	0	Y	N	3.29
		Long Kent Creek	NA	1	-1	-1	-3	NA	-1	Y	N	-5
		Short Prong West	NA	1	-1	-1	-3	NA	1	Y	N	-3
Rio Grande	Kinney	Elm Creek (East)	Not	1	-1	-1	-1	NA	1	N	N	-1
		Elm Creek (West)	Modelled	1	-1	-1	-1	NA	0	N	N	-2
		Las Moras Creek	Modelled	1	-1	-1	-1	NA	1	Y	Y	-1
		Mud Creek	Modelled	1	-1	-2	-1	NA	0	N	Y	-3
		Rio Grande	Modelled	1	-1	-2	-1	NA	1	N	N	-2
		Arenosa Creek	Modelled	1	-1	-1	-1	NA	0	N	N	-2
		East Fork Sycamore Creek	Modelled	1	-1	-2	0	NA	1	N	N	-1
		Flat Rock Creek	Modelled	1	-1	-1	-3	NA	-1	N	N	-5
		Imperialist Creek	Modelled	1	-1	-1	-1	NA	1	N	N	-1
		Lindsey Creek	Modelled	1	-1	-1	-1	NA	1	N	N	-1
		Pinto Creek	Modelled	1	-1	-1	-1	NA	1	Y	Y	-1
		Salado Creek	Modelled	1	-1	-1	-1	NA	1	N	N	-1
		Sycamore Creek	Modelled	1	-1	-1	-1	NA	1	N	Y	-1
		Tequesquite Creek	Modelled	1	-1	-1	-1	NA	1	Y	N	-1
		West Nueces River	Modelled	1	1	-1	-3	5.16	0	N	Y	3.16

Notes: First tier is on numeric system; second tier is on a Yes/No basis.

- 1) Demand nearby: 1=yes, -1=no
- 2) Unappropriated water: 1=yes, -1=no
- 3) Alluvium: -1 is < 1 in/hr, -2 is 1 to 2 in/hr, -3 is 2 to 3 in/hr, -4 is > 3 in/hr
- 4) Bedrock: 0= very low permeability, -1 = low permeability, -2 = moderate permeability, -3 = high permeability
- 5) Topography: Narrow valley=1, Moderate width valley=0, Broad valley= -1
- 6) Any houses or structures inundated (Y for Yes, N for No)
- 7) Potential Reservoir site on a TxPWD ecologically significant stream segment (Y for Yes, N for No)
- 8) Rating score = Sum of values in the first tier (through topography inclusive)

CHAPTER 7 APPENDICES



**APPENDIX 7A
RESPONSES TO PUBLIC HEARING COMMENTS**

Del Rio Public Hearing Verbal Comments

Joe York, Jr.
Bracketville

1. Kinney County population is growing

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

2. Disagrees with graph regarding Austin Chalk aquifer and wells drilled. Says there are some wells in the central part of the county.

Response: In Chapter 6 Section 6.5.3, the Regional Planning Group has recommended that further characterization of the aquifer is needed.

Bret Trant
Chairman of the Board
West Nueces-Las Moras Soil & Water Conservation District - Bracketville

1. Concerned about population in Kinney County.
2. Concerned about "zero" growth.
3. Population increases in cooler months with deer hunters and retirees.

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

4. No comprehensive conservation plan included, region should look at this.
5. Cedar removal should be looked at.
6. Should look at retention dams.

Response: Several regional conservation strategies are discussed in Chapter 5 Section 5.3.

7. Offered his non-profit office to assist in consultation.

Response: The Regional Planning Group is grateful for the offer of assistance and will likely contact Mr. Trant during the next planning cycle.

Darlene Shahan

Concerned about population growth in Kinney County - plan shows flattening out at year 2020.

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

Robert Elledge

Concerned about population growth in Kinney County. Wants PWPG to do something about this now. Suggests submitting changes to TWDB now.

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

Kerrville Public Hearing Verbal Comments

Doug Cavazos
Kerr County

1. Make copies of these plans more readily available to citizens. Hard to download from the Internet and too difficult and time consuming to copy.

Response: The Regional Planning Group (RPG) agrees and will strive to improve the efficiency of information transfer.

2. Canyon Lake - amount of water available out of Canyon Lake is highly disputed. Disputed between Region J and Region L. Disparity was somewhere in the neighborhood of 70,000-acre feet. Resolve and address this issue when the plan is amended.

Response: The difference in availability is the result of slightly different ways in which the two regions ran the water availability model (WAM). The TWDB accepts the degree of availability difference between the Regions; however, the Plateau RPG will continue to establish an availability amount that best depicts the quantity of water that is of concern for this region.

3. Encourage Region J to put a tritium study in somewhere and recommend that the City of Kerrville or Kerr County or the Conservation District to tritium tests specifically on the ASR wells.

Response: The RPG is recommending in Chapter 6 further study of the Trinity aquifer.

4. Encourage region to publish the "margin of error" for numbers/data presented in the plan

Response: The RPG will consider the addition of "margin of error" remarks where appropriate in future editions of the plan.

Bill Rollins

Landowner that had the well

1. Who controls the aquifer?
2. Why are we allowing another municipal (municipality?) to drill wells in this aquifer and what are we going to do about it?
3. Concern that SAWS says they will drill three wells and it will be 50. And that possibly other municipals (municipalities?) will drill wells.

Response: The authority to manage the aquifer in Kerr County lies with the Headwaters Underground Water Conservation District, and this authority does not extend into Bexar County. By state law, local landowners have the right to pump water from beneath their property. The state may intervene if the perceived over pumping of ground water appears to cause a threat to public health and safety.

4. Augmented wells, or Kerrville did, and cleaned the water up for about 15 miles. This was a good idea.
5. When you have extra water, say after a flood, need to somehow capture that water.

Response: Aquifer storage and recovery of excess surface water in Kerr County is discussed in strategy 133-11.

6. Tried in 1984 to get the Corps of Engineers to put a dam on the Guadalupe. Need to capture that water instead of sending it on down the river.

Response: Potential reservoirs are discussed in strategies 133-3 and 133-12.

Jim Tom
City of Leakey

1. Appreciate effort going into this report. Can get a copy from the County Clerk. You can't understand it, but it makes interesting reading.
2. Population in the Leakey area in the Frio Canyon is growing tremendously. A lot of wells being punched in the ground. Report says in the 1950's the low in the Frio River, the Concan was a minimum 8.8 cubic feet per second. A week after I read the report, it was 6.6 cubic feet per second. There are a lot of wells sucking water out because it is the Frio alluvial. This goes into the strategies. I see a lot of wells going into and every one has no negative impacts. I have a problem with that. It is going to take the water out of the river.

Response: A statement has been added to strategies 193-1 and 193-3 that considers water-level decline impact to the river.

3. Because we are a frail alluvial, we are concerned about the traffic down Highway 83. There is a lot of truck traffic and hazardous waste problem up and down. If there were a spill it would kill a twenty mile section of the Frio River and everybody's wells. Below Concan there is no river.

Response: A statement concerning susceptibility to contamination will be added to the Frio River Alluvium aquifer discussion in chapter 3.

4. You say there is no industry in the area. Tourism is a very large industry in our area. If it were not for the river we would not have that industry. The River is the economy for our area. I would like to see tourism addressed as an industry in the plan. Because if we don't have flow we don't have tourism that fits the whole area.

Response: The RPG recognizes the importance of the tourism industry and added a specific member to the Group to represent tourism. The RPG is mandated by SB1 to follow TWDB guidelines that define the industry category; however, the Group will continue to consider water supplies needed for tourism.

5. Do we have a surplus when we consider the in-stream flows?

Response: For drought-of-record conditions, the plan is concerned about having sufficient supplies to meet all needs and does not consider these supplies as surplus.

6. We can use all the water we got and when we are through we will let San Antonio have it.

Robert Hawks
Kerrville

1. Report commented on very important hunting and fishing concerns. Yet did very little to address these concerns.

Response: The RPG recognizes that additional work is needed to quantify water needed to satisfy environmental as well as recreational needs. Further evaluation on this issue is intended for the next planning cycle.

2. Very little biological, ecological conservation related type issues in the report anywhere.

Response: Same as above.

3. Particularly troubling about the unique stream and river segments. Understand that the legislature did not tell you what they were going to do with information, but on the other hand they asked you for a list and you said "We have it but because we don't know what you are going to do with it I am not going to give it to you". I'm not sure that is quite right.

Response: The RPG agrees with the importance of these issues and is aware of the need for further emphasis. The Planning Group will supply emphasis and detail as the Legislature provides additional guidance.

4. One of the statements was that the proposed stream segments that weren't listed did indeed warrant protection, but currently they had qualities that offered protection.

Response: The RPG recognizes that streams within the region are already protected under existing state and federal law. Therefore, State and Federal regulatory protection of surface water is deemed to be adequate until the State Legislature clarifies the actions associated with the designation.

5. Use to be a population of fresh water mussels found only in central Texas (about a mile from here on the Guadalupe River), only four populations were left in the Universe. Two years ago the Guadalupe River level was dropped so a foot bridge could be built. Mussels were left high, dry and dead. Last year one of the other populations dried up and third one probably did. They are not federally listed but we are asking for it. If we don't consider things like this the Feds will do it for us.

Response: The RPG agrees with the importance of these issues and is aware of the need for further emphasis.

Sherry Cunningham
Kerrville Citizen

1. Commend all of you for the time and effort that went into report. Appreciate your holding this meeting tonight.
2. A real concern is that the big cities seem to reach out and don't seem to care about the rural areas around them. We really need to keep our eyes and ears open to what is going on there and be aware that that is in their game plan. (Referring to San Antonio Water System hiking up their fees to build up money so they can buy more water. News story did mention Guadalupe River, Canyon Lake and Colorado River)

Response: The RPG intends to continue its effort to identify all water requirements within the Plateau Region and establish recommendations and strategies that meet all water needs within the region. Outside markets should only be considered after all internal needs are met.

Olga Klout

1. Section 6.6 and 6.8.17 - talks about somebody taking a section of the river. Did not say who, how much they can take or what they have to do today. Need to clarify this.

Response: Section 6.6 of Chapter 6 discusses the RPG's consideration of Ecologically Unique Stream Segments. The RPG recognizes that streams within the region are already protected under existing state and federal law. Therefore, State and Federal regulatory protection of surface water is deemed to be adequate until the State Legislature clarifies the actions associated with the designation. There is no discussion on the taking of stream segments in the plan.

Cornelius Von Bavel

1. Concerned with conservation approach taken with numbers.
2. Population figures are the same that were used in the HDR 1997 report. I knew these were wrong then and I still think they are wrong. Take a good look at your population projections because you will have very different recommendations. (Gives lots of detailed numbers regarding population projection).

Response: The RPG acknowledges concern about disagreements with projected future population growth rates in the Region and will work with local citizens to rectify the projections early in the next planning cycle.

Phillip Nisburg

VERY concerned with the construction of golf courses in the area and the amount of water that they use.

Response: The plan discusses available water supplies under drought-of-record conditions; however the RPG has no authority to mandate how these supplies are used. The information developed in this plan is intended to be used by appropriate local entities to establish management policies as they consider necessary.

Weems Muller

Need to convert the pre-1926 commodes to low flush toilets.

Response: The State plumbing law addresses this issue.

John Curry

1. Thanks for all of the work you have done.
2. The plan was not readily available. Almost impossible to get off that web site.

Response: The Regional Planning Group (RPG) agrees and will strive to improve the efficiency of information transfer.

3. Conservation. Don't know why that was included in the plan. It is a joke unless you are going to make it a law.

Response: The RPG considers conservation a very important requirement in meeting drought-condition water demands, however, it is recognized that the implementation of conservation strategies is the responsibility of affected entities.

4. On all of the recommendations there was a question regarding sustainability. You are unwilling to stand behind any of them. I have a hard time understanding what I paid for if you are unwilling to stand behind your recommendations.

Response: This first plan was developed in a short time period and is intended to establish preliminary information concerning supply and demand. More detailed studies of water-supply availability that will address sustainability is intended for the next planning cycle.

Sandra Pena

Southeast Kerr County

1. Out of 600 pages - only mentioned rainwater harvesting in one sentence. Consider this to be the most sustainable technology that we could use in dealing with our water shortages. Need to have emphasis on indigenal and community rainwater harvesting.

Response: A more detailed discussion on a regional rainfall harvesting strategy appears in Section 5.3.6 of Chapter 5.

Public Hearing Written Comments

Alejandro A. Garcia

City of Del Rio

1. Page 1-28. A total of 16 colonias with Page 1-29 13 in Val Verde County. Add Villarreal Subdivision.

Response: The correction will be made in the plan.

2. Page 3-10. We only know of threatened species not endangered. See paragraph 3.2.2, middle of page.

Response: The correction will be made in the plan.

3. Page 3-11. There are also two other city-owned wells west of Del Rio, at Tierra del Lago. One well is in use; one is not in use. Add to bottom of paragraph 3.2.3.

Response: The addition will be made in the plan.

Letter from US Department of the Interior, Fish and Wildlife Service signed by David C. Frederick, Field Supervisor

1. Not sufficient detailed project information for agency to provide and discuss potential, site-specific impacts on important fish and wildlife resources.
2. Offer agency assistance in determining the potential effects of individual proposed water development projects and water management strategies early in the planning process to avoid any undue delays due to Federal conservation requirements.
3. Need conservation practices to reduce waste during capture, transfer and application of water that can significantly decrease the per capita use of our limited water resources.
4. Plan should recognize need for appropriate instream flows for fish and wildlife resources as beneficial uses of water. Identify unique stream segments and identify conservation measures that should be taken to ensure protection of the quantity and quality of the aquatic habitats of those areas.
5. Section 5.2.1. Service strongly supports implementation of this strategy.

6. Section 5.2.2. Concerned about the substantial environmental impacts that occur with reservoir construction.

Any environmental analysis for ground-water use should include a detailed assessment of the potential impacts on fish and wildlife in surface water in springs, rivers, lakes and inflows to bays and estuaries.

Brush control - Service has some reservations regarding the potential negative impacts of this strategy on the aquatic and terrestrial habitats. Would like an early opportunity to review and comment on any brush control projects.

Encourages the incorporation of rainfall harvesting, reuse of wastewater, protection of ground and surface water from contamination and control of naturally occurring dissolved solids into water management strategies at every opportunity.

7. Section 5.2.3 encourages early coordination regarding the interbasin transfer of ground water through pipelines.
8. Plan is too extensive in scope and review period too brief for detailed comments to be made on all parts of the Plan.
9. Encourages early coordination with the Service on all areas of the Plan.

Response: The Plateau Regional Planning Group is grateful for the in-depth review provided by the USFWS and for its offer to assist in future planning efforts. The Group recognizes that additional work is needed to quantify water needed to satisfy environmental as well as recreational needs. Further evaluation on this issue is intended for the next planning cycle.

Elise A. Huntsman

1. Statistics in report should be changed to show growth for Kinney County to 2050.

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

2. Exportation of water beyond recharge from Kinney County should not be allowed.

Response: The Regional Planning Group intends to continue its effort to identify all water requirements within the Plateau Region and establish recommendations

and strategies that meet all water needs within the region. Outside markets should only be considered after all internal needs are met.

3. Pumpers should have the burden of proof that moved water is not a detriment to the county.

Response: Same as above.

Susan Combs, Commissioner - Texas Department of Agriculture (TDA)

1. Pleased that a representative from TDA was included in each water planning group.
2. Supports legislative recommendations to encourage state funding for irrigation conservation, brush control and precipitation enhancement projects.
3. Would like language in the plan that explicitly stresses that conversion of water rights, voluntary redistribution of water rights and land management is voluntary and/or incentive based.

Response: Similar wording has been added in the last sentence of the Introduction (5.1) to Chapter 5.

4. Contact her directly if TDA attendance or participation is lacking.

Bill Rollins

1. Listed three types of water with definitions.
2. Expanded on riparian rights.
3. Stated that municipal (sic) or anyone else could not take your water if they did not need the water for the necessity of the public. Speaking against SAWS' need for water.

Response: The Regional Planning Group intends to continue its effort to identify all water requirements within the Plateau Region and establish recommendations and strategies that meet all water needs within the region. The Regional Planning Group has been and will continue to be aware of Region L strategies that may affect water supplies in this region.

Peggy Sue Postell

1. She is citizen and landowner in Kinney County and she and her sister own property on Pinto Creek.

2. As a landowner she did not receive any written notice that a public hearing was scheduled. Brackettville paper also did not receive a notice. Local paper owned by individual who did happen to receive a notice to landowners and published the information.

Response: Public hearing press release was sent to the Bracket News.

3. Plan does not adequately address the issue of marketing of water for profit by individuals. There are a number of individuals in Kinney County that are planning to sell water for profit to either municipalities in need of additional water sources or to private business for resale. These individuals all have artesian wells located within a three-mile radius of her property. Does not believe that plan does enough to protect water resources from abuse.

Response: The Regional Planning Group intends to continue its effort to identify all water requirements within the Plateau Region and establish recommendations and strategies that meet all water needs within the region. Outside markets should only be considered after all internal needs are met.

4. Believes that Zach Davis (member of group) is member of water "consortium". Believes this is a conflict of interest and he should either voluntarily resign or be asked to resign. It is her opinion that group members should not be involved in any type of business that would profit from the sale of water.

Response: The Regional Planning Group does not believe there is a conflict of interest because each member represents an interest and not a region. Mr. Davis represents the agricultural water interest in the Region.

R.L. Bret Trant, Chairman of the Board - West Nueces-Las Moras Soil and Water Conservation District No. 236

1. Questions the statistical analysis in the plan for population growth in Kinney County for the next 50 years. Enclosed three documents to support his stance.

Response: The Regional Planning Group acknowledges concern for the low projected future population growth rate in Kinney County and will work with local citizens to rectify the projections early in the next planning cycle.

2. Believes that a comprehensive brush control plan would be very beneficial. Contact him if you need assistance with the plan.

Response: Brush management is discussed in Section 5.3.1 of Chapter 5. The Regional Planning Group is grateful for Mr. Trant's offer of assistance.

Cornelius van Bavel

1. Did not have much time to review report because it was published at such a late date. Web version hard to work with. Hope it is better next time. Date of public hearing was given as August 14th, he did not read about the availability of the report and a public hearing until September 20th.

Response: The Regional Planning Group agrees and will strive to improve the efficiency of information transfer.

2. Wants a summary written in the simplest language possible - easier to understand for layman.

Response: An executive Summary is contained in the final plan.

3. Potentially fatal flaw is future municipal (domestic) demand because it is based on total population of the county. Only warranted and safe assumption is that population rates will remain constant.

Response: The Regional Planning Group acknowledges concern for population projections in various counties and will work with local citizens to rectify the projections early in the next planning cycle.

4. Report ignores the fact that the dependence of the Kerr County population on the Trinity aquifer is concentrated in a corridor along the Guadalupe River, from Hunt to Comfort. Drilling more wells in this corridor area is not the answer.

Response: Population and water demand are discussed by river basin in each county in Chapter 2. Water sources available to meet these demands are also evaluated and listed by river basin in each county in Chapter 3. Specific strategies to meet drought created shortages in the Kerrville area are discussed in Chapter 5. The Regional Planning Group will continue to evaluate the effectiveness of strategies during the next planning period. Recommended studies intended to provide a better understanding of the sustainable yield of the Trinity aquifer are discussed in Chapter 6.

Eddy D. Edmondson, President - Memorandum from Texas Nursery and Landscape Association

1. Commend you for dedication and commitment in drafting the Plan.
2. Recommend that definition of agriculture specifically include the words "floriculture and horticulture products".

Response: The TWDB is currently considering a revision to their official consideration of agricultural activities. Current reported agricultural water use does not include water used in floriculture and horticulture operations. The Plateau Regional Planning Group will consider the inclusion of these terms when the TWDB completes their determination.

John Prentice

1. Reservoir construction. Fears that cost of bottomland lost to flooding and water loss to evaporation does not justify such an action in the interest of conserving water.

Response: Any reservoir construction project is preceded by a thorough feasibility analysis that will consider all issues necessary for the justification of the project. The function of the Regional Planning Group is not to provide such a feasibility analysis but rather to simply consider the possibility of such a project for the purpose of identifying solutions to future water shortages in the region.

2. One State Water Agency. There needs to be an unbiased overview of water issues. Feels there needs to be more than one agency or if only one better define so that all facets of water needs are represented (i.e., water supplies for human development, maintaining water quality, water needs for natural resources)

Response: A single state water agency (Texas Department of Water Resources) was previously in existence but was broken into separate agencies due to the perceived legal conflict of interest between enforcement and financial assistance functions of the agency. However, the Plateau Regional Planning Group has included a single state water agency recommendation (6.2.1) in Chapter 6.

Sandra Pena

Need much more emphasis on both individual and community rainwater harvesting.

Response: A more detailed discussion on a regional rainfall harvesting appears in Section 5.3.6 of Chapter 5.

Catherine Fox

Conservation Education (part of education) City of Kerrville & Kerrville County officials. Must restrict building permits to a certain percentage each year. State Government must give counties legal rights to control their own.

Response: Full intent of written comment is uncertain. Both Kerr County and the Headwaters Underground Water Conservation District have local authority to manage water issues.

Inez (not sure of last name)

Three golf courses are enough. Our wells are going dry. Yet you say there is plenty of water. Ordinary citizens do not know whom to believe. Please tell the truth. If there is plenty of water let us use it. Ordinary citizens should get first priority for water.

Response: The Regional Planning Group will continue to refine water supply needs and available supplies throughout the region. Both Kerr County and the Headwaters Underground Water Conservation District have local authority to manage water issues.

Alys Haugen

1. Wants to see more emphasis place on rainwater harvesting with recommendations for economic incentives offered both to private landowners and municipalities to use the surfaces available to catch and store rainwater.

Response: A discussion on a regional rainfall harvesting appears in Section 5.3.6 of Chapter 5. The Regional Planning Group recognizes the important role of rainfall harvesting for appropriate applications and will consider further evaluation of this strategy during the next planning period.

2. Would like to see broad dissemination of information to the public about how individuals can go about campaigning for such incentives. Who do we start with?

Response: Education needs are discussed in Section 5.3.5 of Chapter 5. Local, municipalities, water-supply entities, and groundwater conservation districts are natural starting points. Various state and federal agencies have a wealth of material for the asking.

Donald Henderson - Retired Corps of Engineers Officer

1. Thinks that the deep canyon on the South Fork of the Guadalupe River is ideal site for a dam. Would lose very little water to evaporation.

Response: The Regional Planning Group considered the possibility of a reservoir strategy but decided to postpone this evaluation until the next planning period when more time could be dedicated to its consideration.

2. Regional plan must address the subject of interbasin transfer, as Region L will be seeking water from the Guadalupe River basin versus the needs of Region J.

Response: The Regional Planning Group intends to continue its effort to identify all water requirements within the Plateau Region and establish recommendations and strategies that meet all water needs within the region. Transfer of water supplies to outside markets should only be considered after all internal needs are met. Several of the City of Kerrville and UGRA strategies specifically relate to surface water needs. The Regional Planning Group has been and will continue to be aware of Region L strategies that may affect water supplies in this region.

3. Regional plan must address the potential supply available from the reuse of effluent fully treated to meet drinking water standards.

Response: The Regional Planning Group agrees that wastewater reuse is a viable strategy and will consider its inclusion in the list of strategies during the next planning period.

Carl Kusch

1. State legislature should establish a priority of use in order to recognize the needs of municipal use versus other uses.

Response: The State Legislature is currently reviewing several issues concerning the most appropriate use and management of water supplies in the state. Prioritization of water use is an issue with many municipalities around the state, and is likewise an issue with private citizens who feel that their private property rights (rule of capture) may be violated. The Regional Planning Group will continue the process of regional water planning based on the recognition of current state laws and water rights.

2. Encourage desalinization technology.

Response: Desalination was discussed but a specific project strategy was never put forth by an entity interested in pursuing the technology. The Regional Planning Group will continue to consider desalination as a potential strategy during the next planning period.

Resolution from Kerr County Commissioners Court signed by Frederick L. Henneke, Kerr County Judge

Response: The resolution is acknowledged by the Plateau Regional Planning Group and is included as follows:

RESOLUTION

WHEREAS, the Kerr County Commissioners Court recognizes that the Trinity Aquifer and the water it holds is a critical element of life in Kerr County and the Hill Country; and

WHEREAS, the Kerr County Commissioners Court recognizes that the Trinity Aquifer provides life-giving water to a larger area than just Kerr County; and

WHEREAS, the Kerr County Commissioners Court applauds and agrees with the recommendation by the Plateau Regional Planning Group that there should be uniform well rules in all of the Trinity Aquifer counties and that such rules should be enforced in an equitable and fair manner; and

WHEREAS, the Kerr County Commissioners Court believes that adoption and enforcement of such rules is the sole responsibility of the appropriate Commissioners Court or underground water conservation district; and

WHEREAS, the Kerr County Commissioners Court firmly opposes the creation of a Trinity Aquifer Authority with powers and authority similar to those granted the Edwards Aquifer Authority by the Texas State Legislature.

NOW, THEREFORE, BE IT RESOLVED by the Kerr County Commissioners Court that:

- 1. There should be uniform well rules in all the Trinity Aquifer counties that are adopted and enforced in an equitable and fair manner by the Commissioners Courts or underground water conservation districts of such Trinity Aquifer counties.*
- 2. There should not be created a Trinity Aquifer Authority or similar regional agency with powers and authority similar to those granted the Edwards Aquifer Authority by the Texas Legislature.*

ADOPTED this 25th day of September 2000.

Signed: Frederick L. Henneke, Kerr County Judge



**APPENDIX 7B
RESPONSE TO TWDB COMMENTS**

**TWDB STAFF COMMENTS
OCTOBER 11, 2000**

1. The required Executive Summary was not found in the draft IPP submitted. Please note that this should be 30 pages or less. Please provide.

Response: Executive Summary is contained in final plan.

2. The required chapter on "Plan Adoption" (Chapter 7) was not found in the draft IPP submitted. Please provide as required by rules (§357.11-12).

Response: Plan Adoption – Chapter 7 is contained in final plan.

3. There were no technical appendices included in the draft IPP as required by the contract. Please provide.

Response: Technical appendices are included with final plan.

4. The summary tables required by Exhibit B, Section 1.7.5, TWDB Contract No. 99-483-292, could not be located in the draft IPP. Please provide.

Response: Summary table is included in final plan.

5. The draft IPP does not identify needs for which no water management strategy is feasible as required by rules [§357.7(a)(5)]. Please identify whether there are any needs which will not be met and provide an explanation of why no water management strategies are feasible.

Response: The following language is added to the Executive Summary.

All cities and water-use categories are expected to have sufficient water supplies to meet drought-of-record conditions if one or a combination of recommended strategies is implemented.

6. Water management strategies must be evaluated based on an equitable comparison and consistent application of all water management strategies determined to be potentially feasible [§357.7(a)(7)(F)]. Please indicate in the plan how this requirement was met.

Response: The following additional language is added to Chapter 5 Section 5.9.2.
The Regional Planning Group members then equitably compared each evaluation criteria, along with the cost and volume comparison in TWDB Table 11 to determine the feasibility of each strategy in relation to other strategies

proposed for each shortage. Where appropriate, the Group specifically considered cost-effective water-management strategies that are environmentally sensitive. The Planning Group chose not to prioritize the strategies but rather to retain all feasible strategies.

TWDB STAFF COMMENTS
OCTOBER 26, 2000

1. Table 3, Water Demand by Major Provider of Municipal and Manufacturing Water.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table3_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 3.

- b. Table 3 does not list the contractual obligations for Upper Guadalupe River Authority and Aqua Source. This information is required for completion of Table 3 and later evaluation of needs (Table 8). Please provide this information.

Response: The Plateau Regional Planning Group officially deleted Upper Guadalupe River Authority and Aqua Source as Major Water Providers. Appropriate changes were made to tables and text.

2. Table 4, Current Water Supply Sources.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table4_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 4.

- b. Table 4 does not reference livestock local supply sources or direct reuse. The water uses information available on the TWDB web site reports reuse currently being used in Kerr, Bandera, and Kinney counties. Please verify whether these supply sources are available during drought-of-record conditions.

Response: The Plateau Regional Planning Group does not consider local supply and direct reuse as being available for livestock use during drought-of-record conditions.

3. Table 5, Current Water Supplies Available to the RWPG by City and Category.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table5_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 5.

- b. Table 5 does not reflect any water rights or non-renewable contracts expiring during the 50-year planning horizon. Please confirm this information.

Response: Expiration dates of permits are listed in Chapter 5 Section 3.3.12 and are shown in the water rights listing provided in the Chapter 3 appendices.

- 4. Table 6, Current Water Supplies Available to the RWPG by Major Provider of Municipal and Manufacturing Water.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table6_IPP.xls, under the column heading entitled, "TWDB Review Comments."
 - b. Field B (MWP alpha number) is blank for Aqua Source. TWDB assigned alpha numbers for Aqua Source based on associated subdivisions – Aqua Source – Bear Creek Park Subdivision (alpha 60333) and Aqua Source – Onion Creek Meadows Subdivision (alpha 626700). It appears that additional subdivisions may now be a part of Aqua Source in Real, Kerr, and Bandera counties. Additional information may be necessary in order to assign the appropriate alpha numbers. Please contact TWDB for further assistance.

Response: The Plateau Regional Planning Group officially deleted Upper Guadalupe River Authority and Aqua Source as Major Water Providers. Appropriate changes were made to tables and text.

- 5. Table 7, Comparison of Water Demands with Current Water Supplies by City and Category.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table7_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 7.

- 6. Table 8, Comparison of Water Demands with Current Water Supplies by Major Provider of Municipal and Manufacturing Water.
 - a. Please address the comments contained in the TWDB file RegJ_QA_Table8_IPP.xls, under the column heading entitled, "TWDB Review Comments."

- b. As a check, Table 6 (MWP supplies) was summed by Major Water Provider and subtracted from the sum of demands from Table 3 (MWP demands). The following tables summarize the results of this check. Please clarify and adjust the appropriate table as needed. Do not leave any fields blank. Note: Because Table 3 did not complete the associated contractual obligations for the Upper Guadalupe River Authority or Aqua Source, TWDB was unable to match the values listed in Table 8.

MWP NAME		Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050
Upper Guadalupe River Authority	Table 6 totals	0	0	0	0	0	0
	Table 3 totals*						
	Subtract 3 from 6	0	0	0	0	0	0
	Table 8 totals	-1738	-1926	-2030	-2177	-2365	-2604
*left blank in Table 3							

MWP NAME		Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050
Aqua Source	Table 6 totals	5342	5342	5342	5342	5342	5342
County 133	Table 3 totals*						
Basin 18	Subtract 3 from 6	5342	5342	5342	5342	5342	5342
	Table 8 totals	-395	-1015	-1352	-1841	-2458	-3246
*left blank in Table 3							

MWP NAME		Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050
Aqua Source	Table 6 totals	515	515	515	515	515	515
County 10	Table 3 totals*						
Basin 19	Subtract 3 from 6	515	515	515	515	515	515
	Table 8 totals	-38	-98	-130	-177	-237	-313
*left blank in Table 3							

MWP NAME		Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050
Aqua Source	Table 6 totals	139	139	139	139	139	139
County 193	Table 3 totals*						
Basin 21	Subtract 3 from 6	139	139	139	139	139	139
	Table 8 totals	-10	-26	-35	-48	-64	-84
*left blank in Table 3							

Response: The Plateau Regional Planning Group officially deleted Upper Guadalupe River Authority and Aqua Source as Major Water Providers. Appropriate changes were made to tables and text.

7. Table 11, Potentially Feasible Water Management Strategies.
- a. Please address the comments contained in the TWDB file RegJ_QA_Table11_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 11.

- b. Please note, any comments or adjustments to Tables 12 or 13 need to be reflected in Table 11. Please check tables 12 and 13 for details (including insufficient supplies associated with strategies or needs that were not addressed by a strategy).

Response: Corrections based on TWDB comments are contained in Table 11.

8. Table 12, Recommended Management Strategies by City and Category.
- a. Please address the comments contained in the TWDB file RegJ_QA_Table12_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: Corrections based on TWDB comments are contained in Table 12.

9. Table 13, Recommended Management Strategies by Major Provider of Municipal and Manufacturing Water.
- a. Please address the comments contained in the TWDB file RegJ_QA_Table13_IPP.xls, under the column heading entitled, "TWDB Review Comments."

Response: The Plateau Regional Planning Group officially deleted Upper Guadalupe River Authority and Aqua Source as Major Water Providers. Appropriate changes were made to tables and text.

TWDB STAFF COMMENTS
NOVEMBER 2, 2000

1. In accordance with TWDB contract #99-483-292, Exhibit B, Section 1.2, an Executive Summary (30 pages or less) is required. This item could not be located in the draft IPP submitted. Please provide the Executive Summary.

Response: Executive Summary is contained in final plan.

CHAPTER 1

2. Sections 1.4 and 3.3.5 of the draft IPP discuss Amistad Reservoir as a special water resource. The scope of work [Phase I, Task 2 (C) (3)] requires a summary of the constraints on this resource as a supply source for Region J. This summary could not be located. Please provide.

Response: The following text change is made to the 4th paragraph of Chapter 1 Section 1.3.2.1:

Although the City of Del Rio owns permits to a limited quantity of water from San Felipe Creek, a tributary of the Rio Grande, most of the Rio Grande water is permitted for downstream users in the Lower Rio Grande Valley. The constraints on Amistad Reservoir as a source of water supply for the Plateau Region are the existing water rights held by water rights holders and enforced by the Watermaster.

3. In Section 1.3.2.1 there is a statement indicating that the City of Del Rio owns permits to a limited amount of water out of the Rio Grande. Please verify the accuracy of this statement. Based on the information in Section 3.3.5, the City of Del Rio obtains supply primarily from San Felipe Springs. Also, the accompanying tables showing water available to Del Rio does not indicate any supply from the Rio Grande.

Response: Same response as number two above.

4. Phase I, Task 2 (A) of the scope of work and TWDB rules [§357.7(a)(1)] requires a summary of all water management plans. Section 1.7 of the draft IPP provides a listing of the water management plans and drought contingency plans that have been prepared by various entities within the region. However, the plans are not summarized as required by the scope of work and TWDB rules. Please provide the summary(ies). In addition, this task requires coordination with adjacent regions for management plans that extend beyond the boundary of Region J. Please indicate in the plan how this requirement has been met.

Response: Summaries of water management plans and drought contingency plans are located in Appendices 1A and 1B. The following statement

concerning coordination with adjacent regions is provided in Chapter 1 Section 1.7.2.

Of the drought contingency plans, none are for entities that extend beyond the boundaries of the Plateau Region. This is also true for the water supply and water management plans, with the exception of the Trans-Texas West Central Study Area plan, and the Nueces River Basin Regional Water Supply Planning Study. The Nueces River Basin Regional Water Supply Planning Study focuses on counties that are not Plateau Region counties, even though physically the Nueces River Basin contains portions of counties within the Plateau Region. This report is also focused on recharge to the Edwards Aquifer, which barely extends to the boundary of the Plateau Region at Bandera County. If the report had addressed groundwater-surface water exchange at Medina Lake, this information would have been of interest to the Plateau Region; however, this report does not address this issue. As regards the Trans-Texas West Central Study Area plan, the summarization of this plan addresses nine water supply options which, if they were to be implemented, would impact the Plateau Region.

5. Phase I, Task 2 (A) (6) of the scope of work requires the plan to identify and summarize county subdivision water-development rules. This item could not be found in the draft IPP. Please provide.

Response: The following statement concerning subdivision water-development rules is added as the 5th paragraph of Chapter 1 Section 1.7.2.

For the purpose of managing the ground-water resources and preventing the over-development of the aquifer system in Bandera County, the Springhills Water Management District in cooperation with the Bandera County Commissioners Court adopted rules in September of 1999 governing the use of the aquifer. Rule 9 (Subdivision Water Availability) establishes requirements that must be met by subdivisions within the county. Requirements differ in regard to whether the subdivision is or is not served by a central water system. Subdivisions without a central water system are required to perform pumping test to identify the hydrological characteristics of the underlying aquifer. Rule 9 can be viewed in its entirety in Appendix 1D. Kerr County is currently considering subdivision water-development rules, while the other four counties in the region do not have similar subdivision rules.

6. Phase I, Task 2 (A) (7) of the scope of work and TWDB rules [§357.7(a)(1)] requires the plan to identify and summarize recommendations in the state water plan. This item could not be found in the draft IPP. Please provide.

Response: The following state water plan recommendations are added as Chapter 1 Section 1.7.1.

The Texas Water Development Board adopted the amended Texas Water Plan, Water for Texas on August 20, 1997 as the official water plan for Texas. The Texas Water Code directs the TWDB to update this comprehensive water

plan which is used as a guide for the management of the State's water resources. This State plan was the result of a consensus planning process that included efforts by the Texas Natural Resource Conservation Commission (TNRCC), the Texas Parks and Wildlife Department, and community and professional leaders. Based on water-resource availability and for planning purposes, the state was divided into 16 regions. The six Plateau counties occur within Regions 9 (Lower Rio Grande), 11 (Southern Edwards) and 12 (Hill Country).

The State plan provides the following recommendations that address regional water-supply problems specific to the counties of the Plateau Planning Region:

- A better understanding of the local hydraulic nature of the aquifer in the design and siting of water wells is needed to better manage available ground-water supplies.
- Conjunctive use of ground water and available surface water supplies is recommended as a means of extending limited ground-water supplies and improving water quality.
- As the trend toward declining irrigation use and increasing municipal use continues in the Rio Grande River Basin, good planning will be needed to adapt the existing institutional framework to accommodate the trend. The need for additional water treatment facilities will increase.

7. TWDB rules [§357.5(k)(1)(F)] require consideration of water availability requirements promulgated by a county commissioner's court. A similar, but more detailed, requirement is contained in Phase I, Task 2(A) (11) of the scope of work, which requires the plan to identify and summarize water availability requirements promulgated by a county commissioner's court. This item could not be found in the draft IPP. Please provide.

Response: A statement concerning subdivision water-development rules is added to Chapter 1 Section 1.7.2. Same as comment #5 above.

8. Phase I, Task 2 (B) of the scope of work requires the plan to identify areas with current or potential water-supply problems that do not have an existing management plan. This item could not be found in the draft IPP. Please provide.

Response: The following statement concerning areas without management plans is added to Chapter 1 Section 1.7.2.

Summaries of the above drought contingency plans can be viewed in Appendix 1B. All entities required by law to turn in plans to TNRCC have done so. Therefore, any areas without an existing management plan do not have entities within them that are required to have a plan.

9. Phase I, Task 2 (D) of the scope of work requires the plan to identify recognized colonia areas and describe the current status of TWDB's EDAP and other government colonia assistance programs. Section 1.8 of the draft IPP provides the listing of recognized colonias within the region. However, there is no discussion describing the current status of TWDB's EDAP and other government assistance programs. Please provide the missing information.

Response: EDAP project status has been added to list of colonias in Chapter 1 Section 1.8.

10. Phase I, Task 2 (E) of the scope of work requires the plan to identify "other legal and regulatory constraints". Please indicate in the plan how this scope of work item was addressed.

Response: The following language is added to Chapter 5 Section 5.9.

The evaluation of each individual water management strategy requires an identification of the legal and regulatory issues that will directly impact the feasibility of the strategy. The 1944 International Treaty below Ft. Quitman governs the primary western surface water resource in the Region, the Rio Grande. The Lower Rio Grande Watermaster administers withdrawals from the Rio Grand on the Texas side of the border. As to the regulatory restraints on the use of ground water, Historically, ground water has not been regulated in Texas except in relatively few areas, but pursuant to Senate Bill 1, ground water districts are now the legislature's preferred method to regulate ground water. Within the Plateau Region there are three underground or groundwater conservation districts, each with statutory rule-making and management authority within their respective jurisdictional boundaries. In summary, no management strategy in the Plateau Region should be pursued without a careful consideration of the legal issues impacted by that strategy.

11. Phase I, Task 2 (F) of the scope of work requires the plan to identify and describe local, state, federal, and international agencies involved with regional water issues. In Section 1.9 of the draft IPP, state and federal agencies are discussed. However, the relevance of these agencies to regional water issues is not presented. In addition, there is no discussion or reference to any local or international agencies. Please provide the missing information.

Response: Additional wording is added to TWDB, TNRCC, TP&WD, TDA and IBWC that indicates each agency's relevance to state and/or regional water planning (Chapter 1 Section 1.9). No other local or international agencies were identified. Underground water conservation districts are discussed elsewhere in the plan.

12. TWDB rules [§357.7(a)(1)] and the scope of work [Phase I, Task 1 (8)] require a description of the identified threats to the agricultural and natural resources due to water quantity problems. Section 1.2.6 (page 1-12) in the draft IPP discusses agricultural and natural resources. However, the discussion does not address water quantity problems. Please provide the missing information.

Response: The following paragraphs addressing quantity threats to agricultural and natural resources are added to Chapter 1 section 1.2.6.

Both agricultural and natural resources water-supply needs are directly influenced by the quantity of water available primarily in rivers and tributaries that flow through the region and to a lesser extent in impounded lakes, ponds and tanks. With the exception of the Rio Grande, much of the drainage basins for the headwater of local rivers lie within Plateau Region counties. Springflow emanating from shallow ground-water sources creates the base flow of these streams. As such, these headwater regions are particularly susceptible to drought conditions as the water table naturally drops and springflow diminishes. Agricultural activities in the region that rely on surface water are designed to accommodate the intermittent nature of the supply. In most cases, this means that agricultural water-supply needs will be switched to ground-water sources, or that irrigation activities will cease until river supplies are replenished. Both plant and animal species endemic to this region have developed a tolerance for the intermittent nature of surface water availability in the region; however, significantly long drought conditions can have a sever effect on these species. Of recognized importance to the water planning process is the concern of the effect that future development of water supplies might have on the permanent reduction and diversity of species in the region. Water-supply deficit strategies developed in Chapter 5 of this plan include an evaluation of each strategy's effect on agricultural and environmental concerns.

13. TWDB rules [§357.5(d)] require the use of population projections contained in the state water plan or revisions approved and adopted by TWDB. At the bottom of page 1-5, the year 2000 population for Camp Wood is shown as 780. The TWDB-adopted population for Camp Wood is 668. It appears that the value shown in the text is a typographical error because the population number shown in TWDB Table 1 of the report appendix is correct. Please correct the text.

Response: The required correction is made in the text.

14. TWDB rules [§357.5(d)] require the use of water demand projections contained in the state water plan or revisions approved and adopted by TWDB. In Section 1.5 (page 1-

24), the total water demand reported for the region is stated as 44,625 AFY. Based on TWDB-approved revisions, the correct value for water demand for the region is 44,909 AFY. Please correct. This change will require that the referenced figure 1-14 also be corrected.

Response: The correct total demand is 44,624. Text and inserted table on IPP page 25 is corrected to correspond to Chapter 2 tables. Also see response to comment 21 for further explanation of demand numbers.

15. TWDB rules [§357.5(d)] require the use of water demand projections contained in the state water plan or revisions approved and adopted by TWDB. The unnumbered table in Section 1.5 (page 1-25) contains the following data errors:

- a. Bandera County: Mining should be 25 AFY (not 278 AFY)
- b. Bandera County: Irrigation should be 278 AFY (not 333 AFY)
- c. Kerr County: Municipal should be 8,886 AFY (not 8,601 AFY)
- d. Kinney County: Municipal should be 1,607 AFY (not 1,608 AFY)
- e. Plateau Region: Municipal Total should be 30,068 AFY (not 29,784 AFY)
- f. Plateau Region: Mining Total should be 336 AFY (not 589 AFY)
- g. Plateau Region: Irrigation Total should be 11,478 AFY (not 11,533 AFY)

Please correct the table to reflect TWDB-approved values. Note that these corrections will also need to be reflected in associated figures (e.g., Figure 1-15).

Response: Table is corrected (see response to comment 11). Kerr County Municipal is 8,601; Municipal region total 29,783; Total regional demand is 44,624.

CHAPTER 2

16. TWDB rules [§357.5(d)] require the use of population and water demand projections contained in the state water plan or revisions approved and adopted by TWDB. In Section 2.3 (page 2-2), Section 2.5 (page 2-9) and Section 2.5.1 (page 2-9) of the draft chapter, there are a number of inaccuracies in the data reported. The following is provided to assist you:

- a. Total population of the region in 1996 is 108,839 (not 107,228).
- b. Referenced Table 2-1 omits Ingram, which has a 1996 population of 1,611.
- c. Year 2050 population projection for the region is 212,344 (not 212,135).
- d. Expected increase for the region over the period is 95% for the region (not 98%).
- e. Percent growth rate for Kerr County is 109% (not 111%).
- f. Total water demand for region will increase 15,306 AF (not 15,255 AF).
- g. Percentage increase in Kerr County is 73% (not 75%).
- h. Water demand increase in Kerr County is 6,760 AF (not 6,709 AF).

- i. Municipal demand in the region is expected to grow to 42,934 AF (not 42,643 AF). This change also requires changes to the overall percentage increase shown and the overall acre-foot increase shown.
- j. Kerr County municipal demand is projected to be 14,626 AF in year 2050 (not 14,335 AF).
- k. The combined Kerr County and Val Verde County municipal demand is projected to be 33,519 AF in year 2050 (not 33,228 AF).
- l. The percentage change in municipal demand for Bandera County from 1996 to 2050 is calculated at 239% (not 229%).

Response: Most of the above comments are the result of TWDB's error with Ingram (see responses to comments 20 and 21 below). The following correction are made to Chapter 2 Sections 2.3 and 2.5.1: (c) - Year 2050 region population is corrected to 210,085; (d) – Region population increase is corrected 96%; and (l) – Bandera County municipal change is corrected to 239%.

- 17. Phase II, Task 1 (B) (1) in the scope of work indicates that the region will be surveyed to determine desired changes to population and water demand projections. Please indicate in the plan how this scope of work item was addressed.

Response: The following discussion on the public input to the revision process is added to Chapter 2 Section 2.2.

The Plateau Regional Planning Group members solicited entities within the Region to approach the Planning Group with desired changes to population and water demand projections. Back-up documentation for such desired changes was evaluated as to whether they qualified under TWDB Rules. Documentation and revisions were prepared in "Plateau Region Revisions to Population and Water Demand Projections" dated July 28, 1999 and were presented to the public for final comment. This document was then submitted to TWDB and served as the basis for TWDB approving the population and demand revisions.

- 18. Phase II, Task 1 (B) (3) in the scope of work indicates that documentation of desired population and water demand changes will be presented to the public for comment. Please indicate in the plan how this scope of work item was addressed.

Response: A discussion on the public input to the revision process is added to Chapter 2 Section 2.2. See comment #17 above.

- 19. In TWDB Table 1, "Population by City and Rural County", there are two rounding errors. The total population for Bandera County-other should be 33,809, not 33,808 as shown. In addition, the total population for Bandera County in the year 2030 should be 36,354, instead of 36,353. Please correct these rounding errors in order to be consistent with TWDB approved population projections. Also note that this correction should be reflected in the text table 2-1.

Response: Correction is made to TWDB Table 1 and Text Table 2-1.

20. In TWDB Table 1, "Population by City and Rural County", the community of Ingram is omitted. Exhibit B, Section 1.4, of the TWDB contract requires the presentation of population projections for all cities and communities of 500 or more. Please provide population projections for Ingram. The following information is provided to assist you:

a. The regional totals should be revised as follows for the years shown:

1996: 108,839
2000: 122,276
2010: 147,774
2020: 161,245
2030: 175,440
2040: 193,088
2050: 212,344

b. The totals for Kerr County should be revised as follows for the years shown:

1996: 42,168
2000: 45,588
2010: 54,151
2020: 62,662
2030: 70,783
2040: 79,065
2050: 87,928

c. The population projections for the City of Ingram are:

1996: 1,611
2000: 1,766
2010: 2,027
2020: 2,170
2030: 2,289
2040: 2,274
2050: 2,259

d. These changes need to be reflected in the text, tables (e.g. Table 2-1) and figures (Figures 2-1 through 2-4) in the chapters.

Response: This comment is no longer necessary. On November 13th documentation was provided to the TWDB that verified that Ingram's population is already included in the "County Other" summary for Kerr County. Ingram has been added as a line item on the appropriate tables and

its authorized revised population has been subtracted from the previous “County Other” total.

21. In TWDB Table 2, “Water Demand by City and Category”, the community of Ingram is omitted. Exhibit B, Section 1.4, of the TWDB contract requires the presentation of water demand projections for all cities and communities of 500 or more. Please provide water demand projections for Ingram. The following information is provided to assist you:

a. The total regional water demand totals should be as follows for the years shown:

2000: 44,909
2010: 47,859
2020: 48,634
2030: 50,330
2040: 52,729
2050: 55,599

b. The regional municipal demand totals should be as follows for years shown:

2000: 30,068
2010: 33,542
2020: 34,768
2030: 36,891
2040: 39,689
2050: 42,934

c. The municipal demand projections for Kerr County should be as follows for years shown:

2000: 8,886
2010: 9,950
2020: 10,888
2030: 12,082
2040: 13,236
2050: 14,626

d. The municipal demand projections for the City of Ingram are:

1996: 240
2000: 285
2010: 300
2020: 297
2030: 305
2040: 295
2050: 291

e. These changes need to be reflected in the text, tables (e.g., Table 2-2) and figures (Figures 2-1 through 2-4) in the chapters.

Response: This comment is no longer necessary. On November 13th documentation was provided to the TWDB that verified that Ingram's water demand is already included in the "County Other" summary for Kerr County. Ingram has been added as a line item on the appropriate tables and its authorized revised water demand has been subtracted from the previous "County Other" total.

CHAPTER 3

22. Phase I, Task 4 (A) in the scope of work indicates that estimates of recharge, discharge, quantity in storage, quality, and past, present and potential future contamination threats to groundwater sources will be described. For the Trinity aquifer, discussion on discharge and past, present, and potential future contamination could not be located. For the Edwards-Trinity (Plateau) and Edwards (BFZ) aquifers, discussion on past, present, and potential future contamination threats could not be located.

Response: Discussion on Trinity discharge and contamination potential is added to Chapter 3 Section 3.2.2.1. Discussion on potential contamination of the Edwards-Trinity (Plateau) and the Edwards BFZ aquifers is added to Sections 3.2.2.2 and 3.2.2.3.

23. Phase I, Task 4 (B) in the scope of work indicates that directional movement of groundwater will be identified based on static water level measurements proximate to areas of heavy pumpage. Although, none of the items required for this scope of work task could be located in the draft IPP TWDB has received a request for contract amendment (dated October 19, 2000) from UGRA to delete this scope of work subtask. TWDB staff is processing the contract amendment.

Response: This task is expected to be deleted by contract amendment.

24. Phase I, Task 4 (C) (2) in the scope of work indicates that groundwater availability estimates will be based on actual well test data. It is not clear from the draft IPP whether actual well test data was used to prepare the availability estimates. Please clarify.

Response: Available pumping test data was evaluated and additional pumping tests were performed as part of the Del Rio and Lower Trinity studies. However, the amount of pumping test data was found to be insufficient to rely totally on its use for calculating ground-water availability. Therefore, availability was estimated based on retrievable storage of the aquifers.

25. Phase I, Task 4 (H) (1-3) in the scope of work requires various activities to be completed related to groundwater conditions in agricultural areas. Section 3.2.5 of the draft IPP provides a very short summary of agricultural activities within the region.

However, none of the scope of work items are included in this discussion. Please provide the missing information.

Response: The following language is added to last paragraph of Chapter 3 Section 3.2.5.

A review of historical and current data suggests that there has been no long-term change in regional water levels or water quality as a result of agricultural pumping. Local water-level declines occur during the irrigation season but generally recover during the off season. Although irrigation conservation efficiencies could be improved, currently used equipment and practices are not resulting in depletion of the aquifers. At the current rate of agricultural use, ground water of sufficient quantity in the Edwards-Trinity (Plateau), Edwards BFZ, and Austin Chalk aquifers should remain available for future agricultural use. However, the competition for Trinity aquifer water between municipal and agricultural needs in Bandera and Kerr Counties is increasing. The Springhills water Management District and the Headwaters Underground Water Conservation District are both actively involved in managing the use of this critical aquifer in these counties.

26. Phase I, Task 4 (D) in the scope of work requires an estimate of safe yield for each aquifer. This scope of work item could not be located in the draft IPP. TWDB received a request for contract amendment, dated October 19, 2000, to delete this scope of work subtask. TWDB staff is processing the contract amendment.

Response: This task is expected to be deleted by contract amendment.

27. Phase I, Task 4 (E) (1-2) in the scope of work requires detailed work on the Trinity aquifer in Bandera and Kerr counties. Based on the information included in Section 3.2 of the draft IPP, it appears that this scope of work item has not been addressed. Please provide the missing information.

Response: Results of this task are presented in a separately bound report titled "The Lower Trinity Aquifer of Bandera and Kerr Counties, Texas".

28. Phase I, Task 4 (F) (1-2) in the scope of work requires an evaluation of potential groundwater supplies for the City of Del Rio. Groundwater resources near Del Rio are discussed in Section 3.2.3 of the draft IPP, but scope of work items have not been addressed. Please provide the missing information.

Response: Results of this task are presented in a separately bound report titled "Ground-Water Resources of the Edwards Aquifer in the Del Rio Area, Texas".

29. Phase I, Task 4 (G) (1-4) in the scope of work requires an overview evaluation of public-supply groundwater sources, including a number of very specific tasks. In

reviewing the draft IPP, the scope of work items could not be located. Please provide the missing information.

Response: The following text is added to Chapter 3 Section 3.2.4.

Historical water-level measurements are only available for public supply wells in the cities of Bandera and Kerrville. Public supply wells serving other communities in Edwards, Kinney, Real and Val Verde Counties are not anticipated to have long-term declines due to the relatively smaller quantities of water that are needed to serve these communities. Only the community of Leakey is anticipated to have a shortage based on drought-of-record conditions in the future (see Chapters 4 and 5). Also, no long-term water-quality deterioration is detected in ground-water supplies for these communities. The principal water supply for Del Rio is not currently produced from wells. Long-term viability of the aquifers serving these other communities appears to be acceptable. However, new wells should be located outside the local areas of pumping influence of the existing wells. Although no evidence of contamination from surface sources have been detected in public-supply ground-water sources in the Plateau Region, a well-head protection program should be considered by all communities.

A City of Bandera well (69-24-202) shows a consistent decline from the 1950's through the 1990's, with a total of approximately 400 feet of water level decline. City of Kerrville wells No. 4 and No. 11 have experienced declines of as much as 200 feet through the early to mid-1980's. Between the early to mid-1980's and the early 1990's, water levels in these two wells increased by as much as 200 feet in response to the decreased pumpage by the City when surface water sources were brought on-line. However, since the early 1990's, water levels have again begun to decline, as much as 100 feet or more in many Kerrville wells. Because there is little data available outside of the Kerrville and Bandera areas, regional declines in the lower Trinity aquifer water level is not able to be determined. Most of the water withdrawn by Bandera and Kerrville public supply wells is produced from the lower Trinity which receives very little vertical recharge and an undetermined amount of lateral underflow from the north and west of the well fields.

The only long-term water-quality degradation trend observed in City of Bandera and Kerrville public-supply wells is noted in the increase in sodium, chloride and total dissolved solids in City of Kerrville Travis Well #14 during the late 1960's to mid-1970's. The well showed steady increases in sodium (18 to 72 mg/L), chloride (55 to 200 mg/L), and total dissolved solids (417 to 624 mg/L) between 1968 and 1976. This corresponded with the time period that large drawdowns in water levels were occurring in the Kerrville area. This indicates that large withdrawals of lower Trinity ground water in the Kerrville area may cause degradation in water quality. The city mixes this water with water from other wells to maintain acceptable overall quality.

Both cities must compete for water from the lower Trinity with numerous other private wells in the counties. Long-term viability of the Trinity aquifer as a supply source for these cities will require implementation of management policies aimed at establishing withdrawals based on the sustainable yield of the aquifer.

Sustainable yield of the lower Trinity has not been established due to lack of available hydrologic data; additional studies based on evaluation of continuous water-level trends is needed. Because of the continuous water-level decline in these well fields, both cities should monitor levels to anticipate production reductions. Specific strategies to meet Kerrville's future water needs are addressed in Chapter 5. If additional wells are needed for increasing supply needs, the cities should consider locating new wells outside the local area of pumping influence. Both cities should also cooperate with efforts of the local groundwater conservation districts to establish aquifer management policies. More detailed information about the lower Trinity aquifer is contained in the report "The Lower Trinity Aquifer of Bandera and Kerr Counties, Texas".

30. Phase I, Task 4 (I) in the scope of work requires the evaluation of groundwater sources that are considered necessary for the enhancement of environmental interests and an identification of quantity and quality threats to groundwater sources and the potential effect on the environment. This information could not be found in the draft IPP. Please provide the missing information.

Response: The following paragraphs addressing quantity threats to agricultural and natural resources are added to Chapter 1 section 1.2.6.

Both agricultural and natural resources water-supply needs are directly influenced by the quantity of water available primarily in rivers and tributaries that flow through the region and to a lesser extent in impounded lakes, ponds and tanks. With the exception of the Rio Grande, much of the drainage basins for the headwater of local rivers lie within Plateau Region counties. Springflow emanating from shallow ground-water sources creates the base flow of these streams. As such, these headwater regions are particularly susceptible to drought conditions as the water table naturally drops and springflow diminishes. Agricultural activities in the region that rely on surface water are designed to accommodate the intermittent nature of the supply. In most cases, this means that agricultural water-supply needs will be switched to ground-water sources, or that irrigation activities will cease until river supplies are replenished. Both plant and animal species endemic to this region have developed a tolerance for the intermittent nature of surface water availability in the region; however, significantly long drought conditions can have a sever effect on these species. Of recognized importance to the water planning process is the concern of the effect that future development of water supplies might have on the permanent reduction and diversity of species in the region. Water-supply deficit strategies developed in Chapter 5 of this plan include an evaluation of each strategy's effect on agricultural and environmental concerns.

31. Section 3.3.6 (page 3-21) of the draft IPP discusses water availability under drought-of-record conditions for several surface water sources as required by TWDB rules [§357.7(a)(3)]. This section of the report indicates the supply amount for Hondo Creek is zero. However, table 3-1 in the text indicates that the drought-of-record supply for Hondo Creek is zero for the year 2000 and 1,022 AFY for the remaining

decades. The associated TWDB Table 4 indicates zero availability for all decade years. Please correct the text table 3-1 to reflect zero availability for all decade years. If necessary, correct associated supply/demand analysis for Bandera County (including tables and text).

Response: Correction is made to Text Table 3-1.

32. Phase I, Task 3 (A)(4) in the scope of work requires a description of water-quality problems identified by a number of agencies, including parameters in excess of water-quality standards, possible sources of the water-quality problem and the impact of the water-quality problem on public health, treatment costs, or agricultural yields. Section 3.3.11 in the draft IPP discusses water quality problems of reservoirs. However, this section does not include a discussion of TWDB and TPWD identified water-quality problems. In addition, the sources of the water-quality problems discussed (i.e., diazinon, selenium, chlorophyll a) are not presented (other than a statement regarding recreational use increases). Finally, the impact of the water-quality problems on public health, treatment costs, or agricultural yields is not discussed. Please provide the missing information in accordance with the scope of work.

Response: The following paragraphs are added to Chapter 3 Section 3.3.11.

The state's clean Water Program administers federal Clean Water Act directives through TNRCC's Water Quality Inventories. TNRCC is the responsible agency for identifying water-quality problems within the Water Quality Inventory. However, the Inventory does not identify sources of water-quality problems, as in most cases, the problems are "non-point source" pollutants. TNRCC, EPA and other agencies have discussed and researched methodologies by which non-point source pollution could be modeled, but thus far modeling efforts have been less than satisfactory. Detailed excerpts from the Water Quality Inventory are included in the Chapter 3 Appendices; these excerpts address potential water-quality threats to river systems in the Plateau Region, including Medina Lake, citing no known water quality problems (i.e., Plateau rivers are clear of the parameters which the agency monitors). Water-quantity threats are discussed elsewhere in Chapter 3 and in Table 3-1. Generally, under drought-of-record conditions, Hondo Creek, Nueces River, West Nueces River, Pecos River, and Devils River are dry or very low.

The impact of water-quality problems on public health varies depending on parameters and levels identified. Treatment costs associated with reducing biochemical parameters may increase depending on the parameters and levels identified. In addition, agricultural yields may be impacted based on the type of chemical in question. For example, diazinol may interfere with the herbicides farmers apply.

33. Phase I, Task 3 (A) (5) in the scope of work requires an identification of potential quantity and quality threats to each river system. Section 3.3.11 of the draft IPP

discusses water quality of reservoirs. However, quantity and quality threats for each river system are not identified. Please provide the missing information.

Response: See response above for comment #32.

34. Phase I, Task 3 (B) (3) in the scope of work requires identification of major downstream water rights in Regions L and M and their impact on water availability for appropriation in Region J. This item could not be located in the draft IPP. Please provide the missing information.

Response: Section 3.3.12 is added to Chapter 3 as follows.

The right to use water from the navigable streams and lakes is permitted through the State of Texas. Current permit holders in the region are listed in the Chapter 3 appendices along with reported diversions from 1990 through 1999. Major downstream water rights include those in Region L supplied by the Guadalupe-Blanco River Authority out of Canyon Lake and by the Bexar-Medina-Atascosa WCID#1 out of the Medina-Diversion Lake System. The firm yields of Canyon and Medina limit the amount of water available for appropriation in both the Plateau Region and Region L. Major downstream water rights in Region M (i.e., cities and irrigators on the Rio Grande downstream from Amistad Reservoir) do not limit the amount of water available for appropriation in the Plateau Region because currently the Plateau Region does not depend on the Falcon-Amistad system. TNRCC's Lower Rio Grande Watermaster allocates water rights on the Rio Grande according to the supply in the Amistad Reservoir and in accordance with the 1944 international treaty with Mexico.

35. Phase I, Task 3 (C) (1) in the scope of work requires an evaluation of the impact of existing or potential surface water recreation demands on existing and future water supplies. This item could not be located in the draft IPP. Please provide the missing information.

Response: The following paragraph is added to Chapter 3 Section 3.3.

Although recreational use of streams and lakes serves an important function in the Plateau Region, its use has no impact on reservoir yields, as these uses are nonconsumptive. However, in some instances, recreational use may harm the water quality of a water supply (e.g., aluminum cans thrown into a lake or fuel byproducts from boat engines).

36. Phase I, Task 3 (C) (2) in the scope of work requires an evaluation of the impact of environmental demands on existing and future surface water supplies. This item could not be located in the draft IPP. Please provide the missing information.

Response: Paragraph is added to Chapter 5 Section 5.6.

The impacts of environmental water demands on existing surface water supplies are non-existent from a legal standpoint. Existing surface water rights are legal documents and if a water right does not require the water right holder to pass

through water for environmental purposes, then the water right holder does not need to do so. However, when a water right holder applies for an amendment to his or her existing water right, and that amendment involves a change in the place of use, type of use or an additional amount of water to be used, then that water right will be open for requiring pass-through for instream flows and possibly bay and estuary flow needs. Future water rights are also subject to TNRCC requirements for instream flow and bay and estuary flow needs.

37. Phase I, Task 3 (C) (3) in the scope of work requires work related to the potential loss of water supply to the City of Del Rio from San Felipe Springs as a result of endangered species action. This item could not be located in the draft IPP. Please provide the missing information.

Response: The following paragraph is added to Chapter 5 Section 5.6.

The City of Del Rio's continued reliable source of water supply in San Felipe Springs will be jeopardized if U.S. Fish and Wildlife Service declares the Devil's River Minnow an endangered species. Currently the City of Del Rio, Texas Parks and Wildlife Department, and U.S. Fish and Wildlife Department cooperatively administer a Conservation Agreement with the objective of ensuring the continued existence of the minnow. The City of Del Rio depends heavily on San Felipe Springs for water supply and is currently engaged in rehabilitating old ground-water wells and developing new wells, as well as taking steps to replace a leaking storage tank. The new ground water and stopping the waste of water from the leaking tank should mitigate the impact to the City should San Felipe Springs no longer be available as a source of water supply. However, the City is confident in the Conservation Agreement and does not expect to lose either the Devil's River Minnow or San Felipe Springs.

38. Phase I, Task 3 (D) in the scope of work requires an identification of environmental water needs and an evaluation of the significance of instream and bay and estuary flows. This item could not be located in the draft IPP. Please provide the missing information.

Response: The following paragraph is added to Chapter 5 Section 5.6.

Environmental water needs is a generic term applied by many persons with many perspectives and therefore the term might have different meanings within the same conversation, or one person may have a broader understanding of the term than another. Statutorily, two environmental water needs that are specifically recognized within Texas Water Code as beneficial uses of water are 'instream flows' and 'bay and estuary flow needs'. Texas Water Code also institutes responsibilities on TNRCC to assess instream flow needs, and on the TWDB and TP&WD to determine bay and estuary flow needs via hydrologic modeling of the bay and estuary systems. TNRCC as the regulatory agency may impose requirements on water right holders to pass-through flows for instream flows and for bay and estuary flow needs. However, pass-through flows for bay and estuary

flow needs are required only for water rights within two hundred river miles of the coast. As such, the Plateau Region is beyond the regulatory range.

39. Phase I, Task 3 (E) in the scope of work requires coordination of water management strategy identification and evaluation with federal and international entities. Please indicate in the plan how this scope of work item is addressed.

Response: the following discussion concerning coordination with Federal and International Agencies is contained in Chapter 7 Section 7.8.

Communication was maintained with the IBWC specifically for the purpose of obtaining and coordinating aquifer water-level data in the Del Rio area. This information is provided in the report titled "Ground-Water Resources of the Edwards Aquifer in the Del Rio Area, Texas". Because there is very limited Rio Grande water rights by individuals or entities in the Plateau Region, no water-deficit strategies were developed that involved water from the river. This negated the need to coordinate strategies with international agencies. The U.S. Fish and Wildlife Service provided comments to the initially prepared plan.

40. Phase I, Task 5 (A-C) in the scope of work contains work elements related to groundwater/surface water relationships within the region. None of the items mentioned in subtasks A, B and C could be located in the draft IPP. Please provide the missing information.

Response: Text discussion is contained in Chapter 3 Section 3.4. Chapter 3 Figure 3-4 shows recharge/discharge potential along stream segments. No gain-loss studies were located. Subtasks B and C were eliminated by contract amendment.

41. TWDB rules [§357.7(a)(3) require an evaluation of current water supplies available under drought-of-record conditions with results reported by city. Ingram is not listed in text table 3-3 or TWDB Table 5. This information is required in order to complete the supply/demand analysis. Please provide the missing data for Ingram.

Response: Ingram is added to all pertinent tables. Also see Nov. 2nd comment #20.

42. In TWDB Table 4 in the draft IPP, Canyon Lake is shown to be in Region J. Canyon Lake is located in Region L. Please correct.

Response: TWDB Table 4 is corrected to show Canyon Lake location in Region L.

CHAPTER 4

43. Phase II, Task 3 (C) in the scope of work indicates that interviews with appropriate entities and industries will be conducted to obtain local reaction to potential social and economic impacts of not meeting identified needs. The socio-economic impact analysis is presented in the draft IPP in Chapter 4 (Section 4.8). However, there is no indication in the plan that the interviews were conducted. Please indicate in the plan how this scope of work item is addressed.

Response: The following discussion concerning public review of the analysis is added to Chapter 4 Section 4.8.

Upon completion, the social and economic impact assessment was included in a draft copy of the plan and presented to the public for comment. Impacted entities and industries were particularly requested to review the analysis and the plan. Public comments are discussed in Chapter 7.

44. TWDB rules [§357.7(a)(4)] require a water supply and demand analysis comparing water demands with current water supplies. This is presented in Chapter 4 of the draft IPP. However, Ingram is not included in the analysis. Please add Ingram to the analysis to determine whether there is a surplus or deficit of water supplies for this water user group. This change will require that the text tables 4-1 and 4-5, and TWDB Table 7 be updated with information on Ingram. In addition, portions of Section 4.4 in the draft IPP may need to be updated with information on Ingram.

Response: Ingram is added to all pertinent tables. Also see Nov. 2nd comment #20.

45. TWDB rules [§357.5(d)] require the use of population and water demand projections contained in the state water plan or revisions approved and adopted by TWDB. In Table 4-5 (page 4-12), the Livestock demand is listed as 135 AF for each decade. The TWDB approved number for Livestock in Kerr County is 526 AF for each decade. Please correct.

Response: Text Table 4-5 is corrected.

46. TWDB rules [§357.7(a)(4)] require a water supply and demand analysis comparing water demands with current water supplies. This information is presented in Chapter 4 of the draft IPP. TWDB staff has discovered a number of inconsistencies in the data reported in this section (see below). Please correct these data.

- a. In table 4-3, the livestock surplus/shortage is zero. However, in table 4-1 for Bandera County the livestock surplus is 43 AFY for all the decades.
- b. In table 4-5, the county other surplus range is 4381 AFY to 2550 AFY. However, in table 4-1, the surplus range is 4388 AFY to 2557 AFY.
- c. In table 4-5, the manufacturing surplus/shortage range is 12 AFY to -2 AFY. However, in table 4-1, the surplus range is 14 AFY to zero.
- d. In table 4-7, the Leakey surplus range is 649 AFY to 563 AFY. However, in table 4-1, the surplus range is 23 AFY to -63 AFY.
- e. In table 4-7, the county other surplus range is 3 AFY to 11 AFY. However, in table 4-1, the surplus range is 6 AFY to 14 AFY (when all river basin values are summed by decade).

Response: Changes are made to all appropriate tables including Chapter 5 tables.

CHAPTER 5

47. TWDB rules [§357.5(i)] and Phase I, Task 3 (F) in the scope of work requires an evaluation of the potential for emergency transfers of surface water. There is a general discussion regarding the statute (Texas Water Code 11.139) related to emergency transfers in Section 5.7 of the draft IPP. However, this section of the report does not indicate whether the Plateau Water Planning Group considered emergency transfers. Please indicate in the draft IPP what consideration was given by the planning group to this rule and scope of work item and what decision was made.

Response: The following sentence expressing the Regional Planning Group’s decision on the potential for emergency transfer strategies is added to Chapter 5 Section 5.7.

The Plateau Regional Planning Group considered the potential for emergency transfer of surface water for communities in the region and chose not to recommend this strategy for this planning period.

48. TWDB rules [§357.7(a)(5)] require the development of plans to be used during drought-of-record to provide sufficient water supply to meet needs of water users in the region. Since Ingram was not included in the chapter 2 or chapter 4 analysis, TWDB is unable to verify whether Ingram’s water supplies are sufficient to meet its needs throughout the 50-year planning horizon. Once the analyses are completed, Ingram will need to be incorporated into chapter 5 as appropriate. All associated text tables and TWDB tables will need to be updated to reflect Ingram. If water management strategies are developed for Ingram, include them within chapter 5.

Response: Ingram is added to all pertinent tables. Also see Nov. 2nd comment #20.

49. In Section 5.5.6 of the draft IPP, there is a statement that “growth in the number of residents and water demand is expected to exceed the capability of the present system

to meet all needs for water.” This statement specifically refers to the City of Del Rio. Results of water demand/supply analysis presented in Chapter 4 of the draft IPP (Section 4.7, page 4-19) states that the City of Del Rio “is projected to have a surplus supply for each of the six drought-of-record years.” These two statements are in conflict. Please clarify.

Response: The above statement in Section 5.5.6 is deleted from the text.

50. Phase II, Task 2 (B) in the scope of work requires a determination of “key water supply reservoirs and water-level monitoring wells to use as indicators of water supply availability.” In addition, this scope of work subtask indicates that “this task will be coordinated with Regions L and M for reservoirs relevant” to these regions. Sections 5.8, 5.8.1 and 5.8.2 discuss drought response triggers. However, these discussions do not include the items specifically outlined in the scope of work. In addition, TWDB rules [§357.5(e)(7)(A-B)] requires identification, for each source of supply, of “factors specific to each source of water supply to be considered in determining whether to initiate a drought response, and actions to be taken as part of the response.” TWDB rules requirements are not addressed by the information contained in the draft IPP. Please provide the missing information.

Response: Required drought triggers, factors and responses are added to Chapter 5 in Section 5.8.1 for surface water, 5.8.2 for ground water, and Table 5-4. Coordination with Regions L and M is addressed in Chapter 7 Section 7.7.

51. In Chapter 4 of the draft IPP, it is noted that there are shortages for irrigation uses in Kerr and Edwards counties. Water management strategies specifically for irrigation users are presented in Chapter 5 of the draft IPP. Although information presented in Chapter 3 of the draft IPP (see Sections 3.3.3 and 3.3.6) indicates that irrigators currently have permits to divert surface water from the Upper Guadalupe and West Nueces rivers, the water management strategies presented do not include either of these surface water sources as potential supply sources to meet the needs of the irrigation users. It should be noted that future permitting decisions by the Texas Natural Resources Conservation Commission (TNRCC) will be based partly on whether a need to be met is consistent with the approved regional water plan (Texas Water Code §11.134). Since there are no water management strategies presented for irrigators out of either the Upper Guadalupe or West Nueces rivers, a request for a permit/permit amendment from TNRCC by an irrigator where the source of supply is the Upper Guadalupe or West Nueces river would be considered “inconsistent” with the approved regional water plan. The region has the option of including water management strategies for this use type where the source of supply is the Upper Guadalupe or West Nueces River.

Response: The following paragraph is added to Chapter 5 Section 5.4.4.
It should be noted that future surface water permitting decisions by the Texas Natural Resource Conservation Commission (TNRCC) will be based partly

on whether a need to be met is consistent with the approved regional water plan. In the case of an irrigator's application to the TNRCC for the right to use surface water, the application would not be inconsistent with this regional plan even though this regional plan does not specifically cite as a strategy such an application. The reasoning for this assertion is simple. The Plateau regional water plan is required to identify shortages and associated strategies based on drought-of-record amounts of supply available. On this drought-of-record basis, some surface water sources of supply within the region show zero to little water available (e.g., Upper Guadalupe River and Hondo Creek). However, the TNRCC for years has had a policy by which, if 75% of the amount of water requested by a non-municipal applicant is available for appropriation in 75% of the requested months of the studied time period, the TNRCC grants the application. In recent years this policy – informally termed “the 75% / 75% rule” - has actually been codified into law. Since the “75% / 75% rule” obviously is based on amounts greater than drought-of-record amounts used within the regional plan, there are likely many irrigators or other non-municipal applicants who may wish to obtain surface water diversion permits from streams that are dry during drought but adequate at other times. TNRCC's lawful authority to grant such permits is in no way abridged by a regional water plan that does not specifically cite as a strategy these potential permit applications.

52. Strategy 69-3 and 133-19, “Conservation Technology and Equipment” is described (in-part) as, “those conservation methods and equipment that are ‘above and beyond’ the methods and equipment included in the level of conservation built-in to the original demands.” Based on this description, it would be difficult to determine “methods” or “equipment” that qualify as “above and beyond” currently used methods and equipment. TWDB rules [357.7(a)(8)] require water management strategies to be described in a level of detail that would allow state agencies to make financial or regulatory decisions. As currently written, TWDB would be unable to make financial or regulatory decisions based on the information contained in these strategies. Please provide more detail.

Response: The following statement is added to the strategy description of strategies 69-3 and 133-19.

The level of conservation built into the original demands is the expected Level 2 conservation discussed in the text of Section 5.4.4 of Chapter 5.

53. TWDB rules [357.7(a)(5) and 357.7(a)(5)(A)] require the regional water plan to meet all needs unless no water management strategy is feasible. The rules further require that the full evaluation of water management strategies be presented and reasons given for why not water management strategies are feasible. Based on the information contained in the draft IPP, TWDB staff is unable to determine whether all needs in the region will be met by the proposed water management strategy. Please provide

this information. If needs will be unmet, please present the full water management strategy evaluations and provide the reasons why the strategy(ies) is not feasible.

Response: The following language is added to the Executive Summary.

All cities and water-use categories are expected to have sufficient water supplies to meet drought-of-record conditions if one or a combination of recommended strategies is implemented.

54. TWDB rules [§357.7(a)(7)(F)] require that water management strategies be evaluated based on an equitable comparison and consistent application of all water management strategies. While the draft IPP acknowledges this requirement in the listing of evaluation criteria provided in Section 5.9.2, it could not be determined how this requirement is addressed. Please indicate in the plan how this requirement is addressed.

Response: The following language is added to Chapter 5 Section 5.9.2.

The Regional Planning Group members then equitably compared each evaluation criteria, along with the cost and volume comparison in TWDB Table 11 to determine the feasibility of each strategy in relation to other strategies proposed for each shortage. Where appropriate, the Group specifically considered cost-effective water-management strategies that are environmentally sensitive. The Planning Group chose not to prioritize the strategies but rather to retain all feasible strategies.

55. Phase II, Task 4 (C) in the scope of work indicates that the “environmental committee will assist in the evaluation of strategies pertaining to natural resource water needs.” Please indicate in the plan how this scope of work item is addressed.

Response: A discussion on the tasks of the environmental committee is added as the last paragraph to Chapter 7 Section 7.3.

Members of the environmental committee were charged with the responsibility of providing guidance and assistance on all work related to environmental and natural resource water needs issues. The committee also reviewed environmental and natural resource impact evaluations of the supply-shortage strategies. Staff of the Texas Parks and Wildlife Department stationed in Kerr (Mr. Richard Luebke) and Val Verde Counties worked with the environmental committee and provided their expertise.

56. TWDB rules [§357.7(a)(7)(H)] require that water management strategies be evaluated based on consideration of third party social and economic impacts. While the draft IPP acknowledges this requirement in the listing of evaluation criteria provided in Section 5.9.2, there are a number of strategy evaluations that leave this evaluation blank. Please provide the missing information.

Response: Third party social and economic impact analysis is added to all strategies. However, TWDB’s Rule regarding third party social and

economic impacts does not give clear direction as to whether the Rule applies to surface water, to ground water, or to both. If the Rule applies to surface water, the Plateau RWPG notes that TNRCC performs a level of detail in their permitting studies that exceeds the level of detail of study possible in a regional water supply plan. If the Rule applies to ground water, it does not give clear direction as to how third party social and economic impacts can be evaluated given lack of groundwater data (e.g., aquifer drawdown). It is hoped that TWDB will clarify this Rule in the future.

57. TWDB rules [§357.5(e)(4)] require that water management strategies be selected so that the cost effective water management strategies, which are environmentally sensitive, are considered and pursued, where appropriate. The process for selecting water management strategies is not discussed in the draft IPP and therefore staff is unable to determine whether this rule requirement is addressed. Please indicate in the plan how this requirement is addressed.

Response: The following language is added to Chapter 5 Section 5.9.2.
Where appropriate, the Group specifically considered cost-effective water-management strategies that are environmentally sensitive.

58. TWDB rules [§357.13 and §357.7(a)(8)] require projects proposed to TWDB for funding to be consistent with specific recommendations contained in the approved regional water plan. To facilitate this decision-making process, it is crucial that water management strategy evaluations (and the associated TWDB Tables 5 and 12) included in chapter 5 of the draft IPP be complete with specific details included related to source of water for the proposed strategy. TWDB staff has noted that some of the strategy evaluations are not completely filled-in. Please review all strategy evaluations and provide missing information as appropriate.

Response: All strategies are now complete.

CHAPTER 7

59. The TWDB contract requires the regional water plan to include chapter 7 describing public participation activities, facilitation, and plan implementation issues. The required chapter 7 could not be located in the draft IPP submitted. Please provide the missing chapter.

Response: Plan Adoption - Chapter 7 is contained in the final plan.

OTHER

60. The TWDB contract (Exhibit B, Section 1.7.5) requires the regional water plan to include summary tables, which present subtotals for the various water user groups

and major water providers. This information could not be located in the draft IPP submitted. Please provide the missing summary tables.

Response: Summary table is provided with other TWDB required tables.

61. The TWDB contract (Article III, Paragraph I) requires the transfer of all data and reports generated by the planning process and used in the development of the regional water plan. The draft IPP submitted does not include these supporting data. Please provide the missing information.

Response: The completed plan, reports, appendices, and other required data has been prepared for transfer to the TWDB.

TWDB STAFF COMMENTS

NOVEMBER 21, 2000

1.

Senate Bill 1 requires future projects to be consistent with the approved regional water plans to be eligible for Texas Water Development Board (TWDB) funding and Texas Natural Resource Conservation Commission (TNRCC) permitting.

The provision related to TNRCC is found in Texas Water Code §11.134. It provides that the Commission shall grant an application to appropriate surface water, including amendments, only if the proposed appropriation address a water supply need in a manner that is consistent with an approved regional water plan. TNRCC may waive this requirement if conditions warrant.

For TWDB funding, Texas Water Code §16.053(j) states that "after January 5, 2002, TWDB may provide financial assistance to a water supply project only after the Board determines that the needs to be addressed by the project will be addressed in a manner that is consistent with that appropriate regional water plan." The TWDB may waive this provision if conditions warrant.

Before finalizing the regional water plans, the Regional Water Planning Groups (RWPG) should consider the scope of their plan against the variety of proposals that could be brought before TNRCC and TWDB and ensure the group's intentions are clear to these agencies. For example, TNRCC considers water right applications for irrigation, hydroelectric power, and industrial purposes, in addition to water right applications for municipal purposes. It also considers other miscellaneous types of applications, such as navigation or recreation uses. Many of these applications are for small amounts of water, often less than 1,000 acre-feet per year. Some are temporary. To ensure that small applications are consistent with the regional water plan, the RWPGs should consider adding specific language to their plans indicating that surface water uses that will not have a significant impact on the region's water supply are consistent with the regional water plan even though not specifically recommended in the plan.

TWDB receives applications for financial assistance for many types of water supply projects. Some involve repairing plants and pipelines and constructing new water towers. The RWPGs should consider adding specific language to their regional water

plans to indicate that the water supply projects that do not involve the development of or connection to a new water source are consistent with the regional water plan even though not specifically recommended in the plan.

Response: The following suggested language is added to Chapter 5 Section 5.10.
The Plateau Regional Planning Group determined that surface water uses that will not have a significant impact on the region's water supply are consistent with the regional water plan even though not specifically recommended in the plan. Also, the Group determined that water supply projects that do not involve the development of or connection to a new water source are consistent with the regional water plan even though not specifically recommended in the plan.

2. TWDB rules [§357.7(a)(1)] and Phase I, Task 2 (A) in the scope of work require a summary of all water management plans. Section 1.7 includes a listing of water management plans of various entities in the region. TWDB staff notes that the Real and Edwards County Conservation and Reclamation District groundwater management plan, which was certified as administratively complete by TWDB in September 1999, was not included in the list of water management plans. In addition, the rules require that the plans be summarized. Please add the above noted district to the listing and provide the missing summaries.

Response: A summary of the Real-Edwards County Conservation and Reclamation District management plan is contained in the Chapter 1 appendices.

3. Strategy #10-5 (pages 5A-9 through 5A-11), Aquifer Storage and Recovery for Springhills Water Management District (County other in Bandera County): TWDB staff notes that the rule-required assessments of reliability, environmental issues, and impact on other water resources are all based on the undetermined compatibility of treated water from the Medina/Diversion Lake system and the native groundwater (in unspecified units of the Trinity aquifer). In addition, the strategy evaluation did not contain any determination of whether the Trinity aquifer could reliably recharge or yield the water to be stored at a feasible rate, a specification of the location of the strategy, or water transport costs. Please provide this missing information.

TWDB staff has also noted that strategy #10-5 relies on surface water from the Medina/Diversion Lake system. In Chapter 3 and TWDB Exhibit B Table 5, the firm yield for Medina/Diversion Lake system is reported as zero under drought-of-record conditions. Based on the strategy description and evaluation provided, TWDB staff is unable to determine what amount of water the region is assuming will be available for recovery via the proposed ASR project. In order to evaluate this water management strategy, it is necessary for the contractor to analyze the amount of water that would be stored in the ASR project during non-drought periods and the amount of water that would likely be recoverable during drought-

of-record conditions. Once this analysis is completed, the value of recoverable water using the ASR project could be reported in TWDB Table 12. Please provide the necessary analyses and modify tables and text as appropriate.

Response: Above elements of Strategy #10-5 are amended.

4. In Table 3-2 (Chapter 3 appendix), the water supply availability values presented for the Edwards-Trinity (Plateau) aquifer in Kerr County are not consistent with the values presented in the corresponding TWDB Exhibit B tables. Please reconcile the values in Table 3-2 to match Exhibit B tables.

Response: Corrections to appropriate tables are made.

5. In Section 3.2.1 of the draft IPP, the fourth paragraph contains the following conflicting statements: "A storage coefficient of 1 percent (0.01) was applied to the total aquifer volumes of the Trinity age rocks and 2 percent (0.02) was applied to the Edwards aquifer due to the relative differences of the transmissivities of the two units. Because all of the water in storage in an aquifer cannot be drained from the pores of that aquifer, a conservative 30 percent specific yield was applied to the calculated aquifer storage volumes." As defined in the previously cited references, the storage coefficient and specific yield of an aquifer are equivalent values. The statements are in conflict regarding which valuation of the specific yield/storage coefficient is applied to aquifer volumes to determine the amount of water in storage. Please review and clarify this item in the final plan.

Response: The specific yield term in Section 3.2.1 is replaced with recoverable yield to indicate a realistic volume of water capable of being delivered to the surface.

Suggestions offered in Section 2 of the November 8th and November 21st TWDB comment letters were reviewed and acted upon where time allowed and where the Regional Planning Group was in agreement.

TWDB TABLES



**TWDB TABLE 1
POPULATION BY CITY AND RURAL COUNTY**

Water User Group Name	County Name	Basin Name	Water User Group ID	RWPG	Seq. No.	City No.	County No.	Basin No.	P1996	P2000	P2010	P2020	P2030	P2040	P2050
BANDERA	BANDERA	SAN ANTONIO	100053000	J	53	36	10	19	1216	1679	2191	2268	2545	2856	3205
COUNTY-OTHER	BANDERA	GUADALUPE	100996010	J	996	757	10	18	181	245	408	422	473	531	596
COUNTY-OTHER	BANDERA	SAN ANTONIO	100996010	J	996	757	10	19	11953	15920	26431	27355	30700	34451	38660
COUNTY-OTHER	BANDERA	NUECES	100996010	J	996	757	10	21	1023	1368	2270	2350	2636	2959	3321
ROCKSPRINGS	EDWARDS	COLORADO	100765000	J	765	512	69	14	1388	1301	1448	1551	1648	1715	1779
ROCKSPRINGS	EDWARDS	NUECES	100765000	J	765	512	69	21	154	144	161	172	183	191	198
COUNTY-OTHER	EDWARDS	COLORADO	100996069	J	996	757	69	14	368	302	337	360	383	399	414
COUNTY-OTHER	EDWARDS	NUECES	100996069	J	996	757	69	21	821	676	753	806	857	891	925
COUNTY-OTHER	EDWARDS	RIO GRANDE	100996069	J	996	757	69	23	147	121	134	144	153	159	165
KERRVILLE	KERR	GUADALUPE	100468000	J	468	320	133	18	20736	21191	25580	30425	35310	39784	44383
INGRAM	KERR	GUADALUPE		J			133	18		6745	7934	9004	9950	11112	12411
COUNTY-OTHER	KERR	COLORADO	100996133	J	996	757	133	14	712	792	929	1052	1161	1295	1445
COUNTY-OTHER	KERR	GUADALUPE	100996133	J	996	757	133	18	18822	14755	17283	19560	21576	24045	26811
COUNTY-OTHER	KERR	SAN ANTONIO	100996133	J	996	757	133	19	29	45	53	60	66	74	83
COUNTY-OTHER	KERR	NUECES	100996133	J	996	757	133	21	258	294	345	391	431	481	536
BRACKETTVILLE	KINNEY	RIO GRANDE	100104000	J	104	70	136	23	1892	3138	3278	3357	3357	3357	3357
COUNTY-OTHER	KINNEY	NUECES	100996136	J	996	757	136	21	531	524	548	561	561	561	561
COUNTY-OTHER	KINNEY	RIO GRANDE	100996136	J	996	757	136	23	966	953	995	1019	1019	1019	1019
CAMP WOOD	REAL	NUECES	100140000	J	140	838	193	21	796	668	635	592	552	536	526
LEAKEY	REAL	NUECES	100513000	J	513	351	193	21	438	422	436	513	576	645	722
COUNTY-OTHER	REAL	COLORADO	100996193	J	996	757	193	14	130	164	172	175	178	179	178
COUNTY-OTHER	REAL	NUECES	100996193	J	996	757	193	21	1376	1787	1876	1905	1941	1949	1944
DEL RIO	VAL VERDE	RIO GRANDE	100237000	J	237	157	233	23	34344	36390	40988	44960	-47385	50182	53144
LAUGHLIN AFB	VAL VERDE	RIO GRANDE	100511000	J	511	348	233	23	2944	2556	2556	2556	2556	2556	2556
COUNTY-OTHER	VAL VERDE	RIO GRANDE	100996233	J	996	757	233	23	6003	8330	8006	7517	6954	8887	11146

Source: 1997 Consensus State Water Plan. Values in bold type have been revised by the Plateau Regional Planning Group.



**TWDB TABLE 2
WATER DEMAND BY CITY AND WATER USE CATEGORY**

Water User Group Name	County Name	Basin Name	Data Cat.	Water User Group ID	RWPG	Seq. No.	City No.	County No.	Basin No.	D1996	D2000	D2010	D2020	D2030	D2040	D2050
BANDERA	BANDERA	SAN ANTONIO	MUN	100053000	J	53	36	10	19	250	303	371	376	413	454	506
COUNTY-OTHER	BANDERA	GUADALUPE	MUN	100996010	J	996	757	10	18	23	41	64	63	69	76	84
COUNTY-OTHER	BANDERA	SAN ANTONIO	MUN	100996010	J	996	757	10	19	1519	2657	4174	4075	4470	4940	5456
COUNTY-OTHER	BANDERA	NUECES	MUN	100996010	J	996	757	10	21	130	228	359	350	384	424	469
MANUFACTURING	BANDERA	GUADALUPE	MFG	101001010	J	1001	0	10	18	0	0	0	0	0	0	0
MANUFACTURING	BANDERA	SAN ANTONIO	MFG	101001010	J	1001	1001	10	19	0	0	0	0	0	0	0
MANUFACTURING	BANDERA	NUECES	MFG	101001010	J	1001	1001	10	21	0	11	13	15	16	19	22
STEAM ELECTRIC POWER	BANDERA	GUADALUPE	PWR	101002010	J	1002	1002	10	18	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	BANDERA	SAN ANTONIO	PWR	101002010	J	1002	1002	10	19	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	BANDERA	NUECES	PWR	101002010	J	1002	1002	10	21	0	0	0	0	0	0	0
MINING	BANDERA	GUADALUPE	MIN	101003010	J	1003	1003	10	18	0	0	0	0	0	0	0
MINING	BANDERA	SAN ANTONIO	MIN	101003010	J	1003	1003	10	19	23	25	25	26	27	27	27
MINING	BANDERA	NUECES	MIN	101003010	J	1003	1003	10	21	0	0	0	0	0	0	0
IRRIGATION	BANDERA	GUADALUPE	IRR	101004010	J	1004	1004	10	18	0	0	0	0	0	0	0
IRRIGATION	BANDERA	SAN ANTONIO	IRR	101004010	J	1004	1004	10	19	404	170	163	155	149	142	136
IRRIGATION	BANDERA	NUECES	IRR	101004010	J	1004	1004	10	21	61	108	103	99	94	91	87
LIVESTOCK	BANDERA	GUADALUPE	STK	101005010	J	1005	1005	10	18	5	6	6	6	6	6	6
LIVESTOCK	BANDERA	SAN ANTONIO	STK	101005010	J	1005	1005	10	19	203	230	230	230	230	230	230
LIVESTOCK	BANDERA	NUECES	STK	101005010	J	1005	1005	10	21	86	97	97	97	97	97	97
ROCKSPRINGS	EDWARDS	COLORADO	MUN	100765000	J	765	512	69	14	267	264	279	285	295	302	311
ROCKSPRINGS	EDWARDS	NUECES	MUN	100765000	J	765	512	69	21	30	29	31	32	33	34	35
COUNTY-OTHER	EDWARDS	COLORADO	MUN	100996069	J	996	757	69	14	46	38	39	39	40	41	42
COUNTY-OTHER	EDWARDS	NUECES	MUN	100996069	J	996	757	69	21	102	84	87	88	89	91	93
COUNTY-OTHER	EDWARDS	RIO GRANDE	MUN	100996069	J	996	757	69	23	18	15	15	16	16	16	17
MANUFACTURING	EDWARDS	COLORADO	MFG	101001069	J	1001	1001	69	14	0	0	0	0	0	0	0
MANUFACTURING	EDWARDS	NUECES	MFG	101001069	J	1001	1001	69	21	0	0	0	0	0	0	0
MANUFACTURING	EDWARDS	RIO GRANDE	MFG	101001069	J	1001	1001	69	23	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	EDWARDS	COLORADO	PWR	101002069	J	1002	1002	69	14	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	EDWARDS	NUECES	PWR	101002069	J	1002	1002	69	21	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	EDWARDS	RIO GRANDE	PWR	101002069	J	1002	1002	69	23	0	0	0	0	0	0	0
MINING	EDWARDS	COLORADO	MIN	101003069	J	1003	1003	69	14	6	8	6	4	3	1	0
MINING	EDWARDS	NUECES	MIN	101003069	J	1003	1003	69	21	0	0	0	0	0	0	0
MINING	EDWARDS	RIO GRANDE	MIN	101003069	J	1003	1003	69	23	0	0	0	0	0	0	0
IRRIGATION	EDWARDS	COLORADO	IRR	101004069	J	1004	1004	69	14	143	239	229	219	210	201	192
IRRIGATION	EDWARDS	NUECES	IRR	101004069	J	1004	1004	69	21	0	0	0	0	0	0	0
IRRIGATION	EDWARDS	RIO GRANDE	IRR	101004069	J	1004	1004	69	23	0	0	0	0	0	0	0
LIVESTOCK	EDWARDS	COLORADO	STK	101005069	J	1005	1005	69	14	131	190	190	190	190	190	190
LIVESTOCK	EDWARDS	NUECES	STK	101005069	J	1005	1005	69	21	176	254	254	254	254	254	254
LIVESTOCK	EDWARDS	RIO GRANDE	STK	101005069	J	1005	1005	69	23	119	171	171	171	171	171	171

TWDB TABLE 2 (continued)
WATER DEMAND BY CITY AND WATER USE CATEGORY

Water User Group Name	County Name	Basin Name	Data Cat.	Water User Group ID	RWPG	Seq. No.	City No.	County No.	Basin No.	D1996	D2000	D2010	D2020	D2030	D2040	D2050
KERRVILLE	KERR	GUADALUPE	MUN	100468000	J	468	320	133	18	4228	4747	5444	6169	7040	7799	8650
INGRAM	KERR	GUADALUPE	MUN		J			133	18		144	132	122	119	116	115
COUNTY-OTHER	KERR	COLORADO	MUN	100996133	J	996	757	133	14	100	135	147	155	166	180	199
COUNTY-OTHER	KERR	GUADALUPE	MUN	100996133	J	996	757	133	18	2639	3517	3864	4079	4381	4769	5286
COUNTY-OTHER	KERR	SAN ANTONIO	MUN	100996133	J	996	757	133	19	4	8	8	9	9	10	11
COUNTY-OTHER	KERR	NUECES	MUN	100996133	J	996	757	133	21	36	50	55	57	62	67	74
MANUFACTURING	KERR	COLORADO	MFG	101001133	J	1001	1001	133	14	0	0	0	0	0	0	0
MANUFACTURING	KERR	GUADALUPE	MFG	101001133	J	1001	1001	133	18	23	30	33	36	38	41	44
MANUFACTURING	KERR	SAN ANTONIO	MFG	101001133	J	1001	1001	133	19	0	0	0	0	0	0	0
MANUFACTURING	KERR	NUECES	MFG	101001133	J	1001	1001	133	21	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KERR	COLORADO	PWR	101002133	J	1002	1002	133	14	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KERR	GUADALUPE	PWR	101002133	J	1002	1002	133	18	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KERR	SAN ANTONIO	PWR	101002133	J	1002	1002	133	19	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KERR	NUECES	PWR	101002133	J	1002	1002	133	21	0	0	0	0	0	0	0
MINING	KERR	COLORADO	MIN	101003133	J	1003	1003	133	14	6	13	9	5	1	0	0
MINING	KERR	GUADALUPE	MIN	101003133	J	1003	1003	133	18	167	163	113	105	102	102	105
MINING	KERR	SAN ANTONIO	MIN	101003133	J	1003	1003	133	19	0	0	0	0	0	0	0
MINING	KERR	NUECES	MIN	101003133	J	1003	1003	133	21	0	0	0	0	0	0	0
IRRIGATION	KERR	COLORADO	IRR	101004133	J	1004	1004	133	14	0	0	0	0	0	0	0
IRRIGATION	KERR	GUADALUPE	IRR	101004133	J	1004	1004	133	18	1366	823	797	771	747	723	700
IRRIGATION	KERR	SAN ANTONIO	IRR	101004133	J	1004	1004	133	19	0	0	0	0	0	0	0
IRRIGATION	KERR	NUECES	IRR	101004133	J	1004	1004	133	21	0	0	0	0	0	0	0
LIVESTOCK	KERR	COLORADO	STK	101005133	J	1005	1005	133	14	110	135	135	135	135	135	135
LIVESTOCK	KERR	GUADALUPE	STK	101005133	J	1005	1005	133	18	288	350	350	350	350	350	350
LIVESTOCK	KERR	SAN ANTONIO	STK	101005133	J	1005	1005	133	19	31	37	37	37	37	37	37
LIVESTOCK	KERR	NUECES	STK	101005133	J	1005	1005	133	21	3	4	4	4	4	4	4
BRACKETTVILLE	KINNEY	RIO GRANDE	MUN	100104000	J	104	70	136	23	540	896	892	865	839	839	835
COUNTY-OTHER	KINNEY	NUECES	MUN	100996136	J	996	757	136	21	224	252	245	237	247	269	292
COUNTY-OTHER	KINNEY	RIO GRANDE	MUN	100996136	J	996	757	136	23	407	459	445	432	450	488	531
MANUFACTURING	KINNEY	NUECES	MFG	101001136	J	1001	1001	136	21	0	0	0	0	0	0	0
MANUFACTURING	KINNEY	RIO GRANDE	MFG	101001136	J	1001	1001	136	23	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KINNEY	NUECES	PWR	101002136	J	1002	1002	136	21	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	KINNEY	RIO GRANDE	PWR	101002136	J	1002	1002	136	23	0	0	0	0	0	0	0
MINING	KINNEY	NUECES	MIN	101003136	J	1003	1003	136	21	0	0	0	0	0	0	0
MINING	KINNEY	RIO GRANDE	MIN	101003136	J	1003	1003	136	23	0	0	0	0	0	0	0
IRRIGATION	KINNEY	NUECES	IRR	101004136	J	1004	1004	136	21	403	192	184	176	168	161	154
IRRIGATION	KINNEY	RIO GRANDE	IRR	101004136	J	1004	1004	136	23	7664	7340	7025	6724	6436	6160	5897
LIVESTOCK	KINNEY	NUECES	STK	101005136	J	1005	1005	136	21	195	283	283	283	283	283	283
LIVESTOCK	KINNEY	RIO GRANDE	STK	101005136	J	1005	1005	136	23	270	392	392	392	392	392	392

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TWDB TABLE 2 (continued)
WATER DEMAND BY CITY AND WATER USE CATEGORY

Water User Group Name	County Name	Basin Name	Data Cat.	Water User Group ID	RWPG	Seq. No.	City No.	County No.	Basin No.	D1996	D2000	D2010	D2020	D2030	D2040	D2050
CAMP WOOD	REAL	NUECES	MUN	100140000	J	140	838	193	21	184	180	163	145	133	127	124
LEAKEY	REAL	NUECES	MUN	100513000	J	513	351	193	21	139	157	156	176	195	217	243
COUNTY-OTHER	REAL	COLORADO	MUN	100996193	J	996	757	193	14	30	32	33	32	33	32	32
COUNTY-OTHER	REAL	NUECES	MUN	100996193	J	996	757	193	21	313	353	354	348	355	354	345
MANUFACTURING	REAL	COLORADO	MFG	101001193	J	1001	1001	193	14	0	0	0	0	0	0	0
MANUFACTURING	REAL	NUECES	MFG	101001193	J	1001	1001	193	21	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	REAL	COLORADO	PWR	101002193	J	1002	1002	193	14	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	REAL	NUECES	PWR	101002193	J	1002	1002	193	21	0	0	0	0	0	0	0
MINING	REAL	COLORADO	MIN	101003193	J	1003	1003	193	14	6	13	9	5	2	0	0
MINING	REAL	NUECES	MIN	101003193	J	1003	1003	193	21	0	0	0	0	0	0	0
IRRIGATION	REAL	COLORADO	IRR	101004193	J	1004	1004	193	14	0	0	0	0	0	0	0
IRRIGATION	REAL	NUECES	IRR	101004193	J	1004	1004	193	21	408	835	799	765	732	701	670
LIVESTOCK	REAL	COLORADO	STK	101005193	J	1005	1005	193	14	20	28	28	28	28	28	28
LIVESTOCK	REAL	NUECES	STK	101005193	J	1005	1005	193	21	108	146	146	146	146	146	146
DEL RIO	VAL VERDE	RIO GRANDE	MUN	100237000	J	237	157	233	23	10852	12106	12993	13648	14225	14896	15716
LAUGHLIN AFB	VAL VERDE	RIO GRANDE	MUN	100511000	J	511	348	233	23	1455	1446	1394	1343	1331	1320	1317
COUNTY-OTHER	VAL VERDE	RIO GRANDE	MUN	100996233	J	996	757	233	23	1861	1642	1498	1330	1192	1533	1860
MANUFACTURING	VAL VERDE	RIO GRANDE	MFG	101001233	J	1001	1001	233	23	0	0	0	0	0	0	0
STEAM ELECTRIC POWER	VAL VERDE	RIO GRANDE	PWR	101002233	J	1002	1002	233	23	0	0	0	0	0	0	0
MINING	VAL VERDE	RIO GRANDE	MIN	101003233	J	1003	1003	233	23	99	114	121	138	155	172	191
IRRIGATION	VAL VERDE	RIO GRANDE	IRR	101004233	J	1004	1004	233	23	1598	1771	1702	1637	1573	1513	1454
LIVESTOCK	VAL VERDE	RIO GRANDE	STK	101005233	J	1005	1005	233	23	534	663	663	663	663	663	663

Source: 1997 Consensus State Water Plan. Values in bold type have been revised by the Plateau Regional Planning Group.



**TWDB TABLE 3
WATER USE BY MAJOR WATER PROVIDER (IN ACRE-FEET)**

Major Water Provider	Receiving Entity	City	County	Basin	Use Cat.	Major Water Provider No.	Receiving Entity No.	Water User Group ID	Reg. Water Plan Group	Seq. No.	City No.	County No.	Basin No.	D1996	D2000	D2010	D2020	D2030	D2040	D2050
City of Del Rio	City of Del Rio	City of Del Rio	Val Verde	Rio Grande	Mun	221200	221200	100237000	J	237	157	233	23	10852	12106	12993	13648	14225	14896	15716
City of Del Rio	County Other	County Other	Val Verde	Rio Grande	Mun	221200		100996233	J	996	757	233	23	16	16	16	16	16	16	16
City of Del Rio	Laughlin A.F.B.	Laughlin AFB	Val Verde	Rio Grande	Mun	221200	889180	100511000	J	511	348	233	23	1455	1446	1394	1343	1331	1320	1317



TWDB TABLE 4

TOTAL WATER SUPPLY AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS

Water Supply Source	Type of Water Supply	Regional Planning Group	County No.	Basin No.	Specific Source ID	S2000	S2010	S2020	S2030	S2040	S2050
South Llano River	00	J	69	14	14540	2,632	2,632	2,632	2,632	2,632	2,632
Upper Guadalupe River	00	J	133	18	18010	6,867	6,867	6,867	6,867	6,867	6,867
Medina River	00	J	10	19	19540	3,367	3,367	3,367	3,367	3,367	3,367
Medina Lake	00	J	10	19	19010	0	0	0	0	0	0
Sabinal River	00	J	10	21	21030	3,943	3,943	3,943	3,943	3,943	3,943
Hondo Creek	00	J	10	21	21550	0	0	0	0	0	0
West Nueces	00	J	69	21	21540	267	267	267	267	267	267
West Nueces	00	J	136	21	21540	443	443	443	443	443	443
Nueces River	00	J	69	21	21500	1	1	1	1	1	1
Nueces River	00	J	193	21	21500	7,001	7,001	7,001	7,001	7,001	7,001
Frio River	00	J	193	21	21560	1,294	1,294	1,294	1,294	1,294	1,294
Pecos River	00	J	233	23	23560	0	0	0	0	0	0
Devil's River	00	J	233	23	23570	0	0	0	0	0	0
San Felipe Springs	00	J	233	23	23580	36,600	36,600	36,600	36,600	36,600	36,600
Canyon Lake	00	L	46	18	18020	36,000	36,000	36,000	36,000	36,000	36,000
Other Local Supply	00	J	193	21	21999	722	722	722	722	722	722
Trinity	01	J	133	18	13328	178,100	173,700	168,900	163,700	158,000	151,600
Trinity	01	J	10	21	01028	250,000	250,000	250,000	250,000	249,948	249,948
Trinity	01	J	193	21	19328	10,700	10,700	10,700	10,700	10,651	10,651
Trinity	01	J	10	19	01028	455,900	455,900	455,900	455,900	455,906	455,906
Trinity	01	J	133	19	13328	26,100	26,100	26,100	26,100	26,140	26,140
Edwards-Trinity (Plateau)	01	J	69	14	06913	492,700	492,700	492,700	492,700	492,687	492,687
Edwards-Trinity (Plateau)	01	J	133	14	13313	192,200	192,200	192,200	192,200	192,211	192,211
Edwards-Trinity (Plateau)	01	J	193	14	19313	48,800	48,800	48,800	48,800	48,795	48,795
Edwards-Trinity (Plateau)	01	J	10	18	01013	12,000	12,000	12,000	12,000	11,968	11,968
Edwards-Trinity (Plateau)	01	J	133	18	13313	505,300	505,300	505,300	505,300	505,320	505,320
Edwards-Trinity (Plateau)	01	J	10	19	01013	172,500	172,500	172,500	172,500	172,515	172,515
Edwards-Trinity (Plateau)	01	J	133	19	13313	26,600	26,600	26,600	26,600	26,622	26,622
Edwards-Trinity (Plateau)	01	J	10	21	01013	79,200	79,200	79,200	79,200	79,203	79,203
Edwards-Trinity (Plateau)	01	J	69	21	06913	715,800	715,800	715,800	715,800	715,827	715,827
Edwards-Trinity (Plateau)	01	J	133	21	13313	17,800	17,800	17,800	17,800	17,802	17,802
Edwards-Trinity (Plateau)	01	J	136	21	13613	136,900	136,900	136,900	136,900	136,892	136,892
Edwards-Trinity (Plateau)	01	J	193	21	19313	494,800	494,800	494,800	494,800	494,764	494,764
Edwards-Trinity (Plateau)	01	J	69	23	06913	521,900	521,900	521,900	521,900	521,897	521,897
Edwards-Trinity (Plateau)	01	J	136	23	13613	753,600	753,600	753,600	753,600	753,567	753,567
Edwards-Trinity (Plateau)	01	J	233	23	23313	3,199,700	3,199,700	3,199,700	3,199,700	3,199,650	3,199,650
Edwards(Balcones Fault Zone)	01	J	136	21	13611	331,200	331,200	331,200	331,200	331,232	331,232
Austin Chalk	01	J	136	21	13622	45,200	45,200	45,200	45,200	45,245	45,245
Austin Chalk	01	J	136	23	13622	75,400	75,400	75,400	75,400	75,413	75,413
Other Aquifer (Frio River Alluvium)	01	J	193	21	19322	2,800	2,800	2,800	2,800	2,800	2,800



TWDB TABLE 5
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	User Regional Planning Group	Seq. No.	City No.	User County No.	User Basin No.	Type of Supply Source	Source Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
Bandera	100053000	J	53	36	10	19	01	J	10	19	01028	Trinity	1612	1612	1612	1612	1612	1612
County Other	100996010	J	996	757	10	18	01	J	10	18	01013	Edwards-Trinity (Plateau)	23	23	23	23	23	23
County Other (Aqua Source)	100996010	J	996	757	10	19	03	J	10	19	01028	Trinity	515	515	515	515	515	515
County Other	100996010	J	996	757	10	19	01	J	10	19	01013	Edwards-Trinity (Plateau)	50	50	50	50	50	50
County Other	100996010	J	996	757	10	19	01	J	10	19	01028	Trinity	954	954	954	954	954	954
County Other	100996010	J	996	757	10	21	01	J	10	21	01013	Edwards-Trinity (Plateau)	10	10	10	10	10	10
County Other	100996010	J	996	757	10	21	01	J	10	21	01028	Trinity	120	120	120	120	120	120
County Other	100996010	J	996	757	10	19	00	J	10	19	19540	Medina River	0	0	0	0	0	0
County Other	100996010	J	996	757	10	21	00	J	10	21	21030	Sabinal River	1	1	1	1	1	1
Manufacturing										18								
Manufacturing										19								
Manufacturing	101001010	J	1001	1001	10	21	01	J	10	21	01028	Trinity	43	43	43	43	43	43
Steam Electric Power										18								
Steam Electric Power										19								
Steam Electric Power										21								
Mining										18								
Mining	101003010	J	1003	1003	10	19	01	J	10	19	01028	Trinity	15	15	15	15	15	15
Mining	101003010	J	1003	1003	10	21	01	J	10	21	01028	Trinity	8	8	8	8	8	8
Irrigation	101004010	J	1004	1004	10	19	01	J	10	19	01028	Trinity	190	190	190	190	190	190
Irrigation	101004010	J	1004	1004	10	21	01	J	10	21	01028	Trinity	108	108	108	108	108	108
Irrigation	101004010	J	1004	1004	10	19	00	J	10	19	19540	Medina River	0	0	0	0	0	0
Irrigation	101004010	J	1004	1004	10	21	00	J	10	21	21550	Hondo Creek	0	0	0	0	0	0
Irrigation	101004010	J	1004	1004	10	21	00	J	10	21	21030	Sabinal River	0	0	0	0	0	0
Livestock	101005010	J	1005	1005	10	19	01	J	10	19	01028	Trinity	177	177	177	177	177	177
Livestock	101005010	J	1005	1005	10	21	01	J	10	21	01028	Trinity	84	84	84	84	84	84
Livestock	101005010	J	1005	1005	10	18	01	J	10	18	01013	Edwards-Trinity (Plateau)	6	6	6	6	6	6
Livestock	101005010	J	1005	1005	10	19	01	J	10	19	01013	Edwards-Trinity (Plateau)	17	17	17	17	17	17
Livestock	101005010	J	1005	1005	10	21	01	J	10	21	01013	Edwards-Trinity (Plateau)	17	17	17	17	17	17
Livestock	101005010	J	1005	1005	10	19	00	J	10	19	19540	Medina River	36	36	36	36	36	36
Livestock	101005010	J	1005	1005	10	21	00	J	10	21	21550	Hondo Creek	18	18	18	18	18	18
Livestock	101005010	J	1005	1005	10	21	00	J	10	21	21030	Sabinal River	18	18	18	18	18	18
Rocksprings	100765000	J	765	512	69	14	01	J	69	14	06913	Edwards-Trinity (Plateau)	885	885	885	885	885	885
Rocksprings	100765000	J	765	512	69	21	01	J	69	21	06913	Edwards-Trinity (Plateau)	97	97	97	97	97	97

TWDB TABLE 5 (continued)
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	User Regional Planning Group	Seq. No.	City No.	User County No.	User Basin No.	Type of Supply Source	Source Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
County Other	100996069	J	996	757	69	14	01	J	69	14	06913	Edwards-Trinity (Plateau)	46	46	46	46	46	46
County Other	100996069	J	996	757	69	21	01	J	69	21	06913	Edwards-Trinity (Plateau)	102	102	102	102	102	102
County Other	100996069	J	996	757	69	23	01	J	69	23	06913	Edwards-Trinity (Plateau)	18	18	18	18	18	18
Manufacturing										14								
Manufacturing										21								
Manufacturing										23								
Steam Electric Power										14								
Steam Electric Power										21								
Steam Electric Power										23								
Mining	101003069	J	1003	1003	69	14	01	J	69	14	06913	Edwards-Trinity (Plateau)	8	8	8	8	8	8
Mining	101003069	J	1003	1003	69	21	01	J	69	21	06913	Edwards-Trinity (Plateau)	2	2	2	2	2	2
Mining	101003069	J	1003	1003	69	23	01	J	69	23	06913	Edwards-Trinity (Plateau)	2	2	2	2	2	2
Irrigation	101004069	J	1004	1004	69	14	01	J	69	14	06913	Edwards-Trinity (Plateau)	100	100	100	100	100	100
Irrigation	101004069	J	1004	1004	69	21	01	J	69	21	06913	Edwards-Trinity (Plateau)	23	23	23	23	23	23
Irrigation	101004069	J	1004	1004	69	23	01	J	69	23	06913	Edwards-Trinity (Plateau)	20	20	20	20	20	20
Irrigation	101004069	J	1004	1004	69	14	00	J	69	14	14540	South Llano River	0	0	0	0	0	0
Irrigation	101004069	J	1004	1004	69	21	00	J	69	21	21540	West Nueces River	0	0	0	0	0	0
Irrigation	101004069	J	1004	1004	69	21	00	J	69	21	21500	Nueces River	0	0	0	0	0	0
Livestock	101005069	J	1005	1005	69	14	01	J	69	14	06913	Edwards-Trinity (Plateau)	164	164	164	164	164	164
Livestock	101005069	J	1005	1005	69	21	01	J	69	21	06913	Edwards-Trinity (Plateau)	164	164	164	164	164	164
Livestock	101005069	J	1005	1005	69	23	01	J	69	23	06913	Edwards-Trinity (Plateau)	171	171	171	171	171	171
Livestock	101005069	J	1005	1005	69	21	00	J	69	21	21540	West Nueces River	62	62	62	62	62	62
Livestock	101005069	J	1005	1005	69	14	00	J	69	14	14540	South Llano River	61	61	61	61	61	61
Kerrville	100468000	J	468	320	133	18	01	J	133	18	13328	Trinity	3,200	3,200	3,200	3,200	3,200	3,200
Kerrville	100468000	J	468	320	133	18	00	J	133	18	18010	Upper Guadalupe River	0	0	0	0	0	0
Ingram		J				18	01	J	133	18	13328	Trinity	290	290	290	290	290	290

TWDB TABLE 5 (continued)
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	User Regional Planning Group	Seq. No.	City No.	User County No.	User Basin No.	Type of Supply Source	Source Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
County Other	100996133	J	996	757	133	18	00	J	133	18	18010	Upper Guadalupe River	0	0	0	0	0	0
County Other	100996133	J	996	757	133	14	01	J	133	14	13313	Edwards-Trinity (Plateau)	7,722	7,722	7,722	7,722	7,722	7,722
County Other	100996133	J	996	757	133	18	01	J	133	18	13313	Edwards-Trinity (Plateau)	17,208	17,208	17,208	17,208	17,208	17,208
County Other	100996133	J	996	757	133	18	01	J	133	18	13328	Trinity	7,746	7,746	7,746	7,746	7,746	7,746
County Other	100996133	J	996	757	133	19	01	J	133	19	13313	Edwards-Trinity (Plateau)	916	916	916	916	916	916
County Other	100996133	J	996	757	133	21	01	J	133	21	13313	Edwards-Trinity (Plateau)	481	481	481	481	481	481
Manufacturing										14								
Manufacturing	101001133	J	1001	1001	133	18	01	J	133	18	13328	Trinity	14	14	14	14	14	14
Manufacturing	101001133	J	1001	1001	133	18	01	J	133	18	13313	Edwards-Trinity (Plateau)	30	30	30	30	30	30
Manufacturing	101001133	J	1001	1001	133	18	00	J	133	18	18010	Upper Guadalupe River	0	0	0	0	0	0
Manufacturing										19								
Manufacturing										21								
Steam Electric Power										14								
Steam Electric Power										18								
Steam Electric Power										19								
Steam Electric Power										21								
Mining	101003133	J	1003	1003	133	14	01	J	133	14	13313	Edwards-Trinity (Plateau)	1	1	1	1	1	1
Mining	101003133	J	1003	1003	133	18	01	J	133	18	13328	Trinity	170	170	170	170	170	170
Mining	101003133	J	1003	1003	133	18	01	J	133	18	13313	Edwards-Trinity (Plateau)	3	3	3	3	3	3
Mining	101003133	J	1003	1003	133	18	00	J	133	18	18010	Upper Guadalupe River	0	0	0	0	0	0
Mining	101003133	J	1003	1003	133	19	01	J	133	19	13313	Edwards-Trinity (Plateau)	1	1	1	1	1	1
Mining	101003133	J	1003	1003	133	21	01	J	133	21	13313	Edwards-Trinity (Plateau)	1	1	1	1	1	1
Irrigation	101004133	J	1004	1004	133	18	01	J	133	18	13328	Trinity	406	406	406	406	406	406
Irrigation	101004133	J	1004	1004	133	18	00	J	133	18	18010	Upper Guadalupe River	49	49	49	49	49	49
Irrigation	101004133									14								
Irrigation	101004133									19								
Irrigation	101004133									21								
Livestock	101005133	J	1005	1005	133	14	01	J	133	14	13313	Edwards-Trinity (Plateau)	73	73	73	73	73	73

TWDB TABLE 5 (continued)
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	User Regional Planning Group	Seq. No.	City No.	User County No.	User Basin No.	Type of Supply Source	Source Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
Livestock	101005133	J	1005	1005	133	18	01	J	133	18	13328	Trinity	179	179	179	179	179	179
Livestock	101005133	J	1005	1005	133	18	01	J	133	18	13313	Edwards-Trinity (Plateau)	145	145	145	145	145	145
Livestock	101005133	J	1005	1005	133	19	01	J	133	19	13313	Edwards-Trinity (Plateau)	12	12	12	12	12	12
Livestock	101005133	J	1005	1005	133	21	01	J	133	21	13313	Edwards-Trinity (Plateau)	12	12	12	12	12	12
Livestock	101005133	J	1005	1005	133	18	00	J	133	18	18010	Upper Guadalupe River	105	105	105	105	105	105
Brackettville	100104000	J	104	70	136	23	01	J	136	21	13611	Edwards (Balcones Fault Zone)	2,338	2,338	2,338	2,338	2,338	2,338
County Other	100996136	J	996	757	136	21	01	J	136	21	13611	Edwards (Balcones Fault Zone)	112	112	112	112	112	112
County Other	100996136	J	996	757	136	21	01	J	136	21	13613	Edwards-Trinity (Plateau)	112	112	112	112	112	112
County Other	100996136	J	996	757	136	23	01	J	136	23	13613	Edwards-Trinity (Plateau)	204	204	204	204	204	204
County Other	100996136	J	996	757	136	23	01	J	136	23	13622	Austin Chalk	203	203	203	203	203	203
Manufacturing										21								
Manufacturing										23								
Steam Electric Power										21								
Steam Electric Power										23								
Mining										21								
Mining										23								
Irrigation	101004136	J	1004	1004	136	21	01	J	136	21	13611	Edwards (Balcones Fault Zone)	356	356	356	356	356	356
Irrigation	101004136	J	1004	1004	136	21	01	J	136	21	13613	Edwards-Trinity (Plateau)	867	867	867	867	867	867
Irrigation	101004136	J	1004	1004	136	21	01	J	136	21	13622	Austin Chalk	433	433	433	433	433	433
Irrigation	101004136	J	1004	1004	136	23	01	J	136	23	13613	Edwards-Trinity (Plateau)	4,912	4,912	4,912	4,912	4,912	4,912
Irrigation	101004136	J	1004	1004	136	23	01	J	136	23	13622	Austin Chalk	2,457	2,457	2,457	2,457	2,457	2,457
Irrigation	101004136	J	1004	1004	136	21	00	J	136	21	21540	West Nueces River	0	0	0	0	0	0
Livestock	101005136	J	1005	1005	136	21	01	J	136	21	13611	Edwards (Balcones Fault Zone)	82	82	82	82	82	82
Livestock	101005136	J	1005	1005	136	21	01	J	136	21	13622	Austin Chalk	49	49	49	49	49	49
Livestock	101005136	J	1005	1005	136	21	01	J	136	21	13613	Edwards-Trinity (Plateau)	180	180	180	180	180	180
Livestock	101005136	J	1005	1005	136	23	01	J	136	23	13613	Edwards-Trinity (Plateau)	180	180	180	180	180	180

TWDB TABLE 5 (continued)
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	User Regional Planning Group	Seq. No.	City No.	User County No.	User Basin No.	Type of Supply Source	Source Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
Manufacturing	101001233	J	1001	1001	233	23	00	J	233	23	23580	San Felipe Springs						
Steam Electric Power										23								
Mining	101003233	J	1003	1003	233	23	01	J	233	23	23313	Edwards-Trinity (Plateau)	99	99	99	99	99	99
Irrigation	101004233	J	1004	1004	233	23	01	J	233	23	23313	Edwards-Trinity (Plateau)	362	362	362	362	362	362
Irrigation	101004233	J	1004	1004	233	23	00	J	233	23	23580	San Felipe Springs	4,962	4,962	4,962	4,962	4,962	4,962
Livestock	101005233	J	1005	1005	233	23	01	J	233	23	23313	Edwards-Trinity (Plateau)	599	599	599	599	599	599
Livestock	101005233	J	1005	1005	233	23	00	J	233	23	23560	Pecos River	0	0	0	0	0	0
Livestock	101005233	J	1005	1005	233	23	00	J	233	23	23570	Devil's River	0	0	0	0	0	0

**TWDB TABLE 6
CURRENT WATER SUPPLIES AVAILABLE UNDER DROUGHT OF RECORD CONDITIONS
WITH NO NEW DEVELOPMENT BY MAJOR WATER PROVIDER**

Major Water Provider	Major Water Provider No.	Type of Supply Source	MWP Selling to Entity in A	Regional Planning Group	Source County No.	Source Basin No.	Specific Source ID	Specific Source Name	S2000	S2010	S2020	S2030	S2040	S2050
City of Del Rio	221200	00		J	233	23	23580	San Felipe Springs	11,416	11,416	11,416	11,416	11,416	11,416
City of Del Rio	221200	01		J	233	23	23313	Edwards-Trinity (Plateau)	6,611	6,611	6,611	6,611	6,611	6,611



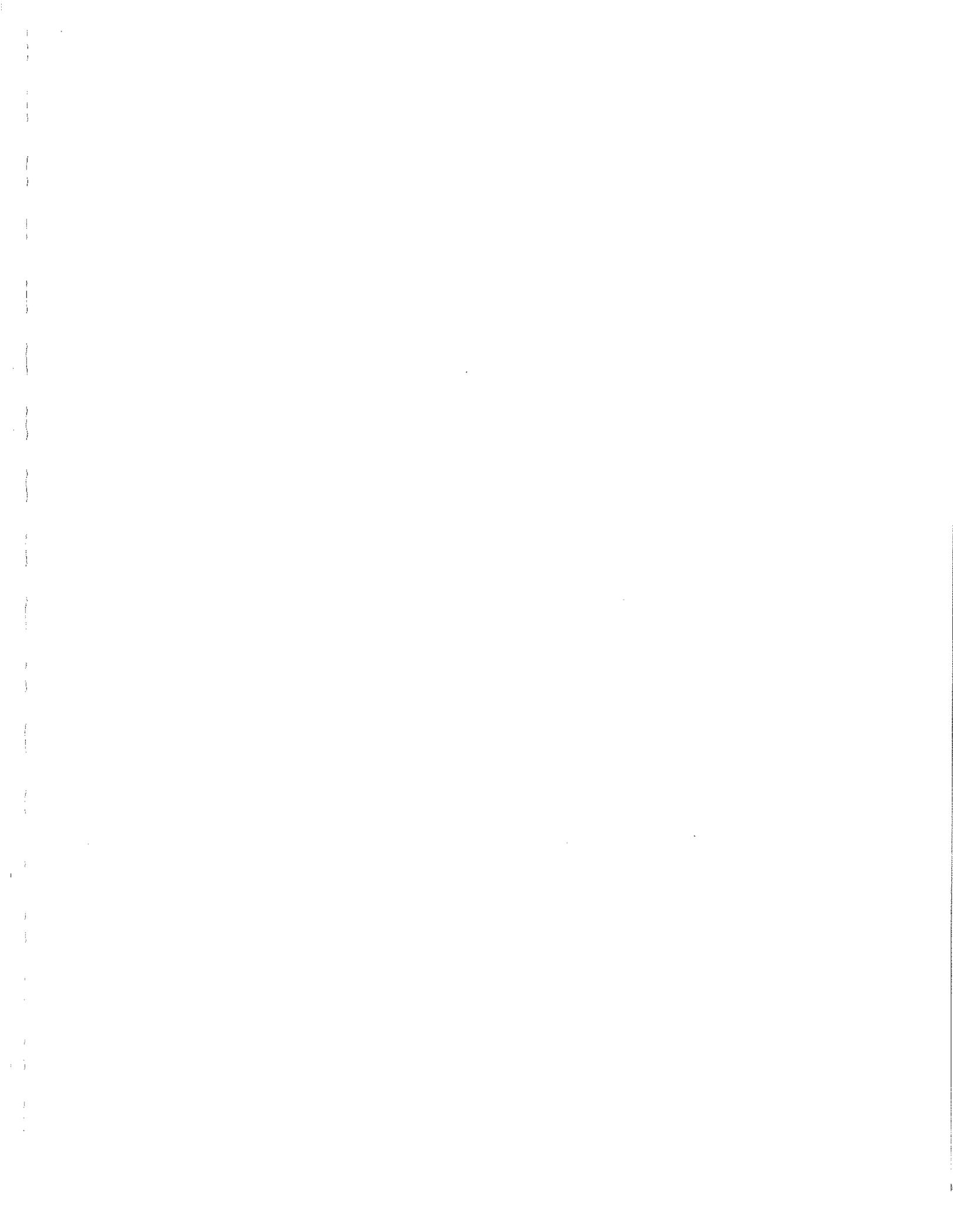
TWDB TABLE 7
COMPARISON OF WATER DEMAND AND WATER SUPPLY CAPACITIES
BY CITY AND CATEGORY

Water User Group Name	Water User Group ID	Reg. Plan. Group	Seq. No.	City No.	Count y No.	Basin No.	S2000	S2010	S2020	S2030	S2040	S2050
Bandera	100053000	J	53	36	10	19	1309	1241	1236	1199	1158	1106
County Other	100996010	J	996	757	10	18	-18	-41	-40	-46	-53	-61
County Other	100996010	J	996	757	10	19	-1138	-2655	-2556	-2951	-3421	-3937
County Other	100996010	J	996	757	10	21	-97	-228	-219	-253	-293	-338
Irrigation		J	1004	1004	10	18						
Irrigation	101004010	J	1004	1004	10	19	20	27	35	41	48	54
Irrigation	101004010	J	1004	1004	10	21	0	5	9	14	17	21
Livestock	101005010	J	1005	1005	10	18	0	0	0	0	0	0
Livestock	101005010	J	1005	1005	10	19	0	0	0	0	0	0
Livestock	101005010	J	1005	1005	10	21	40	40	40	40	40	40
Manufacturing		J	1001	1001	10	18						
Manufacturing		J			10	19						
Manufacturing	101001010	J	1001	1001	10	21	32	30	28	27	24	21
Mining		J	1003	1003	10	18						
Mining	101004010	J	1003	1003	10	19	-10	-10	-11	-12	-12	-12
Mining	101004010	J	1003	1003	10	21	8	8	8	8	8	8
Steam Electric Power		J			10	18						
Steam Electric Power		J			10	19						
Steam Electric Power		J			10	21						
Rocksprings	100765000	J	765	512	69	14	621	606	600	590	583	574
Rocksprings	100765000	J	765	512	69	21	68	66	65	64	63	62
County Other	100996069	J	996	757	69	14	8	7	7	6	5	4
County Other	100996069	J	996	757	69	21	18	15	14	13	11	9
County Other	100996069	J	996	757	69	23	3	3	2	2	2	1
Irrigation	101004069	J	1004	1004	69	14	-139	-129	-119	-110	-101	-92
Irrigation	101004069	J	1004	1004	69	21	23	23	23	23	23	23
Irrigation	101004069	J	1004	1004	69	23	20	20	20	20	20	20
Livestock	101005069	J	1005	1005	69	14	35	35	35	35	35	35
Livestock	101005069	J	1005	1005	69	21	-28	-28	-28	-28	-28	-28
Livestock	101005069	J	1005	1005	69	23	0	0	0	0	0	0
Manufacturing		J			69	14						
Manufacturing		J			69	21						
Manufacturing		J			69	23						
Mining	101003069	J	1003	1003	69	14	0	2	4	5	7	8
Mining	101003069	J	1003	1003	69	21	2	2	2	2	2	2
Mining	101003069	J	1003	1003	69	23	2	2	2	2	2	2
Steam Electric Power		J			69	14						
Steam Electric Power		J			69	21						
Steam Electric Power		J			69	23						
Kerrville	100468000	J	468	320	133	18	-1547	-2244	-2969	-3840	-4599	-5450
Ingram		J			133	18	146	158	168	171	174	175
County Other	100996133	J	996	757	133	14	7587	7575	7567	7556	7542	7523
County Other	100996133	J	996	757	133	18	21437	21090	20875	20573	20185	19668
County Other	100996133	J	996	757	133	19	908	908	907	907	906	905
County Other	100996133	J	996	757	133	21	431	426	424	419	414	407
Irrigation		J			133	14						
Irrigation	101004133	J	1004	1004	133	18	-368	-342	-316	-292	-268	-245
Irrigation		J			133	19						
Irrigation		J			133	21						
Livestock	101005133	J	1005	1005	133	14	-62	-62	-62	-62	-62	-62
Livestock	101005133	J	1005	1005	133	18	79	79	79	79	79	79
Livestock	101005133	J	1005	1005	133	19	-25	-25	-25	-25	-25	-25
Livestock	101005133	J	1005	1005	133	21	8	8	8	8	8	8
Manufacturing		J			133	14						
Manufacturing	101001133	J	1001	1001	133	18	14	11	8	6	3	0
Manufacturing		J			133	19						
Manufacturing		J			133	21						
Mining	101003133	J	1003	1003	133	14	-12	-8	-4	0	1	1
Mining	101003133	J	1003	1003	133	18	10	60	68	71	71	68
Mining	101003133	J	1003	1003	133	19	1	1	1	1	1	1
Mining	101003133	J	1003	1003	133	21	1	1	1	1	1	1
Steam Electric Power		J			133	14						
Steam Electric Power		J			133	18						
Steam Electric Power		J			133	19						
Steam Electric Power		J			133	21						
Brackettville	100104000	J	104	70	136	23	1442	1446	1473	1499	1499	1503



**TWDB TABLE 8
COMPARISON OF WATER DEMAND AND WATER SUPPLY CAPACITIES
BY MAJOR WATER PROVIDER**

Major Water Provider	Major Water Provider No.	County No.	Basin No.	S2000	S2010	S2020	S2030	S2040	S2050
City of Del Rio	221200	233	23	4,459	3,624	3,020	2,455	1,795	978



TWDB TABLE 9
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY REGION

2000						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50996022 COUNTY-OTHER	-507	664	43.8	1,574.0	438.0	18.4
E 51003022 MINING	-144	20	2.7	55.0	18.0	0.8
E 50305000 FORT BLISS	-760	1,449	90.4	3,405.0	971.0	40.7
E 50996071 COUNTY-OTHER	-14,791	19,382	1,279.1	45,548.0	12,792.0	536.1
E 51001071 MANUFACTURING	-9,906	16,513	1,923.0	38,806.0	10,899.0	458.2
E 51002071 STEAM ELECTRIC POWER	-4,698	2,261	403.9	5,313.0	1,515.0	110.1
E 51003071 MINING *	-91	12	1.7	33.0	11.0	0.5
E 51004071 IRRIGATION	-127,386	634	36.3	1,503.0	418.0	8.9
E 51005071 LIVESTOCK	-78	4	0.2	11.0	4.0	0.1
E 50996115 COUNTY-OTHER	-155	203	13.4	481.0	134.0	5.6
E 50996122 COUNTY-OTHER	-73	96	6.3	263.0	85.0	2.6
E 51005122 LIVESTOCK	-24	1	0.1	3.0	1.0	0.0
E 50996189 COUNTY-OTHER	-132	173	11.4	410.0	114.0	4.8
E 50996222 COUNTY-OTHER	-21	28	1.8	77.0	25.0	0.8

2010						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50305000 FORT BLISS	-292	35	34.7	74.0	19.0	15.6
E 50996022 COUNTY-OTHER	-639	837	55.3	1,959.0	552.0	23.2
E 50996071 COUNTY-OTHER	-16,889	22,131	1,460.6	51,787.0	14,385.0	612.2
E 50996115 COUNTY-OTHER	-162	212	14.0	496.0	140.0	5.9
E 50996122 COUNTY-OTHER	-74	97	6.4	204.0	53.0	2.7
E 50996189 COUNTY-OTHER	-170	223	14.7	522.0	147.0	6.2
E 50996222 COUNTY-OTHER	-23	30	2.0	63.0	17.0	0.8
E 51001071 MANUFACTURING	-10,434	17,394	2,025.5	40,702.0	11,306.0	482.6
E 51002071 STEAM ELECTRIC POWER	-3,198	1,539	274.9	3,617.0	1,031.0	74.9
E 51003022 MINING	-159	22	3.0	46.0	12.0	0.9
E 51004071 IRRIGATION	-101,457	505	28.9	1,182.0	333.0	7.1
E 51005071 LIVESTOCK	-78	4	0.2	8.0	2.0	0.1
E 51005122 LIVESTOCK	-24	1	0.1	2.0	1.0	0.0

TWDB TABLE 9
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY REGION

2020						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50996022 COUNTY-OTHER	-668	875	57.8	2,109.0	604.0	24.2
E 51003022 MINING	-287	39	5.4	90.0	30.0	1.6
E 50032000 ANTHONY	-885	1,073	71.8	2,554.0	730.0	29.6
E 50933000 VINTON	-100	124	8.3	299.0	86.0	3.4
E 50996071 COUNTY-OTHER	-18,991	24,886	1,642.4	58,482.0	16,425.0	688.4
E 51001071 MANUFACTURING	-10,350	17,254	2,009.2	40,547.0	11,388.0	478.7
E 51002071 STEAM ELECTRIC POWER	-3,198	1,539	274.9	3,663.0	1,047.0	74.9
E 51004071 IRRIGATION	-85,417	425	24.4	1,024.0	293.0	6.0
E 51005071 LIVESTOCK	-78	4	0.2	9.0	3.0	0.1
E 50996115 COUNTY-OTHER	-163	214	14.1	516.0	148.0	5.9
E 50996122 COUNTY-OTHER	-72	94	6.2	217.0	73.0	2.6
E 51005122 LIVESTOCK	-24	1	0.1	2.0	1.0	0.0
E 50996189 COUNTY-OTHER	-216	283	18.7	682.0	195.0	7.8
E 50996222 COUNTY-OTHER	-18	24	1.6	55.0	19.0	0.7
2030						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50996022 COUNTY-OTHER	-747	979	64.6	2,281.0	636.0	27.1
E 51003022 MINING	-372	51	7.0	106.0	36.0	2.1
E 50032000 ANTHONY	-1,028	1,246	83.4	2,903.0	810.0	34.3
E 50144000 CANUTILLO	-441	534	35.8	1,244.0	347.0	14.7
E 50178000 CLINT	-492	612	40.8	1,426.0	398.0	16.9
E 50275000 EL PASO	-162,505	230,157	14,990.9	501,742.0	142,697.0	6,389.3
E 50288000 FABENS	-1,137	1,378	92.2	3,211.0	896.0	38.0
E 50305000 FORT BLISS	-5,689	10,849	676.8	25,387.0	7,052.0	304.6
E 50413000 HOMESTEAD	-865	1,048	70.2	2,442.0	681.0	28.9
E 50793000 SAN ELIZARIO	-1,475	2,813	175.5	6,554.0	1,828.0	79.0
E 50838000 SOCORRO	-1,535	3,723	226.0	8,675.0	2,420.0	105.3
E 50933000 VINTON	-106	132	8.8	308.0	86.0	3.6
E 50958000 WESTWAY	-338	421	28.0	981.0	274.0	11.6
E 50996071 COUNTY-OTHER	-23,343	30,589	2,018.7	71,578.0	19,883.0	846.1
E 51001071 MANUFACTURING	-17,904	29,846	3,475.6	69,840.0	19,400.0	828.1
E 51002071 STEAM ELECTRIC POWER	-6,000	2,888	515.8	6,729.0	1,877.0	140.6
E 51003071 MINING *	-28	4	0.5	8.0	3.0	0.2
E 51004071 IRRIGATION	-156,920	780	44.7	1,817.0	507.0	11.0
E 51005071 LIVESTOCK	-78	4	0.2	8.0	3.0	0.1
E 50996115 COUNTY-OTHER	-164	215	14.2	501.0	140.0	5.9
E 50996122 COUNTY-OTHER	-69	90	6.0	186.0	64.0	2.5
E 51005122 LIVESTOCK	-24	1	0.1	2.0	1.0	0.0
E 50996189 COUNTY-OTHER	-275	360	23.8	839.0	234.0	10.0
E 50996222 COUNTY-OTHER	-14	18	1.2	37.0	13.0	0.5

TWDB TABLE 9
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY REGION

2040						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50996022 COUNTY-OTHER	-793	1,039	68.6	2,431.0	686.0	28.7
E 51003022 MINING	-500	68	9.4	168.0	46.0	2.8
E 50032000 ANTHONY	-1,136	1,377	92.2	3,222.0	909.0	37.9
E 50144000 CANUTILLO	-465	564	37.7	1,342.0	378.0	15.5
E 50178000 CLINT	-547	681	45.3	1,621.0	456.0	18.8
E 50275000 EL PASO	-179,873	254,755	16,593.1	552,818.0	157,948.0	7,072.2
E 50288000 FABENS	-1,227	2,340	146.0	5,476.0	1,544.0	65.7
E 50305000 FORT BLISS	-5,674	10,820	675.0	25,319.0	7,033.0	303.8
E 50413000 HOMESTEAD	-893	1,082	72.4	2,532.0	714.0	29.8
E 50793000 SAN ELIZARIO	-1,571	2,996	186.9	7,011.0	1,977.0	84.1
E 50838000 SOCORRO	-1,664	4,036	245.0	9,444.0	2,664.0	114.1
E 50933000 VINTON	-111	138	9.2	328.0	92.0	3.8
E 50958000 WESTWAY	-340	423	28.2	1,007.0	283.0	11.7
E 50996071 COUNTY-OTHER	-25,931	33,980	2,242.6	79,513.0	22,087.0	939.9
E 51001071 MANUFACTURING	-19,142	31,910	3,716.0	74,669.0	20,742.0	885.4
E 51002071 STEAM ELECTRIC POWER	-6,000	2,888	515.8	6,758.0	1,906.0	140.6
E 51003071 MINING *	-10	1	0.2	2.0	1.0	0.1
E 51004071 IRRIGATION	-151,289	752	43.1	1,790.0	504.0	10.6
E 51005071 LIVESTOCK	-78	4	0.2	10.0	3.0	0.1
E 50996115 COUNTY-OTHER	-162	212	14.0	505.0	142.0	5.9
E 50996122 COUNTY-OTHER	-64	84	5.5	207.0	57.0	2.3
E 51005122 LIVESTOCK	-24	1	0.1	2.0	1.0	0.0
E 50996189 COUNTY-OTHER	-284	372	24.6	885.0	249.0	10.3
E 50996222 COUNTY-OTHER	-12	16	1.0	40.0	11.0	0.4

TWDB TABLE 9
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY REGION

2050						
RWPG Letter, Water User Group Identifier, Name	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
E 50996022 COUNTY-OTHER	-741	971	64.1	2,272.0	641.0	26.9
E 51003022 MINING	-643	88	12.1	202.0	55.0	3.7
E 50032000 ANTHONY	-1,255	1,521	101.8	3,544.0	989.0	41.9
E 50144000 CANUTILLO	-514	980	61.2	2,293.0	647.0	27.5
E 50178000 CLINT	-608	757	50.4	1,771.0	500.0	20.9
E 50275000 EL PASO	-199,097	281,982	18,366.5	614,721.0	174,829.0	7,828.0
E 50288000 FABENS	-1,349	2,573	160.5	5,995.0	1,672.0	72.2
E 50305000 FORT BLISS	-5,642	10,759	671.2	25,176.0	6,993.0	302.1
E 50413000 HOMESTEAD	-942	1,142	76.4	2,661.0	742.0	31.5
E 50793000 SAN ELIZARIO	-1,653	3,152	196.7	7,344.0	2,049.0	88.5
E 50838000 SOCORRO	-1,800	4,366	265.0	10,173.0	2,838.0	123.4
E 50933000 VINTON	-115	143	9.5	335.0	94.0	3.9
E 50958000 WESTWAY	-351	437	29.1	1,023.0	288.0	12.1
E 50996071 COUNTY-OTHER	-27,549	36,100	2,382.5	84,474.0	23,465.0	998.6
E 51001071 MANUFACTURING	-20,332	33,894	3,947.0	79,312.0	22,031.0	940.5
E 51002071 STEAM ELECTRIC POWER	-6,000	2,888	515.8	6,729.0	1,877.0	140.6
E 51004071 IRRIGATION	-148,761	740	42.4	1,732.0	488.0	10.4
E 51005071 LIVESTOCK	-78	4	0.2	9.0	3.0	0.1
E 50996115 COUNTY-OTHER	-161	211	13.9	494.0	139.0	5.8
E 50996122 COUNTY-OTHER	-65	85	5.6	195.0	54.0	2.4
E 51005122 LIVESTOCK	-24	1	0.1	2.0	1.0	0.0
E 50996189 COUNTY-OTHER	-286	375	24.7	878.0	248.0	10.4
E 50996222 COUNTY-OTHER	-11	14	1.0	32.0	9.0	0.4

TWDB TABLE 10
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY BASIN

2000									
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
COUNTY-OTHER	50996022	E	23	-507	664	43.8	1,574	438	18.4
MINING	51003022	E	23	-144	20	2.7	55	18	0.8
FORT BLISS	50305000	E	23	-760	1,449	90.4	3,405	971	40.7
COUNTY-OTHER	50996071	E	23	-14,791	19,382	1,279.1	45,548	12,792	536.1
MANUFACTURING	51001071	E	23	-9,906	16,513	1,923.0	38,806	10,899	458.2
STEAM ELECTRIC POWER	51002071	E	23	-4,698	2,261	403.9	5,313	1,515	110.1
MINING *	51003071	E	23	-91	12	1.7	33	11	0.5
IRRIGATION	51004071	E	23	-127,386	634	36.3	1,503	418	8.9
LIVESTOCK	51005071	E	23	-78	4	0.2	11	4	0.1
COUNTY-OTHER	50996115	E	23	-155	203	13.4	481	134	5.6
COUNTY-OTHER	50996122	E	23	-73	96	6.3	263	85	2.6
LIVESTOCK	51005122	E	23	-24	1	0.1	3	1	0.0
COUNTY-OTHER	50996189	E	23	-132	173	11.4	410	114	4.8
COUNTY-OTHER	50996222	E	23	-21	28	1.8	77	25	0.8

2010									
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
FORT BLISS	50305000	E	23	-292	35	34.7	74	19	15.6
COUNTY-OTHER	50996022	E	23	-639	837	55.3	1,959	552	23.2
COUNTY-OTHER	50996071	E	23	-16,889	22,131	1,460.6	51,787	14,385	612.2
COUNTY-OTHER	50996115	E	23	-162	212	14.0	496	140	5.9
COUNTY-OTHER	50996122	E	23	-74	97	6.4	204	53	2.7
COUNTY-OTHER	50996189	E	23	-170	223	14.7	522	147	6.2
COUNTY-OTHER	50996222	E	23	-23	30	2.0	63	17	0.8
MANUFACTURING	51001071	E	23	-10,434	17,394	2,025.5	40,702	11,306	482.6
STEAM ELECTRIC POWER	51002071	E	23	-3,198	1,539	274.9	3,617	1,031	74.9
MINING	51003022	E	23	-159	22	3.0	46	12	0.9
IRRIGATION	51004071	E	23	-101,457	505	28.9	1,182	333	7.1
LIVESTOCK	51005071	E	23	-78	4	0.2	8	2	0.1
LIVESTOCK	51005122	E	23	-24	1	0.1	2	1	0.0

**TWDB TABLE 10
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY BASIN**

2020										
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)	
COUNTY-OTHER	50996022	E	23	-668	875	57.8	2,109	604	24.2	
MINING	51003022	E	23	-287	39	5.4	90	30	1.6	
ANTHONY	50032000	E	23	-885	1,073	71.8	2,554	730	29.6	
VINTON	50933000	E	23	-100	124	8.3	299	86	3.4	
COUNTY-OTHER	50996071	E	23	-18,991	24,886	1,642.4	58,482	16,425	688.4	
MANUFACTURING	51001071	E	23	-10,350	17,254	2,009.2	40,547	11,388	478.7	
STEAM ELECTRIC POWER	51002071	E	23	-3,198	1,539	274.9	3,663	1,047	74.9	
IRRIGATION	51004071	E	23	-85,417	425	24.4	1,024	293	6.0	
LIVESTOCK	51005071	E	23	-78	4	0.2	9	3	0.1	
COUNTY-OTHER	50996115	E	23	-163	214	14.1	516	148	5.9	
COUNTY-OTHER	50996122	E	23	-72	94	6.2	217	73	2.6	
LIVESTOCK	51005122	E	23	-24	1	0.1	2	1	0.0	
COUNTY-OTHER	50996189	E	23	-216	283	18.7	682	195	7.8	
COUNTY-OTHER	50996222	E	23	-18	24	1.6	55	19	0.7	
2030										
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)	
COUNTY-OTHER	50996022	E	23	-747	979	64.6	2,281	636	27.1	
MINING	51003022	E	23	-372	51	7.0	106	36	2.1	
ANTHONY	50032000	E	23	-1,028	1,246	83.4	2,903	810	34.3	
CANUTILLO	50144000	E	23	-441	534	35.8	1,244	347	14.7	
CLINT	50178000	E	23	-492	612	40.8	1,426	398	16.9	
EL PASO	50275000	E	23	-162,505	230,157	14,990.9	501,742	142,697	6,389.3	
FABENS	50288000	E	23	-1,137	1,378	92.2	3,211	896	38.0	
FORT BLISS	50305000	E	23	-5,689	10,849	676.8	25,387	7,052	304.6	
HOMESTEAD	50413000	E	23	-865	1,048	70.2	2,442	681	28.9	
SAN ELIZARIO	50793000	E	23	-1,475	2,813	175.5	6,554	1,828	79.0	
SOCORRO	50838000	E	23	-1,535	3,723	226.0	8,675	2,420	105.3	
VINTON	50933000	E	23	-106	132	8.8	308	86	3.6	
WESTWAY	50958000	E	23	-338	421	28.0	981	274	11.6	
COUNTY-OTHER	50996071	E	23	-23,343	30,589	2,018.7	71,578	19,883	846.1	
MANUFACTURING	51001071	E	23	-17,904	29,846	3,475.6	69,840	19,400	828.1	
STEAM ELECTRIC POWER	51002071	E	23	-6,000	2,888	515.8	6,729	1,877	140.6	
MINING *	51003071	E	23	-28	4	0.5	8	3	0.2	
IRRIGATION	51004071	E	23	-156,920	780	44.7	1,817	507	11.0	
LIVESTOCK	51005071	E	23	-78	4	0.2	8	3	0.1	
COUNTY-OTHER	50996115	E	23	-164	215	14.2	501	140	5.9	
COUNTY-OTHER	50996122	E	23	-69	90	6.0	186	64	2.5	
LIVESTOCK	51005122	E	23	-24	1	0.1	2	1	0.0	
COUNTY-OTHER	50996189	E	23	-275	360	23.8	839	234	10.0	
COUNTY-OTHER	50996222	E	23	-14	18	1.2	37	13	0.5	

TWDB TABLE 10
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY BASIN

2040									
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
COUNTY-OTHER	50996022	E	23	-793	1,039	68.6	2,431	686	28.7
MINING	51003022	E	23	-500	68	9.4	168	46	2.8
ANTHONY	50032000	E	23	-1,136	1,377	92.2	3,222	909	37.9
CANUTILLO	50144000	E	23	-465	564	37.7	1,342	378	15.5
CLINT	50178000	E	23	-547	681	45.3	1,621	456	18.8
EL PASO	50275000	E	23	-179,873	254,755	16,593.1	552,818	157,948	7,072.2
FABENS	50288000	E	23	-1,227	2,340	146.0	5,476	1,544	65.7
FORT BLISS	50305000	E	23	-5,674	10,820	675.0	25,319	7,033	303.8
HOMESTEAD	50413000	E	23	-893	1,082	72.4	2,532	714	29.8
SAN ELIZARIO	50793000	E	23	-1,571	2,996	186.9	7,011	1,977	84.1
SOCORRO	50838000	E	23	-1,664	4,036	245.0	9,444	2,664	114.1
VINTON	50933000	E	23	-111	138	9.2	328	92	3.8
WESTWAY	50958000	E	23	-340	423	28.2	1,007	283	11.7
COUNTY-OTHER	50996071	E	23	-25,931	33,980	2,242.6	79,513	22,087	939.9
MANUFACTURING	51001071	E	23	-19,142	31,910	3,716.0	74,669	20,742	885.4
STEAM ELECTRIC POWER	51002071	E	23	-6,000	2,888	515.8	6,758	1,906	140.6
MINING *	51003071	E	23	-10	1	0.2	2	1	0.1
IRRIGATION	51004071	E	23	-151,289	752	43.1	1,790	504	10.6
LIVESTOCK	51005071	E	23	-78	4	0.2	10	3	0.1
COUNTY-OTHER	50996115	E	23	-162	212	14.0	505	142	5.9
COUNTY-OTHER	50996122	E	23	-64	84	5.5	207	57	2.3
LIVESTOCK	51005122	E	23	-24	1	0.1	2	1	0.0
COUNTY-OTHER	50996189	E	23	-284	372	24.6	885	249	10.3
COUNTY-OTHER	50996222	E	23	-12	16	1.0	40	11	0.4

**TWDB TABLE 10
SOCIAL AND ECONOMIC IMPACTS OF NOT MEETING NEEDS BY BASIN**

2050									
Water User Group Name	Water User Group Identifier	Regional Water Planning Group	Basin	Value of Need (Acre-Feet)	Impact of Need on Employment	Impact of Need on Gross Business Output in 1999 US Dollars (Millions)	Impact of Need on Population	Impact of Need on School Enrollment	Impact of Need on Income in 1999 US Dollars (Millions)
COUNTY-OTHER	50996022	E	23	-741	971	64.1	2,272	641	26.9
MINING	51003022	E	23	-643	88	12.1	202	55	3.7
ANTHONY	50032000	E	23	-1,255	1,521	101.8	3,544	989	41.9
CANUTILLO	50144000	E	23	-514	980	61.2	2,293	647	27.5
CLINT	50178000	E	23	-608	757	50.4	1,771	500	20.9
EL PASO	50275000	E	23	-199,097	281,982	18,366.5	614,721	174,829	7,828.0
FABENS	50288000	E	23	-1,349	2,573	160.5	5,995	1,672	72.2
FORT BLISS	50305000	E	23	-5,642	10,759	671.2	25,176	6,993	302.1
HOMESTEAD	50413000	E	23	-942	1,142	76.4	2,661	742	31.5
SAN ELIZARIO	50793000	E	23	-1,653	3,152	196.7	7,344	2,049	88.5
SOCORRO	50838000	E	23	-1,800	4,366	265.0	10,173	2,838	123.4
VINTON	50933000	E	23	-115	143	9.5	335	94	3.9
WESTWAY	50958000	E	23	-351	437	29.1	1,023	288	12.1
COUNTY-OTHER	50996071	E	23	-27,549	36,100	2,382.5	84,474	23,465	998.6
MANUFACTURING	51001071	E	23	-20,332	33,894	3,947.0	79,312	22,031	940.5
STEAM ELECTRIC POWER	51002071	E	23	-6,000	2,888	515.8	6,729	1,877	140.6
IRRIGATION	51004071	E	23	-148,761	740	42.4	1,732	488	10.4
LIVESTOCK	51005071	E	23	-78	4	0.2	9	3	0.1
COUNTY-OTHER	50996115	E	23	-161	211	13.9	494	139	5.8
COUNTY-OTHER	50996122	E	23	-65	85	5.6	195	54	2.4
LIVESTOCK	51005122	E	23	-24	1	0.1	2	1	0.0
COUNTY-OTHER	50996189	E	23	-286	375	24.7	878	248	10.4
COUNTY-OTHER	50996222	E	23	-11	14	1.0	32	9	0.4

**TWDB TABLE 11
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES**

Water User Group	WUG	RPG User	Seq	City	County	River Basin	Strategy Type	RPG Source	County Source	Basin Source	Specific Source ID	Specific Source Name
Bandera County Other	100996010	J	996	757	10	18	4c / 10-3	J	10	18	01028	Edwards-Trinity (Plateau)
Bandera County Other	100996010	J	996	757	10	19	4c / 10-4	J	10	19	01028	Trinity
Bandera County Other	100996010	J	996	757	10	19	4c / 10-1	J	10	19	01028	Trinity
Bandera County Other	100996010	J	996	757	10	19	4n / 10-2	J	10	19	19540	Trinity
Bandera County Other	100996010	J	996	757	10	21	4c / 10-6	J	10	21	01028	Trinity
Bandera / Mining	101003010	J	1003	1003	10	19	4c / 10-7	J	10	19	01028	Trinity
Edwards / Irrigation	101004069	J	1004	1004	69	14	4c / 69-1	J	69	14	06913	Edwards-Trinity (Plateau)
Edwards / Irrigation	101004069	J	1004	1004	69	14	4c / 69-2	J	69	14	06913	Edwards-Trinity (Plateau)
Edwards / Irrigation	101004069	J	1004	1004	69	14	4a / 69-3	J	69	14	38069	Irrigation Conservation
Edwards / Livestock	101005069	J	1005	1005	69	21	4c / 69-4	J	69	21	06913	Edwards-Trinity (Plateau)
Edwards / Livestock	101005069	J	1005	1005	69	21	4c / 69-5	J	69	21	06913	Edwards-Trinity (Plateau)
City of Kerrville	100468000	J	468	320	133	18	4d / 133-1	L	133	18	18020	Canyon Reservoir
City of Kerrville	100468000	J	468	320	133	18	4e / 133-2	J	133	18	18010	Upper Guadalupe River
City of Kerrville	100468000	J	468	320	133	18	4j / 133-4	J	133	18	13313	Edwards-Trinity (Plateau)
City of Kerrville	100468000	J	468	320	133	18	4o / 133-5A	J	133	18	18010	Upper Guadalupe River
City of Kerrville	100468000	J	468	320	133	18	4o / 133-5B	J	133	18	18010	Upper Guadalupe River
Kerr County Other	10996133	J	996	757	133	18	4o / 133-9	J	133	18	18010	Upper Guadalupe River
Kerr County Other	10996133	J	996	757	133	18	4d / 133-10	J	133	18		unknown
Kerr County Other	10996133	J	996	757	133	18	4n / 133-11	J	133	18	18010	Upper Guadalupe River
Kerr / Irrigation	101004133	J	1004	1004	133	18	4c / 133-17	J	133	18	13328	Trinity
Kerr / Irrigation	101004133	J	1004	1004	133	18	4c / 133-18	J	133	18	13328	Trinity
Kerr / Irrigation	101004133	J	1004	1004	133	18	4a / 133-19	J	133	18	38133	Irrigation Conservation
Kerr / Livestock	101005133	J	1005	1005	133	14	4c / 133-20	J	133	14	13313	Edwards-Trinity (Plateau)
Kerr / Livestock	101005133	J	1005	1005	133	14	4c / 133-21	J	133	14	13313	Edwards-Trinity (Plateau)
Kerr / Livestock	101005133	J	1005	1005	133	19	4c / 133-22	J	133	19	13313	Edwards-Trinity (Plateau)
Kerr / Livestock	101005133	J	1005	1005	133	19	4c / 133-23	J	133	19	13313	Edwards-Trinity (Plateau)
Kerr / Mining	101003133	J	1003	1003	133	14	4c / 133-24	J	133	14	13313	Edwards-Trinity (Plateau)
Kinney County Other	100996136	J	996	757	136	21	4c / 136-1	J	136	21	13611	Edwards (Balcones Fault Zone)
Kinney County Other	100996136	J	996	757	136	23	4c / 136-2	J	136	23	13613	Edwards-Trinity (Plateau)
Kinney / Livestock	101005136	J	1005	1005	136	23	4c / 136-3	J	136	23	13613	Edwards-Trinity (Plateau)
Kinney / Livestock	101005136	J	1005	1005	136	23	4c / 136-4	J	136	23	13613	Edwards-Trinity (Plateau)
City of Leakey	100513000	J	513	351	193	21	4c / 193-1	J	193	21	19322	Frio River Alluvium
Real / Mining	101003193	J	1003	1003	193	14	4c / 193-5	J	193	14	19313	Edwards-Trinity (Plateau)
Val Verde / Livestock	101005233	J	1005	1005	233	23	4c / 233-1	J	233	23	23313	Edwards-Trinity (Plateau)
Val Verde / Livestock	101005233	J	1005	1005	233	23	4c / 233-2	J	233	23	23313	Edwards-Trinity (Plateau)
Val Verde / Mining	101003233	J	1003	1003	233	23	4c / 233-3	J	233	23	23313	Edwards-Trinity (Plateau)

TWDB TABLE 11 (continued)
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGIES

Water User Group	Total Capital	C 2000	C 2010	C 2020	C 2030	C 2040	C 2050	V	V	V	V	V	V
Bandera County Other	\$270	\$270	\$270	\$270	\$270	\$270	\$270	46	46	46	46	46	46
Bandera County Other	\$42,189,790	\$272	\$272	\$272	\$272	\$272	\$272	2,766	2,766	2,766	2,766	3,613	3,613
Bandera County Other	\$670,000	\$108	\$108	\$108	\$108	\$108	\$108	162	162	162	162	323	323
Bandera County Other	\$197,427	\$108	\$108	\$108	\$108	\$108	\$108	108	108	108	108	108	5,000
Bandera County Other	\$3,923,810	\$153	\$153	\$153	\$153	\$153	\$153	251	251	251	251	337	337
Bandera / Mining	\$38,144	\$156	\$156	\$156	\$156	\$156	\$156	10	10	11	12	12	12
Edwards / Irrigation	\$323,127	\$115	\$115	\$115	\$115	\$115	\$115	133	133	133	133	133	133
Edwards / Irrigation	\$47,529	\$148	\$148	\$148	\$148	\$148	\$148	26	26	26	26	26	26
Edwards / Irrigation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Edwards / Livestock	\$51,185	\$274	\$274	\$274	\$274	\$274	\$274	28	28	28	28	28	28
Edwards / Livestock	\$119,357	\$270	\$270	\$270	\$270	\$270	\$270	27	27	27	27	27	27
City of Kerrville	\$100,000	NI	\$500	\$500	\$500	\$500	\$500	NI	1,547	3,840	3,840	5,450	5,450
City of Kerrville	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
City of Kerrville	\$22,561,453	\$66	\$66	\$66	\$66	\$66	\$66	3,000	3,000	3,000	6,000	6,000	6,000
City of Kerrville	\$6,250,000	NI	\$500	\$500	\$500	\$500	\$500	NI	1,547	3,840	3,840	5,450	5,450
City of Kerrville	\$6,650,000	NI	\$500	\$500	\$500	\$500	\$500	NI	1,547	3,840	3,840	5,450	5,450
Kerr County Other	\$1,805,000	NI	NA	NA	NA	NA	NA	0	0	0	0	0	0
Kerr County Other	NA	NI	NA	NA	NA	NA	NA	0	0	0	0	0	0
Kerr County Other	\$765,000	NI	NA	NA	NA	NA	NA	0	0	0	0	0	0
Kerr / Irrigation	\$979,917	\$170	\$170	\$170	\$170	\$170	\$170	361	361	361	361	361	361
Kerr / Irrigation	\$24,861	\$381	\$381	\$381	\$381	\$381	\$381	136	136	136	136	136	136
Kerr / Irrigation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kerr / Livestock	\$118,822	\$135	\$135	\$135	\$135	\$135	\$135	65	65	65	65	65	65
Kerr / Livestock	\$305,337	\$377	\$377	\$377	\$377	\$377	\$377	62	62	62	62	62	62
Kerr / Livestock	\$49,357	\$135	\$135	\$135	\$135	\$135	\$135	27	27	27	27	27	27
Kerr / Livestock	\$109,357	\$270	\$270	\$270	\$270	\$270	\$270	27	27	27	27	27	27
Kerr / Mining	\$22,301	\$347	\$347	\$347	\$347	\$347	\$347	12	0	0	0	0	0
Kinney County Other	\$763,034	\$548	\$548	\$548	\$548	\$548	\$548	28	28	28	28	68	68
Kinney County Other	\$958,111	\$270	\$270	\$270	\$270	\$270	\$270	52	38	25	43	81	124
Kinney / Livestock	\$148,070	\$135	\$135	\$135	\$135	\$135	\$135	81	81	81	81	81	81
Kinney / Livestock	\$663,968	\$273	\$273	\$273	\$273	\$273	\$273	163	163	163	163	163	163
City of Leakey	\$84,245	NI	NI	NI	\$436	\$436	\$436	NI	NI	NI	33	67	67
Real / Mining	\$22,301	\$347	NI	NI	NI	NI	NI	12	NI	NI	NI	NI	NI
Val Verde / Livestock	\$118,822	\$135	\$135	\$135	\$135	\$135	\$135	65	65	65	65	65	65
Val Verde / Livestock	\$260,994	\$274	\$274	\$274	\$274	\$274	\$274	64	64	64	64	64	64
Val Verde / Mining	\$136,563	\$28	\$28	\$28	\$28	\$28	\$28	56	56	56	56	92	92
NA = Indicates that the strategy does not have a specific cost or volume estimate. Additional discussion on cost and volume is contained in the strategy evaluation.													
NI = Indicates that the strategy is not implemented at this time.													

**TWDB TABLE 12
RECOMMENDED MANAGEMENT STRATEGIES BY CITY AND CATEGORY**

Water User Group	WUG	Seg	City	County	River Basin	Strategy Name	Supply Type	County Source	Basin Source	Specific Source ID	Specific Source Name	Total Capital Cost	V 2000	V 2010	V 2020	V 2030	V 2040	V 2050
Bandera County Other	100996010	996	757	10	18	Additional system wells	4c / 10-3	10	18	01028	Edwards-Trinity (Plateau)	\$710,157	46	46	46	46	46	46
Bandera County Other	100996010	996	757	10	19	Expanded use of existing wells	4c / 10-4	10	19	01028	Trinity	\$670,939	2,766	2,766	2,766	2,766	3,613	3,613
Bandera County Other	100996010	996	757	10	19	Additional private wells	4c / 10-1	10	19	01028	Trinity	\$42,189,790	162	162	162	162	323	323
Bandera County Other	100996010	996	757	10	19	Aquifer storage and recovery	4n / 10-2	10	19	19540	Trinity	\$9,486,218	108	108	108	108	108	5,000
Bandera County Other	100996010	996	757	10	21	Additional private wells	4c / 10-6	10	21	01028	Trinity	\$3,923,810	251	251	251	251	337	337
Bandera / Mining	101003010	1003	1003	10	19	Additional wells	4c / 10-7	10	19	01028	Trinity	\$38,144	10	10	11	12	12	12
Edwards / Irrigation	101004069	1004	1004	69	14	Additional wells	4c / 69-1	69	14	06913	Edwards-Trinity (Plateau)	\$323,127	133	133	133	133	133	133
Edwards / Irrigation	101004069	1004	1004	69	14	Expanded use of existing wells	4c / 69-2	69	14	06913	Edwards-Trinity (Plateau)	\$47,529	26	26	26	26	26	26
Edwards / Irrigation	101004069	1004	1004	69	14	Conservation technology and equipment	4a / 69-3	69	14	38069	Irrigation Conservation	NA	NA	NA	NA	NA	NA	NA
Edwards / Livestock	101005069	1005	1005	69	21	Expanded use of existing wells	4c / 69-4	69	21	06913	Edwards-Trinity (Plateau)	\$51,185	28	28	28	28	28	28
Edwards / Livestock	101005069	1005	1005	69	21	Additional wells	4c / 69-5	69	21	06913	Edwards-Trinity (Plateau)	\$119,357	27	27	27	27	27	27
City of Kerrville	100468000	468	320	133	18	Obtain additional / modify existing water rights	4d / 133-1	133	18	18020	Canyon Reservoir	\$100,000	NI	1,547	3,840	3,840	5,450	5,450
City of Kerrville	100468000	468	320	133	18	Purchase raw water from UGRA/GBRA	4e / 133-2	133	18	18010	Upper Guadalupe River	NA	NA	NA	NA	NA	NA	NA
City of Kerrville	100468000	468	320	133	18	Additional wells in remote well field	4j / 133-4	133	18	13313	Edwards-Trinity (Plateau)	\$22,561,453	3,000	3,000	3,000	6,000	6,000	6,000
City of Kerrville	100468000	468	320	133	18	Increased water treatment capacity	4o / 133-5A	133	18	18010	Upper Guadalupe River	\$6,250,000	NI	1,547	3,840	3,840	5,450	5,450
City of Kerrville	100468000	468	320	133	18	Increased water treatment capacity	4o / 133-5B	133	18	18010	Upper Guadalupe River	\$6,250,000	NI	1,547	3,840	3,840	5,450	5,450
Kerr County Other	100996133	996	757	133	18	Increased water treatment capacity	4o / 133-9	133	18	18010	Upper Guadalupe River	\$1,805,000	NI	0	0	0	0	0
Kerr County Other	100996133	996	757	133	18	Reallocation of reservoir storage	4d / 133-10	133	18		unknown	NA	NI	0	0	0	0	0
Kerr County Other	100996133	996	757	133	18	Aquifer storage and recovery	4n / 133-11	133	18	18010	Upper Guadalupe River	\$765,000	NI	0	0	0	0	0
Kerr / Irrigation	101004133	1004	1004	133	18	Additional wells	4c / 133-17	133	18	13328	Trinity	\$979,917	361	361	361	361	361	361
Kerr / Irrigation	101004133	1004	1004	133	18	Expanded use of existing wells	4c / 133-18	133	18	13328	Trinity	\$248,611	136	136	136	136	136	136
Kerr / Irrigation	101004133	1004	1004	133	18	Conservation technology and equipment	4a / 133-19	133	18	38133	Irrigation Conservation	\$765,000	NA	NA	NA	NA	NA	NA

**TWDB TABLE 12
RECOMMENDED MANAGEMENT STRATEGIES BY CITY AND CATEGORY**

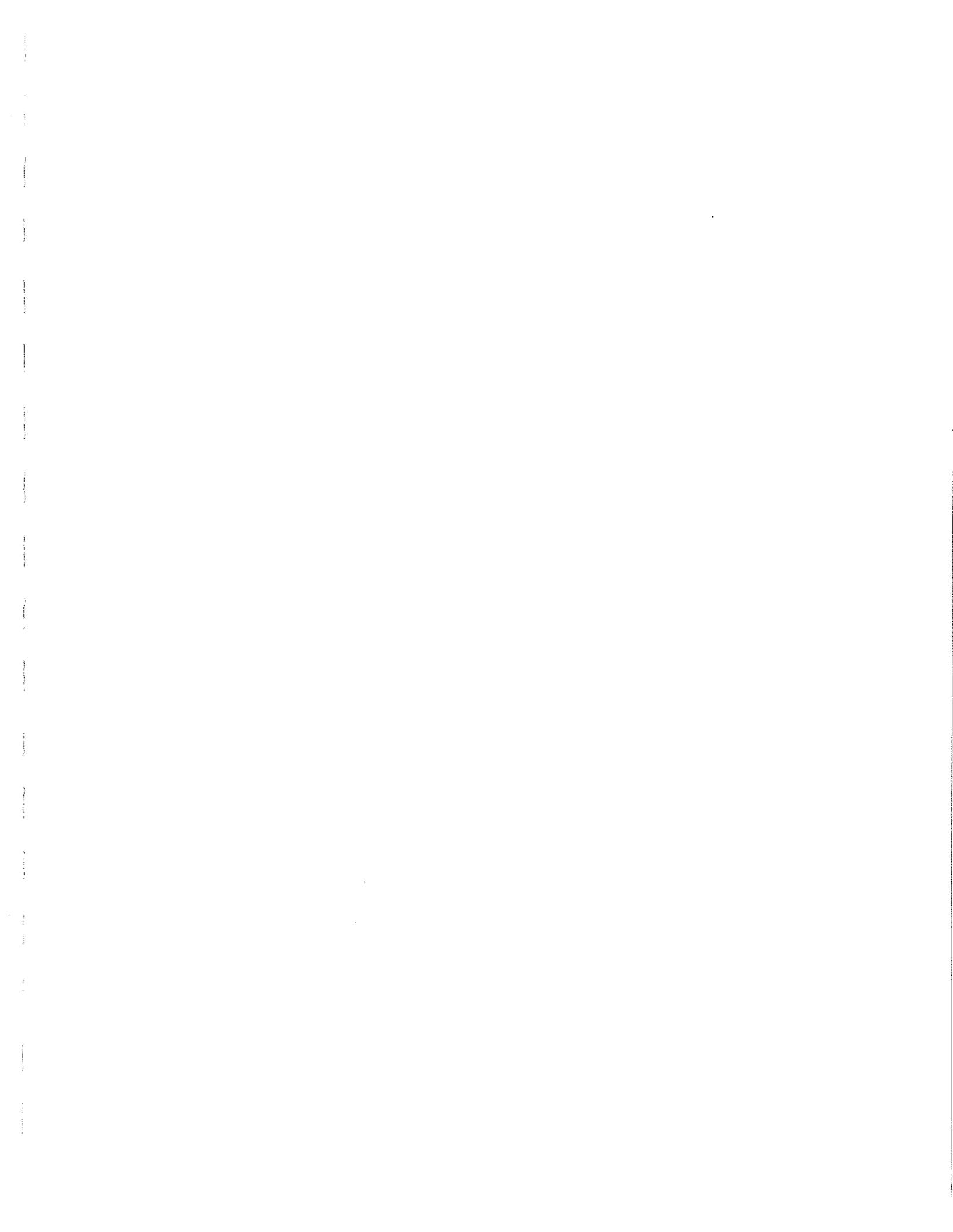
Water User Group	WUG	Seg	City	County	River Basin	Strategy Name	Supply Type	County Source	Basin Source	Specific Source ID	Specific Source Name	Total Capital Cost	V 2000	V 2010	V 2020	V 2030	V 2040	V 2050
Kerr / Livestock	101005133	1005	1005	133	14	Expanded use of existing wells	4c / 133-20	133	14	13313	Edwards-Trinity (Plateau)	\$118,822	65	65	65	65	65	65
Kerr / Livestock	101005133	1005	1005	133	14	Additional wells	4c / 133-21	133	14	13313	Edwards-Trinity (Plateau)	\$305,337	62	62	62	62	62	62
Kerr / Livestock	101005133	1005	1005	133	19	Expanded use of existing wells	4c / 133-22	133	19	13313	Edwards-Trinity (Plateau)	\$49,357	27	27	27	27	27	27
Kerr / Livestock	101005133	1005	1005	133	19	Additional wells	4c / 133-23	133	19	13313	Edwards-Trinity (Plateau)	\$109,357	27	27	27	27	27	27
Kerr / Mining	101003133	1003	1003	133	14	Additional wells	4c / 133-24	133	14	13313	Edwards-Trinity (Plateau)	\$22,301	12	0	0	0	0	0
Kinney County Other	100996136	996	757	136	21	Additional private wells	4c / 136-1	136	21	13611	Edwards (Balcones Fault Zone)	\$763,034	28	28	28	28	68	68
Kinney County Other	100996136	996	757	136	23	Additional private wells	4c / 136-2	136	23	13613	Edwards-Trinity (Plateau)	\$958,111	52	38	25	43	81	124
Kinney / Livestock	101005136	1005	1005	136	23	Expanded use of existing wells	4c / 136-3	136	23	13613	Edwards-Trinity (Plateau)	\$148,070	81	81	81	81	81	81
Kinney / Livestock	101005136	1005	1005	136	23	Additional wells	4c / 136-4	136	23	13613	Edwards-Trinity (Plateau)	\$663,968	163	163	163	163	163	163
City of Leakey	100513000	513	351	193	21	Additional wells	4c / 193-1	193	21	19322	Frio River Alluvium	\$84,245	NI	NI	NI	33	67	67
Real / Mining	101003193	1003	1003	193	14	Additional wells	4c / 193-5	193	14	19313	Edwards-Trinity (Plateau)	\$22,301	12	NI	NI	NI	NI	NI
Val Verde / Livestock	101005233	1005	1005	233	23	Expanded use of existing wells	4c / 233-1	233	23	23313	Edwards-Trinity (Plateau)	\$118,822	65	65	65	65	65	65
Val Verde / Livestock	101005233	1005	1005	233	23	Additional wells	4c / 233-2	233	23	23313	Edwards-Trinity (Plateau)	\$260,994	64	64	64	64	64	64
Val Verde / Mining	101003233	1003	1003	233	23	Additional wells	4c / 233-3	233	23	23313	Edwards-Trinity (Plateau)	\$136,563	56	56	56	56	92	92

NA = Indicates that the strategy does not have a specific cost or volume estimate. Additional discussion on cost and volume is contained in the strategy evaluation.
 NI = Indicates that the strategy is not implemented at this time.

**TWDB TABLE 13
RECOMMENDED MANAGEMENT STRATEGIES BY MAJOR WATER PROVIDER**

Major Water Provider	MWP	User Basin	Supply Type	RPG User	County	Origin Basin	Strategy	Specific Source ID	Specific Source Name	Total Capital Cost	V 2000	V 2010	V 2020	V 2030	V 2040	V 2050	Exception	Long-term Scenario
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None



**TWDB TABLE 14
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
BANDERA COUNTY							
City of Bandera							
Population	1679	2191	2268	2545	2856	3205	
Water Demand (ac-ft/yr)	303	371	376	413	454	506	
Current Supply (ac-ft/yr)	1,612	1,612	1,612	1,612	1,612	1,612	
Supply-Demand (ac-ft/yr)	1,309	1,241	1,236	1,199	1,158	1,106	
Short Term Strategy (ac-ft/yr)	NS						
Bandera County Other							
Population	17533	29109	30127	33809	37941	42577	
Water Demand (ac-ft/yr)	2926	4597	4488	4923	5440	6009	
Current Supply (ac-ft/yr)	1,673	1,673	1,673	1,673	1,673	1,673	
Supply-Demand (ac-ft/yr)	-1,253	-2,924	-2,815	-3,250	-3,767	-4,336	
Short Term Strategy (ac-ft/yr)	46	46	46	46	46	46	10-3
	2,766	2,766	2,766	2,766	3,613	3,613	10-4
	162	162	162	162	323	323	10-1
	108	108	108	108	108	5,000	10-2
	251	251	251	251	337	337	10-6
Bandera Irrigation							
Water Demand (ac-ft/yr)	278	266	254	243	233	223	
Current Supply (ac-ft/yr)	290	290	290	290	290	290	
Supply-Demand (ac-ft/yr)	12	24	36	47	57	67	
Short Term Strategy (ac-ft/yr)	NS						
Bandera Livestock							
Water Demand (ac-ft/yr)	333	333	333	333	333	333	
Current Supply (ac-ft/yr)	373	373	373	373	373	373	
Supply-Demand (ac-ft/yr)	40	40	40	40	40	40	
Short Term Strategy (ac-ft/yr)	NS						
Bandera Manufacturing							
Water Demand (ac-ft/yr)	11	13	15	16	19	22	
Current Supply (ac-ft/yr)	43	43	43	43	43	43	
Supply-Demand (ac-ft/yr)	32	30	28	27	24	21	
Short Term Strategy (ac-ft/yr)	NS						
Bandera Mining							
Water Demand (ac-ft/yr)	25	25	26	27	27	27	
Current Supply (ac-ft/yr)	23	23	23	23	23	23	
Supply-Demand (ac-ft/yr)	-2	-2	-3	-4	-4	-4	
Short Term Strategy (ac-ft/yr)	10	10	11	12	12	12	10-7

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
EDWARDS COUNTY							
City of Rocksprings							
Population	1445	1609	1723	1831	1906	1977	
Water Demand (ac-ft/yr)	293	310	317	328	336	346	
Current Supply (ac-ft/yr)	982	982	982	982	982	982	
Supply-Demand (ac-ft/yr)	689	672	665	654	646	636	
Short Term Strategy (ac-ft/yr)							
Edwards County Other							
Population	1099	1224	1310	1393	1449	1504	
Water Demand (ac-ft/yr)	137	141	143	145	148	152	
Current Supply (ac-ft/yr)	166	166	166	166	166	166	
Supply-Demand (ac-ft/yr)	29	25	23	21	18	14	
Short Term Strategy (ac-ft/yr)							
Edwards Irrigation							
Water Demand (ac-ft/yr)	239	229	219	210	201	192	
Current Supply (ac-ft/yr)	143	143	143	143	143	143	
Supply-Demand (ac-ft/yr)	-96	-86	-76	-67	-58	-49	
Short Term Strategy (ac-ft/yr)	133	133	133	133	133	133	69-1
	26	26	26	26	26	26	69-2
	NA	NA	NA	NA	NA	NA	69-3
Edwards Livestock							
Water Demand (ac-ft/yr)	615	615	615	615	615	615	
Current Supply (ac-ft/yr)	615	615	615	615	615	615	
Supply-Demand (ac-ft/yr)	0	0	0	0	0	0	
Short Term Strategy (ac-ft/yr)	28	28	28	28	28	28	69-4
	27	27	27	27	27	27	69-5
Edwards Mining							
Water Demand (ac-ft/yr)	8	6	4	3	1	0	
Current Supply (ac-ft/yr)	12	12	12	12	12	12	
Supply-Demand (ac-ft/yr)	4	6	8	9	11	12	
Short Term Strategy (ac-ft/yr)	NS						

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
KERR COUNTY							
City of Kerrville							
Population	21191	25580	30425	35310	39784	44383	
Water Demand (ac-ft/yr)	4747	5444	6169	7040	7799	8650	
Current Supply (ac-ft/yr)	3,200	3,200	3,200	3,200	3,200	3,200	
Supply-Demand (ac-ft/yr)	-1,547	-2,244	-2,969	-3,840	-4,599	-5,450	
Short Term Strategy (ac-ft/yr)	NI	1,547	3,840	3,840	5,450	5,450	133-1
	NA	NA	NA	NA	NA	NA	133-2
	3,000	3,000	3,000	6,000	6,000	6,000	133-4
	NI	1,547	3,840	3,840	5,450	5,450	133-5A
	NI	1,547	3,840	3,840	5,450	5,450	133-5B
Ingram							
Population	6745	7934	9004	9950	11112	12411	
Water Demand (ac-ft/yr)	144	132	122	119	116	115	
Current Supply (ac-ft/yr)	290	290	290	290	290	290	
Supply-Demand (ac-ft/yr)	146	158	168	171	174	175	
Short Term Strategy (ac-ft/yr)	NS						
Kerr County Other							
Population	15886	18610	21063	23234	25895	28875	
Water Demand (ac-ft/yr)	3710	4074	4300	4618	5026	5570	
Current Supply (ac-ft/yr)	34,073	34,073	34,073	34,073	34,073	34,073	
Supply-Demand (ac-ft/yr)	30,363	29,999	29,773	29,455	29,047	28,503	
Short Term Strategy (ac-ft/yr)	NS						
Kerr Irrigation							
Water Demand (ac-ft/yr)	823	797	771	747	723	700	
Current Supply (ac-ft/yr)	455	455	455	455	455	455	
Supply-Demand (ac-ft/yr)	-368	-342	-316	-292	-268	-245	
Short Term Strategy (ac-ft/yr)	361	361	361	361	361	361	133-17
	136	136	136	136	136	136	133-18
	NA	NA	NA	NA	NA	NA	133-19
Kerr Livestock							
Water Demand (ac-ft/yr)	526	526	526	526	526	526	
Current Supply (ac-ft/yr)	526	526	526	526	526	526	
Supply-Demand (ac-ft/yr)	0	0	0	0	0	0	
Short Term Strategy (ac-ft/yr)	65	65	65	65	65	65	133-20
	62	62	62	62	62	62	133-21
	27	27	27	27	27	27	133-22
	27	27	27	27	27	27	133-23

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
KERR COUNTY							
Kerr Manufacturing							
Water Demand (ac-ft/yr)	30	33	36	38	41	44	
Current Supply (ac-ft/yr)	166	166	166	166	166	166	
Supply-Demand (ac-ft/yr)	136	133	130	128	125	122	
Short Term Strategy (ac-ft/yr)	NS						
Kerr Mining							
Water Demand (ac-ft/yr)	176	122	110	103	102	105	
Current Supply (ac-ft/yr)	176	176	176	176	176	176	
Supply-Demand (ac-ft/yr)	0	54	66	73	74	71	
Short Term Strategy (ac-ft/yr)	12	0	0	0	0	0	133-24

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy
	2000	2010	2020	2030	2040	2050	Number
KINNEY COUNTY							
Bracketville							
Population	3138	3278	3357	3357	3357	3357	
Water Demand (ac-ft/yr)	896	892	865	839	839	835	
Current Supply (ac-ft/yr)	2,338	2,338	2,338	2,338	2,338	2,338	
Supply-Demand (ac-ft/yr)	1,442	1,446	1,473	1,499	1,499	1,503	
Short Term Strategy (ac-ft/yr)	NS						
Kinney County Other							
Population	1477	1543	1580	1580	1580	1580	
Water Demand (ac-ft/yr)	711	690	669	697	757	823	
Current Supply (ac-ft/yr)	631	631	631	631	631	631	
Supply-Demand (ac-ft/yr)	-80	-59	-38	-66	-126	-192	
Short Term Strategy (ac-ft/yr)	28	28	28	28	68	68	136-1
	52	38	25	43	81	124	136-2
Kinney Irrigation							
Water Demand (ac-ft/yr)	7532	7209	6900	6604	6321	6051	
Current Supply (ac-ft/yr)	9,025	9,025	9,025	9,025	9,025	9,025	
Supply-Demand (ac-ft/yr)	1,493	1,816	2,125	2,421	2,704	2,974	
Short Term Strategy (ac-ft/yr)	NS						
Kinney Livestock							
Water Demand (ac-ft/yr)	675	675	675	675	675	675	
Current Supply (ac-ft/yr)	675	675	675	675	675	675	
Supply-Demand (ac-ft/yr)	0	0	0	0	0	0	
Short Term Strategy (ac-ft/yr)	81	81	81	81	81	81	136-3
	163	163	163	163	163	163	136-4

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
REAL COUNTY							
Camp Wood							
Population	668	635	592	552	536	526	
Water Demand (ac-ft/yr)	180	163	145	133	127	124	
Current Supply (ac-ft/yr)	320	320	320	320	320	320	
Supply-Demand (ac-ft/yr)	140	157	175	187	193	196	
Short Term Strategy (ac-ft/yr)	NS						
Leakey							
Population	422	436	513	576	645	722	
Water Demand (ac-ft/yr)	157	156	176	195	217	243	
Current Supply (ac-ft/yr)	180	180	180	180	180	180	
Supply-Demand (ac-ft/yr)	23	24	4	-15	-37	-63	
Short Term Strategy (ac-ft/yr)	NI	NI	NI	33	67	67	193-1
Real County Other							
Population	1951	2048	2080	2119	2128	2122	
Water Demand (ac-ft/yr)	385	387	380	388	386	377	
Current Supply (ac-ft/yr)	391	391	391	391	391	391	
Supply-Demand (ac-ft/yr)	6	4	11	3	5	14	
Short Term Strategy (ac-ft/yr)	NS						
Real Irrigation							
Water Demand (ac-ft/yr)	835	799	765	732	701	670	
Current Supply (ac-ft/yr)	1,574	1,574	1,574	1,574	1,574	1,574	
Supply-Demand (ac-ft/yr)	739	775	809	842	873	904	
Short Term Strategy (ac-ft/yr)	NS						
Real Livestock							
Water Demand (ac-ft/yr)	174	174	174	174	174	174	
Current Supply (ac-ft/yr)	244	244	244	244	244	244	
Supply-Demand (ac-ft/yr)	70	70	70	70	70	70	
Short Term Strategy (ac-ft/yr)	NS						
Real Mining							
Water Demand (ac-ft/yr)	13	9	5	2	0	0	
Current Supply (ac-ft/yr)	6	6	6	6	6	6	
Supply-Demand (ac-ft/yr)	-7	-3	1	4	6	6	
Short Term Strategy (ac-ft/yr)	12	NI	NI	NI	NI	NI	193-5

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
VAL VERDE COUNTY							
Del Rio							
Population	36390	40988	44960	47385	50182	53144	
Water Demand (ac-ft/yr)	12106	12993	13648	14225	14896	15716	
Current Supply (ac-ft/yr)	16,556	16,556	16,556	16,556	16,556	16,556	
Supply-Demand (ac-ft/yr)	4,450	3,563	2,908	2,331	1,660	840	
Short Term Strategy (ac-ft/yr)	NS						
Laughlin AFB							
Population	2556	2556	2556	2556	2556	2556	
Water Demand (ac-ft/yr)	1446	1394	1343	1331	1320	1317	
Current Supply (ac-ft/yr)	1,469	1,469	1,469	1,469	1,469	1,469	
Supply-Demand (ac-ft/yr)	23	75	126	138	149	152	
Short Term Strategy (ac-ft/yr)	NS						
Val Verde County Other							
Population	8330	8006	7517	6954	8887	11146	
Water Demand (ac-ft/yr)	1642	1498	1330	1192	1533	1860	
Current Supply (ac-ft/yr)	1,861	1,861	1,861	1,861	1,861	1,861	
Supply-Demand (ac-ft/yr)	219	363	531	669	328	1	
Short Term Strategy (ac-ft/yr)	NS						
Val Verde Irrigation							
Water Demand (ac-ft/yr)	1771	1702	1637	1573	1513	1454	
Current Supply (ac-ft/yr)	5,324	5,324	5,324	5,324	5,324	5,324	
Supply-Demand (ac-ft/yr)	3,553	3,622	3,687	3,751	3,811	3,870	
Short Term Strategy (ac-ft/yr)	NS						
Val Verde Livestock							
Water Demand (ac-ft/yr)	663	663	663	663	663	663	
Current Supply (ac-ft/yr)	599	599	599	599	599	599	
Supply-Demand (ac-ft/yr)	-64	-64	-64	-64	-64	-64	
Short Term Strategy (ac-ft/yr)	65	65	65	65	65	65	233-1
	64	64	64	64	64	64	233-2

**TWDB TABLE 14 (continued)
SUMMARY TABLE**

County and Water Use	Year						Strategy Number
	2000	2010	2020	2030	2040	2050	
VAL VERDE COUNTY							
Val Verde Manufacturing							
Water Demand (ac-ft/yr)	0	0	0	0	0	0	
Current Supply (ac-ft/yr)	50	50	50	50	50	50	
Supply-Demand (ac-ft/yr)	50	50	50	50	50	50	
Short Term Strategy (ac-ft/yr)	NS						
Val Verde Mining							
Water Demand (ac-ft/yr)	114	121	138	155	172	191	
Current Supply (ac-ft/yr)	99	99	99	99	99	99	
Supply-Demand (ac-ft/yr)	-15	-22	-39	-56	-73	-92	
Short Term Strategy (ac-ft/yr)	56	56	56	56	92	92	233-3
NS = Indicates that the water user does not have a supply shortage and therefore no strategies were developed.							
NA = Indicates that the strategy does not have a specific cost or volume estimate.							
NI = Indicates that the strategy is not implemented at this time.							
0 = Indicates that the supply source is unavailable during drought-of-record conditions.							