2011 Regional Water Plan

Prepared by:
Lavaca Regional Water Planning Group

With assistance from:
AECOM USA Group, Inc.
TBPE Reg. No. F-3082

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Contents

List of Tables

List of Figures

List of Appendices

Abbreviations Used in the Report

Ac-ft/yr	Acre-feet per year
CBGCD	Coastal Bend Groundwater Conservation District
DOR	Drought of Record
GAM	Groundwater Availability Model
GCD	Groundwater Conservation District
LNRA	Lavaca-Navidad River Authority
LRWPA	Lavaca Regional Water Planning Area
LRWPG	Lavaca Regional Water Planning Group
MGD	Million gallons per day
ROR	Run of River
RWPG	Regional Water Planning Group
STWM	South Texas Watermaster
SWP	State Water Plan
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
WAM	Water Availability Model
WMS	Water Management Strategy
WUG	Water User Group
WWP	Wholesale Water Provider

Water Measurements

Acre-foot (AF) = 43,560 cubic feet = 325,851 gallons
Acre-foot per year (ac-ft/yr) = 325,851 gallons per year = 893 gallons per day
Gallons per minute (gpm) = 1,440 gallons per day = 1.6 ac-ft/yr
Million gallons per day (mgd) = 1,000,000 gallons per day = 1120 ac-ft/yr

County Codes used in the Tables

120	Jackson County
143	Lavaca County
241	Wharton County

Basin Codes used in the Tables

15	Colorado-Lavaca Coastal Basin Basin
16	Lavaca Basin
17	Lavaca-Guadalupe Coastal Basin

Contents

List of Tables

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ES - Executive Summary

ES.1 Introduction

The 2011 Regional Water Planning process continues the planning process set forth by the 2006 Regional Water Plans (RWPs) for the State of Texas. Beginning in 2006, the 2011 RWP process sought to combine a variety of expertise and interests to prepare updated plans for the 16 unique planning regions within the state. These "initially prepared" Regional Water Plans were to be submitted to TWDB by March 1, 2010. Following a comment period from state agencies and the general public, these plans will be finalized and adopted by September 1, 2010, to be combined into the 2012 State Water Plan. In order to provide consistency and facilitate the compilation of the different regional plans, the Texas Water Development Board (TWDB) requires the incorporation of the data from the completed regional plans into a standardized online database, referred to as TWDB DB12.

Scope of Work

The scope of work was prepared through a public process and is reflected in the tasks below:

ES.1.1 Task 1

Task 1 was intended to collect data and to provide a physical, social, and economic description of the Lavaca Regional Water Planning Area (LRWPA). The geographical boundaries of the LRWPA, originally designated as Region P, are shown in *Figure 1-1* in *Chapter 1*. Information regarding irrigated acreage for agricultural water use was recognized as being of particular importance, and surveys were conducted in order to determine this data that would later be used for estimating irrigation water demand.

ES.1.2 Task 2

Task 2 presented the population and water demand projections for the LRWPA. *Chapter 2* summarizes this data and discusses the procedures used to obtain revised population and demand projections. These revised projections were then submitted to TWDB in a formal request to be accepted for use in the State Water Plan. The total demands for each county or portion of a county are shown in *Table ES.1* below. Because agriculture constitutes the dominant water use in the basin, nearly 95 percent of the demands shown are related to irrigation supplies. This supply is obtained from both groundwater and surface water sources. Further information regarding population and water demand projections is available in *Chapter 2*.

Table ES.1
Total Demands in Acre-Feet per Year

Counties	2010	2020	2030	2040	2050	2060
Jackson	63,300	63,409	63,455	63,465	63,481	63,531
Lavaca	13,815	13,794	13,735	13,651	13,580	13,550
Wharton (Region P)	152,698	152,781	152,813	152,807	152,792	152,773
LRWPA Total	229,813	229,984	230,003	229,923	229,853	229,854

ES.1.3 Task 3

The availability of surface water and groundwater supplies were determined in Task 3. Surface water sources were determined to be limited under drought-of-record (DOR) conditions. The only surface water supply determined to be available during DOR was a supply of 79,000 acre-feet from Lake Texana, the only reservoir in the region; of this 79,000 acre-feet, 4,500 acre-feet is reserved for environmental flows. Only a small portion of this supply is contracted through the Lavaca-Navidad River Authority (LNRA) to a customer within the region. The remaining supply is used to meet demands from outside of the region.

Groundwater supplies are responsible for meeting virtually all of the WUG demands within the LRWPA. Irrigation, the single largest demand for the region, would be served entirely by groundwater during DOR. Models were developed for the portion of the Gulf Coast Aquifer serving LRWPA in order to update groundwater availability estimates.

As an additional task for the 2011 RWP, LRWPG representatives met with representative of Regions L and N to discuss projected needs and potential supply projects in order to maintain regional consistency. For additional information regarding the determination of available water supplies, see *Chapter 3*.

ES.1.4 Task 4

The fourth task was to determine the surpluses and shortages resulting from the division of available resources performed for Task 3 and to assign management strategies to meet these demands. It was assumed that irrigators, unlike municipal and industrial water users, would not have the economic ability to deepen groundwater wells to obtain additional supplies as DOR conditions caused an increased reliance on groundwater sources. For this reason, it was assumed that farmers would be impacted by limited supplies within the region. *Table ES.2* includes a summary of shortages for the LRWPA.

Table ES.2
Shortages in Acre-Feet per Year

County	WUG	Basin	2010	2020	2030	2040	2050	2060
JACKSON	IRRIGATION	COLORADO-LAVACA	-5,053	-5,053	-5,053	-5,053	-5,053	-5,053
WHARTON	IRRIGATION	COLORADO-LAVACA	-1,490	-1,490	-1,489	-1,489	-1,490	-1,489
WHARTON	IRRIGATION	LAVACA	-61,196	-61,196	-61,197	-61,197	-61,196	-61,197

A process for the evaluation of feasibility of strategy implementation was developed. Alternative strategies were presented in a form so that all potential alternatives were identified and evaluated in accordance with local desires and needs. The costs of potential water management strategies (WMSs) were given the most consideration during the strategy selection process because irrigators are sensitive to the increase in water prices and all shortages in the LRWPA were assumed to impact these users. Results of groundwater availability modeling from *Chapter 3* were used to estimate potential drawdowns from conjunctive use of groundwater and in turn additional pumping costs associated with the WMS. The only WMS that was found to be of a reasonable cost to farmers was the strategy of conjunctive use of groundwater in excess of the available supplies determined from Task 3. This would be a temporary condition and the aquifer would be allowed to recharge in years of normal rainfall when surface water supplies would be used for irrigation. The definition of the Palmetto Bend Stage II Reservoir was updated to match the most recent available data and information was added for a potential off-channel reservoir for the Lavaca River. Additional information regarding surpluses and shortages and recommended WMSs can be found in *Chapter 4*.

ES.1.5 Task 5

The purpose of Task 5 was to determine the effects of water management strategies on water quality and agriculture through the movement of water from these rural regions to population centers. The effect of water conservation and the overpumpage of groundwater on streamflows during DOR were considered. There are currently no strategies in place to export additional surface water from the area to serve municipal purposes outside of the region and therefore, no anticipated impacts upon the availability of water for agricultural uses. Available water quality data from wells within the region were examined in order to identify formations with high levels of dissolved solids. Groundwater was generally of good quality, although there were a number of locations with higher relative solute concentrations. This information was viewed in conjunction with water levels to determine if there is a clear relationship between drawdown and water quality exists for LRWPA; no clear relationship was apparent from available data. Additional information concerning impacts on water quality and rural water availability is shown in *Chapter 5*.

ES.1.6 Task 6

Water conservation plans are required for any entity seeking a TWDB loan, a new or amended surface water right, or current holders of existing surface water diversion permits under certain circumstances. Additionally, drought contingency plans are required of certain water right owners and applicants. As these documents have become integral to providing a reliable supply of water throughout the State, *Chapter 6* was prepared to provide information to various water users. The chapter also provides model water conservation and drought contingency plans and includes the results of a survey used to investigate the status and efficacy of municipal conservation practices in the region.

ES.1.7 Task 7

Task 7 summarized the status of water resources in each basin and the anticipated impacts of the recommended WMS. The Colorado-Lavaca and Lavaca basins were determined to have insufficient water supplies to meet all potential demands during DOR. As a result of these shortages, it was recommended that water be pumped from the Gulf Coast Aquifer to serve short-term demands in excess of the volumes presented in *Chapter 3* of this Plan.

ES.1.8 Task 8

No designation of unique stream segments was made, as the Group desired to have additional information on the potential impacts of such designation. Nine proposed policy issues were developed and adopted by the LRWPG concerning regulatory and legislative issues. These recommendations are listed below and are described in detail in *Chapter 8*.

- Environmental Issues
- Ongoing RWPG Activities
- Inter-Regional Coordination
- Conservation Policy
- Sustainable Yield of the Gulf Coast Aquifer
- Support of the Rule of Capture
- Groundwater Conservation Districts
- Establishment of Fees for Groundwater Export
- Limits for Groundwater Conservation Districts

ES.1.9 Task 9

Task 9 included the presentation of the result of the TWDB study, *Socioeconomic Impacts of Unmet Water Needs in Lavaca Regional Water Planning Area.* This report documented the projected impacts to the region in respect to jobs, income, and business taxes resulting from unmet water demands.

Several policy recommendations were also made regarding funding opportunities that can benefit the Region in making the necessary infrastructure improvements. These recommendations regard the following programs and policies:

- State and Federal Agricultural Water Conservation Programs
- Drinking Water State Revolving Funds
- State Loan Program
- Water and Waste Disposal Loans and Grants from the USDA Rural Utilities Service
- TWDB Funding Through Taxation of Bottled Water Sales
- Desalination Research and Demonstration Projects
- Water Research Program – Agriculture

Additional information regarding infrastructure financing for the region and recommended policies can be found in *Chapter 9*.

ES.1.10 Task 10

Public participation has been encouraged through the efforts of the Planning Group members as they take information back to the WUGs they represent. This was the most effective method of informing the public of the progress of the Plan. All of the members were active in meeting with various interest groups and making presentations. Public meetings were held at the inception of the project to review the population and water demand data; the supply, surpluses, and shortages; and management strategies. Meetings of the Planning Group were well attended by the members and non-voting members, but participation by the general public has been limited. The LRWPG held two public meetings and one public hearing to receive comments on the submitted Draft Plan. Meeting events are summarized in *Chapter 10*.

Contents

List of Tables

List of Figures

List of Appendices

Chapter 1– Description of the Lavaca Regional Water Planning Area

1.1 Introduction and Background

Sections 16.051 and 16.055 of the Texas Water Code direct the Executive Administrator of the Texas Water Development Board (TWDB) to prepare and maintain a comprehensive State Water Plan as a flexible guide for the development and management of all water resources in Texas in order to ensure that sufficient supplies of water will be available at a reasonable cost to further the State's economic growth. Section 16.056 requires the TWDB to amend the plan as needed in response to increased knowledge and changing conditions.

In February 1998, the TWDB adopted rules establishing 16 regional water planning areas and designated the initial members of the regional water planning groups representing 11 interests. Each Regional Water Planning Group (RWPG) has the option to add interest group categories and members. With technical and financial assistance from the TWDB, and in accordance with planning guidelines it set forth, the RWPGs prepared a consensus-based Regional Water Plan (RWP) for 2001. The TWDB assembled the Regional Water Plans into a new 2002 State Water Plan (SWP). A second cycle of planning produced a 2006 RWP and 2007 SWP. This current, third round of regional water planning produced an "initially prepared" Regional Water Plan that was required to be submitted to the TWDB by March 1, 2010, and is to be finalized and adopted by September 1, 2010. Subsequently, by January 5, 2012, the TWDB will prepare a new State Water Plan which will incorporate the adopted Regional Water Plans.

This chapter summarizes the results of Task 1, and describes the Lavaca Regional Water Planning Area (LRWPA).

1.2 Description of the Lavaca Regional Water Planning Area

The LRWPA is located along the southeastern Texas coast and consists of all of Lavaca and Jackson Counties, as well as Precinct 3 of Wharton County and the entire city of El Campo, as shown in *Figure 1-1*. The eastern portion of Wharton County is included in the Region K planning area.

The LRWPA is bounded by Victoria and DeWitt Counties to the southeast, Gonzales and Fayette Counties to the northwest, Colorado County to the northeast, Matagorda County and the remainder of Wharton County to the east, and Calhoun County to the south. LRWPA is located in the Lavaca, Lavaca-Guadalupe Coastal, and the Colorado-Lavaca Coastal River Basins, as shown in *Figure 1-1*.

LRWPA is located in the Gulf Coastal Plains region of Texas and contains both Gulf Coast prairies and marshes and Blackland Prairies. The Gulf Coast prairies and marshes encompass the majority of the region. They contain marsh and saltwater grasses in tidal areas and bluestems and tall grasses inland. Hardwoods grow in limited amounts in the bottomlands. The upland soils consist of clays, clay loams, sandy loams, and black soils. The natural grasses make the region ideal for cattle grazing, and the productive soils and typically flat topography support the farming of rice, sorghums, corn, cotton, wheat, and hay.

Figure 1-1
General Location Map

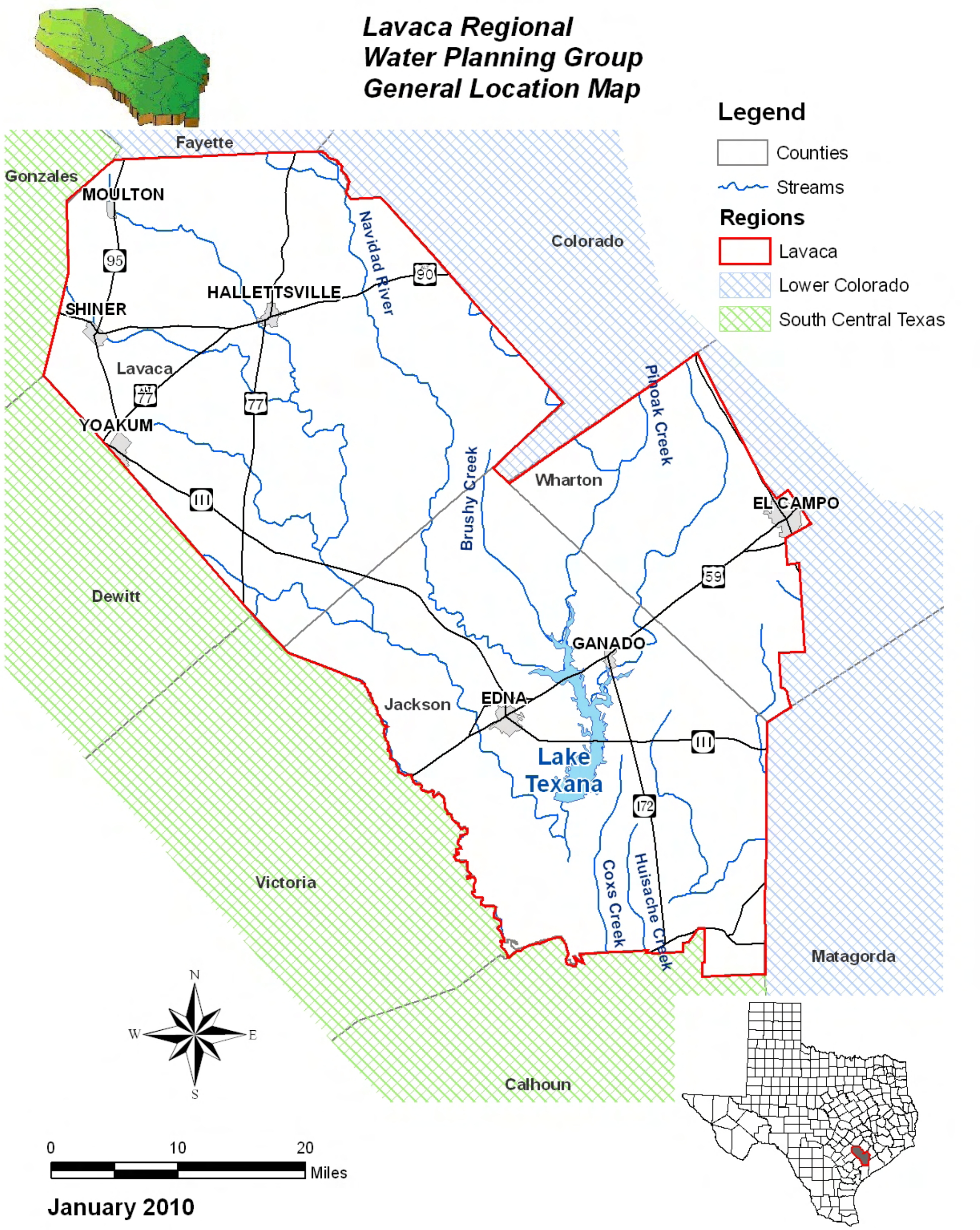
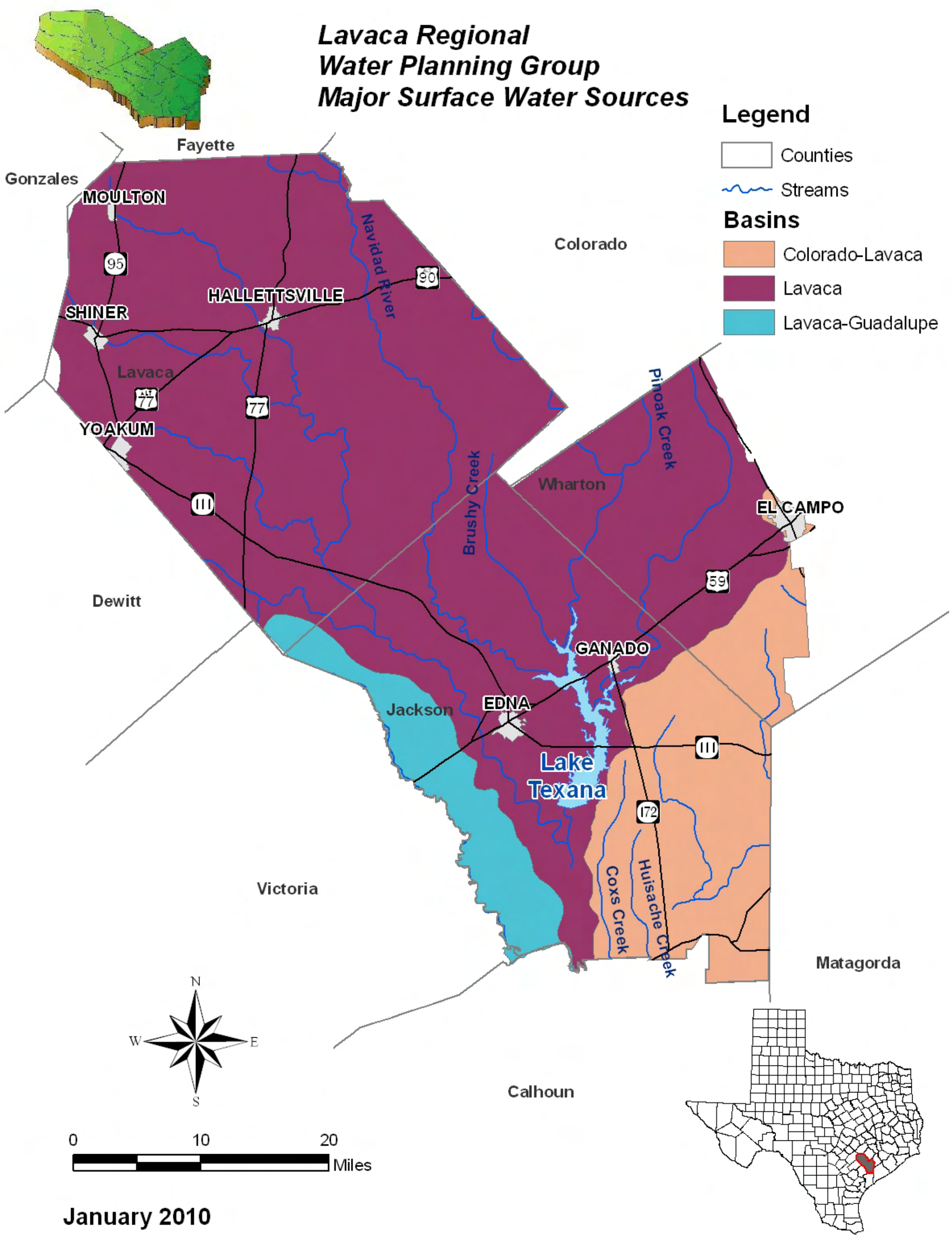


Figure 1-2
Major Surface Water Sources



The Blackland Prairies are mainly shrink-swell clays that form cracks in dry weather. A large amount of timber grows along the streams, and even though it was originally grasslands, most of the area has been cultivated with productive grasses. The land is used as croplands and grasslands and the grasslands are used as pastures. The main crops supported by the Blackland Prairies are cotton, grain, sorghums, corn, wheat, oats, and hay.

The counties have hot and humid summers which are occasionally relieved by thunderstorms. The average growing seasons are 290 days in Jackson County, 280 days in Lavaca County, and 266 days in Wharton County. The mean rainfall is approximately 40.8 inches annually for the region. Average temperatures for the region vary, from lows of 41 degrees F in January to highs of 94 degrees F in July. Jackson County encompasses 857 square miles (mi^2); Lavaca County encompasses 970 mi^2; and Wharton County encompasses 1,094.4 mi^2, of which approximately half is in the LRWPA.

1.2.1 Governmental Authorities in the Lavaca Planning Region

The primary governmental entities in the region are municipal and county governments. Jackson and Lavaca Counties are included on the Golden Crescent Regional Planning Commission, which was established in 1968. This commission also includes the counties of Calhoun, DeWitt, Goliad, Gonzales, and Victoria. Member cities within Jackson and Lavaca Counties include Edna, Ganado, Hallettsville, Moulton, Shiner, and Yoakum. The Jackson County Soil and Water Conservation District, Jackson County Hospital District, Lavaca County Soil and Water Conservation District, and the Lavaca-Navidad River Authority (LNRA) are all the special districts created under the Texas Law. The Commission assists in developing opportunities for intergovernmental coordination to increase economic opportunities for the region (Golden Crescent Regional Planning Commission 1999). The Jackson Countywide Drainage District and the Jackson County Rural Fire and Emergency Services District are also included in the LRWPA.

Wharton County is included in the Houston-Galveston Area Council of Governments (H-GAC). H-GAC was established in 1966 and includes 12 other counties located to the east and north of Wharton County. H-GAC is focused on economic development for the region, as well as on environmental issues such as evaporation and air quality, solid waste, geographic information systems and demographic information, and social and nutrition services to senior citizens. El Campo is also a member of the H-GAC.

In addition to these entities, there are several regulatory authorities that influence long-range water planning. The South Texas Water Master (STWM) monitors the regional water uses in seven south central Texas river basins including the Lavaca River Basin. The STWM plays a role in allocation of water supplies by user in the event of drought conditions. Field investigations also play a role in locating illegal diversions of water. With regard to the state, TWDB, Texas Commission on Environmental Quality (TCEQ), and Texas Parks & Wildlife Department (TPWD) are responsible for gathering information on water supply and quality. LNRA manages the surface water supplies in Jackson County. There are also soil and water conservation districts in the region.

Recent additions to the governmental entities in the region include the Coastal Bend Groundwater Conservation District (GCD) in Wharton County, and the Texana GCD in Jackson County. The primary focus of these districts is to preserve and protect groundwater supplies in their respective counties for future generations. The original management plans for the Coastal Bend and Texana districts were certified by TWDB on September 28, 2004. Subsequently, an updated groundwater management plan for the Coastal Bend GCD was approved by TWDB on November 4, 2009. The Lavaca County GCD was created by the 80th Texas Legislature on May 25, 2007 but has not received local support.

1.2.2 General Economic Conditions

The regional planning area is described below on a county-by-county basis.

The economy of Jackson County includes petroleum production and operation, metal fabrication and tooling, sheet-metal works, plastics manufacturing, agribusiness, and lake recreation. The major agricultural interests in Jackson County include corn, cotton, rice, grain sorghum, and beef cattle. These agricultural products had a market value of approximately $64.6 million in 2007.

The economy of Lavaca County includes varied manufacturing, leather goods, agribusiness, oil and gas production, and tourism. The major agricultural interests in Lavaca County include livestock (especially beef cattle), eggs, poultry, hay, rice, corn, tree nuts, and sorghum, with a market value of approximately $58.9 million in 2007.

The economy of Wharton County includes oil, sulfur, other minerals, agribusiness, hunting leases, and varied manufacturing. The major agricultural interests in Wharton County include rice, sorghum, cotton, corn, eggs, turfgrass, beef cattle, hay and soybeans; with a market value of approximately $240.2 million for the entire county in 2007 (the county is only partially contained in the Lavaca Region).

The distribution of personal income generated from each of the employment sectors for the period 2004-2006 is shown in *Table 1–1*.

Table 1–1 Magnitude of Personal Income in the Lavaca Region for 2004-2006

Income Sources	Jackson County % of Total County Earnings	Lavaca County % of Total County Earnings	Wharton County % of Total County Earnings
Farm Earnings	2.00	2.06	6.51
Ag. Service, Forestry, Fishing, etc.	1.98	N/A	3.41
Mining-Metal, Coal, Oil and Gas, Minerals	N/A	3.54	8.80
Construction	13.87	4.55	4.51
Manufacturing	N/A	35.76	11.47
Transportation and Public Utilities	4.11	N/A	5.71
Wholesale Trade	4.23	5.36	5.34
Retail Trade	5.98	8.24	9.37
Finance, Insurance, and Real Estate	3.23	4.02	6.05
Services (Health, Business, Recreation, etc.)	11.57	5.88	8.92
Government and Government Enterprises	19.03	13.34	18.04

N/A – Not Available due to confidential information
Source: U.S. Department of Commerce, Bureau of Economic Analysis *CA05 Personal Income by Major Source and Earnings by Industry*

The magnitudes of personal incomes for each county were based on an average of the data from 2004-2006. For Jackson County, the farm earnings increased slightly, from about 2.3 percent in 2004 to 2.9 percent in 2005, but declined significantly to 0.94 percent in 2006. For Lavaca County, farm earnings have been declining in recent years. Farm earnings were approximately 5.1 percent in 2004, 1.5 percent in 2005, and dropped to -0.22 percent in 2006. The same trend holds true for Wharton County, as farm earnings have steadily decreased from 8.6 percent to 4.8 percent between 2004 and 2006.

The 2007 median household income was approximately $48,497 for Jackson County, $38,025 for Lavaca County, and $40,185 for all of Wharton County. The Texas 2007 median household income was approximately $47,563.

Unemployment in December 2008 was approximately 4.8 percent in Jackson County, 3.8 percent in Lavaca County, and 4.9 percent in Wharton County (U.S. Bureau of Labor Statistics).

Table 1–2 presents the market value of some crops in LRWPA for 2002.

Table 1–2 Market Value of Agricultural Products Sold in Jackson, Lavaca, and Wharton Counties in 2002 and 2007 (in $1,000)

County	Jackson		Lavaca		Wharton (Entire County)	
Year	2002	2007	2002	2007	2002	2007
Grains, Oilseeds, Dry Beans, and Dry Peas	$19,697	$42,147	$1,630	$1,858	$43,218	$65,604
Cotton and Cottonseed	$10,533	$2,742	N/A	N/A	$26,011	N/A

N/A – Not Available
Source: United States Department of Agriculture and the National Agricultural Statistics Service, *2007 Census of Agriculture for Texas–County Data*

Census sales information for manufacturing in the LRWPA was inconsistent or incomplete, since information was withheld when only one entity exists in a county, to avoid disclosing data tied to a specific company and because of the differences in the 2002 and 2007 Censuses.

The value of properties within the Lavaca Region has increased substantially in recent years, as shown in *Table 1–3*.

Table 1–3 Property Value by County

County	2001 Property Value	2005 Property Value
Jackson	$1,488,427,224	$1,416,741,983
Lavaca	$1,632,936,514	$2,335,053,537
Wharton	$2,167,215,194	$2,651,668,721

Source: *Texas Almanac* 2004–2005 and 2008-2009

1.3 Population and Municipal Water Demand in the Lavaca Region

A summary of population and water usage by county is shown in *Table 1–4* and *Figure 1-3*. The LRWPA's 2000 Census population was 48,068. Cities in the LRWPA include Hallettsville, Moulton, Shiner, and Yoakum in Lavaca County (total county population 19,210 in 2000); Edna and Ganado in Jackson County (total county population 14,391 in 2000); and El Campo in Wharton County, the largest city in the region (total city population 10,945 in 2000).

Table 1–4 Population and Water Usage by County for the Lavaca Regional Water Planning Area

		County		
		Jackson	**Lavaca**	**Wharton (LRWPA)**
Year 2000 Census Population		14,391	19,210	14,467
Year 2000 Reported Water Usage (acre–feet)	Municipal	1,816	3,073	2,294
	Manufacturing	560	319	49
	Mining	110	30	4
	Steam Electric	0	0	0
	Livestock	852	2,059	588
	Irrigation	88,707	11,492	118,494

Municipal water usage, as reported by TWDB in the 2000 Water Use Survey Estimate for the LRWPA, totaled 1,816, 3,073, 2,294 acre-feet for Jackson, Lavaca, and Wharton Counties, respectively. Irrigation usage in the region was, by far, the greatest demand in the LRWPA.

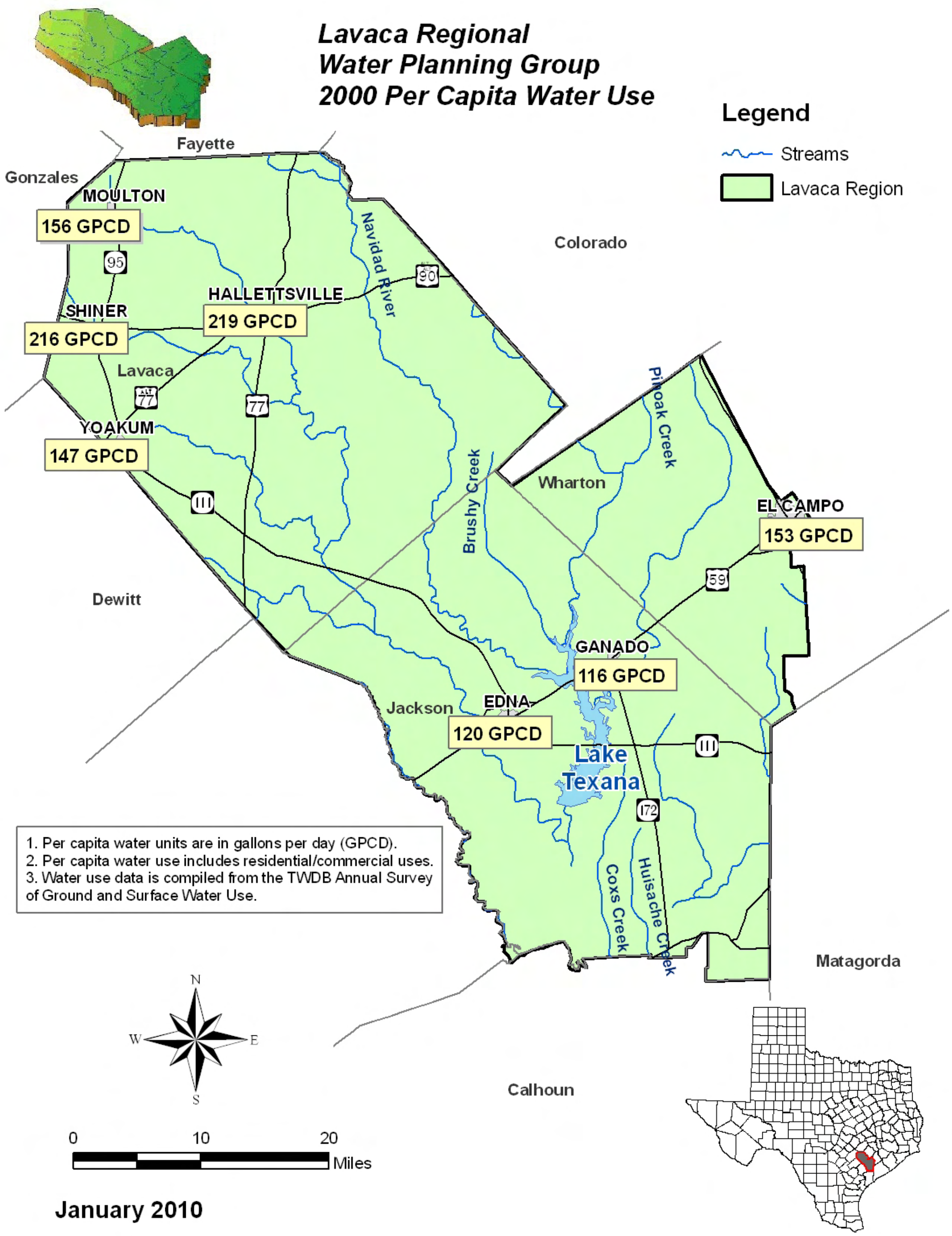
1.4 Agricultural Water Demand in the Lavaca Region

According to the 2000 Water Use Survey Estimate, the amount of water consumed by irrigated agriculture equaled 88,707, 11,492, and 118,494 acre-feet for Jackson, Lavaca, and Wharton Counties, respectively.

The LRWPG elected to perform an update of agricultural demand projections as part of developing the 2011 RWP. Detailed information was obtained from sources including the Coastal Bend GCD, the Farm Service Agency, and the STWM. An expected demand condition for the year 2010 was developed using historical planted acreage and, where possible, measured data regarding application rates for the irrigation of rice and other crops. The results generally showed that the anticipated 2010 water use for irrigation in the LRWPA was similar to the projections developed in the 2006 RWP, although the makeup of that demand varied due to a greater level of production for crops other than rice. The study projected 2010 water demands for irrigation in Jackson, Lavaca, and Wharton Counties of 59,801 Ac-Ft, 8,357 Ac-Ft, and 149,688 Ac-Ft, respectively.

The *Agricultural Water Demands Analysis* investigated trends in crop production and water usage for the area and developed long-term projections for the planning cycle. The study determined that no single factor such as climate, water source, use of conservation practices, crop price, the prospect of biofuels, or new markets for rice pointed toward a conclusive growth or reduction of agricultural water demand in the foreseeable future. Recent increases in the price for rice have also been met with increased production costs that make any long-term trend difficult to project. The year 2010 projections were assumed to carry throughout the planning horizon as a peak demand condition.

Figure 1-3 Per Capita Water Use



The prevalence of water conservation practices in the area was also studied using aerial photography and GIS. It was found that approximately 14,232 of the rice acres in the LRWPA were found to be improved with conservation practices. The majority of this acreage, over 13,000 acres, was identified in Wharton County.

1.5 Other Water Demand in the Lavaca Region

Regional demands for manufacturing, mining, and livestock totaled 4,571 acre-feet for all three counties in the 2000 Water Use Survey Estimate. No steam electric demands were identified within the LRWPA.

1.6 Lavaca Regional Water Supply Sources and Providers

The available water supply within the region includes both groundwater and surface water. Groundwater is provided from the Jackson Group and the Gulf Coast Aquifer. Primary surface water sources are the Navidad and Lavaca Rivers and Lake Texana.

1.6.1 Groundwater Sources

Groundwater supplies most of the water currently used in the region. Of the 231,543 ac-ft total 2000 water demand, approximately 90 percent, or 208,389 ac-ft, was supplied by groundwater. This trend is expected to continue due to the current relatively low demand for water in the region and anticipated low growth in demand.

There are two major aquifers in the Lavaca Region. These are the Jackson Group and Gulf Coast aquifers. The Gulf Coast aquifer is the predominant supply source, serving more than 90 percent of the total supply. The Jackson Group is only available in the northwestern corner of Lavaca County; it is not found in Jackson or Wharton Counties.

Two components of the Gulf Coast aquifer, the Chicot and Evangeline aquifers, provide large amounts of fresh groundwater to Wharton County. Within the Lavaca Region in Wharton County, the aquifers contain fresh water to depths that range from about 1,400 to 1,700 feet, based on data contained in Texas Department of Water Resources Report 270, *Groundwater Resources of Colorado, Lavaca, and Wharton Counties, Texas*. "The aquifers are composed of interbedded layers of sand, silt, and clay, with, in some locations, minor amounts of small gravel. The aquifers have been providing water to Wharton County for over 100 years, with the principal water use being irrigation of agriculture crops" (John Siefert 1999). The 2006 Lavaca Regional Water Plan estimated the groundwater availability of Wharton County to be 89,941 ac-ft/yr.

As in Wharton County, large amounts of groundwater from the Gulf Coast aquifer are available in Jackson County. The 2006 regional water plan estimated the groundwater availability of Jackson County at 87,876 ac-ft/yr from this supply. Available groundwater in Lavaca County is approximately 38,123 ac-ft/yr from the Gulf Coast aquifer and the Jackson Group.

1.6.2 Surface Water Sources

The Lavaca and Navidad Rivers are located within the LRWPA. The main river basins in the area are the Lavaca, the Colorado-Lavaca, and the Lavaca-Guadalupe. These basins include the Arenosa, Big Rocky, Brushy, Chicolete, Clarks, Coxs, East Carancahua, Huisache, Mixon, Pinoak, Rocky, Sandy, West Carancahua, and West Mustang Creeks. Approximately 90 percent of the LRWPA is within the Lavaca River Basin, which has a total drainage area of 2,318 mi^2. *Figure 1-2* shows the location of the Lavaca Basin and adjacent basins. There are no major springs in the LRWPA.

1.6.3 Use by Source

Average groundwater pumpage for Jackson County from 1984 to 2003 was 66,770 ac-ft/yr. Average groundwater pumpage was 15,369 ac-ft/yr and 168,039 ac-ft/yr for Lavaca and Wharton Counties, respectively. The pumpage over the last 15 years has not caused additional static-water level decline, and some wells show a slight recovery.

In 2000, 23,154 ac-ft of the total demand in the Lavaca Region was supplied by surface water. The only reservoir in the Lavaca Regional Planning Area is Lake Texana. The available firm yield of Lake Texana is 74,500 ac-ft. The Lavaca and Navidad Rivers also supply some run-of-river water to the LRWPA, primarily for irrigation purposes. See *Chapter 3* for more information on current water supplies.

1.6.4 Wholesale Water Providers

A wholesale water provider is an entity that delivers and sells a significant amount of raw or treated water on a wholesale basis (TWDB 1999). The Lavaca Region has one wholesale water provider, the LNRA.

The LNRA operates and maintains Lake Texana. Water transfers outside the Lavaca Region account for most of the water sales from Lake Texana. Of the 74,500 ac-ft of available firm yield and 12,000 ac-ft available on an interruptible basis, 84,668 ac-ft are dedicated for water uses outside the region. The following amounts are contracted annually:

- 178 ac-ft firm yield to the City of Point Comfort in Calhoun County
- 41,840 ac-ft firm yield to the City of Corpus Christi and surrounding areas
- 12,000 ac-ft interruptible water to the City of Corpus Christi and surrounding areas
- 30,000 ac-ft firm yield to Formosa Plastics in Calhoun County
- 594 ac-ft firm yield to the Calhoun County Navigation District
- 56 ac-ft firm yield held in reserve

Of the annual acre-feet contracted to the City of Corpus Christi, 10,400 ac-ft was sold on a temporary basis and can be recalled for use in Jackson County when needed.

A total of 1,832 ac-ft firm yield is committed to Inteplast within the LRWPA.

1.7 Water Quality and Natural Resources

A table of state, local, and regional planning information reports and data compiled for the LRWPA study is attached in *Appendix 1A*. A summary of some of this information pertaining to water planning follows.

1.7.1 Water Quality

The Lavaca River Basin contains 277 stream miles. It is primarily drained by two major rivers: the Lavaca River and the Navidad River. The Lavaca River originates in the southern portion of Fayette County and outfalls into Lavaca Bay while the Navidad River also originates in Fayette County but flows into Lake Texana.

The Lavaca River Basin is divided into 5 classified stream segments numbered 1601 through 1605. Approximately 60 percent of the Lavaca River Basin is drained by the Navidad River and its tributaries, while the Lavaca River and its tributaries drain the remaining 40 percent. Stream segment uses and water quality considerations for the Lavaca River basin are shown in *Table 1–5*.

Table 1–5 Stream Segment Uses and Water Quality Criteria in the Lavaca River Basin 2004

Colorado River Basin			Uses[1]			State Stream Standards Criteria[2]						
Stream Segment #	Stream Segment Name	SB 1 Planning Region	Recreation	Aquatic Life	Water Supply	Chloride Annual Avg. (mg/L)	Sulfate Annual Avg (mg/L)	TDS Annual Avg (mg/L)	DO (mg/L)	pH Range	Fecal Coliform (30-day Geometric mean CFU/100ml)	Temp (°F)
1601	Lavaca River Tidal	P	CR	H					4	6.5–9.0	200	95
1601A	Catfish Bayou	P	CR	H					4	6.5–9.0	200	95
1601B	Redfish Bayou	P	CR	H					4	6.5–9.0	200	95
1602	Lavaca River Above Tidal	P	CR	H	PS	200	100	700	5	6.5–9.0	200	91
1603	Navidad River Tidal	P	CR	H	PS				4	6.5–9.0	200	91
1604	Lake Texana	P	CR	H	PS	100	50	500	5	6.5–9.0	200	93
1604A	East Mustang Creek	P	CR	I					4	6.5–9.0	200	93
1604B	West Mustang Creek	P	CR	H					5	6.5–9.0	200	93
1604C	Sandy Creek	P	CR	H					5	6.5–9.0	200	93
1605	Navidad River Above Lake Texana	P	CR	H	PS	100	50	550	5	6.5–9.0	200	91

Source: *Lavaca Basin Summary Report*, Lavaca-Navidad River Authority, prepared in cooperation with the Texas Commission on Environmental Quality 2007; Water Quality Criteria accurate as of 2004

[1] Uses: CR = Contact Recreation; H = High Aquatic Life; E = Exceptional Aquatic Life; PS = Public Water Supply; AP = Aquifer Protection

[2] Criteria: Standards set by the TCEQ do not guarantee the water to be usable for municipal, domestic, irrigation, livestock, &/or industrial uses; this causes the above screening process to be misleading for certain segments, especially for salinity.

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The primary agricultural issue in the LRWPA is the availability of sufficient quantities of irrigation water for rice farming under drought of record conditions. Natural resources, on the other hand, have impacts from both water quantity and water quality issues. Stream segments in the Lavaca River Basin with water quality concerns are listed in *Table 1–6*. The stream segments that have water quality concerns within the LRWPA are discussed below.

The primary water quality issue for all of the surface water stream segments and the major groundwater aquifers in the LRWPA is the increasing potential for water contamination due to nonpoint source pollution. Nonpoint source pollution is precipitation runoff that, as it flows over the land, picks up various pollutants that adhere to plants, soils, and man-made objects and eventually infiltrates into the groundwater table or flows into a surface water stream. Another nonpoint source of pollution is the accidental spill of toxic chemicals near streams or over recharge zones that can send a concentrated pulse of contaminated water through stream segments and/or aquifers. Public water supply groundwater wells that currently only use chlorination water treatment, and domestic groundwater wells that may not treat the water before consumption, are especially vulnerable to nonpoint source pollution, as are the habitats of threatened and endangered species that live in and near seeps and certain stream segments. Nonpoint sources of pollution are difficult to control. There has been increased awareness of this issue which has sparked additional research and interest in the initiation of nonpoint source pollution abatement programs.

There are few water quality concerns in the Lavaca Basin. *Table 1–6* lists the concerns found in the 2004 Texas Water Quality Inventory conducted by TCEQ. The concerns are as follows:

Two surface water quality indicators are dissolved oxygen (DO) and the associated biochemical oxygen demand (BOD). DO is a measure of the amount of oxygen that is available in the water for metabolism by microbes, fish, and other aquatic organisms. BOD is a measure of the amount of organic material, containing carbon and/or nitrogen, in a body of water that is available as a food source to microbial and other aquatic organisms that require the consumption of DO from the water to metabolize the organic material. The historical basin-wide concentrations of DO are indicative of relatively unpolluted waters. The primary manmade sources of BOD in bodies of water are the discharge of municipal and industrial waste, as well as nonpoint source pollution from urban and agricultural runoff. Data from 2002-2008 indicates that there is a portion of one classified stream segment with a concern for DO, based on the State Stream Standards Criteria in the Lavaca Regional Water Planning Area (*Table 1–5* and *Table 1–6)*.

Table 1–6 Stream Segment Water Quality Concerns in the Lavaca Region[1]

Stream Segment #	Stream Segment	Aquatic Life Use	Nutrient Enrichment	Algal / Bacterial Growth	Sediment Contaminants	Public Water Supply	Narrative Criteria
1601	Lavaca River Tidal						
1601A	Catfish Bayou						
1601B	Redfish Bayou						
1602	Lavaca River Above Tidal	Concern *	Concern[2]	Concern[3]			
1603	Navidad River Tidal						
1604	Lake Texana		Concern				
1604A	East Mustang Creek		Concern				
1604B	West Mustang Creek						

Table 1–6 *cont.*

Stream Segment #	Stream Segment	Aquatic Life Use	Nutrient Enrichment	Algal Growth	Sediment Contaminants	Public Water Supply	Narrative Criteria
1604C	Sandy Creek						
1605	Navidad River Above Lake Texana						

* Only the Upper 29 miles of Segment 1602 in Lavaca County have been identified as being of concern for depressed Dissolved Oxygen (DO) levels.
[1]Source: TCEQ 2008 Texas Water Quality Inventory
[2]Indicated by LNRA
[3]Source: Draft TCEQ 2010 Texas Water Quality Inventory

Another set of surface water quality parameters are termed "nutrients" and includes nitrogen (Kjeldahl nitrogen, nitrite+nitrate, and ammonia nitrogen), phosphorus (phosphates, orthophosphates, and total phosphorus), sulfur, potassium, calcium, magnesium, iron, and sodium. Nutrients are monitored by the TCEQ as a part of the Clean Rivers Program (CRP); however, there are currently no government mandated standard for assessing the level of concern posed by nutrients. Currently, naturally occurring background levels reported by the USGS or data collected by the TCEQ are used to determine the level of concern for nutrients Based on 2002-2008 data, there is one classified and one unclassified stream segment with a concern in the Lavaca Regional Water Planning Area (*Table 1–5* and *Table 1–6*).

Fecal coliform are usually harmless bacteria that are present in human and/or animal waste. However, the presence of this organism can be an indicator for the possible presence of disease-causing bacteria and viruses that are also found in human/animal wastes. Municipal waste is treated to remove most of the bacterial and viral contaminants so that safe levels will exist in the receiving surface water body. Therefore, when fecal coliform is detected, the most likely source of contamination is nonpoint source pollution, which can include agricultural runoff as well as runoff from failed septic systems. A wastewater treatment plant point source could also be the source of contamination if the system is not functioning properly or if overwhelmed by flood waters. In recent years, TCEQ has changed the indicator bacteria from the generic "fecal coliform" to be *Escherichia Coli* for non-tidal surface waters and *Enterococci* for tidal waters.

1.7.2 Recreational and Natural Resources

Lake Texana is the main recreational area in the LRWPA. There are public boat ramps, a 250-acre Mustang Wilderness Campground for primitive camping, a marina, picnic sites, Brackenridge Recreation Complex (462 acres), the 575-acre Lake Texana State Park, sailing, and canoeing. Brackenridge Recreation Complex and Lake Texana State Park are located across State Highway (SH) 111 from each other, on the west side of the SH 111 Bridge. Some of the recreational activities enjoyed at these parks are camping, boating, fishing, and picnicking. Brackenridge Recreation Complex opened a new event center as well as many other recreational facilities in 2009. The area has good nature-viewing opportunities including birding, and sometimes alligators can be found in park coves. Hunting and fishing are very popular recreational activities throughout the entire Lavaca Region. Deer and waterfowl hunting are the most common. The Gulf Coastal Plains support a wide variety of animal species. The threatened, endangered, or rare species within Jackson, Lavaca, and Wharton Counties are shown in *Table 1–7*.

LNRA operates Lake Texana to provide freshwater inflows for the bay and estuary in order to reduce high salinity events in Lavaca Bay and to protect coastal habitats. LNRA has an agreement with the Texas Parks and Wildlife Department and the TCEQ for a freshwater release program.

Table 1–7 Threatened, Endangered, and Rare Species Found in Jackson, Lavaca, and Wharton Counties

Threatened	
Artic Peregrine Falcon	*Falco peregrinus tundrius*
Bald Eagle	*Haliaeetus leucocephalus*
Cagle's Map Turtle	*Graptemys caglei*
Green Sea Turtle	*Chelonia mydas*
Loggerhead Sea Turtle	*Caretta caretta*
Louisiana Black Bear	*Ursus americanus luteolus*
Reddish Egret	*Egretta rufescens*
Sooty Tern	*Sterna fuscata*
Texas Horned Lizard	*Phrynosoma cornutum*
Texas Fatmucket	*Lampsilis bracteata*
Texas Scarlet Snake	*Cemophora coccinea lineri*
Texas Tortoise	*Gopherus berlandieri*
Timber/Canebrake Rattlesnake	*Crotalus horridus*
White-faced Ibis	*Plegadis chihi*
White-tailed Hawk	*Buteo albicaudatus*
Wood Stork	*Mycteria americana*
Endangered	
American Peregrine Falcon	*Falco peregrinus anatum*
Attwater's Greater Prairie-Chicken	*Tympanuchus cupido attwateri*
Brown Pelican	*Pelecanus occidentalis*
Houston Toad	*Bufo houstonensis*
Interior Least Tern	*Sterna antillarum athalassos*
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*
Red Wolf	*Canis rufus*
West Indian Manatee	*Trichechus manatus*
Whooping Crane	*Grus americana*
Rare	
American Eel	*Anguilla rostrata*
Crayfish	*Cambarellus texanus*
Gulf Saltmarsh Snake	*Nerodia clarkia*
Henslow's Sparrow	*Ammodramus henslowii*
Mountain Plover	*Charadrius montanus*
Plains Spotted Skunk	*Spilogale putorius interrupta*
Sharpnose Shiner	*Notropis oxyrhynchus*
Pistolgrip	*Tritogonia verrucosa*
Rock Pocketbook	*Arcidens confragosus*
Southeastern Snowy Plover	*Charadrius alexandrinus tenuirostris*
Texas Diamondback Terrapin	*Malaclemys terrapin littoralis*
Western Burrowing Owl	*Athene cunicularia hypugaea*

Source: Texas Parks & Wildlife Department, Wildlife Division, Non-game and Rare Species and Habitat Assessment programs. County Lists of Texas' Special Species (Jackson, Lavaca, and Wharton Counties, revised August 8, 2007).

1.7.3 Navigation

Navigation within the LRWPA is generally recreational in nature, with boaters and fishermen utilizing rivers and streams as well as Lake Texana. There is also heavy recreational use in the bays and estuaries at the southern end of the Region. The current recommended water management strategy in the 2011 Regional Water Plan for LRWPA, conjunctive use of groundwater, is not anticipated to adversely impact navigation in the Region.

1.7.4 Threats to Agricultural and Natural Resources

The Regional Water Plan Guidelines (31 TAC §357.7(a)(i)(L) require that planning groups identify threats to the State's agricultural and natural resources due to issues with water quantity or water quality problems related to supply. Any potential threat to agricultural resources would be of particular concern for the Lavaca Region, as irrigated agriculture is by far the largest water user in the Region. Irrigation in the Region relies almost exclusively on groundwater. Groundwater conditions have been favorable and should continue to be favorable within the Lavaca Region for the pumping of substantial quantities of good quality water. There is the potential for agriculture in some portions of the Region to experience shortages under drought conditions coupled with peak production, with the likely result being temporary use of groundwater resources beyond the average recharge rate.

Natural resources in the Region, particularly steams and riparian habitat, can also be impacted by drought conditions. Flows for many streams in the Region show a high seasonal variability, and flows in some streams may be drastically reduced or eliminated under prolonged dry conditions. Irrigation return flows play an important role in maintaining streamflows during moderately dry conditions. While observations of streamflow during a recent drought event indicate that irrigation returns and streamflow are both minimal under exceptional drought conditions, it is likely that for moderately dry conditions the increased amount of groundwater entering a stream through irrigation return flows would help to sustain habitat that would otherwise be water-stressed.

1.8 Existing Water Plans

1.8.1 Existing Regional and Local Water Management Plans

LNRA has published a *Land and Water Resource Management Plan for Lake Texana and Associated Project Lands*. This plan was developed in accordance with Texas Water Code Section 11.173(b). In addition, each of LNRA's major water customers has a TCEQ-approved water conservation and emergency demand management plan, see *Appendix 6C*. LNRA, TCEQ, and USGS/LNRA cooperative program has routinely collected water quality monitoring data in Lake Texana since 1988. Through this program, the USGS/LNRA has been collecting annual pesticide monitoring data since 1992 at stations on Lake Texana. The Texas State Soil and Water Conservation Board (TSSWCB) has a water quality management plan on file for LNRA and has developed management plans and studies to control nonpoint source pollution from agriculture and silviculture (LNRA 1997).

> "Lake Texana has excellent water quality. The LNRA intends to maintain the present condition of the lake and has instituted management practices designed to monitor and protect current water quality and wildlife diversity. Streamflows will continue to be monitored by LNRA and USGS at various locations in the Lavaca-Navidad Basin. Lavaca River streamflows are monitored near Hallettsville and Edna, while upstream of Lake Texana, flow monitoring stations are maintained near Hallettsville, Speaks, Morales, and Strane Park on the Navidad mainstem and

> on its three major tributaries; Sandy, West Mustang Creek, and East Mustang Creek" (*Land and Water Resource Management Plan for Lake Texana and Associated Project Lands 1997*).

LNRA's water quality monitoring program includes contracts with the USGS and the Guadalupe-Blanco River Authority, which provides laboratory analyses of water samples. This program was developed under the auspices of the CRP, a statewide effort administered by the TCEQ to encourage the assumption of responsibility for water quality monitoring by local entities already managing water supplies, and the management of water quality on a river basin basis, rather than by political subdivisions whose interests may cut across multiple river basins, or be restricted to portions of basins. Locations, parameters, and details of sample collection, handling, and analytical methodologies for the CRP are detailed in the Quality Assurance Project Plan (QAPP) prepared by LNRA which is filed with, and approved by, TCEQ every two years.

LNRA has designated a Lavaca Basin CRP Steering Committee to advise LNRA on water quality issues and priorities. Since FY2005, LNRA has been conducting the following water quality monitoring under the Clean Rivers Program QAPP:

- 22 parameters including field data (e.g. dissolved oxygen, water temperature, pH, specific conductivity, salinity, flow) and conventional water chemistry analyses including total suspended solids (TSS), sulfate, chloride, ammonia and nitrate + nitrite nitrogen, total phosphate, total alkalinity, total organic carbon (TOC), turbidity, total hardness
- *E. coli* bacterial analyses in Lake Texana and in the Lavaca River
- Chlorophyll-a analysis in Lake Texana

Water sampling sites are fixed and include: Lake Texana and its inflows (West and East Mustang Creeks, Sandy Creek, Navidad River), the Lavaca River both above tidal and below the Palmetto Bend spillway to Lavaca Bay, and Rocky Creek.

In addition to CRP monitoring, LNRA contracts with the United States Geological Survey (USGS) to do additional flow and water quality monitoring in the Lavaca Basin. Streamflows at multiple gaging stations (Lavaca River near Edna, Sandy Creek near Louise, West Mustang Creek near Ganado, East Mustang Creek near Louise, and the Navidad River near Speaks, Morales, and Strane Park) are monitored directly by radio telemetry into LNRA's computer-based hydrologic data collection system. USGS monitors in Dry Creek and in Lake Texana and its four inflows for metals and organics (pesticides) in both the water column and in the bottom sediments.

LNRA has developed a Geographic Information System (GIS) electronic database to store geographic and attribute data for the Lavaca Basin. This system uses base maps of aerial photographs or USGS topographic maps and overlays data upon these electronic maps in layers. This system is computer-based, and updates/changes can be made relatively easily. Hard-copy maps may be printed as needed. Information layers in the LNRA GIS include:

- Wastewater treatment plants with attributes such as capacity, type, date of permit renewal, contact information, etc.
- City and town information
- Soils
- Gas and oil wells
- Gas and oil pipelines
- Water quality sampling sites
- Rivers, streams, roads, county lines

- Water permit holders
- Cultural resources
- Land use
- Parks and trails
- Observation wells
- Piezometers
- Boat ramps
- Threatened species locations
- Injection disposal wells
- Confined animal feeding operations (CAFOs)
- Precipitation and stream flow gages

LNRA is notified of TCEQ discharge permit applications and EPA NPDES applications for point source discharges and industrial stormwater runoff permits. These are reviewed by LNRA, and appropriate actions are taken (i.e., submission of written comments, negotiation with applicants, requests for hearings and party status) to assure protection of Lake Texana water quality.

Master plan information is not available for the cities in the Lavaca Region. These cities are relatively small, there is relatively low municipal usage, and there is very little expected growth in municipal usage.

1.8.2 Current Preparations for Drought

The LNRA developed a Water Conservation and Drought Management Plan in 1995 which was updated in 2000, 2002, and again in 2005, in accordance with the TCEQ guidance for the Lavaca River Basin including Lake Texana. The goals of the Water Conservation Plan are to reduce the quantity of water required through implementation of efficient water supply and water use practices, without eliminating any use. The Drought Management Plan provides procedures for both voluntary and mandatory actions to temporarily reduce water usage during a water shortage crisis.

1.8.3 Water Loss Audits

House Bill 3338, passed by the 78th Texas Legislature, requires public utilities providing potable water to file water audits with the TWDB once every five years giving the most recent year's water loss. TWDB subsequently commissioned a study of available loss data. For the first phase of water auditing, a number of issues have been identified with the data provided, and work to correct inconsistencies is ongoing. Year 2005 water loss audit information was provided to LRWPG by TWDB and was available for eight public utilities in LRWPA. Total loss rates were found to vary from 7.8 to 28.9 percent. Losses may vary annually and could currently be higher or lower.

Total losses are not limited to loss from known leaks, although for some utilities leakage is responsible for a majority of lost water. Total loss also includes meter inaccuracy, unmetered or unauthorized water use, unidentified line leaks, and storage overflows. Reliability of the 2005 dataset is limited by considerable error in the water balance for a number of utilities; for several utilities, the water balance error is higher than the estimated total water loss. It is hoped that data submitted to TWDB for subsequent water audits will more accurately portray water balance components for the utilities in LRWPA.

1.9 Recommendations Made in the 2006 Lavaca Regional Water Plan

1.9.1 Unique Reservoir Sites

The LRWPG designated the Palmetto Bend Phase II reservoir site on the Lavaca River as a unique reservoir site. This site is currently permitted and awaiting funding in order for the project to move forward. The water supply created by the Palmetto Bend Phase II reservoir site was evaluated as one of the management strategies for the region's agricultural shortages.

1.9.2 Proposed Regulatory Changes and Resolutions

The primary concern of the LRWPG has been the protection of existing groundwater sources to maintain the agricultural production because of its direct economic impact to the area. As a result of the planning process, the LRWPG considered and approved eight policy resolutions to deal with: environmental issues, conservation policy, sustainable yield of the Gulf Coast aquifer, support of the rule of capture, the continued control of groundwater resources through GCDs, the establishment of fees for groundwater export, subjecting any local groundwater used outside the region to comparable basin of origin protections, and ongoing regional water planning activities.

1.10 Recommendations Made in the 2007 State Water Plan

Several broad recommendations were made in the 2007 State Water Plan which would also apply to the LRWPG. Some of these recommendations include:

- Water conservation (both municipal and agricultural) and drought management
- Developing new groundwater and surface water supplies
- Expanding and improving management of existing water supplies, such as improving reservoir operations, reallocating reservoir storage space, using groundwater and surface water conjunctively, and conveying water from one area to another
- Water reuse
- Implementing other, less traditional approaches such as desalinating seawater and brackish water, controlling vegetation that consumes large volumes of water, practicing land stewardship, and weather modification.

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Appendix 1A

Sources Used

Document	Description/Importance
Texas Almanac: 2008-2009, 2004-2005 and *1998-1999*.	Provides background information and statistics on Texas and each county.
TWDB. November 2006. *2007 State water Plan*	The official water plan for Texas. Describes current use and supply, identifies water management measures and environmental concerns, and offers recommendations.
Texas Clean Rivers Program and TCEQ. 2008. *Texas Water Quality Inventory*	Summarizes the water quality issues for each segment of the Texas river basins.
Texas Clean Rivers Program and TCEQ. 2010. *Draft 2010 Texas Water Quality Inventory*	Summarizes the water quality issues for each segment of the Texas river basins.
U.S. Department of Commerce, Bureau of Economic Analysis webpages, *Personal Income by Major Source and Earnings by Industry for 2002, 2003, and 2004* www.bea.doc.gov/bea/regional/reis/action.cfm	Outlines how much was earned in every county from each industry type in thousands of dollars per year.
U.S. Census Bureau. *Total Population Estimates for Texas Counties and Places.* Census 2000. http://www.factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=04000US48&-_box_head_nbr=GCT-PH1&-ds_name=DEC_2000_SF1_U&-_lang=en&-format=ST-2&-_sse=on	Resource for population estimates for Texas counties and places in various years.
U.S. Department of Agriculture. *2007 Agriculture Profiles, Texas State and County Profiles* www.nass.usda.gov/:81/ipedbcnty/report2.htm	Outlines the overall agricultural commodities for each county for 2003. Provides info. on planted acres, harvested acres, and crop yield.
U.S. Department of Agriculture and the National Agricultural Statistics Service. *2007 Census of Agriculture*, February 4, 2009	The section on Market Value of Agricultural Products Sold and Farms by North American Industry Classification System: 2002 and 1997 gives the total sales and size of farms, etc. for specific crops in 2002 and 1997.
U.S. Census Bureau. *Small Area Income & Poverty Estimates for Texas in 2007* www.census.gov/cgi-bin/saipe/saipe.cgi	Contains statistical estimates for every county in the USA including information on median household incomes and poverty estimates.
Texas Parks and Wildlife Department, Wildlife Division, Non-game and Rare Species and Habitat Assessment programs. County Lists of Texas' Special Species. [Lavaca County, Jackson County, and Wharton County: 2008].	Lists endangered, threatened, and rare species for each county.
National Center for Education Statistics, US Department of Education and Bureau of the Census, US Department of Commerce http://maps.nces.ed.gov/sddsgis/	Contains statistical information regarding school districts from 1999-2000.

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Contents

List of Tables

List of Figures

List of Appendices

Chapter 2 – Presentation of Population and Water Demands

2.1 Introduction

2.1.1 Scope of Work

This chapter presents the results of Task 2 of the project scope, which addresses updated population and water demand data for the region and outlines the guidelines and methodology used for the update. Also, to provide consistency and facilitate the compilation of the different regional plans, TWDB required the incorporation of this data into a standardized online database referred to as TWDB DB12. This information is contained in the following tables.

- *Table 2-1* – Population by City, Collective Reporting Unit (CRU), Individual Retail Public Utility, and Rural County

- *Table 2-2* – Water Demand by City and Category

- *Table 2-7* – Water Demand by WWP of All Water Use Categories

2.1.2 Background[1]

The increased demand for water, combined with recent droughts, has increased awareness of water supply availability issues in Texas. Currently, estimates of future Texas population anticipate the population will more than double, increasing from about 21 million (year 2000 population) to more than 45 million people by the year 2060. According to the 2007 State Water Plan, by 2060, almost 1,200 cities and other water users (representing greater than 85 percent of the projected population) will have needs for water beyond those supplies currently available to meet their needs during droughts. Current water sources are unable to meet demands increases from 3.7 million ac-ft/yr in 2010 to 8.8 million ac-ft/yr in 2060. This includes water users that cannot rely on current sources because contracts expire during the planning period. 2.8 million ac-ft/yr of irrigation demand cannot be met by existing sources if a DOR were to occur today. Approximately 611,000 ac-ft/yr of municipal demand would not be met by existing sources if a drought were to occur now.

The projected economic impacts of not addressing water shortages are substantial. A repeat of the drought of record in 2010 could result in losses as high as $9.1 billion for businesses and employees in the State. Losses for similar drought conditions in 2060 increase to approximately $98.4 billion

Water resource planning and management in Texas is a shared responsibility of local utilities, regional special purpose districts, and state agencies. Local and regional water development authorities and municipalities have had primary responsibility for financing and constructing new water resource projects. The State's primary role has been providing guidance, regulatory governance, and limited financial assistance.

Senate Bill 1 (SB 1), 75th Texas Legislature, established a new approach to the preparation of the state water plan consisting of local consensus on regional plans first. LRWPG prepared and

[1] Some of the information used for describing the background came from *Water for Texas*, published and distributed by the TWDB, January 2007, and referenced as the 2007 State Water Plan.

submitted regional plans in 2001 and 2006. LWRPG is now responsible for completing an update to that consensus-based regional water supply management plan for final submittal to TWDB by September 1, 2010. LRWPG contracted with AECOM to develop technical data needed to prepare a RWP.

2.1.3 Description of the Region[2]

The Lavaca Region consists of Jackson and Lavaca Counties, and Precinct 3 of Wharton County, including the entire City of El Campo. The eastern portion of Wharton County is included in the Region K planning area. The region had a population of 48,068 in 2000. Most of the water demand in the Lavaca Region is associated with agricultural irrigation. See *Figure 1-1* for a map of LRWPA.

2.2 Methodology[3]

The following methodology for generation of population and water demand projections was developed in accordance with TWDB guidance and relevant scope items for the 2011 Regional Water Planning round.

2.2.1 General

A key task in the preparation of the water supply plan for LRWPA is to determine current and future water demands within the region. Projections of future water demand must be compared with estimates of currently available water supply to identify future water shortages. TWDB prepared draft population and water demand projections for all water user groups (WUGs) within the Lavaca Region for the development of the 2011 RWP. Information from other sources was used to develop irrigation demand projections in the 2011 RWP.

The term "default estimates" or TWDB projections is used throughout this report to refer to the population and water demand projections from the 2002 through 2007 planning cycle. This section discusses the guidelines and methodology used to evaluate these projections and to select projections for use in RWP for LRWPA.

TWDB rules require that the analysis of current and future water demands be performed for each WUG within LRWPA. To be considered a WUG within the municipal category, an entity must fall into one of the following categories:

- Cites with a population of 500 or more, per the Texas State Demographer's July 2005 population estimate
- Individual utilities providing more than 280 ac-ft/yr of water for municipal use in 2005 (for counties having four or less of these utilities)
- CRUs consisting of grouped utilities having a common association

All smaller communities and rural/unincorporated areas, aggregated at the county level, are considered a WUG and are referred to as "County-Other" for each county. Additionally, for each county, the categories of manufacturing, irrigation, steam-electric power generation, mining, and livestock water use are each considered a WUG.

Furthermore, TWDB rules require the determination of demands associated with each of the WWPs designated by the RWPG. Lavaca RWPG defines wholesale providers as any persons or entities, including river authorities and irrigation districts, that have contracts to sell more than 1,000 ac-ft of

[2] *Chapter 1: Description of the Lavaca Regional Water Planning Area*
[3] TWDB Exhibit B Guidelines for Regional Water Plan Development

water wholesale in any one year during the five years immediately preceding the adoption of the last RWP. The RWPG will also include other persons and entities that enter or that the Planning Group expects or recommends to enter into contracts to sell more than 1,000 ac-ft of water wholesale during the period covered by the plan. The designated WWP in LRWPA is the LNRA.

Throughout this section, verbiage excerpted directly from TWDB published guidelines for changes to the draft TWDB projections appears in italics. The applicable TWDB criteria used to support and develop revisions to the TWDB numbers are designated in bold, italic type.

2.2.2 Methodology

This section describes the methodology used to develop projections for population and for water demand for the Lavaca Region. The TWDB provided default estimates for population and water demands from the 2007 SWP. Additionally, for municipal WUGs meeting certain criteria for population projection revision, TWDB provides a set of alternative population and water demand projections. TWDB criteria for justifiable changes for sub-county populations are described in *Section 2.2.3.1* below. Due to a lack of population growth, population and water demand projections from the 2006 RWP were used for the 2011 RWP for LRWPA. The only WUG for which a change was made to the population projection was Hallettsville, for which an increase in population is projected. Corresponding changes in water demand for Hallettsville were also developed. Correspondence was prepared and submitted to each of the municipal WUGs presenting them with proposed populations for this planning round and providing suggestions concerning data to be gathered if the WUGs want to challenge the proposed numbers now or in the next planning cycle (see example in *Appendix 2A*). A response was received from Hallettsville indicating that no revision was required to the proposed population projection for the current planning round. Changes to water demand were also implemented for agricultural irrigation, which represents the largest water demand in LRWPA.

Population and water demand projections were formally approved by the RWPG at the Group's regular meeting on April 20, 2009. A formal population and water demand revision request was submitted by the RWPG to TWDB on May 6, 2009 (*Appendix 2B*). After the revised population and water demand projections were approved by the RWPG and formally adopted by the TWDB, the projections were incorporated into the TWDB online database DB12. Water demands for manufacturing, steam-electric power generation, mining, and livestock operations were not projected to change; for these use categories, water demands from the 2007 SWP have been retained. Population projections are included in *Table 2-1* at the end of the chapter. For all WUGs, including non municipal categories, water demands are presented by county, basin, and decade, in *Table 2-2* at the end of the chapter.

2.2.2.1 Population Projection Methodology

As noted above, the only municipality for which a population change was made was Hallettsville, which is within the Lavaca River basin in Lavaca County. For Hallettsville, the State Demographer's population estimate exceeded the projected 2010 population of the city, satisfying a criterion to revise sub-county population. For the current planning round, Lavaca RWPG adopted the TWDB alternative population projections for Hallettsville. Because there was not a basis for revision of the entire county population, the increase in population for Hallettsville was deducted from the "County-Other" population for Lavaca County within the Lavaca River basin. For all other municipal WUGS, TWDB-approved population projections from the 2006 RWP were retained. Population projections by WUG are presented in *Table 2-1*.

2.2.2.2 Municipal Water Demand Projection Methodology

Municipal water demand projections were calculated for all WUGs identified in the population projections process. The components of the water demand projection process are population projection and per capita water use. *Section 2.2.2.1* discussed the methodology used to determine the population projections for the region. Per capita water use and conservation as applied to water demand projections are discussed below.

a) **Per Capita Water Use:**

TWDB used per capita water use values established in the *2006 Region P Regional Water Plan*. For more information on TWDB estimates, please reference the 2006 Region P Regional Water Plan. TWDB guidelines for revisions to municipal water demand projections provide that adjustments in per capita use rates can be proposed if more recent data indicates that per capita use has changed.

b) **Municipal Water Demand:**

The municipal water demand projections are the product of the proposed population projections and the proposed per capita usage projections described above. These projections were adopted by the TWDB and are presented for each municipal WUG by county, river basin, and decade in *Table 2-2*.

c) **Irrigation Water Demand:**

Agricultural water use within the Lavaca Regional Water Planning Area (LRWPA) is by far the greatest use in the area, with these demands making up more than 90 percent of the total demand in the region. As a result, maintaining reliable and up-to-date estimates of irrigation demands is essential to ensuring a viable water supply for agricultural operations in the future. For this reason, the LRWPA requested and received funding from the Texas Water Development Board (TWDB) for investigation of a changed condition in water demands.

For the 2006 Regional Water Plan (RWP) the LRWPA elected to forego the TWDB baseline irrigation estimates for agriculture and develop a methodology based on local information and experience. This methodology was carried out using a tabular analysis which integrated planted acreage, irrigated acreage, water usage rates, and other region-specific information.

Estimates for the current RWP utilize a similar region-specific methodology to the 2006 RWP but enhance the process through the use of more current and specific data for determining water demands. Factors considered in demand estimation included crop acreages, irrigation rates, water sources, second crop production, farm policy impacts, and short- and long-term agricultural market projections. Data was obtained from the Farm Service Agency (FSA) regarding crop acreage estimates for each county. Updated information regarding application rates was obtained, if available, from sources such as the Coastal Bend Groundwater Conservation District (CBGCD) and used to produce a projected water demand for each county. Second crop rice production, also referred to as ratoon crop demand, was also estimated based on FSA data and appropriate irrigation rates to estimate a ratoon crop demand. Loss factors were considered for water conveyance and separate demands were determined for both groundwater and surface water irrigated crops. Additional information regarding the development of this methodology can be found in *Appendix A* of the *Agricultural Water Demands Analysis*. Current estimates for Year 2010 irrigation water demand are shown in *Table 2-3* at the end of the chapter.

Rice irrigation accounts for a majority of the projected irrigation demands in the LRWPA, making up 87 percent of total irrigation demands. Rice irrigation is proportionally highest in

Lavaca County; while its overall demand is low compared to the other counties in the LRWPA, Demand for other crops in Lavaca county is very small. Overall regional demand is dominated by Wharton County, which represents the highest irrigation demands for all crops except turfgrass. The LRWPA section of Wharton County makes up 69 percent of total LRWPA agricultural irrigation demand.

A number of factors were considered in viewing how the overall regional water irrigation demand could change over the planning horizon (to year 2060). These included weather, water source, crop price, production costs, market projections, fuel cost and biofuel demand, and farm policy impacts. No one factor indicated a trend of either increasing or decreasing potential for rice production in the LRWPA. No factors point to either the conversion of current rice acreage to other crops or the reversion of land that has transitioned to other uses back to the growth of rice.

A comparison of current 2010 demand estimates to those for previous RWPs is shown in *Table 2-4* at the end of the chapter. Total estimated 2010 demand is very similar to the value from the 2006 RWP and several thousand acre-feet lower than the value from the 2001 RWP. While the 2006 RWP had the greatest demands for rice, demands for the remaining crops were generally lower than for the 2001 RWP or the current RWP. The current RWP shows water demands in excess of the 2001 and 2006 RWPs for the majority of non-rice crops, with the exceptions being corn and turfgrass. The proportion of estimated total irrigation demands for rice is similar to the 2001 RWP as well. Rice irrigation represents 87 percent of the total irrigation demand while this percentage was found to be 86 and 93 percent in the 2001 and 2006 RWPs, respectively. Correspondingly, there has been an estimated increase in the relative demand for first crop rice. From the 2001 RWP to the present, first crop rice estimates have increased from 71 to 81 percent of total rice demand (61 to 70 percent of total irrigation demand).

The agricultural irrigation demand estimates presented in this RWP are subject to influence by a number of different factors. Future fuel and production costs, federal farm policy, and trends in domestic and international commodity markets all have the potential to create shifts in planted acreage and, in turn, water demands. However, as indicated earlier, there is currently no clear indication of either a growth or decline in LRWPA agricultural irrigation demands. For this reason, the estimated 2010 demand projections are recommended for use throughout the planning horizon.

2.2.3 TWDB Guidelines for Revisions to Population and Water Demand Projections

TWDB established criteria and data requirements to be used in evaluating and developing revisions to the state's census-based and/or consensus-based population and water demand projections. The criteria applied in developing revisions to the draft TWDB projections for LRWPA are displayed in bold, italic type below and are described in detail.

2.2.3.1 Population Projections

Population is the principal determinant for projected future municipal water demand when combined with estimates of per capita water use and water conservation assumptions. As such, emphasis has been placed on evaluating the state's draft population projections and on developing revisions in accordance with the following criteria.

Sub-County Population

The projected population growth throughout the planning period for the cities, utilities and rural area (County-Other) within a county is a function of a number of factors, including the entity's share of the county's growth between 1990 and 2000, as well as local information provided by Planning Groups.

Criteria: *One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the sub-county population projections**:***

a) The July 2005 State Demographer's population estimate is greater than the 2010 projected population of the city.

b) The population growth rate for a city, utility or County-Other over the most recent five years is substantially greater than the growth rate between 1990 and 2000.

c) Identification of areas that have been annexed by a city since the 2000 Census.

d) Identification of the expansion of a utility's CCN or service area since the last update by the TCEQ to the digital boundary data.

e) Identification of growth limitations or build-out conditions in a city or utility that would result in maximum population that is less than was originally projected.

2.2.3.2 Municipal Water Use

Updated municipal water use estimates are based on TWDB Water Use Survey data through the year 2000. As indicated above, per capita water use rates and assumptions regarding water conservation are additional variables in municipal water demand projections. Accordingly, the following criteria were applied in the evaluation of the state's municipal water demand projections and in the development of revisions to those projections.

Criteria: *One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the municipal water demand projections:*

a) Any changes to the population projections for an entity will require revisions to the municipal water use projections.

b) Errors identified in the reporting of municipal water use for an entity.

c) Evidence that the year 2000 water use was abnormal due to temporary infrastructure constraints.

d) Evidence that per capita water use from a year between 2000–2005 would be more appropriate because that year was more representative of below-normal rainfall conditions.

e) Trends indicating that per capita water use for a city, utility, or rural area of a county have increased over the latest period of analysis, beginning in 1995, and evidence that these trends will continue to rise in the short-term future.

f) Evidence that the number of fixture installations to water-efficient fixtures between 2000 and 2005 is different than the TWDB schedule.

2.2.3.3 Agricultural Irrigation Water Demand Basis for Revision

The basis for requesting a revision to the agricultural irrigation water demands is described in detail herein.

Criteria: *One or more of the following criteria must be verified by the Planning Group and the Executive Administrator for consideration of revising the irrigation water use projections:*

a) Evidence that a year between 2000–2005 would be more representative of typical irrigated acreage or below-normal rainfall than 2000.

b) Evidence that irrigation water use estimates for a county from another source are more accurate than those used by TWDB.

c) Evidence that the expectation of conditions in the region are such that the projected annual rates of change for irrigation water use in the 2002 State Water Plan are no longer valid.

2.3 Population and Water Demand Projections

This section discusses the projections for population and for municipal, manufacturing, irrigation, mining, livestock, and steam-electric power generation water demands for each of the three counties in LRWPA. These projections were developed from the 2006 RWP for LRWPA, with the exceptions for Hallettsville and agricultural irrigation as described above. As previously described, *Tables 2-1* and *2-2* present data on population and water demands. *Table 2-5* at the end of the chapter presents a summary of LRWPA's total revised water demand projections by water user category from the 2006 RWP and the 2011 RWP at a county level and *Figure 2-1* at the end of the chapter depicts a graphical summary of the total water demand for LRWPA by water use category, respectively.

After the revised population and water demand projections were approved by RWPG and formally adopted by TWDB, the projections were incorporated into TWDB DB12.

2.3.1 Regional Summary of Projections by Category

Population

The revised population projections indicate that LRWPA population will grow from 48,068 in year 2000 to 49,663 in the year 2060. When comparing the 2006 plan and 2011 plan population estimates for the region, overall populations for each decade are the same. However, population was shifted from County-Other to Hallettsville within Lavaca County.

Municipal Water Demand

Revised municipal water demand projections for LRWPA show a decrease in projected demand from 7,215 ac-ft/yr in the year 2010 to 6,892 ac-ft/yr in the year 2060. This represents a decrease in municipal demand of 4.5 percent across the planning horizon. The revised projections by county and by river basin for each municipal WUG are provided in *Table 2-2*.

Manufacturing Water Demand

The proposed manufacturing water demands for all counties in LRWPA are the TWDB default projections. The proposed manufacturing water demand for LRWPA is projected to increase from

1,089 to 1,425 ac-ft/yr from 2010 to 2060. The revised projections are provided in *Table 2-2* as well as in TWDB DB12.

Irrigation Water Demand
The TWDB total irrigation water demand for the region is projected to be 217,846 ac-ft/yr between 2010 and 2060. LRWPA's main agricultural crop is rice. LRWPG prepared a revised rice irrigation projection, as well as projections for other crops, based on LRWPA's most current information available. The projected value of 217,846 ac-ft/yr is applied for the entire period from 2010 through 2060, as no single factor examined in the demand estimation process indicated a clear increasing or decreasing demand trend. The revised projections are provided in *Table 2-2* as well as in TWDB DB12. The 2010 estimates for agricultural water use by category are shown in *Table 2-5* for each county and for the Lavaca Region.

Steam-Electric Power Generation Water Demand
The steam-electric water demands used for the Lavaca Region are the default TWDB projections. There are no steam-electric power generation facilities in the region and none planned, so the water demand for the Lavaca Region is zero throughout the period from 2010 to 2060.

Mining Water Demand
The proposed mining water demands for the Lavaca Region are the TWDB default projections and reflect the same projected demand as the 2006 RWP. The proposed mining water demand by decade for LRWPA is 164 ac-ft/yr in the year 2010 and 192 ac-ft/yr in 2060; this is an increase of 17 percent. The projections are provided in *Table 2-2* as well as in TWDB DB12.

Livestock Water Demand
The proposed livestock water demands for the Lavaca Region are the TWDB default projections, which are found using the same rates of change in livestock water demand as the 2007 State Water Plan. The base water use for 2000 was developed using adjusted livestock inventories and adjustments in water usage developed by TAES.

The proposed livestock water demand by decade for LRWPA is 3,499 ac-ft/yr, which was held constant for all decades between 2010 to 2060. The projections are provided in *Table 2-2* as well as in TWDB DB12.

Demand of WWPs
The only WWP within LRWPA was identified as LNRA. LNRA maintains current customer contracts for 1,832 ac-ft of supply to the Colorado-Lavaca Coastal Basin of Jackson County. LNRA assumes the continuation of municipal contracts across the 60-year planning period, at least to the level of existing obligations.

2.3.2 County Summary of Projections

The revised projections by county and by river basin for each municipal WUG are provided in *Table 2-2*. *Table 2-6* at the end of the chapter is a reference table that summarizes which methodology was used for each water demand category in each county within LRWPA. Unless otherwise stated, TWDB default population and water demand projection methodologies, as described in *Section 2.2.3*, were used.

Jackson
Municipal population projections for Jackson County show population increasing from 14,391 in year 2000 to 17,716 in year 2060. This represents a 23.1 percent increase in projected population over the six-decade planning period.

The livestock and irrigation demand for Jackson County both remained constant over the planning horizon. Irrigation demand projections are substantially reduced from the 2006 RWP, with decreases in projected demands of 32.6 to 32.8 percent for 2010 through 2060. Manufacturing demands ranged from 643 to 771 ac-ft/yr from 2010 to 2060. The mining demand increased by over 19.8 percent during the six-decade planning period.

Lavaca
Municipal population projections for Lavaca County show population decreasing from 19,210 in year 2000 to 15,061 in year 2060. This represents a 27.5 percent decrease in projected population over the six-decade planning period.

Livestock demands remained constant across the planning horizon. Irrigation demands were constant for 2010 through 2060 but are reduced by 27.4 to 28.1 percent from the 2006 RWP estimate. Lavaca County manufacturing demand projections increase 47.7 percent from 2010 through 2060. Mining demands increase 17.1 percent by year 2060.

Wharton
Municipal population projections for Wharton County show population increasing from 14,467 in the 2000 decade to 16,886 in the 2060 planning decade. This represents a 16.7 percent increase in projected population over the six decades.

Livestock and irrigation demands remained constant across the planning horizon. Irrigation water demand projections, when compared to the 2006 RWP projection values, increase by 32.0 percent in year 2010 and increased by 58.2 percent in year 2060. For the 2011 RWP, irrigation estimates are constant across the planning horizon. The manufacturing demands in Wharton County increase 40.0 percent from 2010 through 2060. The mining demands decrease to 0 by 2040.

2.4 Wholesale Water Provider Demands

The sole WWP in the LRWPA is the LNRA, who holds rights to the firm yield of Lake Texana. Demands by WWP are given in *Table 2-7* at the end of the chapter. Existing contracts and sales agreements for water from LNRA are as shown in *Table 2-8*. Correspondence with LNRA indicates that there is one recent request for service within their planning horizon. In addition to the existing supplies from Lake Texana, LNRA is currently studying the development of water supplies to meet an additional 10,000 ac-ft/yr of demand for an existing LNRA industrial customer located in Region L. This demand is located outside of the LRWPA and thus there is no change in manufacturing water demand for LRWPA associated with this increase.

Table 2-8
Lavaca-Navidad River Authority Water Sales Agreements

Customer / Use*	Supply Volume (ac-ft/yr)
Calhoun County Navigation District	594
Held in reserve	56
City of Corpus Christi (firm supply)	41,840
City of Corpus Christi (interruptible supply)	12,000
City of Point Comfort	178
Formosa Plastics Corporation	30,000
Inteplast Corporation	1,832
TOTAL	**86,500**

*An additional 4,500 ac-ft/yr of firm yield is used for environmental flows

Table 2-1
Population by City, Collective Reporting Unit, Individual Retail Public Utility, and Rural County

Region	Water User Group	County Name	P2000 (1)	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.(2)	County Split Pop.(3)
P	EDNA	JACKSON	5,899	6,331	6,773	7,048	7,206	7,266	7,267		
P	GANADO	JACKSON	1,915	2,081	2,251	2,357	2,418	2,441	2,441		
P	COUNTY-OTHER	JACKSON	6,577	7,029	7,491	7,778	7,943	8,006	8,008		
		JACKSON Total	***14,391***	***15,441***	***16,515***	***17,183***	***17,567***	***17,713***	***17,716***		
P	HALLETTSVILLE	LAVACA	2,345	2,603	2,614	2,901	3,409	3,998	4,673		
P	MOULTON	LAVACA	944	921	920	895	851	799	740		
P	SHINER	LAVACA	2,070	2,020	2,018	1,963	1,866	1,753	1,623		
P	YOAKUM	LAVACA	3,594	3,508	3,504	3,409	3,239	3,043	2,818	P	P
P	COUNTY-OTHER	LAVACA	10,257	9,698	9,675	9,051	7,949	6,671	5,207		
		LAVACA Total	***19,210***	***18,750***	***18,731***	***18,219***	***17,314***	***16,264***	***15,061***		
P	COUNTY-OTHER	WHARTON	3,522	3,725	3,937	4,074	4,153	4,155	4,111	P	
P	EL CAMPO	WHARTON	10,945	11,575	12,236	12,662	12,906	12,912	12,775		
		WHARTON Total	***14,467***	***15,300***	***16,173***	***16,736***	***17,059***	***17,067***	***16,886***	***P***	
		LRWPA TOTAL	**48,068**	**49,491**	**51,419**	**52,138**	**51,940**	**51,044**	**49,663**		

1) The year 2000 population for cities and county totals are from the 2000 Census. For utilities, TWDB staff estimated the population served by the utility in 2000. Some of the 2000 population estimates for utilities were revised by the Regional Water Planning Groups. The County-Other population was derived by summing all of the city and utility population within a county and subtracting it from the county total population.

2) If "P" is present in this column, the WUG is located in more than one region, and the projections listed in the row represent only the WUG's population projections within that particular region, not the WUG's total population projections. If the "P" is present for a county total entry, then the county has been split by regional boundaries, and the projections listed in the row represent only the county's populations within the particular region, not the county's total population projections.

3) If "P" is present in this column, the WUG is located in more than one county, and the projections listed in the row represent only the WUG's population projections within that particular county, not the WUG's total population projections.

Projections last updated 04/09/2009

Table 2-2
Water Demand by City and Category

WUG Name	WUG Basin	WUG County	WUG ID	City ID	Water Demand (ac-ft/yr)						
					2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	COLORADO-LAVACA	JACKSON	2959	0757	256	266	275	277	274	273	273
COUNTY-OTHER	LAVACA	JACKSON	2960	0757	461	478	495	498	493	491	492
COUNTY-OTHER	LAVACA-GUADALUPE	JACKSON	2961	0757	57	59	61	61	61	60	60
EDNA	LAVACA	JACKSON	2951	0183	793	816	850	861	856	855	855
GANADO	LAVACA	JACKSON	2954	0228	249	259	272	277	276	276	276
IRRIGATION	COLORADO-LAVACA	JACKSON	2976	1004	32,732	22,066	22,066	22,066	22,067	22,066	22,066
IRRIGATION	LAVACA	JACKSON	2977	1004	42,492	28,645	28,645	28,645	28,645	28,645	28,645
IRRIGATION	LAVACA-GUADALUPE	JACKSON	2978	1004	13,483	9,090	9,090	9,090	9,089	9,090	9,090
LIVESTOCK	COLORADO-LAVACA	JACKSON	2982	1005	298	298	298	298	298	298	298
LIVESTOCK	LAVACA	JACKSON	2983	1005	418	418	418	418	418	418	418
LIVESTOCK	LAVACA-GUADALUPE	JACKSON	2984	1005	136	136	136	136	136	136	136
MANUFACTURING	COLORADO-LAVACA	JACKSON	2966	1001	558	641	668	688	706	722	768
MANUFACTURING	LAVACA	JACKSON	2967	1001	2	2	2	2	3	3	3
MINING	COLORADO-LAVACA	JACKSON	2970	1003	22	25	27	28	29	30	30
MINING	LAVACA	JACKSON	2971	1003	33	38	40	41	43	44	45
MINING	LAVACA-GUADALUPE	JACKSON	2972	1003	55	63	66	69	71	74	76
COUNTY-OTHER	LAVACA	LAVACA	2962	0757	1,235	1,140	1,105	1,004	854	701	547
COUNTY-OTHER	GUADALUPE	LAVACA	2964	0757	5	5	5	5	4	4	4
HALLETTSVILLE	LAVACA	LAVACA	2955	0259	575	627	621	680	787	914	1,067
IRRIGATION	LAVACA	LAVACA	2979	1004	11,492	8,357	8,357	8,357	8,357	8,357	8,357
LIVESTOCK	LAVACA	LAVACA	2985	1005	1,997	1,997	1,997	1,997	1,997	1,997	1,997
LIVESTOCK	LAVACA-GUADALUPE	LAVACA	2986	1005	21	21	21	21	21	21	21
LIVESTOCK	GUADALUPE	LAVACA	2987	1005	41	41	41	41	41	41	41
MANUFACTURING	LAVACA	LAVACA	2968	1001	319	386	427	463	498	528	570
MINING	LAVACA	LAVACA	2973	1003	7	8	9	9	9	9	10
MINING	LAVACA-GUADALUPE	LAVACA	2974	1003	23	27	28	29	30	31	31
MOULTON	LAVACA	LAVACA	2956	0723	165	158	155	147	137	127	118

Table 2-2
Water Demand by City and Category (Continued)

WUG Name	WUG Basin	WUG County	WUG ID	City ID	Water Demand (ac-ft/yr)						
					2000	2010	2020	2030	2040	2050	2060
SHINER	LAVACA	LAVACA	2957	0557	501	482	475	455	426	397	367
YOAKUM	LAVACA	LAVACA	2958	0670	592	566	553	527	490	453	420
COUNTY-OTHER	LAVACA	WHARTON	2965	0757	418	426	437	438	433	428	424
EL CAMPO	COLORADO	WHARTON	2952	0184	269	277	287	290	290	288	285
EL CAMPO	COLORADO-LAVACA	WHARTON	2953	0184	1,584	1,632	1,690	1,713	1,709	1,698	1,680
EL CAMPO	LAVACA	WHARTON	3795	0184	23	24	24	25	25	24	24
IRRIGATION	COLORADO-LAVACA	WHARTON	2980	1004	17,132	21,642	21,642	21,641	21,641	21,642	21,641
IRRIGATION	LAVACA	WHARTON	2981	1004	101,362	128,046	128,046	128,047	128,047	128,046	128,047
LIVESTOCK	LAVACA	WHARTON	2988	1005	588	588	588	588	588	588	588
MANUFACTURING	COLORADO-LAVACA	WHARTON	2969	1001	49	60	65	70	74	78	84
MINING	LAVACA	WHARTON	2975	1003	4	3	2	1	0	0	0

Table 2-3
Summary of LRWPA Projected Irrigation Demands for 2010

Water Use Category	Total Water Demand (ac-ft)			Percentage of County Irrigation Demand (%)			Region P Total	
	LRWPA Wharton Co.	Jackson Co.	Lavaca Co.	Wharton Co.	Jackson Co.	Lavaca Co.	Water Demand	
							(%)	(ac-ft)
Rice								
GW Source	107,526	51,261	7,848	71.8	85.7	93.9	76.5	166,634
SW Source	17,572	4,073	429	11.7	6.8	5.1	10.1	22,074
Total Rice	125,097	55,333	8,277	83.6	92.5	99.0	**86.6**	**188,708**
Cotton Irr.	5,262	1,233	3	3.5	2.1	0.0	3.0	6,498
Corn Irr.	5,399	654	0	3.6	1.1	0.0	2.8	6,053
Milo Irr.	4,544	0	0	3.0	0.0	0.0	2.1	4,544
Soybean Irr.	2,306	0	44	1.5	0.0	0.5	1.1	2,350
Turf Irr.	429	1,304	0	0.3	2.2	0.0	0.8	1,732
Crop Irr.	143,037	58,524	8,324	95.6	97.9	99.6	**96.3**	**209,885**
Waterfowl	2,355	144	33	1.6	0.2	0.4	1.2	2,531
Aquaculture	4,296	1,133	0	2.9	1.9	0.0	2.5	5,430
Total Irr.	149,688	59,801	8,357	100.0	100.0	100.0	**100.0**	**217,846**

Table 2-4
Irrigation Demands for Current and Previous RWPs

Crop	2001 RWP (ac-ft)	2006 RWP (ac-ft)	Current (ac-ft)
Aquaculture	0	2,260	5,430
Corn	15,187	2,421	6,053
Cotton	5,832	3,758	6,498
Sorghum	4,077	1,883	4,544
Soybeans	1,219	338	2,350
Turfgrass	5,750	3,250	1,732
Waterfowl	802	877	2,531
1st Crop Rice			
GW	110,549	141,492	135,153
SW	27,381	15,131	17,340
2nd Crop Rice			
GW	46,430	39,642	31,481
SW	9,583	7,640	4,734
Total	**226,810**	**218,693**	**217,846**

Table 2-5
Comparison Between 2006 RWP and 2011 RWP
Water Demands* (in ac-ft/yr) by WUG Category
Jackson County

RWP	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal							
2006	1816	1,878	1,953	1,974	1,960	1,955	1,956
2011	1,816	1,878	1,953	1,974	1,960	1,955	1,956
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Livestock							
2006	852	852	852	852	852	852	852
2011	852	852	852	852	852	852	852
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation							
2006	88,707	88,749	88,793	88,841	88,901	88,959	89,019
2011	88,707	59,801	59,801	59,801	59,801	59,801	59,801
Difference	0	-28,948	-28,992	-29,040	-29,100	-29,158	-29,218
% Change	0.0	-32.6	-32.7	-32.7	-32.7	-32.8	-32.8
Manufacturing							
2006	560	643	670	690	709	725	771
2011	560	643	670	690	709	725	771
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mining							
2006	110	126	133	138	143	148	151
2011	110	126	133	138	143	148	151
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steam-Electric Power Generation							
2006	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	0
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in ac-ft/yr

Table 2-5
Comparison Between 2006 RWP and 2011 RWP
Water Demands* (in ac-ft/yr) by WUG Category
Lavaca County (Continued)

RWP	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal							
2006	3,073	2,934	2,869	2,729	2,535	2,345	2,172
2011	3,073	2,978	2,914	2,818	2,698	2,596	2,523
Difference	0	44	45	89	163	251	351
% Change	0.0	1.5	1.6	3.3	6.4	10.7	16.2
Livestock							
2006	2,059	2,059	2,059	2,059	2,059	2,059	2,059
2011	2,059	2,059	2,059	2,059	2,059	2,059	2,059
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation							
2006	11,492	11,511	11,529	11,552	11,577	11,602	11,629
2011	11,492	8,357	8,357	8,357	8,357	8,357	8,357
Difference	0	-3,154	-3,172	-3,195	-3,220	-3,245	-3,272
% Change	0.0	-27.4	-27.5	-27.7	-27.8	-28.0	-28.1
Manufacturing							
2006	319	386	427	463	498	528	570
2011	319	386	427	463	498	528	570
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mining							
2006	30	35	37	38	39	40	41
2011	30	35	37	38	39	40	41
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steam-Electric Power Generation							
2006	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	0
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in ac-ft/yr

Table 2-5
Comparison Between 2006 RWP and 2011 RWP
Water Demands* (in ac-ft/yr) by WUG Category
Wharton County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2006	2,294	2,359	2,438	2,466	2,457	2,438	2,413
2011	2,294	2,359	2,438	2,466	2,457	2,438	2,413
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Livestock							
2006	588	588	588	588	588	588	588
2011	588	588	588	588	588	588	588
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation							
2006	118,494	113,378	109,324	105,413	101,642	98,007	94,603
2011	118,494	149,688	149,688	149,688	149,688	149,688	149,688
Difference	0	36,310	40,364	44,275	48,046	51,681	55,085
% Change	0.0	32.0	36.9	42.0	47.3	52.7	58.2
Manufacturing							
2006	49	60	65	70	74	78	84
2011	49	60	65	70	74	78	84
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mining							
2006	4	3	2	1	0	0	0
2011	4	3	2	1	0	0	0
Difference	0	0	0	0	0	0	0
% Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Steam-Electric Power Generation							
2006	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	0
% Change	NA	NA	NA	NA	NA	NA	NA

***All values are presented in ac-ft/**

Table 2-6
Summary of Methodology Used for Revised Projections –
Jackson, Lavaca, Wharton Counties

	Category	TWDB Default	Other	Notes
Jackson	Municipal	X		
	Livestock	X		
	Irrigation		X	LRWPG developed irrigation projections based on the six-year average (2000–2005) demand for agriculture determining the amount of water applied to specific crop types and total irrigated acreage of that crop.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Lavaca	Municipal		X	TWDB alternative projections (Where applicable)
	Livestock	X		
	Irrigation		X	LRWPG developed irrigation projections based on the six-year average (2000–2005) demand for agriculture determining the amount of water applied to specific crop types and total irrigated acreage of that crop.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Wharton	Municipal	X		
	Livestock	X		
	Irrigation		X	LRWPG developed irrigation projections based on the six-year average (2000–2005) demand for agriculture determining the amount of water applied to specific crop types and total irrigated acreage of that crop.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

Table 2-7
Water Demand by WWP of all Water Use Categories*

WUG Name	WUG Basin	WUG County	WUG ID	City ID	Water Demand (ac-ft/yr)						
					2000	2010	2020	2030	2040	2050	2060
Manufacturing	Colorado-Lavaca	Jackson	2960	1001	1,832	1,832	1,832	1,832	1,832	1,832	1,832

*LRWPA contracts only.

FIGURES

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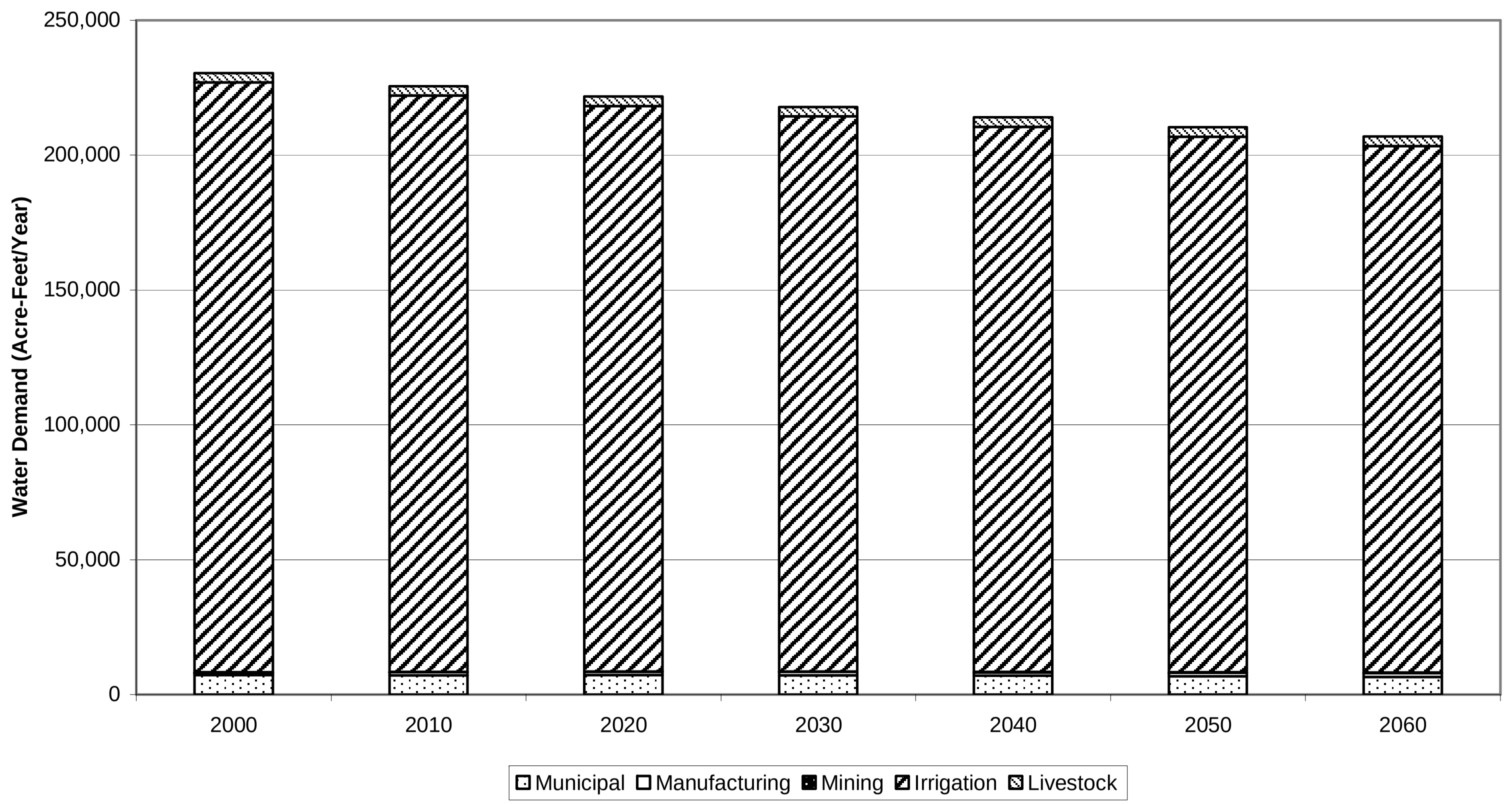
Figure 2-1
Water Demand by Decade



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Appendix 2A

Sample Correspondence to WUGs

March 9, 2009

[Addressee]
[Street Address]
[City, State Zip]

Subject: Lavaca Regional Water Planning Group Projected Population and Water Demand for 2011 Regional Water Plan

Dear Water User Group Representative:

We are writing this letter on behalf of the Lavaca Regional Water Planning Group (LRWPG). AECOM is the consultant for the LRWPG and we are currently engaged in the process of preparing the 2011 Regional Water Plan (RWP) for the region. This plan is submitted to the Texas Water Development Board (TWDB) and will be used to compile the 2012 State Water Plan (SWP).

As part of the 2011 RWP, the consultant team is currently performing tasks related to the allocation of water supply and demand for Water User Groups (WUGs) in our region to determine projected future water shortages. A WUG consists of a demand center to which water resources can be allocated. Municipal WUGs are associated with populations and the projections of these populations are used to estimate future water demands.

The development of representative demand projections is crucial for the planning process because these demands and available water supplies are used to generate an overview of expected shortages for the future. Once these shortages are identified, strategies will be assigned to meet future needs. Identifying these needs is an essential step in properly allocating water management strategies that will eventually be written into the SWP. Projects must be consistent with the SWP to be eligible for State funding.

In the 2006 RWP, population and demand projections were provided by the TWDB and based on a cohort-component methodology incorporating Year 2000 Census data. Because no revised Census data is available in time for development of the 2011 RWP, the consultant team has prepared population projections based on a number of sources including information from the Texas State Data Center (SDC). However, many WUGs have been assigned the same population and demand projections used in the development of the 2006 RWP.

The LRWPG has requested that information regarding revised projections be provided to each WUG so that corrections may be made as necessary. The table below shows the current water demands and projected populations for your WUG for the next 50 years:

2011 RWP Projections	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
WUG Projected Population:						
WUG Projected Water Demand:						

We are asking that you review the population and demand projections for your WUG and determine if either:

1. The numbers represent reasonable projections and require no revision, or
2. You would like to revise your projections and *can provide information to backup your request*, such as a planning level study of your water system.

If **no** revisions are needed, **no** response is necessary. Please note that the TWDB will accept revisions to the sub-county (i.e., cities, utilities or rural areas) population projections that may have been revised. Justifiable reasons to changes in these populations include:

- population estimates of the Texas State Data Center, or other credible sources, are greater than projected populations used in the 2007 state water plan for the year 2010;
- population growth rates for a sub-county area as tabulated by the Texas SDC over the most recent five years is substantially greater than growth rates reported by the U.S. Census Bureau between 1990 and 2000;
- cities have annexed additional land since the 2000 Census; or
- water utilities have expanded their service areas since last updated by the Texas Commission on Environmental Quality.

Municipal water demands may be adjusted for WUGs with revised population projections. Similarly, if acceptable data sources indicate that a measured gallons per capita per day from years prior to 2000 *is more representative of drought of record conditions*, the TWDB will consider formal requests for revisions.

You may also contact me directly regarding your request. My contact information is located at the conclusion of this letter. In order to meet the accelerated timeline of this planning round, we would like to receive all responses by **April 1, 2009**. Information received by this date will be incorporated into projections that will be reviewed and considered for approval by the LRWPG at their scheduled April 20, 2009 meeting. WUGs are highly encouraged to submit recommended changes (if needed) by April 1st to guarantee consideration for adoption at the April 20th meeting.

The consultant team is working with the WUGs in the region ensure that the 2011 Regional Water Plan accurately reflects the current and future water supply plans for the WUGs in an effort to reduce the need for plan amendments and to ease the process for obtaining funding for vital infrastructure improvements. Therefore, your input in this matter is crucial to our planning and we appreciate any assistance you may be able to provide.

If you have any questions regarding this matter or wish to discuss further, please feel free to call me at (713) 267-3112 or email me at Jason.Afinowicz@aecom.com.

Sincerely,

Jason D. Afinowicz, P.E.
Project Manager

JDA:mes

c: Project File

Appendix 2B

Population and Water Demand Revision Request

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

May 6, 2009

J. Kevin Ward
Executive Administrator
Texas Water Development Board
1700 North Congress Avenue
Austin, TX 78701

**Subject: Request for Population and Water Demand Revisions
Lavaca Regional Water Planning Group**

Dear Mr. Ward:

On behalf of the Lavaca Regional Water Planning Group (LRWPG), I am submitting the enclosed population and water demand revision request to you in accordance with 31 TAC §357.5 (d)(2). These revised values were presented at the public meeting for LRWPG on April 20, 2009 and were formally approved by the LRWPG Board at that meeting. This submittal follows the obligatory 14-day period following the public meeting to receive public comment.

The Group is requesting approval of TWDB alternative population projections and associated water demands for the City of Hallettsville within Lavaca County. Because there is not sufficient basis to revise the municipal population for all of Lavaca County, increases in population for Hallettsville were deducted from County-Other for Lavaca County.

Additionally, the LRWPG is requesting revision to irrigation water demand for Jackson, Lavaca, and Wharton Counties. These revised demands were developed from a report entitled Agricultural Water Demands Analysis, which was carried out as a special study as part of planning efforts for the first biennium of the 2011 Regional Water Planning cycle. This report was submitted to the office of the Executive Administrator on April 29, 2009.

In addition to the population and water demand revision request, also enclosed is a comparison of revised values and TWDB-adopted 2006 estimates. If we may provide further information or clarification on these requested revisions, please contact myself or Jason Afinowicz at (713) 267-3122.

Sincerely,

Harrison Stafford II
Chairman

Enclosures

cc: Angela Kennedy, TWDB (by e-mail w/ PDF attachment)
Patrick Brzozowski, LNRA (by e-mail w/ PDF attachment)

Population/Water Demand Revision Data

Please indicate the purpose of the submission (a and/or b; or c)

[ ] a) to request preliminary population and/or water demand revisions be developed by TWDB for subsequent consideration by RWPG
[ ] b) to request feedback on proposed revisions for subsequent consideration by the RWPG

[✓] **c) to make an official request that TWDB adopt the associated revisions to population or water demands based on documented RWPG action per 357.5(d)(2)**

					Population						Water Demand (acre-feet)					
Name of Water User Group (WUG)	Revised Population (Y/N)	Revised Water Demand (Y/N)	Basis for revised data - data source (please attach and/or provide reference)	Projection source	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060
County-Other (Lavaca)	Y	Y	*Adjustment for Hallettsville*	*TWDB*	*9,698*	*9,675*	*9,051*	*7,949*	*6,671*	*5,207*	*1,145*	*1,110*	*1,009*	*858*	*705*	*551*
Hallettsville	Y	Y	*TWDB-provided State Data Center data*	*TWDB*	*2,603*	*2,614*	*2,901*	*3,409*	*3,998*	*4,673*	*627*	*621*	*680*	*787*	*914*	*1,067*
Irrigation (Jackson)	N	Y	*Agricultural Water Demands Analysis*	*RWPG*	—	—	—	—	—	—	*59,801*	*59,801*	*59,801*	*59,801*	*59,801*	*59,801*
Irrigation (Lavaca)	N	Y	*Agricultural Water Demands Analysis*	*RWPG*	—	—	—	—	—	—	*8,357*	*8,357*	*8,357*	*8,357*	*8,357*	*8,357*
Irrigation (Wharton)	N	Y	*Agricultural Water Demands Analysis*	*RWPG*	—	—	—	—	—	—	*149,688*	*149,688*	*149,688*	*149,688*	*149,688*	*149,688*

Comparison of Requested Revisions to Approved 2006 RWP Values

Comparison of Requested Population to 2006 RWP							
WUG	**Estimate**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Hallettsville	2006 RWP	2,289	2,287	2,224	2,114	1,985	1,839
	Requested	2,603	2,614	2,901	3,409	3,998	4,673
	Difference	*314*	*327*	*677*	*1,295*	*2,013*	*2,834*
County-Other (Lavaca)	2006 RWP	10,012	10,002	9,728	9,244	8,684	8,041
	Requested	9,698	9,675	9,051	7,949	6,671	5,207
	Difference	*-314*	*-327*	*-677*	*-1,295*	*-2,013*	*-2,834*

Comparison of Requested Demand to 2006 RWP*							
WUG	**Estimate**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Hallettsville	2006 RWP	551	543	521	488	454	420
	Requested	627	621	680	787	914	1,067
	Difference	*76*	*78*	*159*	*299*	*460*	*647*
County-Other (Lavaca)	2006 RWP	1,177	1,143	1,079	994	914	847
	Requested	1,145	1,110	1,009	858	705	551
	Difference	*-32*	*-33*	*-70*	*-136*	*-209*	*-296*
Irrigation (Jackson)	2006 RWP	88,749	88,793	88,841	88,901	88,959	89,019
	Requested	59,801	59,801	59,801	59,801	59,801	59,801
	Difference	*-28,948*	*-28,992*	*-29,040*	*-29,100*	*-29,158*	*-29,218*
Irrigation (Lavaca)	2006 RWP	11,511	11,529	11,552	11,577	11,602	11,629
	Requested	8,357	8,357	8,357	8,357	8,357	8,357
	Difference	*-3,154*	*-3,172*	*-3,195*	*-3,220*	*-3,245*	*-3,272*
Irrigation (Wharton)	2006 RWP	113,378	109,324	105,413	101,642	98,007	94,603
	Requested	149,688	149,688	149,688	149,688	149,688	149,688
	Difference	*36,310*	*40,364*	*44,275*	*48,046*	*51,681*	*55,085*

*All values in units of ac-ft/yr.

Contents

List of Tables

List of Figures

List of Appendices

Chapter 3– Analysis of Current Water Supplies

3.1 Introduction

The available water supply within the region includes both groundwater and surface water. Groundwater is provided from the Gulf Coast aquifer. Primary surface water sources are the Navidad and Lavaca Rivers and Lake Texana.

Much of the regional water demand is supplied by groundwater. Of the total Year 2000 water demand, approximately 90 percent, or 208,389 ac-ft, was supplied by groundwater. The Gulf Coast aquifer is the predominant supply source.

Surface water supplies are obtained from Lake Texana and run-of-river (ROR) flows from the Lavaca and Navidad Rivers and some creeks. The majority of LRWPA is located in the Lavaca River Basin. Surface water supplies accounted for approximately 10 percent of the total 2000 water demand. The only reservoir in the Lavaca Region is Lake Texana, and there are no major springs in LRWPA.

This chapter summarizes the results of Task 3 and describes the resources available to LRWPA and their allocation to WUGs throughout LRWPA. Also, to provide consistency and facilitate the compilation of the different regional plans, TWDB required the incorporation of this data into a standardized online database referred to as TWDB DB12. Tables that contain this information are identified below and are located in the appendix accompanying this chapter.

- *Table 3A-1* – Current Water Supply Sources
- *Table 3A-2* – Current Water Supplies Available to the Lavaca RWPA by City and Category
- *Table 3A-3* – Current Water Supply Sources Available to the Lavaca Region by WWP

Some of the information contained within this chapter is based on information published in *Chapter 1 – Description of the Region*. For a complete and detailed list of sources, see references for *Chapter 1*.

3.2 Identification of Groundwater Sources

3.2.1 Groundwater Aquifers

The only major aquifer in the Lavaca Region is the Gulf Coast aquifer. This aquifer accounts for nearly all of the groundwater supply to LRWPA. The Jackson Group, a minor aquifer in northwest Lavaca County, provides small amounts of supply for domestic and livestock uses.

The Gulf Coast aquifer consists of four general water-producing units. The shallowest is the Chicot aquifer, followed by the Evangeline and Jasper aquifers and then the Catahoula Sandstone. These formations are composed of interbedded layers of sand, silt, and clay, with minor amounts of small gravel in some locations. Shale can also be present at deeper depths, below the base of the Evangeline aquifer where the Burkeville confining zone exists and separates the Evangeline aquifer from the Jasper aquifer. The aquifer beds vary in thickness and composition and are normally discontinuous over extended distances.

The Chicot and Evangeline aquifers provide large amounts of freshwater. The aquifers contain freshwater to depths that range from 1,400 to 1,700 feet in the portion of Wharton County in LRWPA, according to Report 270.

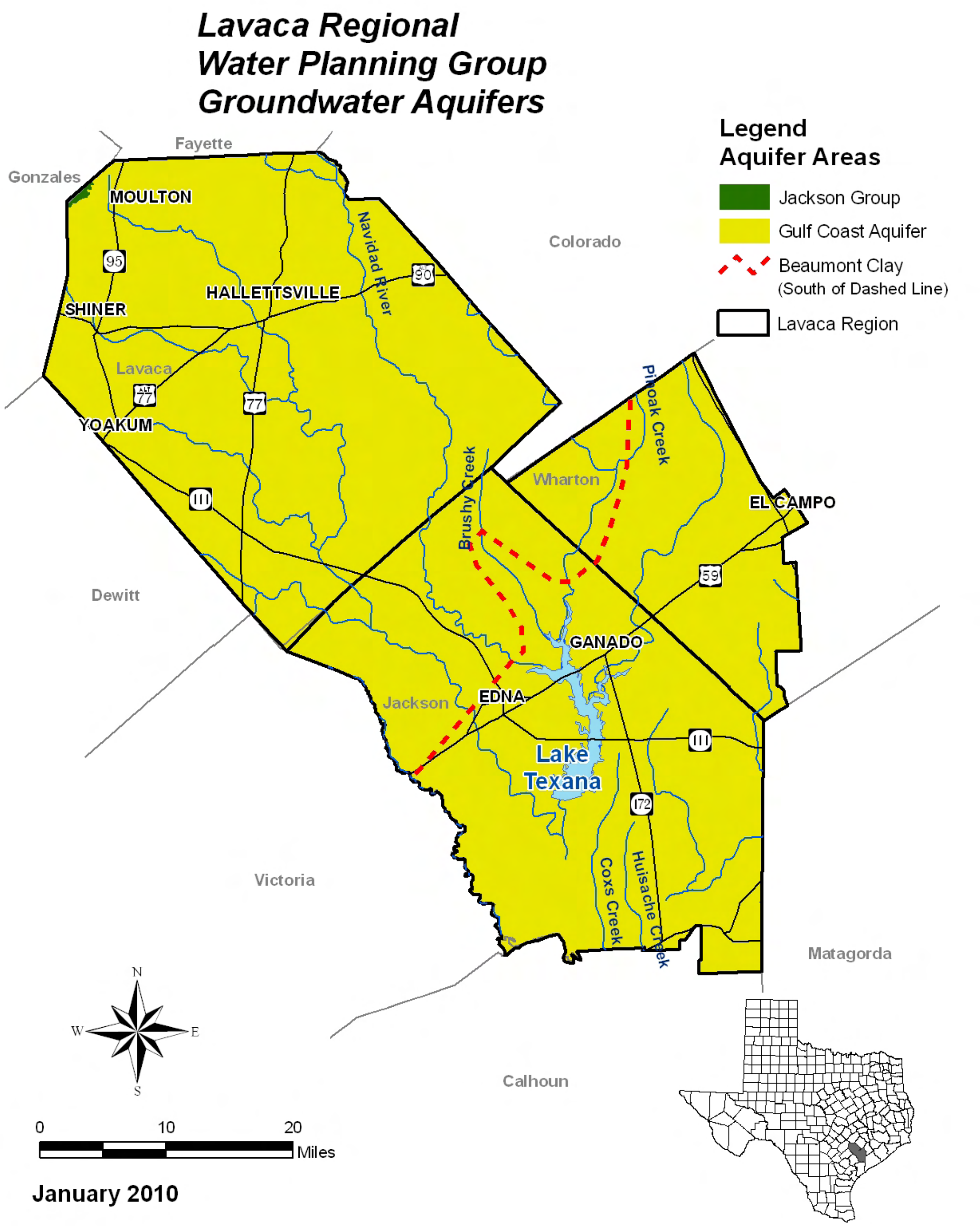
Recharge to the aquifers is principally from the infiltration of precipitation and streamflow. Average annual rainfall in LRWPA ranges from about 32 to 42 inches per year. The eastern portion of the region experiences the upper end of the average annual rainfall amounts.

The geographic coverage of the Gulf Coast aquifer within the Lavaca Region is shown in *Figure 3-1*. The area includes the Jasper, Evangeline, and Chicot aquifer formations. The Gulf Coast Aquifer parallels the coast and is at times 40 miles wide and also extends outside LRWPA to the northeast and southwest.

The Jackson Group, a minor aquifer, is located in the northwestern portion of Lavaca County. The aquifer provides small amounts of water to domestic and livestock wells in the very northwestern reaches of LRWPA. Only a small part of the Jackson Group occurs in the very northwestern part of Lavaca County northwest of the Town of Moulton.

There are no minor aquifers present in Jackson or Wharton Counties for which estimates of groundwater availability have previously been provided, as groundwater in the two counties is pumped from the Gulf Coast Aquifer System. Data and text from TWDB and U.S. Geologic Survey reports for Wharton and Jackson Counties do not reference minor aquifers in these two counties.

Figure 3-1
Groundwater Aquifers



3.2.2 Groundwater Use Overview

Groundwater in the region is pumped for domestic, agricultural, municipal, and industrial uses. In 2000, the Lavaca Region pumped approximately 208,389 ac-ft of groundwater for these purposes. Agricultural irrigation accounts for approximately 96 percent of the groundwater pumped in the region. Wells used for agricultural irrigation tend to be deeper than the more shallow wells used for pumping water for livestock purposes. Municipal and public usage, which includes usage for cities, communities, parks, campgrounds, and water districts, represents approximately 3.4 percent of the groundwater pumped. Less than one percent of groundwater pumped in LRWPA is for industrial needs, including manufacturing and other industrial uses.

3.2.3 Aquifer Conditions

Groundwater conditions have been favorable and should continue to be favorable within the Lavaca Region for the pumping of substantial quantities of good quality water.

The Gulf Coast aquifer was deposited in a manner that resulted in substantial thicknesses of sand that contain fresh (good quality) groundwater. The aquifer has about 200 to 450 feet of sand that contains freshwater in Lavaca County. Sand thickness tends to be greater in the southeastern part of the county. In Jackson and Wharton Counties within LRWPA, the Gulf Coast aquifer contains about 300 to 700 feet of freshwater sands in most of the area. In the southern part of Jackson County, north of Lavaca Bay, a limited area of the aquifer has 0 to 200 feet of sand that contains freshwater of less than 1,000 milligrams per liter (mg/L) total dissolved solids (TDS).

As discussed in the 2006 RWP, a Central Gulf Coast Groundwater Availability Model (GAM) was developed for the Central Gulf Coast aquifer in LRWPA, and the model is described in a report prepared by TWDB entitled *Groundwater Availability Model of the Central Gulf Coast Aquifer System: Numerical Simulations through 1999.* The model divides the Gulf Coast aquifer into four layers that are the Chicot aquifer, Evangeline aquifer, Burkeville Confining System, and the Jasper aquifer. The main layers of the model that provide substantial amounts of water are the Chicot, Evangeline, and Jasper aquifers. For modeling purposes, the Catahoula Sandstone in northwestern Lavaca County is considered to be hydraulically connected to the Jasper aquifer. Further to the southeast, the Catahoula contains a greater percentage of fine-grained material and functions as a confining layer below the Jasper aquifer. Utilization of the model provides an additional method to evaluate the groundwater resources in LRWPA.

Based on the GAM discussed in the 2006 RWP, the estimated transmissivity for the Chicot aquifer in LRWPA ranges less than 15,000 gallons per day per foot (gpd/ft) near the outcrop and up to 220,000 gpd/ft near southern Wharton County and eastern Jackson County. The Evangeline aquifer transmissivity ranges from less than 7,500 gpd/ft near the outcrop and up to 85,000 gpd/ft in eastern Wharton County. The Central Gulf Coast GAM estimates that the transmissivity for the Jasper aquifer ranges from about 250 gpd/ft in eastern Lavaca County to 7,500 gpd/ft in eastern Wharton County. Pumping test data from a City of Hallettsville (Lavaca County) public supply well completed in the Jasper aquifer show transmissivity values ranging from 4,500 gpd/ft to 10,000 gpd/ft. The transmissivity values for the Chicot and Evangeline aquifers indicate that they are capable of transmitting large quantities of water to wells. The transmissivity values calculated from the City of Hallettsville well indicate that the Jasper aquifer is capable of transmitting moderate quantities of water to wells.

The development of large quantities of groundwater within LRWPA has resulted in potentiometric head decline in the Gulf Coast aquifer. Data in TWDB Report 289, combined with water level changes since about 1970, indicate that the potentiometric head in the Chicot aquifer has declined about 20 feet to possibly 80 or 120 feet since 1900 as a result of the pumping that has occurred in the area. For the Evangeline aquifer, about 20 to possibly 100 feet of potentiometric head decline has occurred since 1900 as the result of the withdrawals of groundwater. The depth interval screened by the large capacity wells in the Lavaca Region normally ranges from about 300 to 600 feet, with some wells' screening depths as deep as 1,200 to 1,400 feet. Static water levels measured in the wells normally range from about 50 to 120 feet. This illustrates that there is a substantial amount of available drawdown in the wells that will continue to sustain the overall pumpage in LRWPA.

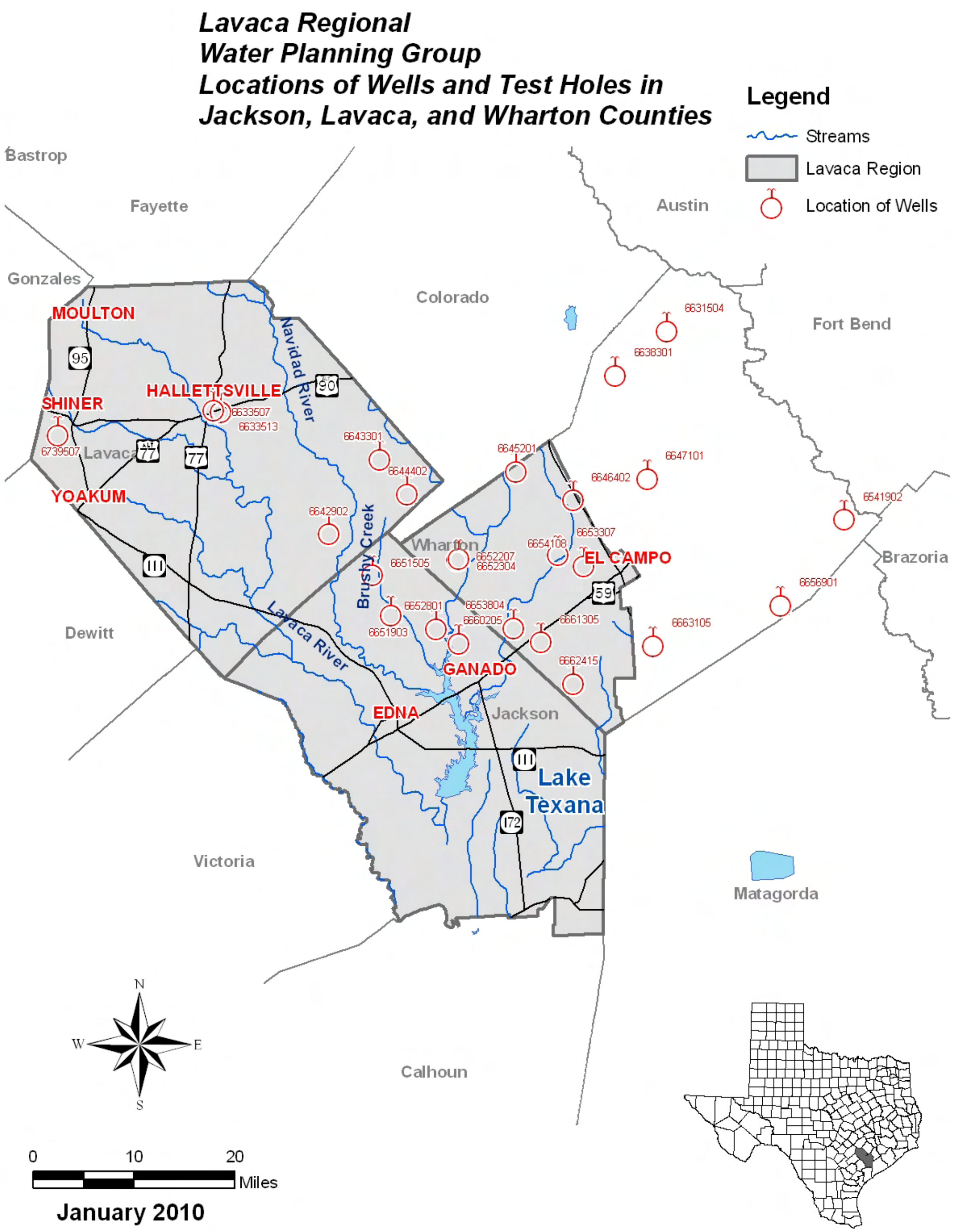
Static (non-pumping) water levels have been measured in wells in Wharton and adjoining counties for decades to help monitor the response of the aquifer to pumpage. The locations of observation wells within Wharton and Lavaca Counties and in the eastern part of Jackson County are circled on *Figure 3-2.* The wells screen the Chicot and/or Evangeline aquifers. *Figure 3-3* at the end of the chapter is a graph showing static water levels in wells located in the western part of Wharton County. The data show a gradual decline in water levels in the 1960s and into the 1970s as pumpage generally increased within LRWPA. From about 1984 to 2000, total pumpage averaged about 102,100 ac-ft/yr in LRWPA part of Wharton County, while water levels have fluctuated but show essentially no net static water-level decline; the exception being Well 66-52-207 which had about 5 feet of water-level decline during the period. Recent static water level data indicate the Well 66-52-207 water level is slightly fluctuating. Wells 66-52-304 and 66-53-804 show a static water level rise over the 2000 to 2004 period of about 1.1 and about 1.6 feet per year (ft/yr), respectively.

Figure 3-4 at the end of the chapter shows static water levels in wells located in the central Wharton County with measurements in one well extending as far back as 1934. The water-level data show some water-level decline occurring in the 1960s and 1970s as pumpage in the region increased. From about 1983 through 2004, the data show essentially no net static water-level decline, and, in some wells, a slight rise, indicating that the aquifers are providing water at a rate that is not causing water levels to decline and that the aquifers can continue to sustain the rate of pumping. Pumping for irrigation over the last few years from 2001 through 2004 may have been of a lower amount because of the amount of precipitation that has occurred during the growing season and because of a possible reduction in the acres of rice grown. Static water level data from about 1998 to 2004 shows a rise in the water level ranging from about 0.4 ft/yr at Well 66-54-108 to about 1.6 ft/yr at Well 66-61-305. Well 66-46-402 shows fluctuation in the static water level during that period.

Static water levels have been measured in wells outside LRWPA, and data for some of the wells are shown on *Figure 3-5* at the end of the chapter*.* Again, the water-level data are showing that water levels have stabilized in the last 15 years, and in some wells, the water levels actually have risen about 10 to 15 feet through the period. The data show that the stabilization of static water levels in Wharton County is not confined to the part of the county within LRWPA. Data from 1998 to 2004 continue to indicate the stabilization or small rise of static water levels in wells in the area.

Water levels are also shown on *Figure 3-6* at the end of the chapter for wells located in the eastern part of Jackson County. The data from the four wells show that static water levels fluctuated some in the 1980s and have risen about 7 to 35 feet between 1990 and 2004. From 1984 to 2000, pumpage in Jackson County averaged about 75,100 ac-ft/yr based on data provided by TWDB. During the years from 1997 to 2004, pumpage averaged about 51,960 ac-ft/yr. The rise in static water levels from 1990 to 2004 can be related to the reduction in pumpage.

Figure 3-2
Locations of Wells and Test Holes in
Jackson, Lavaca, and Wharton Counties



Static water levels for wells in the Lavaca County area are shown on *Figure 3-7* at the end of the chapter. The static water level in one well (67-39-507) in the western part of the county has been stable since 1960. The static water levels in Wells 66-44-402 and 66-42-902 in the southeast part of the county declined some during the 1970s and 1980s when irrigation pumpage was higher and have recovered a significant amount as overall pumpage in the area has decreased some, principally due to a reduction in irrigation. Groundwater pumpage in Lavaca County averaged about 21,100 ac-ft/yr in the 1980s, about 15,300 ac-f/yr in the 1990s, and was 8,520 ac-ft in 2000. Water levels in wells in the City of Hallettsville show an average decline rate of about 7 ft/yr for the 1984 to 1996 time period. Recent static water level data from Well 66-33-513 indicate a rise in the static water level in the City of Hallettsville area.

As of the 2006 RWP, total groundwater availability was estimated by TWDB for the Lavaca Region at 207,599 ac-ft/yr. Of this estimated amount, 87,876 ac-ft was expected to be available to Jackson County, with Lavaca and Wharton Counties' projected available amounts being 38,123 and 89,853 ac-ft, respectively. Groundwater pumpage within the part of Wharton County in LRWPA has exceeded, during some years, the estimate of groundwater availability within that part of the county.

As stated previously, groundwater pumpage in the Lavaca Region has resulted in acceptable amounts of static water level decline and the recovery of static water levels in years when pumpage decreases occurred in various parts of LRWPA. Groundwater availability in the region is the amount of withdrawal that can be sustained by the aquifers on a long-term basis as shown by the response of the aquifer to long-term pumping.

There are millions of ac-ft of water in storage in sand layers of the aquifers. Water in storage fills the aquifer pore space and helps maintain the aquifer's artesian pressure which helps limit subsidence. The aquifers are a flow system with recharge infiltrating into the aquifers and water slowly flowing in the large aquifer storage volume from areas of recharge to areas or points (wells) of discharge. It should be noted here that not all of the stored water is recoverable and that the aquifer is currently being pumped at or near the sustainable demand. Future increases in pumpage will result in declining water levels.

3.2.4 Groundwater Quality

Water samples have been collected from wells for water chemistry analysis for over 40 years within LRWPA. Groundwater in the LRWPA is generally of good quality, although test results for some wells have shown tested constituents above the maximum contaminant level. In general, the areas with groundwater quality issues occur in Lavaca County where water demand is lower than the estimates of available groundwater supply. In Jackson and Wharton Counties, data show that the groundwater for large capacity production is of good quality, has not been adversely impacted by past pumping, and should not be adversely impacted by estimated future pumping. Additional information on water quality can be found in the 2006 RWP.

3.2.5 Water Level Monitoring Program for the LRWPA

The 2006 RWP included a detailed description of the Water Level Monitoring Program for the LRWPA. The Water Leveling Monitoring Program was designed to assess changes in groundwater pumping conditions that occur through the irrigation season. An objective of the study was to estimate the effects that increases in pumpage during the irrigation season could have on water levels in wells and on the pumping rates and pumping lifts of wells. The irrigation and public supply wells located in the study area provide data that reflect the response of the aquifer to the pumping. This information has relevance to the overall pumping costs that agriculture has to shoulder in providing water for irrigated crops and how water levels and pumping rates could change if there were a significant change in groundwater pumping in the region.

A number of conclusions were drawn from data collected as part of the program between its inception in 2001 through the spring of 2005. Results indicated that pumping rates of the large capacity irrigation wells can decline a few hundred gallons per minute during the irrigation season due to static water level decline and resulting increased pumping lift. In turn, the increased pumping lift through the irrigation season can result in an estimated 10 to 15 percent increase in the cost of pumping water. The data show that the seasonal fluctuations in static water levels in wells were greater in 2002 and 2003 than in 2004 because there was less precipitation and probably higher amounts of pumping in the growing seasons of 2002 and 2003 than during the growing season of 2004. Within the study area, there has been a small rise in the static water levels in wells from 2001 through the spring of 2005. The small rise in static water levels probably is the result of less groundwater pumping, particularly in 2004. The static water level fluctuations during the irrigation season normally are greater in the deeper wells that are pumped at higher rates and less in the shallower wells that normally do not have as high pumping rates or total pumped volume. Additional information on the Water Level Monitoring Program can be found in the 2006 RWP.

3.2.6 Subsidence Effects

Data show that small amounts of land surface subsidence have resulted from the withdrawal of groundwater that helps to support the economic viability of the Lavaca Region. Land surface subsidence is best described as follows: the artesian pressure within the confining layers of the aquifer keeps the clays fully saturated and at the same pressure as the aquifer sand layers above and below the clay layers. As water is pumped from the sands the pressure is reduced in them and the pressure in the clays begins decreasing as small amounts of water flow from clays to the sands. As water flows from the clays, the clay matrix compresses slightly. This, in turn, results in a small amount of subsidence of the land surface. Available data indicate subsidence of up to 1.5 feet in the southeastern part of Jackson County with lesser subsidence in other areas for 1900 through the mid 1970s. Subsidence since the 1970s is estimated to have been very minor in the LRWPA. Additional information is available in the 2006 RWP.

3.2.7 Public Supply Groundwater Usage

The Lavaca Region relies on groundwater to provide all of the municipal water supply. This accounts for approximately 3.1 percent, or 7,183 ac-ft of the groundwater used in LRWPA in 2000. Within LRWPA, Jackson County accounts for approximately 25.3 percent, or 1,816 ac-ft of the region’s municipal groundwater usage; Lavaca County accounts for 42.8 percent, or 3,073 ac-ft; and Wharton County accounts for 31.9 percent, or 2,294 ac-ft. There are ten major municipal users scattered throughout LRWPA. The major municipal users in Jackson County are the Towns of Edna and Ganado and the County-Other category with approximately 44, 14, and 42 percent of the county’s municipal groundwater usage, respectively. Municipal users represent cities, communities, and water districts with a population over 500 as well as public water systems with an annual usage of 280 ac-ft/yr or approximately 250 million gallons per day (mgd), while County-Other represents cities, communities, or districts with a population less than 500, water systems with a usage of less than 280 ac-ft/yr, parks, campgrounds, and areas supplied by domestic wells. The major municipal users in Lavaca County are Hallettsville, Moulton, Shiner, Yoakum, and County-Other with approximately 19, 5, 16, 19, and 41 percent of the county’s municipal groundwater usage, respectively. The major municipal users in Wharton County are El Campo and County-Other with approximately 82 and 18 percent of the county’s municipal groundwater usage, respectively.

3.2.8 Agricultural Groundwater Usage

Data concerning groundwater pumpage in LWRPA within Wharton County were obtained from TWDB. A graph of pumpage from 1950 through 2003 for LWRPA within Wharton County is attached as *Figure 3-8*. Pumpage in Wharton County within LWRPA has averaged more than 80,000 ac-ft/yr since 1967. From 1984 through 2003, pumpage within the region averaged about 99,000 ac-ft/yr with the principal usage being the irrigation of rice. The pumpage for rice irrigation is distributed throughout the region within Wharton County. The location of the region boundary in Wharton County is shown in *Figure 3-2*. This figure also shows the eastern portion of Jackson County which immediately adjoins Wharton County to the southwest.

In 2000, groundwater pumped for agricultural practices, principally irrigation, accounted for approximately 96 percent or 200,134 ac-ft of the groundwater pumped in the Lavaca Region. Groundwater was pumped to irrigate approximately 59,653 ac in the region in 2000. Of those 59,653 ac, 2,785 were in Lavaca County, 23,803 were in Jackson County, and 33,065 were in Wharton County. In terms of the region's total agricultural groundwater pumpage, Jackson County accounted for about 42 percent; Lavaca County, 6 percent; and Wharton County, 52 percent of the groundwater pumped. Agricultural pumpage represents water that is used for livestock purposes and irrigation of crops. Groundwater used for irrigation represented approximately 99 percent of the groundwater pumped for agriculture in LRWPA. The main crop is rice with small acreages of cotton, grain, sorghum, soybeans, and corn which are all irrigated.

LRWPA's agricultural irrigated areas are scattered throughout Wharton and Jackson Counties and are concentrated in the southeastern part of Lavaca County. Groundwater pumpage accounted for about 89 percent of the water supplied for irrigated agriculture. The remainder of the water was provided by surface water from creeks and rivers. Surface water was used in combination with groundwater to irrigate some areas in southern and western Jackson County, and surface water from the Colorado River was used to irrigate about 1,500 acres in the northwestern part of Wharton County.

As noted in *Chapter 2* of this report, estimates of agricultural irrigation demand have been revised from values presented in the 2006 RWP. Projected agricultural irrigation demands for the 2010 through 2060 planning horizon are 59,801 ac-ft/yr for Jackson County, 8,357 ac-ft/yr for Lavaca County, and 149,688 ac-ft/yr for the portion of Wharton County within LRWPA.

3.3 Groundwater Availability Modeling for the Central Gulf Coast Aquifer

As part of the 2011 Regional Water Planning round, LRWPG opted to review estimates of groundwater availability in the Central Gulf Coast Aquifer based on a completed GAM model not available during the previous planning round. Since completion of the GAM for the Central Gulf Coast Aquifer, a number of model runs have been executed by TWDB on behalf of Groundwater Management Areas (GMAs), Groundwater Conservation Districts (GCDs), and Regional Water Planning Groups. After considering several recent alternative models to use as a base for developing availability, TWDB GAM Run 08-56 was selected as an option for representing conditions of the Gulf Coast Aquifer within GMA 15, which encompasses the LRWPA. Two GAM runs, referred to as GAM Run #1 and #2 in this chapter, were developed from this base to determine groundwater availability for LRWPA.

A complicating factor in determining groundwater availability for the Central Gulf Coast Aquifer is the absence of an established Desired Future Condition (DFC) for GMA 15. DFCs represent quantified goals for groundwater and may encompass water levels, quality, and other parameters. Establishment of DFCs is largely an outgrowth of Texas House Bill 1763, which among other measures regionalized the process of determining groundwater availability. GMA 15 is in the process of determining desired conditions for its aquifers but has not yet formally adopted DFCs for the Central Gulf Coast Aquifer.

In the event that DFCs are not available to serve as a limiting factor on groundwater withdrawals, TWDB's *General Guidelines for Regional Water Plan Development (2007-2011)* indicates the following:

"The Planning Groups may use other groundwater availability for a source if desired future conditions are not submitted to the TWDB by December 1, 2007 for that source. Calculate the largest annual amount of water that can be pumped from a given aquifer without violating the most restrictive physical, regulatory or policy conditions limiting withdrawals, under drought-of-record conditions. Regulatory conditions refer specifically to any limitations on pumping withdrawals imposed by groundwater conservation districts through their rules and permitting programs. If there are no permitting restrictions, groundwater withdrawals may also be limited by physical conditions."

The area included within the LRWPA is not currently subject to a permitting restriction that would limit groundwater withdrawal and, as such, groundwater availability must be determined through application of reasonable physical constraints. To determine availability, a target maximum drawdown level was established and pumpage amounts adjusted to maximize availability without exceeding the drawdown limit. The establishment of drawdown constraints for purposes of this RWP was based on results of the base GAM run and discussion with a GCD representative and will be discussed in greater detail in the following text.

3.3.1 Base GAM Run

TWDB GAM Run 08-56 was developed at the request of the Coastal Bend Groundwater Conservation District on behalf of GMA 15. The run was requested in June 2008, with the model run report released in March 2009. The run is a 60-year predictive simulation. The model included representation of four major geologic units, with model layers for the Chicot, Evangeline, and Jasper Aquifers and the Burkeville Confining Unit. The historic calibration-verification period for the model represented the time period from 1981 through 1999. The predictive period was from 2000 through 2060; this happens to coincide with the end of the planning horizon for the current round of regional water planning. Initial water levels for the predictive period were taken from the end of the historical calibration period. Average recharge, evapotranspiration rates, and initial streamflow from the historic calibration period were applied to each of the yearly timesteps during the predictive period.

Groundwater pumpage amounts for the run were specified by GMA 15. Groundwater withdrawals were predominantly from the Chicot, Evangeline, and Jasper Aquifers, with only minor withdrawal from the Burkeville confining unit. The amount of pumpage was assumed to be the same for each year of the predictive period. Pumpage distributions for the Chicot, Evangeline, and Jasper Aquifers are shown in *Figures 3-9*, *3-10*, and *3-11*, respectively. Examination of the three distributions shows proportionally greater withdrawals in the vicinity of municipal demand centers. Additionally, for the Chicot and Evangeline Aquifers, demand was represented as very high in (predominantly rice) irrigation demand centers within Wharton County. Based on this evidence, the pumpage distribution from the base run appears to reflect expected demand conditions.

GAM Run 08-56 was obtained from TWDB for use as a baseline model. Prior to making any modifications to the model, the run was executed as-is and compared against published results in the model run report to confirm that no changes had been made to the file subsequent to publication of results. Resultant drawdown values indicate consistent results between the model provided and published results for Model Run 08-56. Groundwater pumpage for the LRWPA from the run is given in *Table 3-1*, with drawdowns for Year 2060 conditions given in *Table 3-2*. Graphical representation of drawdown contours for the three major aquifers is given in *Figures 3-12, 3-13, and 3-14*. It is important to note that while the base run pumpage rates for Jackson and Lavaca counties are higher than the projected Year 2060 demand presented in *Chapter 2*, projected Year 2060 demands for LRWPA-Wharton are 157 percent of the pumpage in the base run.

Table 3-1
LRWPA County Pumpage for TWDB GAM Run 08-56

County	Pumpage by Aquifer (acre-feet per year)				
	Chicot	Evangeline	Burkeville	Jasper	Total
Jackson	54,680	20,320	0	0	75,000
Lavaca	3,036	12,400	149	4,600	20,185
Wharton*	57,682	39,594	0	0	97,276

*Pumpage values given only include the portion of Wharton County in LRWPA as determined from the GAM .wel file.

Table 3-2
LRWPA County Average Year 2060
Drawdown for TWDB GAM Run 08-56

County	Drawdown by Aquifer (feet)			
	Chicot	Evangeline	Average	Jasper
Jackson	-12.5	-15.6	*-14.1*	-19.1
Lavaca	-4.7	-5.1	*-4.9*	-28.6
Wharton*	-11.7	-3.8	*-7.8*	-21.1

*Average drawdown is for all of Wharton County

3.3.2 GAM Run #1

As noted earlier, GAM Run #1 was developed from the base run in order to determine groundwater availability for the portion of the Central Gulf Coast Aquifer underlying the LRWPA. The assumptions used in the base run were retained, including parameters for the historical calibration period and application of average recharge, evapotranspiration, and initial streamflow for each timestep of the predictive simulation. The predictive period was kept at 2000 through 2060, as this coincided with the planning horizon.

The only modification made to the base run was alteration of pumpage volume on a per-county basis for Jackson, Lavaca, and Wharton Counties; for all other Counties in the model, no modifications were made to groundwater withdrawals. Total pumpage for each county was adjusted to match the Year 2060 demand as presented in *Chapter 2* of this RWP. Because Wharton County is split between the LRWPA and Region K, the groundwater demand in the Region K portion of the county stayed the same while demand in the LRWPA portion was increased. As with Base Run 08-56, the same pumpage volume was applied for each year of the predictive period. Annual groundwater withdrawals for each aquifer are shown by county in *Table 3-3*. While total annual pumpage amounts were revised, the pumpage distribution pattern for each aquifer from the base run was retained and simply scaled up or down based on total demand. As noted earlier, the pumpage distribution patterns resembled expected conditions and thus there was no clear need to revise the locations of greatest groundwater demand.

Table 3-3
LRWPA County Pumpage for GAM Run #1

County	Pumpage by Aquifer (acre-feet per year)				
	Chicot	Evangeline	Burkeville	Jasper	Total
Jackson	46,318	17,213	0	0	63,531
Lavaca	2,038	8,328	100	3,088	13,550
Wharton*	90,590	62,183	0	0	152,773

*Pumpage values given only include the portion of Wharton County in LRWPA as determined from the GAM .wel file.

Average Year 2060 drawdown by county for each aquifer within LRWPA is shown in *Table 3-4*, with drawdown contours for the three aquifers shown in *Figures 3-15, 3-16,* and *3-17*. As can be seen from the table and figures, drawdown is substantially greater for all three aquifers in comparison to GAM Run 08-56. There is a clear trend toward development of a pronounced drawdown cone focused on the agricultural irrigation center in the LRWPA portion of Wharton County. The impacts of this extend outside of Wharton County and into Jackson and Lavaca Counties; this contrast is particularly noticeable for the Evangeline Aquifer. The effects of increased pumpage within LRWPA-Wharton County can also be seen in the *Average* column in *Table 3-4*. Although pumpage for Jackson and Lavaca Counties was reduced for GAM Run #1, average drawdown in these counties is substantially greater than for the base run, indicating that this drawdown is caused by the increased pumpage from LRWPA-Wharton.

Table 3-4
LRWPA County Average Year 2060
Drawdown for GAM Run #1

County	Drawdown by Aquifer (feet)			
	Chicot	Evangeline	Average	Jasper
Jackson	-20.2	-28.1	*-24.1*	-20.9
Lavaca	-9.3	-7.3	*-8.3*	-19.8
Wharton*	-28.5	-30.1	*-29.3*	-25.8

*Average drawdown is for all of Wharton County

After an initial assessment of model output, the GAM Run #1 results were presented in a meeting attended by the LRWPG consultant as well as a CBGCD representative. A discussion of the modified GAM run and earlier GAM runs performed on behalf of GAM 15 indicated that the drawdowns predicted for Year 2060 exceed the expectations of the GMA for a reasonable amount of drawdown. Due to the lack of an established DFC for GMA 15, there is no set value available to limit maximum drawdown. Based on prior efforts on the part of CBGCD and GMA 15, CBGCD recommended an average drawdown of 10ft for the Chicot and Evangeline Aquifers and 20 ft for the Jasper Aquifer. These are intended to be general guidelines and are subject to change by the time of DFC adoption for GMA 15.

3.3.3 GAM Run #2

As indicated by GAM Run #1, groundwater pumpage for LRWPA-Wharton County cannot satisfy all of the projected Year 2060 demands without creating excessive drawdown. As such, a second GAM run was necessary to establish availability with a reduced pumpage amount within LRWPA-Wharton. Because of the large total water demand in western Wharton County and increased agricultural demands in LRWPA-Wharton compared to the 2006 RWP (largely attributable to greater projected rice acreage in that area), it was deemed reasonable to model a pumpage rate for LRWPA Wharton larger than that in the base run but smaller than in GAM Run #1. For GAM Run #2, groundwater demand in LRWPA-Wharton County was set to 110,000 acre-feet per year, while for Jackson and Lavaca Counties the pumpage volumes from GAM Run #1 were retained (See *Table 3-5*). The historical calibration and 60-year predictive periods were not altered, nor were assumptions for recharge, evapotranspiration, or spatial distribution of pumpage. Average Year 2060 drawdown by county for each aquifer within LRWPA is shown in *Table 3-6*, with drawdown contours for the three aquifers shown in *Figure 3-18, 3-19, and 3-20*.

Table 3-5
LRWPA County Pumpage for GAM Run #2

County	Pumpage by Aquifer (acre-feet per year)				
	Chicot	Evangeline	Burkeville	Jasper	Total
Jackson	46,318	17,213	0	0	63,531
Lavaca	2,038	8,328	100	3,088	13,550
Wharton*	65,227	44,773	0	0	110,000

*Pumpage values given only include the portion of Wharton County in LRWPA as determined from the GAM .wel file.

Table 3-6
LRWPA County Average Year 2060
Drawdown for GAM Run #2

County	Drawdown by Aquifer (feet)			
	Chicot	Evangeline	Average	Jasper
Jackson	-11.8	-14.4	*-13.1*	-17.8
Lavaca	-4.3	-3.7	*-4.0*	-18.9
Wharton*	-14.5	-8.5	*-11.5*	-21.9

*Average drawdown is for all of Wharton County

As shown in *Table 3-6*, reduction in demands for LRWPA-Wharton resulted in reduced drawdowns compared to GAM Run #1 not only in Wharton County but also within Jackson and Lavaca Counties. For Jackson and Lavaca Counties, drawdowns are lower than those in the base run as well. Subsequent discussion with CBGCD indicated that the drawdowns shown in *Table 3-6* above appeared more reasonable than GAM Run #1 and that the Run #2 availability for Wharton County (187,724 acre-feet per year for the entire county) was reasonable given its similarity to availability from the 2006 RWPs for LRWPA and Region K.

3.3.4 Other Groundwater Models

A number of GAM runs have been executed for the Central Gulf Coast Aquifer, including TWDB GAM Run 08-56 as discussed above. In addition to the TWDB GAMs, an independent groundwater model focused on groundwater for agriculture was initiated as part of the LCRA-SAWS Water Project. While a report detailing model development and calibration was released in October 2007, no subsequent report detailing results of model execution has been released. As such, LRWPG will continue to rely primarily on the efforts of GMA 15 and its member GCDs for guidance in GAM development.

3.3.5 Groundwater Availability Estimate

Results of the above GAM Model Runs were presented to the LRWPG during the Group's regular meeting on June 22, 2009. CBGCD also provided information on ongoing efforts by GMA 15 to develop a DFC and managed available groundwater (MAG) for the Central Gulf Coast Aquifer. Additional discussion was focused on groundwater availability estimates for Region K, which includes the eastern portion of Wharton County. Based on CBGCD guidance, the LRWPG elected to retain groundwater availability values from the 2006 RWP to maintain consistency with Region K and to avoid potential conflicts with the ongoing development of a DFC and MAG for the Central Gulf Coast Aquifer.

3.4 Identification of Surface Water Sources

LRWPA is located in the Lavaca, Colorado-Lavaca Coastal, and Lavaca-Guadalupe Coastal River Basins. Approximately 90 percent of LRWPA is located in the Lavaca River Basin. A portion of the surface water supply is obtained from ROR water out of the Lavaca and Navidad Rivers. These are the two main rivers in LRWPA. The remaining surface water is obtained from Lake Texana, the only reservoir in the region. Please refer to *Figure 1-2* for the location of major surface water sources.

3.4.1 Available Surface Water

Surface water availability was estimated for the 2006 RWP using the TCEQ WAM for the river basins within LRWPA. The WAMs use the Water Rights Analysis Package (WRAP), developed at Texas A&M University, to simulate diversions under current and future conditions using historical rainfall and evaporation data. (The model does not increase diversion amounts over time, as will actually occur. Instead, the model simulates one set of monthly diversion targets attempted annually against a historical inflow dataset, which is typically 50 years long and varies each year.) DOR for most of Texas occurred in the 1950s and is reflected in the historical dataset for each basin. Water diversions are modeled according to the parameters of each particular water right and taken in priority order, so that the most senior water rights are satisfied before junior rights are allowed to divert water. Output files are compared by reviewing the statistical frequency of meeting diversion amounts or target instream flow levels. The reliable yield of a water right is the least amount of water diverted among all of the calendar years modeled. For reservoirs, an additional step is required to determine firm yield. Water stored in reservoirs allows diversions to continue during periods of drought; however, diverting at high rates rapidly depletes storage. To find the optimal target for a reservoir, an iterative process is used, modeling the permit first at its full-authorized diversion, and then at reduced target diversions until a yield is identified that is met throughout the simulation period.

There were originally eight WAM scenarios (referred to as model runs) simulated under the TCEQ program. The Guidelines for Regional Water Planning require the use of WAM Run 3, the full-authorized diversion of current water rights with no return flows, when determining the supply available to the region. This is a very conservative approach, since diversions for municipal and manufacturing use typically return up to 60 percent of that water to streams as treated wastewater effluent. However, the majority of water rights do not address return flows to source streams, implying a right to full consumptive use.

ROR water from the Lavaca and Navidad Rivers is used primarily for irrigation purposes. No surface water is currently being used within the region for municipal purposes, and only a small amount is used for industrial purposes. *Table 3-7* shows the permitted diversions within LRWPA. However, none of these permitted diversion rights in LRWPA are firm under DOR conditions. Individual water right appropriations of rivers and creeks in LRWPA were included in *Table 7A* in *Appendix 7A* in the 2006 RWP.

Table 3-7
Permitted Diversions from LRWPA Rivers and Streams

Stream	Permitted Authorization (ac-ft/yr)
Lavaca River	4,547.5
Navidad River	2,050.0
West Mustang	3,155.0
East Mustang	3,313.0
Sandy Creek	3,023.0
Pinoak Creek	5,007.0
Goldenrod Creek	2,950.0
Sutherland Branch	400.0
Arenosa Creek	10.0
Rocky Creek	33.0
Stage Stand Creek	640.0
Lunis Creek	100.0
Porters Creek	3,306.0
Total	**33,534.5**

Lake Texana is the only reservoir in LRWPA. It was developed as part of the Palmetto Bend Reclamation Project in 1968. Lake Texana has a firm yield of 79,000 ac-ft. Of this amount, 4,500 ac-ft of water is reserved for required releases for the bays and estuaries.

3.4.2 Previously Studied Potential Reservoir Sites

Water demand projections show that communities and entities within LRWPA do not need additional surface water supplies. However, there are communities and entities outside of the Lavaca Region that are experiencing supply needs that potentially can be satisfied by the development of the Palmetto Bend Reservoir. To that end, LRWPG has designated the Palmetto Bend Stage II reservoir site as a unique reservoir site.

3.5 Wholesale Water Providers

The only WWP in the LRWPA is the LNRA, who holds rights to the firm yield of Lake Texana. Approximately 42,000 ac-ft of this water is contracted for municipal use to Corpus Christi and its surrounding service area. Another 32,500 ac-ft is contracted for industrial use to Formosa Plastic Corporation, Inteplast Corporation, Central Power and Light Company, and Calhoun County Navigational District. The Inteplast Corporation contract is the only use of water from Lake Texana that is used within LRWPA. This contract is for 1,832 ac-ft/yr and is assigned to the Colorado-Lavaca Basin of Jackson County for manufacturing use. This contract exceeds the year 2000 manufacturing water use within the basin of 558 ac-ft. In addition to the existing supplies from Lake Texana, LNRA is currently studying the development of water supplies to meet an additional 10,000 ac-ft/yr of demand for an existing LNRA industrial customer located in Region L. This demand is located outside of the LRWPA and thus there is no change in manufacturing water demand for LRWPA associated with this increase.

A volume of water equal to 4,500 ac-ft is set aside from the firm yield of Lake Texana for environmental flows. Additionally, LNRA releases water from the reservoir to meet pass through requirements as set forth in an agreement with TPWD. This agreement stipulates freshwater release rates for bay and estuary inflows that are based on historical mean and median streamflows in the Lavaca Basin.

In addition to the firm yield rights listed above, LNRA has a total of 12,000 ac-ft/yr of interruptible water supply from Lake Texana. The majority of this supply is contracted to the City of Corpus Christi. Although this amount is not reliable in DOR conditions, these supplies are available for typical conditions.

3.6 Inter-Regional Coordination

The LRWPG is aware that water demands in neighboring Regions have caused a demand for water within LRWPA sooner than initially expected. As such, coordination with neighboring regional water planning groups is essential to maintaining consistency among the different regions and insuring that supplies and management strategies are properly developed. To this end, an inter-regional meeting was held on April 8, 2009 attended by representatives of LRWPG, Region L (South Central Texas Region), and Region N (Coastal Bend Region). A number of topics relevant to the three regions were discussed, including potential and projected water needs in the regions and projects for meeting demands. Based on the content of the meeting, implementation of water management strategies currently planned for Regions L and N are not expected to impact supplies in the LRWPA.

3.7 Water Supply Allocations

Water supply allocations by WUG, county, and basin are shown in *Appendix 3A*. In Jackson County, the only WUG with a shortage is irrigation within the Colorado-Lavaca Basin; this shortage of 5,054 ac-ft/yr remains constant across the planning horizon. While total Jackson County groundwater availability exceeds the total county groundwater demand, the portion of groundwater available within the Colorado-Lavaca Basin is inadequate to meet demands within this subarea of the county. No shortages are projected for Lavaca County. For LRWPA-Wharton, shortages are projected for irrigation in the Colorado-Lavaca (1,490 ac-ft/yr shortage) and Lavaca (61,197 ac-ft/yr shortage) Basins. These projected shortages remain constant across the planning horizon.

FIGURES

Figure 3-3
Static Water Levels in West Wharton County

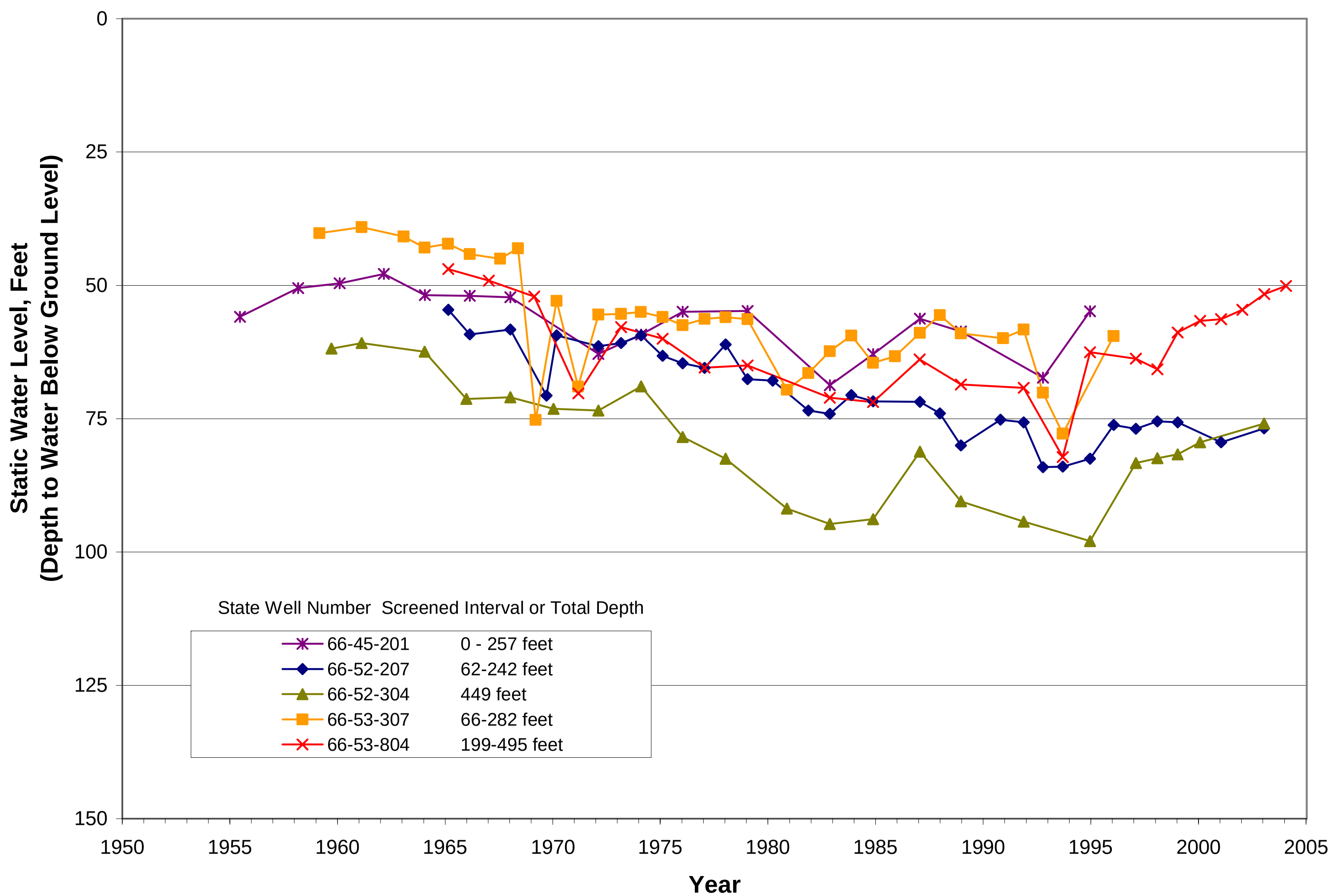


Figure 3-4
Static Water Levels in Central Wharton County

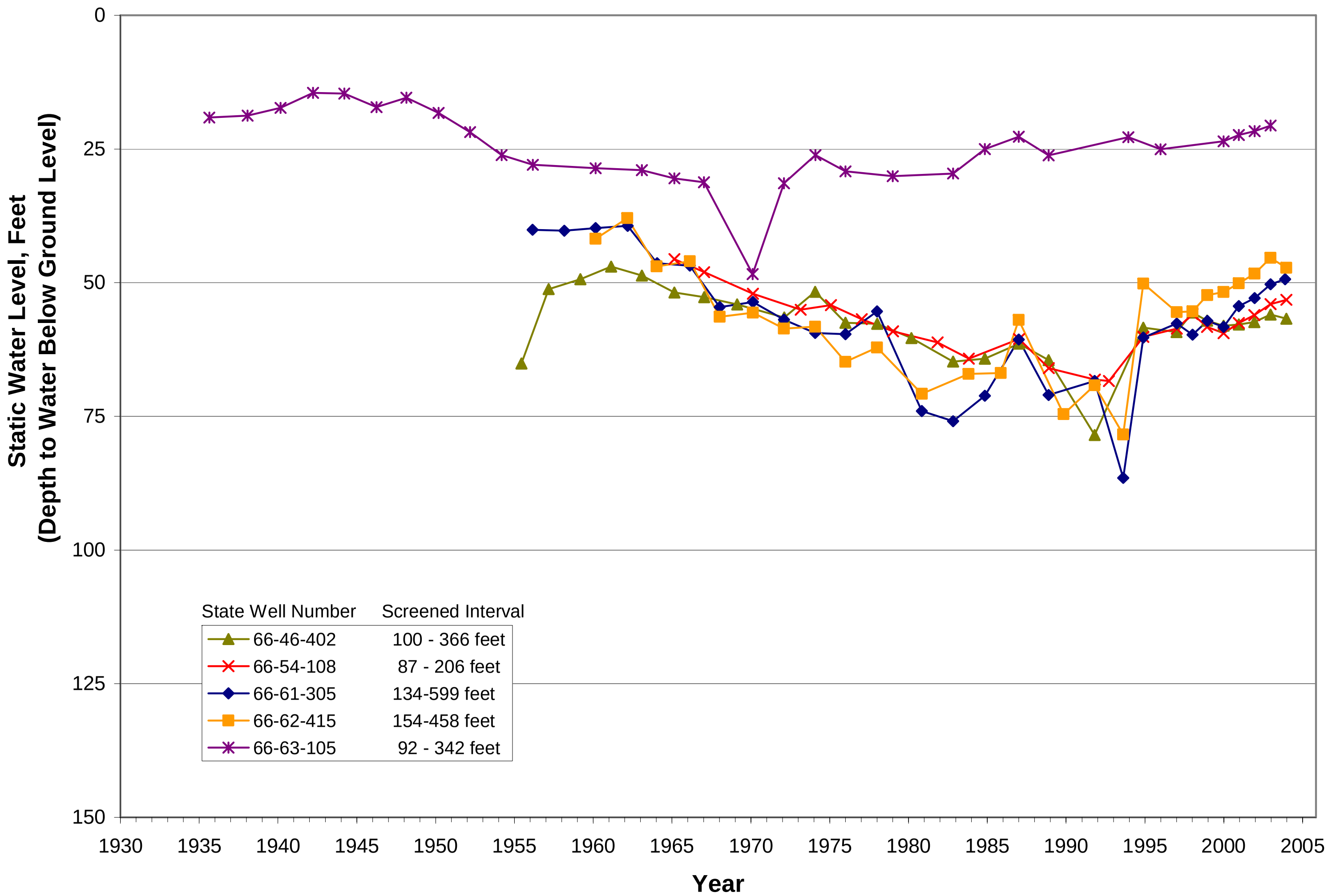


Figure 3-5
Static Water Levels in Wells in East Wharton County

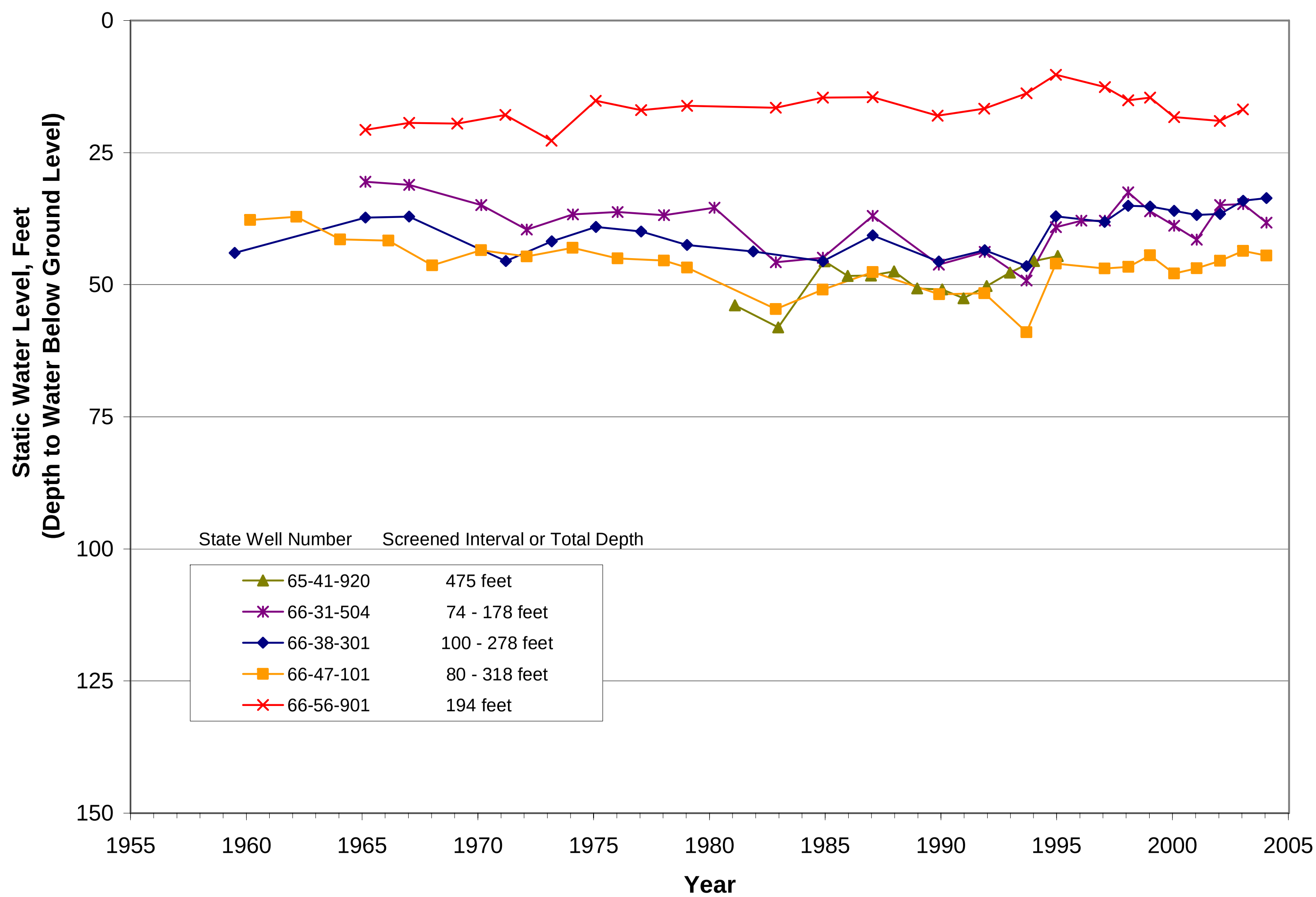


Figure 3-6
Static Water Levels in Wells in East Jackson County

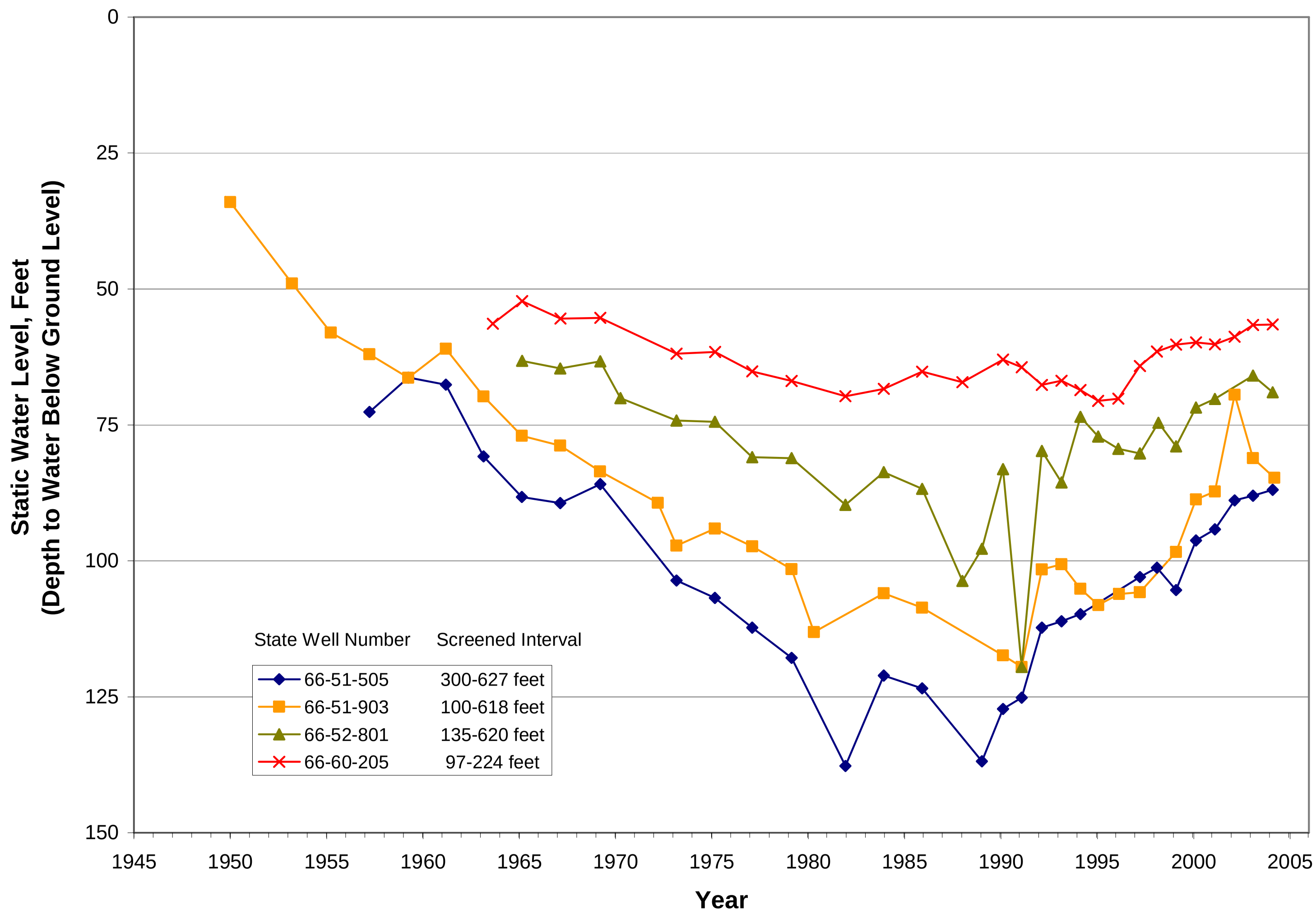


Figure 3-7
Static Water Levels in Wells in Lavaca County

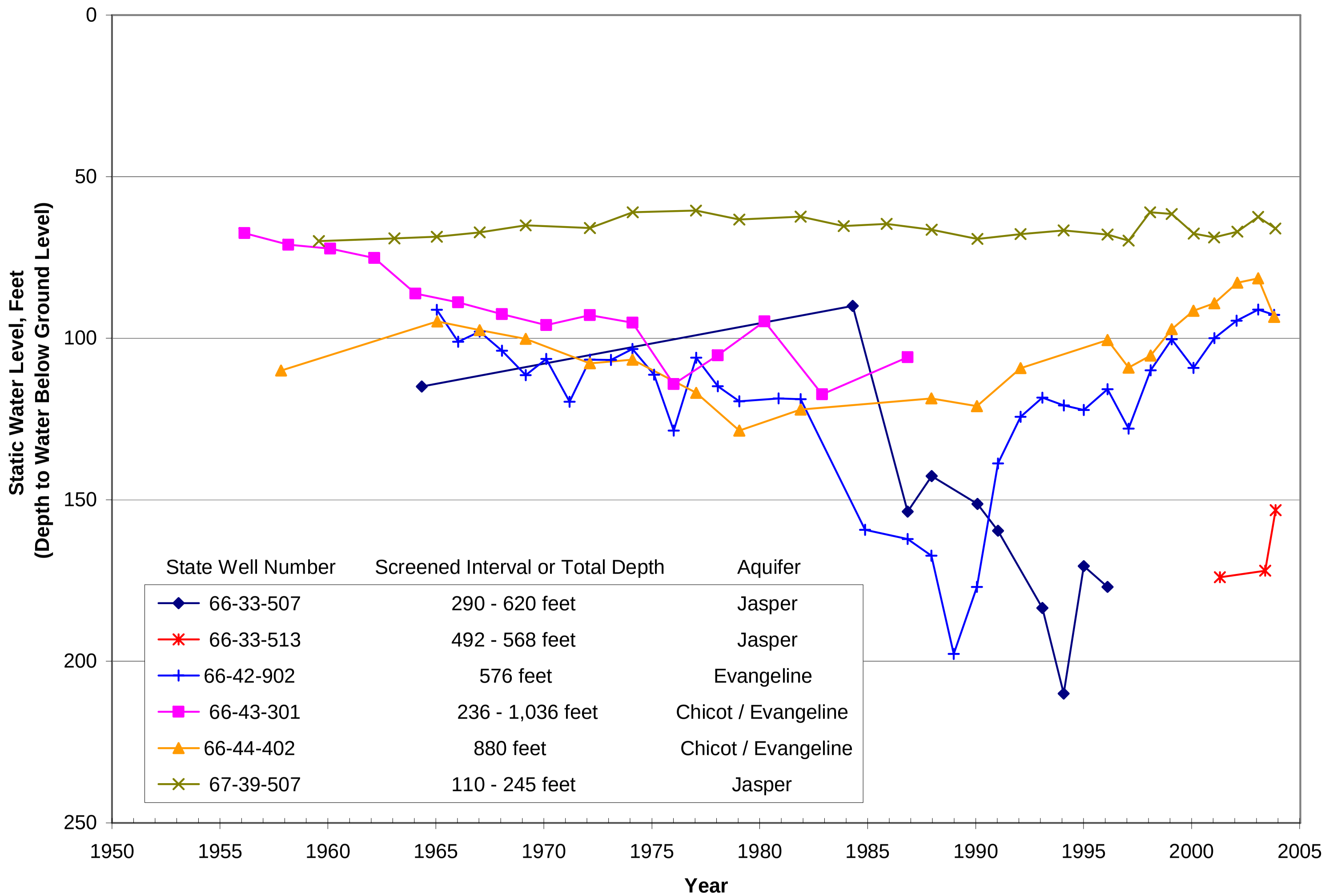


Figure 3-8
Estimated Pumpage in Wharton County Within the Lavaca Regional Water Planning Area

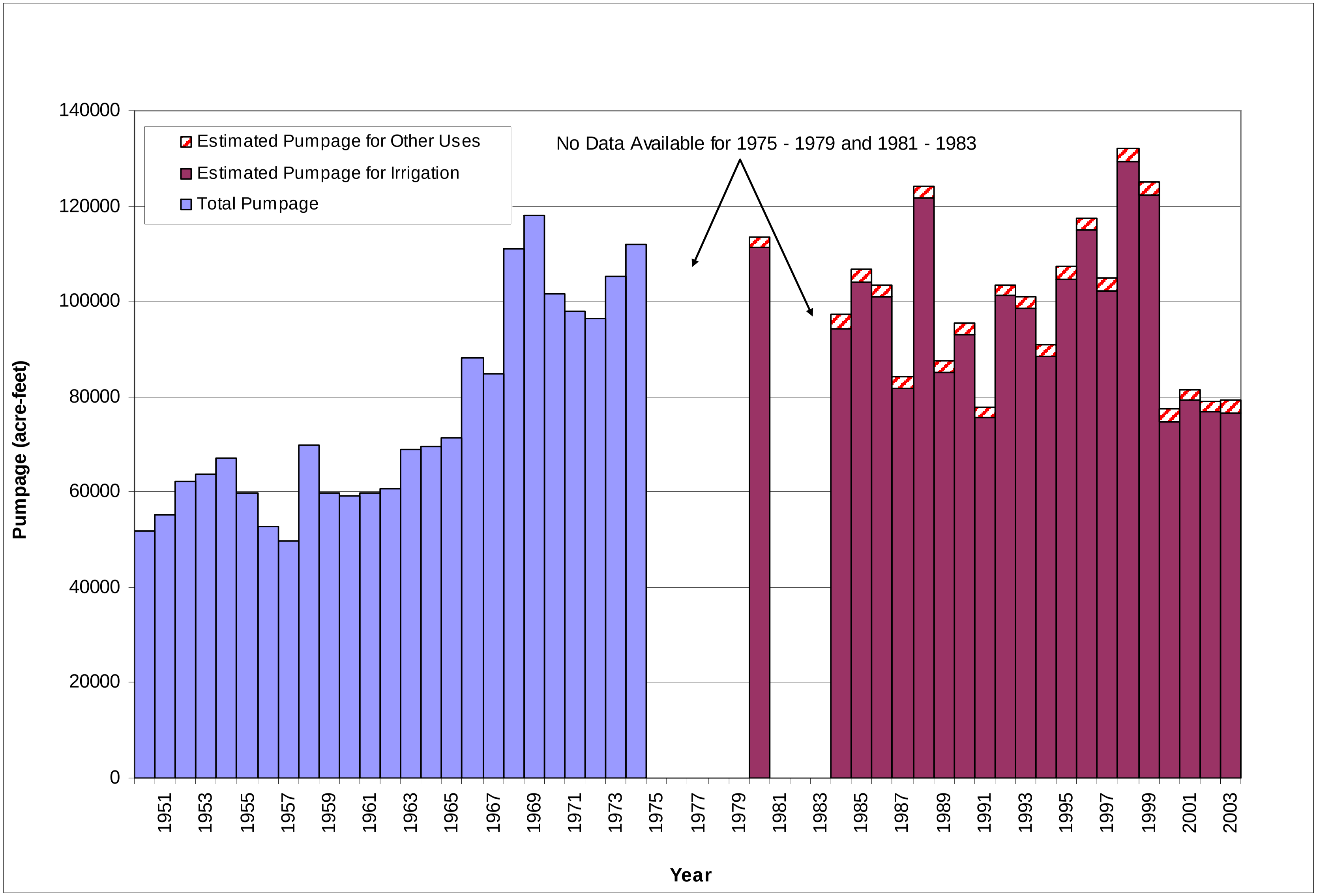
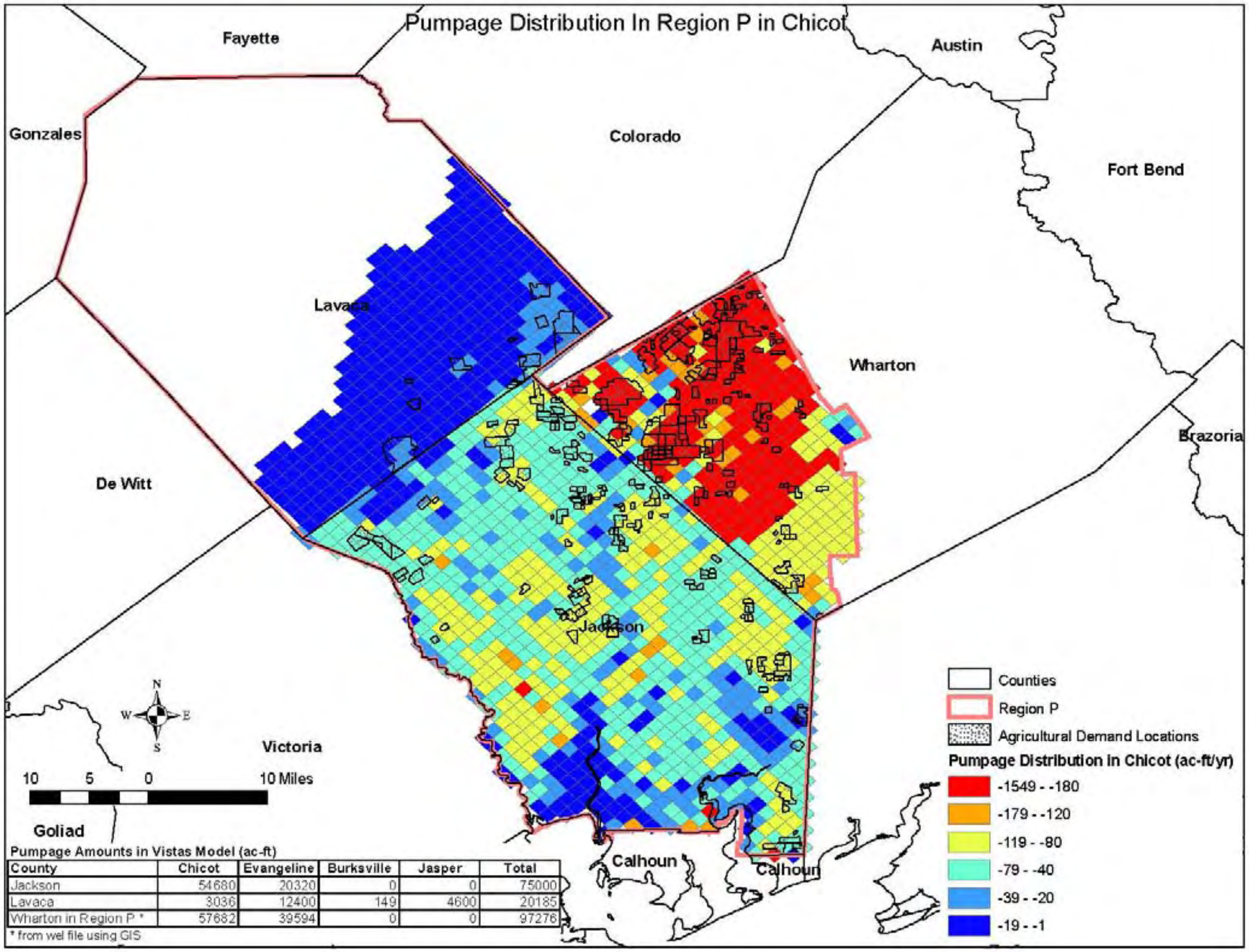


Figure 3-9
TWDB GAM RUN 08-56 Pumpage Distribution for the Chicot Aquifer

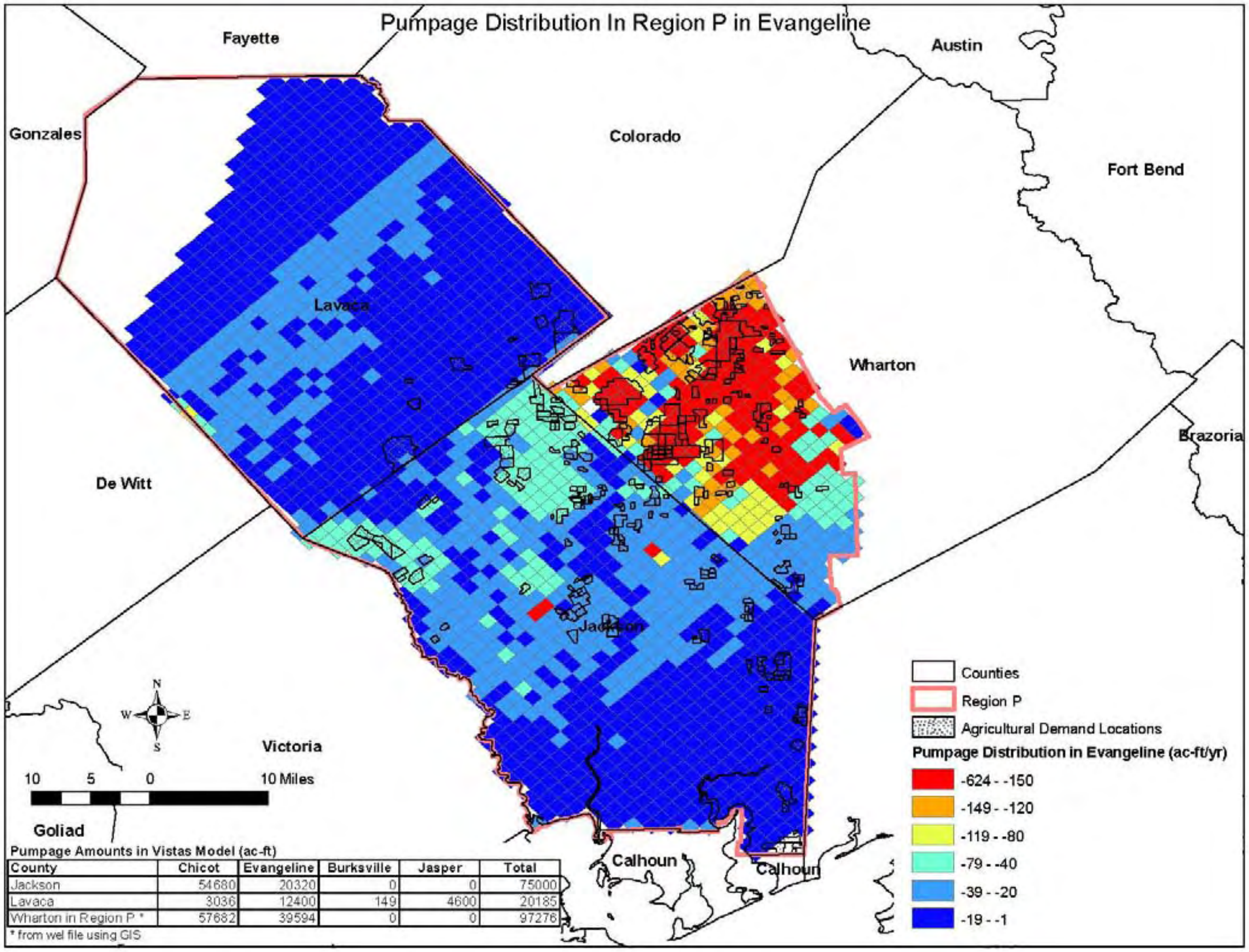


Pumpage Amounts in Vistas Model (ac-ft)

County	Chicot	Evangeline	Burksville	Jasper	Total
Jackson	54680	20320	0	0	75000
Lavaca	3036	12400	149	4600	20185
Wharton in Region P *	57682	39594	0	0	97276

* from wel file using GIS

Figure 3-10
TWDB GAM RUN 08-56 Pumpage Distribution for the Evangeline Aquifer

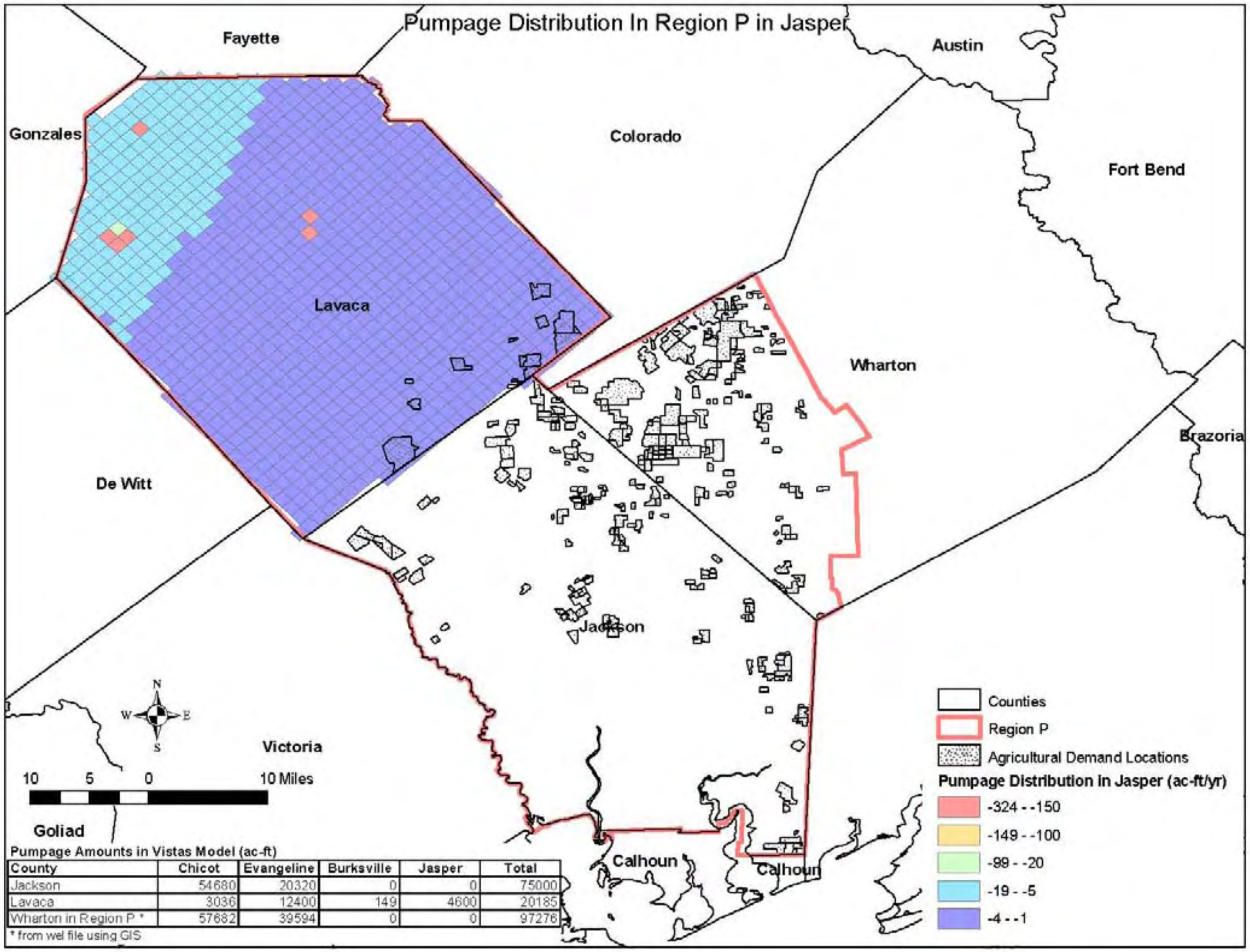


Pumpage Amounts in Vistas Model (ac-ft)

County	Chicot	Evangeline	Burksville	Jasper	Total
Jackson	54680	20320	0	0	75000
Lavaca	3036	12400	149	4600	20185
Wharton in Region P *	57682	39594	0	0	97276

* from wel file using GIS

Figure 3-11
TWDB GAM RUN 08-56 Pumpage Distribution for the Jasper Aquifer



Pumpage Amounts in Vistas Model (ac-ft)

County	Chicot	Evangeline	Burksville	Jasper	Total
Jackson	54680	20320	0	0	75000
Lavaca	3036	12400	149	4600	20185
Wharton in Region P *	57682	39594	0	0	97276

* from wel file using GIS

Figure 3-12
TWDB GAM RUN 08-56 Drawdown Contours for the Chicot Aquifer

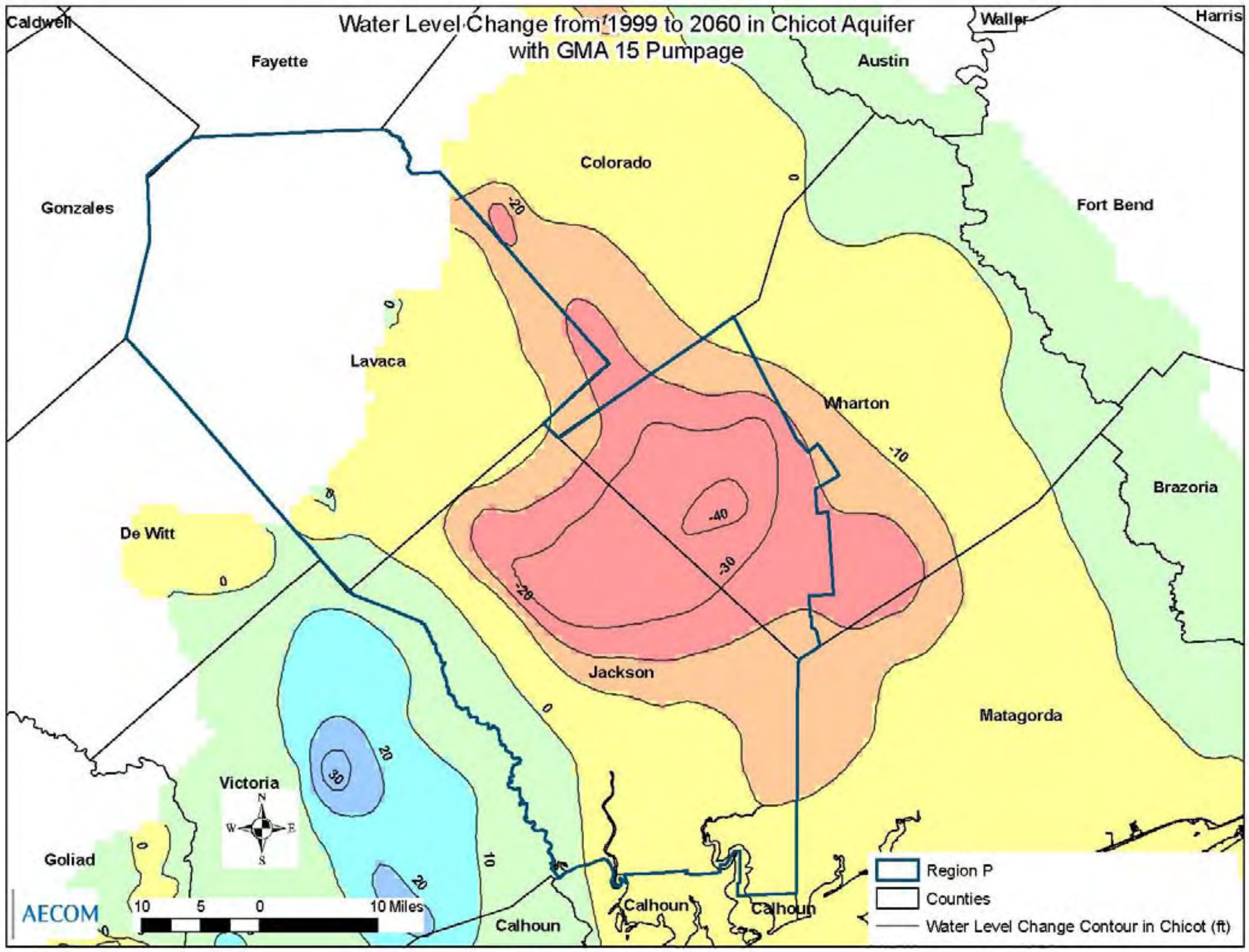


Figure 3-13
TWDB GAM RUN 08-56 Drawdown Contours for the Evangeline Aquifer

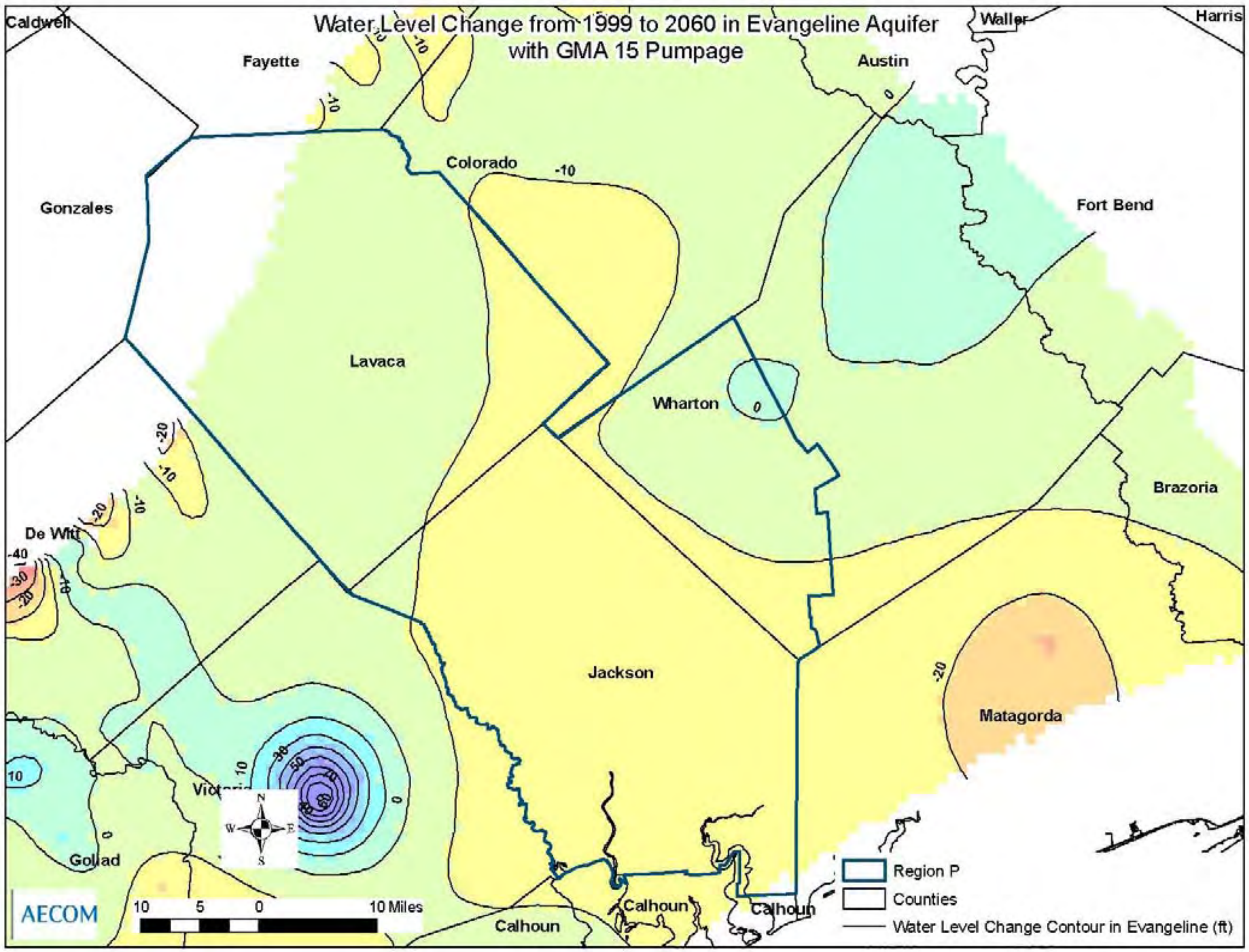


Figure 3-14
TWDB GAM RUN 08-56 Drawdown Contours for the Jasper Aquifer

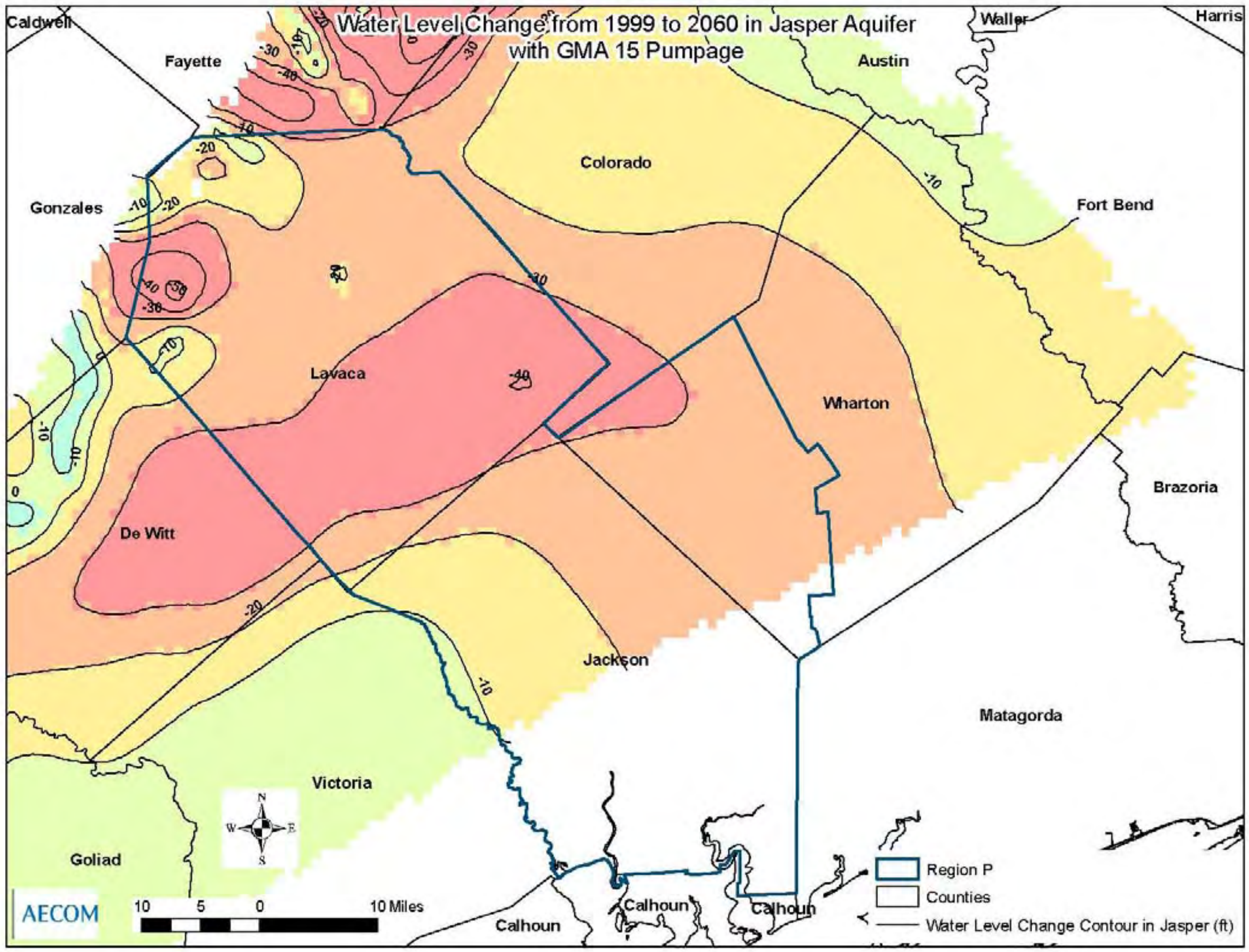


Figure 3-15
GAM Run #1 Drawdown Contours for the Chicot Aquifer

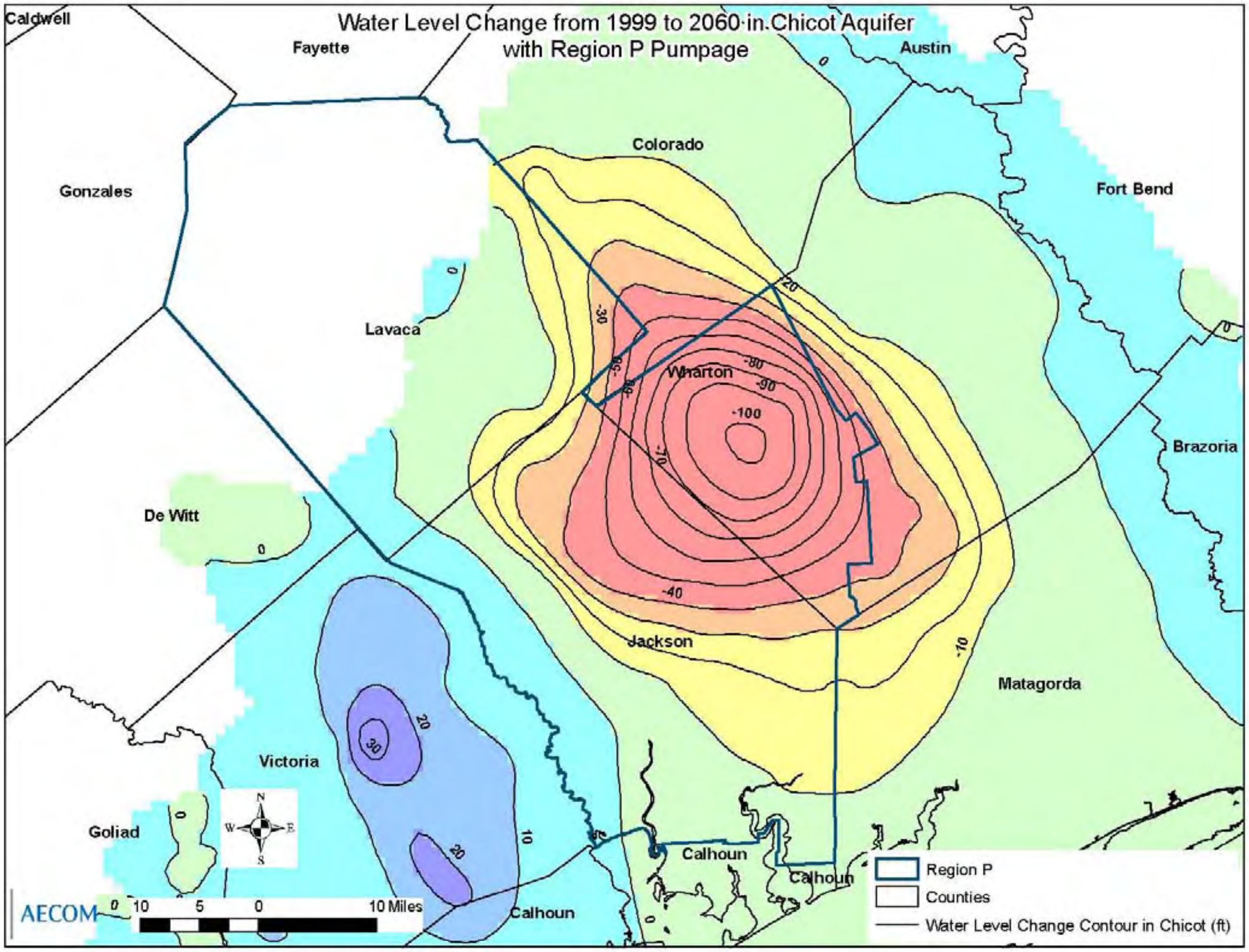


Figure 3-16
GAM Run #1 Drawdown Contours for the Evangeline Aquifer

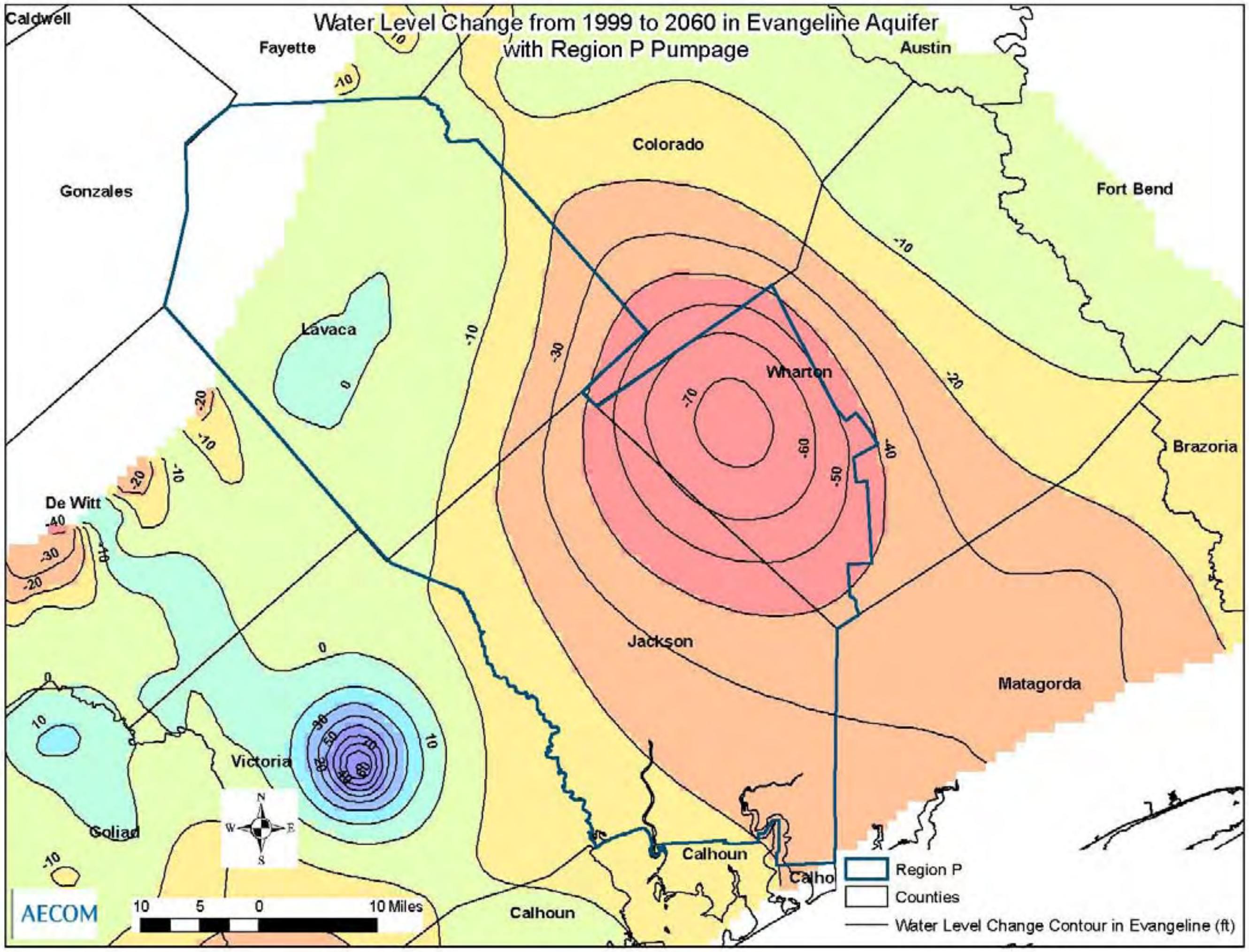


Figure 3-17
GAM Run #1 Drawdown Contours for the Jasper Aquifer

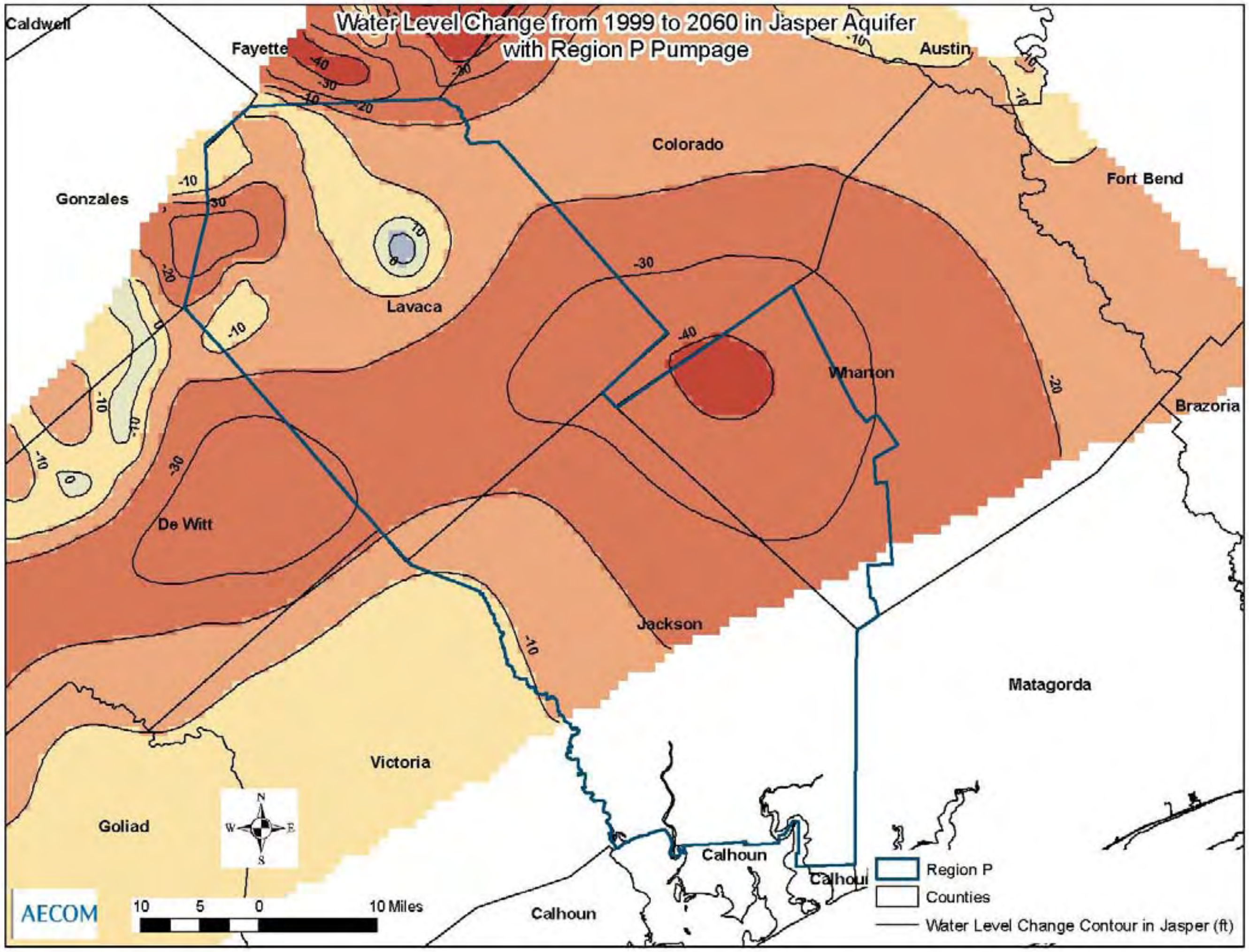


Figure 3-18
GAM Run #2 Drawdown Contours for the Chicot Aquifer

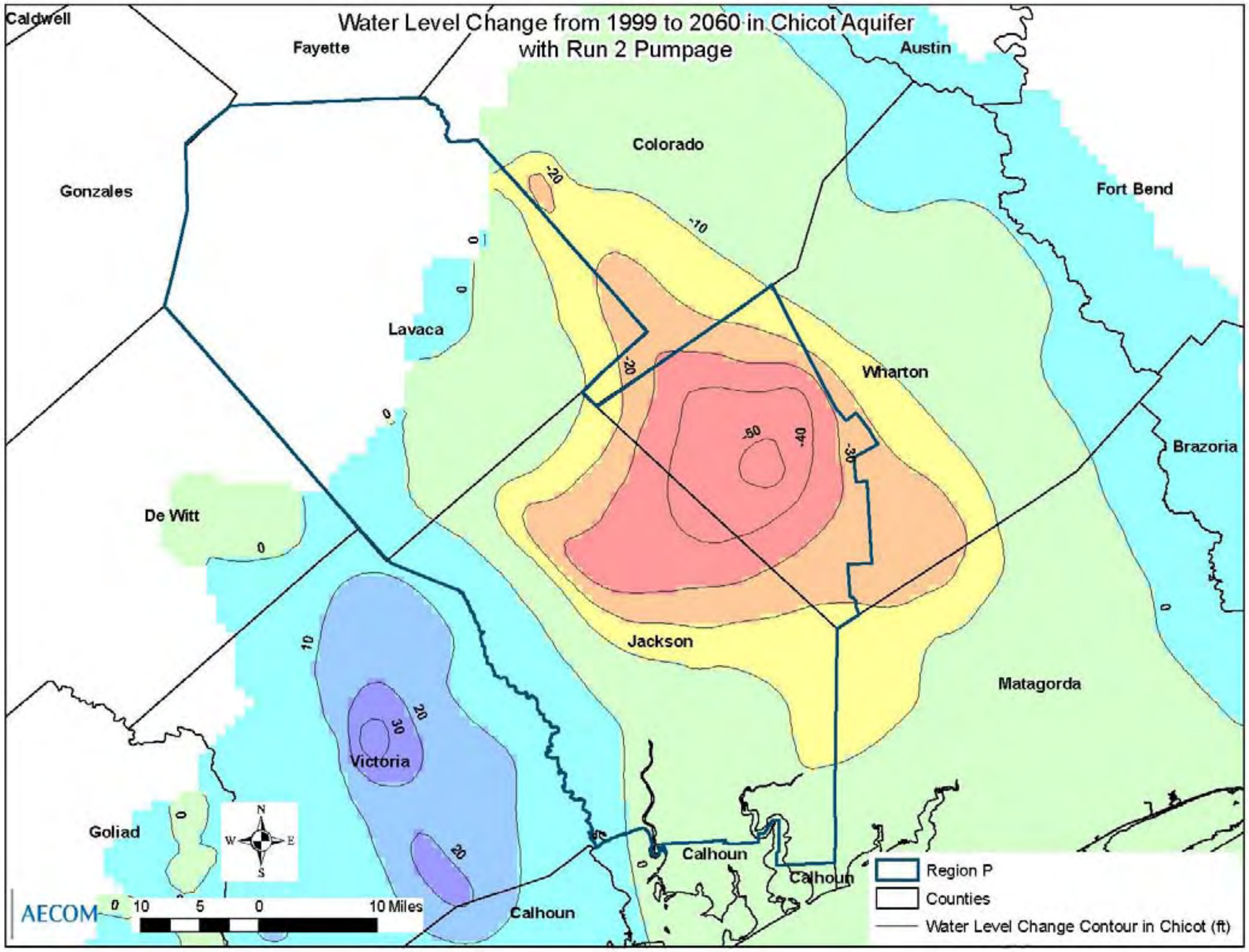


Figure 3-19
GAM Run #2 Drawdown Contours for the Evangeline Aquifer

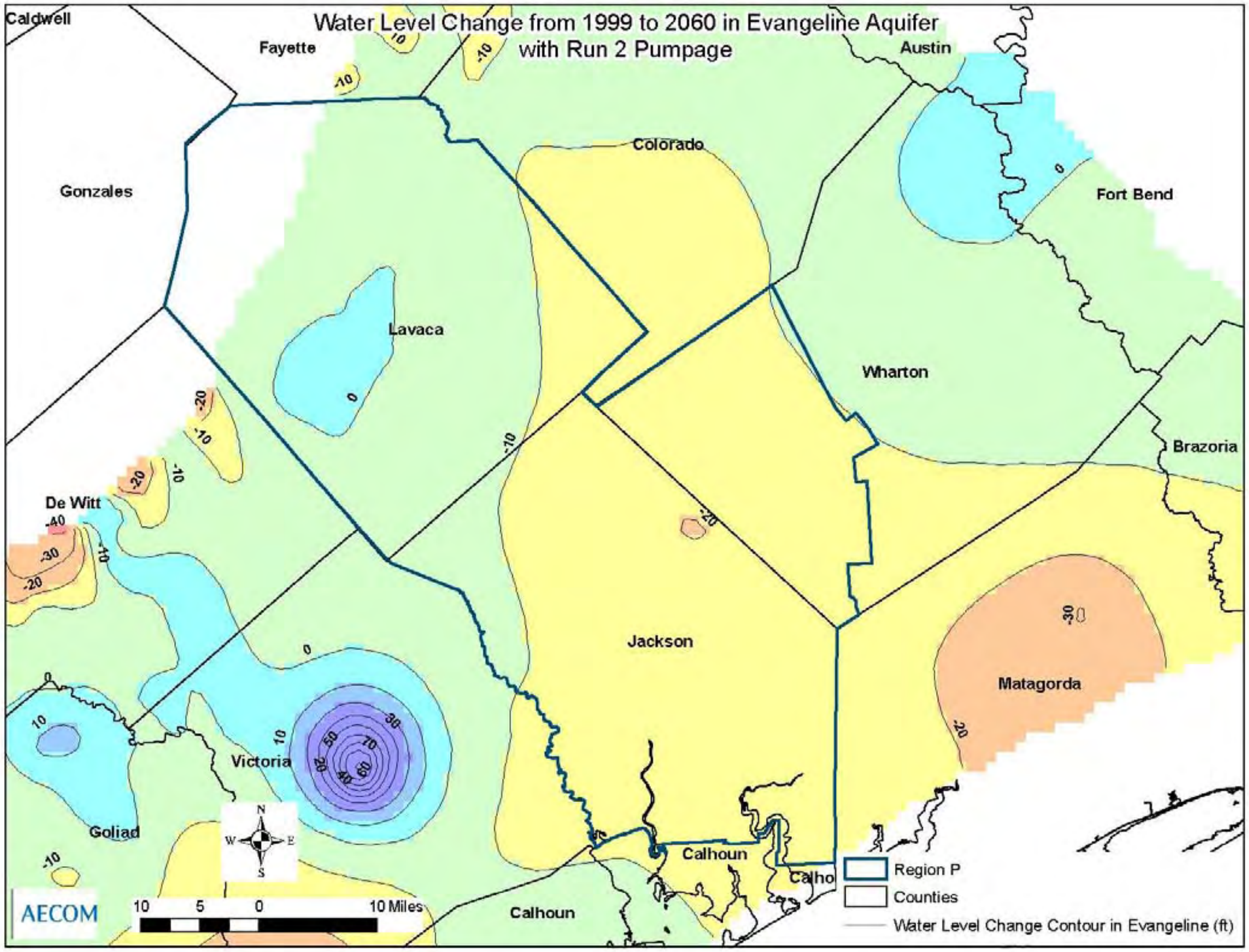
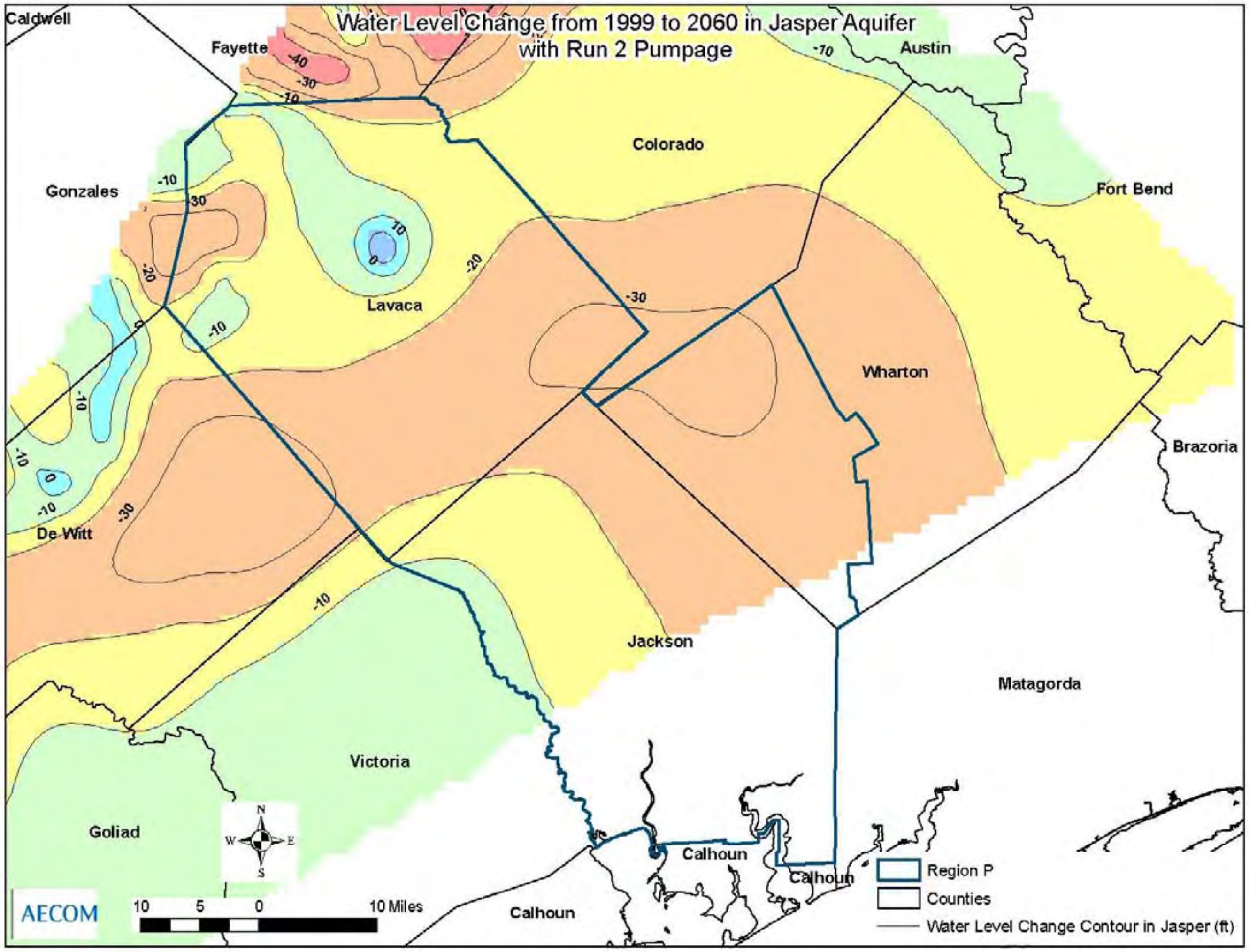


Figure 3-20
GAM Run #2 Drawdown Contours for the Jasper Aquifer



Appendix 3A

Water Supplies

Table 3A-1 - Current Water Supply Sources Available to the Lavaca Region

Ground Water Source	Type	RWPG	County	Basin	Source Id.	2010	2020	2030	2040	2050	2060	
GULF COAST AQUIFER	01	P	JACKSON	COLORADO-LAVACA	12015	17,618	17,618	17,618	17,618	17,618	17,618	
GULF COAST AQUIFER	01	P	JACKSON	LAVACA	12015	51,395	51,395	51,395	51,395	51,395	51,395	
GULF COAST AQUIFER	01	P	JACKSON	LAVACA-GUADALUPE	12015	18,863	18,863	18,863	18,863	18,863	18,863	
Jackson County Total						87,876	87,876	87,876	87,876	87,876	87,876	
GULF COAST AQUIFER	01	P	LAVACA	LAVACA	14315	38,025	38,025	38,025	38,025	38,025	38,025	
GULF COAST AQUIFER	01	P	LAVACA	LAVACA-GUADALUPE	14315	52	52	52	52	52	52	
GULF COAST AQUIFER	01	P	LAVACA	GUADALUPE	14315	46	46	46	46	46	46	
Lavaca County Total						38,123	38,123	38,123	38,123	38,123	38,123	
GULF COAST AQUIFER	01	P	WHARTON	COLORADO-LAVACA	24115	21,949	21,949	21,949	21,949	21,949	21,949	
GULF COAST AQUIFER	01	P	WHARTON	LAVACA	24115	67,904	67,904	67,904	67,904	67,904	67,904	
Wharton County Total						89,853	89,853	89,853	89,853	89,853	89,853	
GULF COAST AQUIFER	01	K	WHARTON	COLORADO	24115	290	290	290	290	290	290	[1]
Regional Total						216,142	216,142	216,142	216,142	216,142	216,142	

Surface Water Source	Type	RWPG	County No.	Basin No.	Source Id.	2010	2020	2030	2040	2050	2060	
Lake Texana	00	P	RESERVOIR	LAVACA	16010	74,500	74,500	74,500	74,500	74,500	74,500	[2]
Regional Total						74,500	74,500	74,500	74,500	74,500	74,500	

[1] A portion of the Gulf Coast Aquifer in Wharton County is a supply for Region K .

[2] The total yield of Lake Texana is 79,000 ac-ft, and 4,500 ac-ft is designated for environmental flows.

Table 3A-2 - Current Water Supplies Available to the Lavaca Regional Water Planning Area by City and Category

WUG Name	WUG No.	RWPG User	City No.	County	Basin	Type of Source	Alpha Provider	RWPG Source	County Source	Basin Source	Source Id. No.	Source Name	2010	2020	2030	2040	2050	2060
EDNA	2951	P	0183	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	861	861	861	861	861	861
GANADO	2954	P	0228	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	277	277	277	277	277	277
COUNTY-OTHER	2959	P	0757	JACKSON	COLORADO-LAVACA	01		P	JACKSON	COLORADO-LAVACA	12015	GULF COAST AQUIFER	277	277	277	277	277	277
COUNTY-OTHER	2960	P	0757	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	498	498	498	498	498	498
COUNTY-OTHER	2961	P	0757	JACKSON	LAVACA-GUADALUPE	01		P	JACKSON	LAVACA-GUADALUPE	12015	GULF COAST AQUIFER	61	61	61	61	61	61
MANUFACTURING	2966	P	1001	JACKSON	COLORADO-LAVACA	01	570	P	RESERVOIR	LAVACA	16010	TEXANA LAKE/RESERVOIR	1,832	1,832	1,832	1,832	1,832	1,832
MANUFACTURING	2967	P	1001	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	3	3	3	3	3	3
MINING	2970	P	1003	JACKSON	COLORADO-LAVACA	01		P	JACKSON	COLORADO-LAVACA	12015	GULF COAST AQUIFER	30	30	30	30	30	30
MINING	2971	P	1003	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	45	45	45	45	45	45
MINING	2972	P	1003	JACKSON	LAVACA-GUADALUPE	01		P	JACKSON	LAVACA-GUADALUPE	12015	GULF COAST AQUIFER	76	76	76	76	76	76
IRRIGATION	2976	P	1004	JACKSON	COLORADO-LAVACA	01		P	JACKSON	COLORADO-LAVACA	12015	GULF COAST AQUIFER	17,013	17,013	17,013	17,013	17,013	17,013
IRRIGATION	2977	P	1004	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	28,645	28,645	28,645	28,645	28,645	28,645
IRRIGATION	2978	P	1004	JACKSON	LAVACA-GUADALUPE	01		P	JACKSON	LAVACA-GUADALUPE	12015	GULF COAST AQUIFER	9,090	9,090	9,090	9,090	9,090	9,090
LIVESTOCK	2982	P	1005	JACKSON	COLORADO-LAVACA	01		P	JACKSON	COLORADO-LAVACA	12015	GULF COAST AQUIFER	298	298	298	298	298	298
LIVESTOCK	2983	P	1005	JACKSON	LAVACA	01		P	JACKSON	LAVACA	12015	GULF COAST AQUIFER	418	418	418	418	418	418
LIVESTOCK	2984	P	1005	JACKSON	LAVACA-GUADALUPE	01		P	JACKSON	LAVACA-GUADALUPE	12015	GULF COAST AQUIFER	136	136	136	136	136	136
Jackson County Total													59,560	59,560	59,560	59,560	59,560	59,560
HALLETTSVILLE	2955	P	0259	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	1,067	1,067	1,067	1,067	1,067	1,067
MOULTON	2956	P	0723	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	158	158	158	158	158	158
SHINER	2957	P	0557	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	482	482	482	482	482	482
YOAKUM	2958	P	0670	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	566	566	566	566	566	566
COUNTY-OTHER	2962	P	0757	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	1,140	1,140	1,140	1,140	1,140	1,140
COUNTY-OTHER	2964	P	0757	LAVACA	GUADALUPE	01		P	LAVACA	GUADALUPE	14315	GULF COAST AQUIFER	5	5	5	5	5	5
MANUFACTURING	2968	P	1001	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	570	570	570	570	570	570
MINING	2973	P	1003	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	10	10	10	10	10	10
MINING	2974	P	1003	LAVACA	LAVACA-GUADALUPE	01		P	LAVACA	LAVACA-GUADALUPE	14315	GULF COAST AQUIFER	31	31	31	31	31	31
IRRIGATION	2979	P	1004	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	8,357	8,357	8,357	8,357	8,357	8,357
LIVESTOCK	2985	P	1005	LAVACA	LAVACA	01		P	LAVACA	LAVACA	14315	GULF COAST AQUIFER	1,997	1,997	1,997	1,997	1,997	1,997
LIVESTOCK	2986	P	1005	LAVACA	LAVACA-GUADALUPE	01		P	LAVACA	LAVACA-GUADALUPE	14315	GULF COAST AQUIFER	21	21	21	21	21	21
LIVESTOCK	2987	P	1005	LAVACA	GUADALUPE	01		P	LAVACA	GUADALUPE	14315	GULF COAST AQUIFER	41	41	41	41	41	41
Lavaca County Total													14,445	14,445	14,445	14,445	14,445	14,445
EL CAMPO	2952	P	0184	WHARTON	COLORADO	01		K	WHARTON	COLORADO	24115	GULF COAST AQUIFER	290	290	290	290	290	290
EL CAMPO	2953	P	0184	WHARTON	COLORADO-LAVACA	01		P	WHARTON	COLORADO-LAVACA	24115	GULF COAST AQUIFER	1,713	1,713	1,713	1,713	1,713	1,713
COUNTY-OTHER	2965	P	0757	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	438	438	438	438	438	438
MANUFACTURING	2969	P	1001	WHARTON	COLORADO-LAVACA	01		P	WHARTON	COLORADO-LAVACA	24115	GULF COAST AQUIFER	84	84	84	84	84	84
MINING	2975	P	1003	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	3	3	3	3	3	3
IRRIGATION	2980	P	1004	WHARTON	COLORADO-LAVACA	01		P	WHARTON	COLORADO-LAVACA	24115	GULF COAST AQUIFER	20,152	20,152	20,152	20,152	20,152	20,152
IRRIGATION	2981	P	1004	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	66,850	66,850	66,850	66,850	66,850	66,850
LIVESTOCK	2988	P	1005	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	588	588	588	588	588	588
EL CAMPO	3795	P	0184	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	25	25	25	25	25	25
Wharton County Total													90,143	90,143	90,143	90,143	90,143	90,143
Regional Total													164,148	164,148	164,148	164,148	164,148	164,148

Table 3A-3 - Current Water Supply Sources Available to the Lavaca Region by WWP

Major Provider Name	Major Provider α No.	Type of Source	Seller Major Provider α No.	RWPG	County No.	Basin No.	Source Identifier	Name of Source	2010 (acre-feet/year)	2020 (acre-feet/year)	2030 (acre-feet/year)	2040 (acre-feet/year)	2050 (acre-feet/year)	2060 (acre-feet/year)
Lavaca-Navidad River Authority	570	03		P		16	16010	Lake Texana	12,232	12,232	12,232	12,232	12,232	12,232

Note: The current reliable supply from LNRA to the Lavaca Region includes the Inteplast contract of 1,832 acre-feet/year and the amount of water recallable to the Lavaca Region from the City of Corpus Christi.

Contents

List of Tables

List of Figures

List of Appendices

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Chapter 4 – Identification, Evaluation, and Selection of Water Management Strategies Based on Needs

This chapter describes the analysis regarding the identification of WUGs with needs and identification, evaluation, and selection of appropriate water management strategies for LRWPA. Water management strategies have been defined for each of the identified future water shortages within LRWPA as required by the regional water planning process. Included within this report are:

- Review of the projected water shortages
- Description of the potentially available water management strategies
- Definition of the recommended management strategies
- Allocation of selected strategies to specific WUGs

In addition to the above, this report contains a description of socio-economic impacts of not meeting the identified needs.

4.1 Identification of Needs

In *Chapter 2*, water demands were identified for all WUGs. In *Chapter 3*, water supplies available to LRWPA were identified and allocated to WUGs and WWPs based on current usage and contracts. Projected surpluses and shortages were determined by matching the supplies and the demands. *Table 4A* in *Appendix 4A* lists all WUGs within LRWPA with shortages.

Total water demands in LRWPA were 230,447 ac-ft/yr in the year 2000 and are projected to decrease to 229,854 ac-ft/yr in year 2060. This is approximately 11 percent greater than the 2060 demand projected in the 2006 LRWPA RWP of 206,908 ac-ft/yr. Throughout the planning period, the demand projections for municipal and irrigation have increased in comparison to the 2006 RWP. Total water supplies allocated to WUGs in the region were estimated at 168,148 ac-ft/yr for all planning periods between the years 2010 and 2060.

The sum of the projected shortages in *Table 4A* remains at 67,739 ac-ft/yr between 2010 and the planning horizon in year 2060. As no WUGs are currently experiencing water shortages in LRWPA, it is assumed that the remaining demands have been made up by additional groundwater pumpage in excess of the supply numbers presented in *Chapter 3* or with available interruptible surface water supplies which are preferred due to the lower expense of pumping surface water rather than groundwater. In addition, the Plan focuses on maximum rice production during dry years, which may indicate that the current level of demand does not reach this maximum level.

Lavaca County was found to experience no shortages through the year 2060. Shortages for irrigation are expected to occur in the Colorado-Lavaca River Basin of Jackson County from year 2010 through year 2060 planning periods. Irrigation in Wharton County will experience the greatest shortages in the planning area with a deficit 62,686 ac-ft/yr from 2010 through 2060. There are no municipal shortages anticipated for LRWPA through the year 2060.

4.2 Selection and Application of Water Management Strategies

The planning group and their consultants identified the existence of sufficient quantities of groundwater stored in the Gulf Coast aquifer within the limits of the region to support short-term increases in pumping. Because of the sensitivity of agricultural producers to the price of the water, additional attention was paid to the issue of sustainable use to prevent the drawdown of the water table to the point that the water would be unavailable to agriculture from a pumping cost standpoint. The converse of this assumption, however, is that the groundwater is available in the area and that municipal and industrial users have the necessary funding to drill their wells deeper and pay the increased costs of energy for pumping from greater depths. As a result, it was assumed that the municipalities and the industrial WUGs had the assurance that they would have sufficient supply. Furthermore, since the municipal and manufacturing usages within the planning region composed less than 4 percent of the total usage, this assumption would not cause the increased drawdown of the static and pumping water levels to the point that the remaining water would be unavailable for agricultural uses.

The primary evaluation criteria established by LRWPG was cost and the minimization of capital expenditures for providing water, since there is no readily available source of capital for agricultural water procurement and limited ability of agricultural operations to repay loans if loans were available. LRWPG input regarding management strategy cost was solicited at the Group's April 20, 2009 meeting. LRWPG concurred that the price of the water obtained had to be the overriding criteria. In this instance, if the cost of a project was beyond the ability of agriculture to pay for it, either through the need for environmental mitigation or the capital cost necessary to provide infrastructure, no further analysis was appropriate.

Regions are required to consider emergency transfers of non-municipal use surface water per 31 TAC §357.5(i). Emergency transfers of surface water are granted by the Texas Commission on Environmental Quality on an interim basis during periods where an imminent threat to public health and safety exists, including multi-year droughts, spikes in demands, or failure of water supply systems where demands are unable to be met by available resources. As the regional water planning process considers supplies and demands over decadal periods, temporary emergency transfers of water were not considered. As all supplies allocated are considered available during drought of record (DOR) conditions, the need for additional supplies in the water planning process are due to unmet demands rather than temporary unavailability of supplies. If shortages are identified in a decade within the planning period, they are met with new supplies developed in a WMS.

Currently, non-municipal users in the LRWPA rely almost entirely on groundwater, and thus there is no infrastructure available to convey water from non-municipal users under emergency conditions. Furthermore, all needs within the Plan are assigned to irrigated agriculture; in the event of an emergency such as drought, municipal WUGs would be expected to simply increase their use of groundwater,

Regions are required to consider regional water supply facilities and providing regional management of regional resources. However, due to the dependence of the Lavaca Region on groundwater supplies, regional-level supply infrastructure has not developed in the region, nor is it anticipated to develop or be needed in the foreseeable future. WUGs and individual agricultural irrigators predominantly are supplied by their own wells. Municipal WUGs are unlikely to display interest in regional water infrastructure development as they have access to adequate supplies and for a majority of municipal WUGs no growth is projected. At the same time, irrigated agriculture cannot financially support development of large-scale water infrastructure.

4.2.1 Potential Water Management Strategies

The management strategies considered for shortages in the 2006 RWP that have been carried through to the 2011 RWP are as follows:

- Conjunctive use of groundwater in Jackson and Wharton Counties
- Conversion of Ganado and Edna to surface water
- Reuse of municipal effluent
- Development of a water supply on the Lavaca River by on-channel impoundment or off-channel reservoir

The individual strategies and their costs and environmental impacts are contained in *Appendix 4B*. Note that Regions N and L have selected an off-channel reservoir on the Lavaca River as a recommended strategy for their 2011 Regional Water Plans. *Table 4C.1* in *Appendix 4C* includes a list of the potential management strategies recommended for each shortage.

4.2.2 Strategy Evaluation and Selection

The ultimate factor considered by LRWPG when selecting management strategies is the cost of the proposed strategy. As farmers are the only users in the region with an anticipated shortage, they would bear the costs of any water management strategy. Irrigators would not be able to financially support strategies above a certain cost as higher rates for water would become economically prohibitive. A maximum cost of $50 per ac-ft was set by LRWPG as a cost that would be reasonable for irrigators to pay for additional water. Management strategies with a unit cost greater than this were not considered. Several of the strategies which are over the $50/acre-foot limit but still at the lower end of the cost spectrum were also limited by the amount of water that could be provided. This is particularly true of strategies involving municipalities, as the total municipal demand in LRWPA is a very small percentage of total water demand.

Pumping of additional groundwater beyond the sustainable yield was identified as the lowest cost alternative. Since there are no major springs in the area with the higher water demands, this option also maintains the current status with regard to the environment by allowing the flooding of rice fields to continue and return flows to continue without diminishing. In addition, the area has seen static water levels in earlier years that are as low as or lower than the levels predicted to occur if dry years coincide with maximum rice production. As a result of the lowering of many of the irrigation well pumps during that earlier period, it was assumed that no capital costs would be incurred since the wells have already been modified to meet the lower water table conditions. This is an important factor, since there are no municipal or manufacturing WUGs with shortages which would be a source of capital investment to help farmers implement on-farm water conservation measures in return for receiving a portion of the resulting water conserved.

Because of the extreme sensitivity of agricultural users to the cost of water, no previously proposed management strategies were further developed for the 2011 Lavaca RWP. Agricultural users cannot afford the cost of water from new reservoirs for firm yield, although the development of new reservoirs would result in some additional interruptible water that could potentially be used for agricultural purposes if it could be provided economically. For much of the region, groundwater is used as the primary source of irrigation water, so large-scale canal systems do not exist. The cost of building canals or pipelines would make widespread distribution of any interruptible water uneconomical. For the remaining water management strategies considered, planning level costs and data are contained in *Appendix 4B* for each potential strategy. The costs for those strategies presented in the 2006 RWP have been adjusted to a September 2008 reference per Texas Water Development Board Guidance. However, a full reassessment of strategy costs was not executed for any strategy other than conjunctive use of groundwater since the last planning cycle, as none of the strategies were remotely within reasonable costs set by LRWPG.

It should be noted that the analysis of demand and supply was done assuming certain acreages were in agricultural production during the DOR conditions. The overpumping will occur only if peak agricultural production is combined with DOR hydrological conditions. It is possible that the acreages of rice grown would be reduced during record drought conditions to the extent that pumping of the aquifer beyond the sustainable yield amounts would not occur. As a result, even the costs for pumping at greater lifts for the water used would not materialize. For planning purposes, however, it is prudent to assume that these costs would be incurred during DOR conditions.

An analysis of the interruptible flows from Lake Texana was conducted as a part of the 2006 RWP. This analysis determined that there are approximately 12,000 ac-ft of interruptible flows in Lake Texana at least 80 percent of the time. Currently, all of this interruptible yield water is under contract to the City of Corpus Christi.

Planning level costs were estimated for the conversion of both Edna and Ganado to surface water to meet the municipal demand. Unit costs were based on information from the 2006 Plan updated per TWDB Exhibit C. On a planning level, the probable cost for the conversion to surface water is approximately $970 per ac-ft/yr. This estimate includes an intake structure, lift station pumping, conveyance lines, a Level 3 (conventional treatment) plant, ground storage, yearly operation and maintenance cost, energy costs, possible studies (feasibility, environmental, etc.), engineering and contingencies. The assumption was also made that the available water from Lake Texana would be the municipal portion allocated currently to the City of Corpus Christi, but recallable by Jackson County and made available to the regional treatment plant at the same cost that Corpus Christi is currently paying for the water. The proposed plant would be located at a suitable site south of U.S. Highway 59 and west of Lake Texana. It is assumed that only major conveyance lines would be needed to tie into the existing distribution systems of the two cities. By converting the municipal water demand to surface water, groundwater currently being used to meet this demand can be utilized for other demands. Since the conversion efforts noted above will result in only 2,000 ac-ft annually of groundwater reduction, the effects on groundwater pumpage, aquifer drawdown, and subsidence are expected to be negligible.

4.2.3 Strategy Allocation

The management strategy of exceeding firm groundwater supplies to meet short-term demands was applied to meet the irrigation shortages in both Jackson and Wharton Counties. This is shown in *Table 4C.2* in *Appendix C*.

4.3 Water Conservation

As noted above, there are no municipal WUGs with shortages. In addition, while water conservation by municipalities is encouraged, the significance of even a 20 percent reduction in municipal use, when applied to the 3 percent of total usage that municipal usage composes, results in a 0.6 percent savings overall. Further, most of the municipalities have standby well capacities so that they can provide the maximum daily demand with the largest well out of service. Since the anticipated net growth in total population from 2010 through 2060 is only 172 persons, it is not anticipated that conservation savings will result in significant savings over the 50-year planning horizon. In fact, many of the cities are projected to experience a decrease in population over time. As a result, they have no incentive to conserve to delay implementation of costly expansions. There is no real driver to induce conservation for these WUGs.

On the agricultural side, conservation savings would not result in a reduction of capital expenditures but a forced expenditure of funding to garner any savings. As noted previously by several of the group members, there is a finite upper limit to the amount of money that can be spent to conserve agricultural water and still be supported by on-farm income. There are no municipalities within the planning area that are in need of additional supplies that cannot be supported by groundwater.

Neighboring regions with needs tend to have much larger needs than could be supported by savings in groundwater for irrigation purposes. As an example, if 20 percent of the total irrigation water used in Jackson County could be conserved by the canal and on-farm conservation practices outlined in the management strategies, the net effect is that the usage would be reduced to the sustainable yield of the aquifer and there would still not be any surplus to be marketed under DOR conditions. With total usage of approximately 100,000 ac-ft annually, the savings would only result in 20,000 ac-ft of available water annually even under the best of conditions. The needs of neighboring basins are such that much larger projects are needed to provide economical costs for new supplies.

As noted in the 2006 RWP, increased conservation in agricultural irrigation would have a potentially negative impact on streamflows in the area. During dry months, return flows from agricultural operations represent nearly all of the streamflow seen in the region. Therefore, additional conservation during these times could have adverse effects on wildlife habitat. The more efficient usage of available supply may reduce habitat if canals with current plant growth and wildlife harborage are converted to pipelines, or are lined to reduce seepage and plant growth.

Additionally, the high cost of conservation and the lack of funds to pay for it make large scale conservation projects unlikely. Programs such as the Environmental Quality Incentive Program (EQIP) have made the costs of improvements more reasonable for farmers with some success. However, the way in which agricultural operations in LRWPA are managed prevent such programs from having substantial effects. A large portion of the irrigated acreage within LRWPA is farmed by tenant farmers who have only year-to-year leases. These farmers have a limited incentive for investing in conservation measures without financial backing from the owner of the property. This is discussed in greater detail in the *Agricultural Water Demands Analysis* developed as part of the 2011 Regional Water Planning Process.

4.4 Irrigation Return Flow Analysis

An analysis of irrigation return flows, especially as they relate to instream flows in LRWPA, was carried out as part of the 2006 RWP. A major point of concern is the potential reduction in instream flows from conservation of water, particularly in the rice growing areas. For the 2011 planning round, irrigation accounts for 95 percent of the water demand projected for the 2010 through 2060 planning period. As noted in the *Agricultural Water Demands Analysis*, rice is projected to be responsible for 87 percent of irrigation demand. It is further noted that during extended periods of below normal rainfall, virtually all of the rice in LRWPA is grown using groundwater since the surface water irrigation rights are not firm rights. Results of the 2006 analysis are summarized below, with more detailed information available in the 2006 RWP.

4.4.1 WAM Contributions

The first area of investigation was to identify the sources of return flows in the current Lavaca Region Water Availability Model (WAM). WAM Run 3 has no return flows from municipal and manufacturing WUGs, but it was determined that there was some return flow from agriculture in the model. The Lavaca WAM contains return flows from tracts irrigated with groundwater at 5 percent of the total water applied. For tracts irrigated with surface water, the total estimated return flow is 15 percent of the water applied. These represent annual return flow amounts. A review of the information developed in the water demand section of this report indicates that total water applied for rice production in lands irrigated by groundwater is approximately 4.15 ac-ft/ac based on total planted first-crop acres, and 6.51 ac-ft/ac for lands irrigated with surface water, again based on total first-crop acres. As a result, annual return flow contributions were estimated at 2.49 inches per acre (in/ac) for groundwater-irrigated lands, and 11.7 inches for surface water-irrigated lands.

4.4.2 Estimated Conservation Savings

The 2006 RWP examined a report prepared by Dr. James Stansel concerning the impacts of various conservation measures, with the most effective measures (land leveling combined with multiple inlets) anticipated to provide an annual savings of approximately 0.5 ac-ft/ac, or 6 in/ac. Note that these numbers are scaled to all acreage for a multi-year rotation; in a given year, the land actively irrigated will show greater conservation savings. These measures would, however, have an impact on wildlife habitat. Costs for these measures were scaled to September 2008 values using the ENR Construction Cost Index (CCI) per TWDB guidance for the 2011 RWP. However, the Group expressed concern that scaled costs were not representative of true current values, as the CCI is focused primarily on urban construction. Local information on current agricultural water conservation practices was provided by Dennis Mueck (USDA-NRCS, Ronald Gertson (Coastal Bend Groundwater Conservation District), and Glen Minzenmeyer (USDA-NRCS). *Table 4-1* lists a summary of current local conservation costs. In general, costs are prohibitive to implementation.

Table 4-1
Estimated Unit Cost of
Agricultural Conservation Improvements

Improvement	Improvement Cost per Acre
Land Leveling	$400 to $450
Multiple Inlets	$75
Reduced Levee Interval	Minimal
Irrigation Pipeline	$179 to $200

The *Agricultural Water Demands Analysis* carried out as part of the 2011 planning cycle indicated an average planted rice acreage of about 50,250 acres per year. Calculations from the *Agricultural Water Demand Analysis* indicate that approximately 14.7 percent of the rice acreage in LRWPA is improved. For land with combined multiple inlets and land leveling with approximately 50% of rice acreage ratoon cropped, conservation savings would be 1.23 acre-feet per acre. Based on these numbers, the average annual savings from conservation practices already in place would be approximately 9,044 acre-feet per year. Application of conservation practices to unimproved land (up to a maximum of 85 percent) could result in up to 43,400 acre-feet of additional savings per year; however, the large unimproved acreage and high cost of implementation will likely limit widespread conservation improvements. Note that the savings are for acreage in active production. For a multi-year rotation the effective cost of conservation is increased as additional land must be improved.

4.4.3 Extent and Timing of Flows From Rice Culture

As part of the 2006 RWP development process, telephone interviews were conducted with L. G. Raun, Jr., representing primarily groundwater rice irrigation, and Ronald Gertson, representing primarily surface water rice irrigation. These two individuals were chosen based on their experience and knowledge of overall farming practices in the area as well as the fact that they both currently serve on RWPG boards. Estimated flows were remarkably similar. Both individuals indicated that water is used in the early spring, approximately in February, to flush the fields. This water is to provide a suitable environment for the seeds to be planted and to prevent weeds from getting a head start in the fields. Both individuals estimated approximately 1.5 inches per flush and two flushes as being needed to properly prepare the seedbed. This represents the amount of water that will be seen as runoff from the fields as the water drains off the fields prior to planting.

The next increment of return flow occurs during the harvest. The rice fields are drained just prior to the harvest, and whatever water remains is discharged during that time. Both individuals estimated that 90 percent of the fields are drained in July and that the amount of water drained varies between 3 and 4 in/ac. The fields are kept flooded right up to the time of harvest to keep red rice from getting a foothold in the area and reducing the quality of the harvest.

The rice plants that are used for the ratoon crop are already in the field, so there is less need to flush and more need to just flood the fields to maintain the proper weed control. The final increment of water from the fields to the streams is the draining of the fields for the harvesting of the ratoon crop. Once again, the fields are kept full right up to the time of draining. Approximately 50 percent of the water for a ratoon crop is drained in September and the remaining 50 percent is drained in October.

Since both the March and September/October time frames coincide with times when the streams traditionally have more flow in them, the July time period was analyzed. July tends to be quite dry while, at the same time, July has more fields being drained than at any other time with an estimated 90 percent of the acreage being drained at that time.

The TWDB map of irrigated lands for year 2000 was downloaded primarily to determine the spatial distribution of the acreage throughout the region. The individual parcels were then increased in size so that the total acreage reflected the acreage used for determining the irrigation water demands for LRWPA. Each irrigated parcel was then assigned to a control point in the model if possible. There were some instances where acreage was located in a coastal basin and there were no usable control points to assign the return flows to.

Once the locations were determined, a spreadsheet table was developed to calculate the potential runoff under various conditions. For the purposes of this spreadsheet, it was assumed that the flow coming off the fields was 3 inches per first-crop acre prior to conservation measures being applied, and that flow was reduced by 50 percent to 1.5 inches per first-crop acre after precision leveling and installation of multiple inlets.

Thirty-six control points from the model were examined to determine the potential influence of agricultural return flows during the months of June and July. Two points, Southeast and Northeast, were not included as no naturalized flow data existed for these two points, even though each point would receive notable amounts of return flow during these months. Of the 36 remaining points, it was observed that 7, or nearly 20 percent, of the points would receive irrigation return flows in both June and July when the minimum naturalized flow would be zero. These flows represent an important contribution to these stream systems that would be dry during DOR conditions. These flows would contribute to the Lavaca River at two WAM control points, Sandy Creek at two control points, and Pinoak Creek at three control points. Two other model control points in Lavaca County and Jackson County would receive flow from irrigation returns in July, when the minimum streamflow would be zero under DOR conditions. These flows would likely be considerable as they occur in July when approximately 90 percent of rice fields are drained in preparation for harvest. Additionally, 13 other points located in Wharton County experience irrigation return flows during the month of June when streams would otherwise be dry in a DOR. These flows are made up of discharges from only 10 percent of the rice fields in the basin and would be smaller than the July flows but would still contribute water to stream habitat.

Results of the 2006 RWP also showed that 22 of the 36 control points receive irrigation return flows from rice-planted fields that are greater than the minimum DOR flow for the month of June. Eighteen control points will receive more irrigation return than naturalized streamflow in the month of July during a DOR. In comparison, with conservation applied, it was anticipated that 20 and 14 control points would receive return flows that surpass naturalized flow for the months of June and July, respectively. Overall, conservation would reduce the volume of return flows by half that contribute to the health of streams in LRWPA during dry conditions, following the assumptions presented here.

4.4.4 Impacts of Irrigation Return Flows

The analysis above was performed to determine whether or not there is a significant impact upon in-stream flows in LRWPA from rice return flows. This analysis has shown that there is an impact, and that the impact is positive in terms of the presence of additional flow that would otherwise not be in the stream during dry weather periods. It should be noted further that the estimate of contribution is a very conservative estimate in that only the 2000 survey acreages were used, instead of the higher acreages that are likely during times of good price and demand for rice when acreages increase. It is further noted that the estimates of contribution are very conservative. Some additional flow from the rice fields can be expected from rainfall that would otherwise soak into the soil and produce no runoff during dry weather conditions. Where the rice fields are saturated, runoff will be produced even during dry times. Finally, all of the water that will be applied to the land is produced from groundwater. There are no springs in the Lavaca Region, and there is no reduction of flow from the streams or from any springs as a result of the production of the groundwater. The additional water flowing in the streams as a result of rice return flow is a net increase. Additional conservation in the rice industry diminishes that additional flow as a consequence of more efficient water use and may reduce or impair existing aquatic and riparian habitat.

Subsequent to the 2006 RWP, the LRWPA has experienced a prolonged period of drought, including exceptionally dry conditions for the first half of 2009. Several LRWPG members, including L. G. Raun Jr. (referenced above) indicated that many of the streams in the region have been dry except for short periods immediately following releases of water from rice fields; these flows are of short duration and do not extend far downstream of the discharge point. In addition, releases of water have been extremely rare during the ongoing drought. As such, the conclusions of the 2006 plan regarding irrigation return flows may need to be re-examined during future planning rounds.

4.5 Conjunctive Use of Groundwater

As noted earlier, conjunctive use of groundwater is the only economically viable water management strategy to meet shortages within LRWPA. Conjunctive use refers to the process of short-term pumping of groundwater beyond sustainable capacity during periods of high water demand and drought conditions, with use of lower pumping levels and surface water at other times allowing aquifer levels to recover. For the 2006 RWP, estimation of the strategy cost was constrained by limited information concerning drawdown due to overdrafting of the aquifer. However, for the current planning round, data from new GAM modeling (discussed in *Chapter 3*) allows for better estimation of costs for this strategy as the increased lift required for providing groundwater during lowered aquifer conditions will be available. This detailed information on aquifer drawdown, along with updated electrical rates, was used to generate decadal average pumping costs per acre-foot. Note that costs discussed in this section are not total pumping costs but rather reflect additional cost to overcome increased drawdown.

For the 2006 RWP, the additional pumping cost due to drawdown from conjunctive use was estimated using electricity as the assumed energy source for pumping due to it's being the most expensive energy source at the time. In reality, many of the irrigators in LRWPA rely on a variety of other fuel sources for pumping, including natural gas, diesel, or gasoline. Ideally, estimation of increased pumping costs due to conjunctive use would be calculated based on the most expensive fuel source. In the past year, both electric and fossil fuel costs have varied considerably, making this determination difficult. Issues of policy and availability could also influence fossil fuel and electricity costs in the future. For the current RWP, the additional cost of drawdown was determined for electric, diesel, and natural gas fuel sources.

For the current analysis, the electric cost per kilowatt-hour was based on the 2009 cost schedule for the Wharton County Electric Cooperative (WCEC). The base cost of electricity is $0.105 per kilowatt-hour. Donald Naiser of the WCEC indicated that in addition to this base cost there is also a power factor adjustment that may be applied. This factor has ranged from \$0.01 to \$0.04 per kilowatt-hour over the past year. Mr. Naiser indicated an expected average factor of \$0.02 for the next year; in the event that cap-and-trade legislation is enacted, that value could increase to \$0.04. Based on this information, an adjustment of \$0.04 per kilowatt hour was assumed for determining the cost of conjunctive use, resulting in a total cost of \$0.145 per kilowatt-hour. The cost of pumping for an acre-foot of water was calculated using the following equation:

Equation 4-1

$$Cost = \frac{(0.000189)(t)(H)(C_{unit})(Q)}{(E_p)(E_m)}$$

Where:
H = drawdown in feet
Q = pumping rate in gpm
t = pumping time in hours
E_p = pump efficiency
E_m = electric motor efficiency
C_{unit} = electric cost per kilowatt-hour

Assuming a pumping rate of 2,000 gpm, it would take approximately 2.7 hours to pump an acre-foot (325,851 gallons) of water. Cumulative drawdown (measured from year 2000) for each decade were extracted from GAM Run #1 by county and hydraulic unit. These drawdowns are presented in *Table 4-2* below. The cost equation above was applied to the drawdown values in *Table 4-2* to generate decadal cost estimates for each county and aquifer. Calculations assume pump and motor efficiencies of 75 percent. Because the drawdowns shown will impact all users and not just those experiencing shortages, the result of the cost equation was scaled to represent conjunctive use cost by multiplying by total demand for the decade and then dividing by the decadal shortage. Resultant values are presented in *Table 4-3* below. As shown in the table, the highest cost for conjunctive use for each decade occurs in the LRWPA portion of Wharton County, especially in the Chicot and Evangeline aquifers. This corresponds to substantial drawdowns in these aquifers underlying rice production centers in western Wharton County. In contrast, the cost of conjunctive use is small in Lavaca County, which has no irrigation shortage itself but would potentially experience groundwater drawdown due to overdrafting in the other counties. The table also shows a trend of increasing cost with time for all counties and aquifers due to increasing drawdowns with prolonged conjunctive use. As noted in *Section 4.2.2* above, the analysis of demand and supply was done assuming certain acreages were in agricultural production during the DOR conditions. Overpumping will occur only if peak agricultural production is combined with DOR hydrological conditions. Given that the existing drought of record lasted less than a decade, it is unlikely that drought conditions would occur for a duration as long as that modeled by GAM Run #1.

Table 4-2
GAM Run #1 Central Gulf Coast
Aquifer Drawdown by Decade

Year	County	Aquifer Drawdown (ft)		
		Chicot	*Evangeline*	*Jasper*
2010	Jackson	-6.0	-10.2	-3.4
	Lavaca	-1.7	-1.7	-4.7
	Wharton (P)	-26.7	-18.5	-4.9
2020	Jackson	-10.8	-14.6	-7.0
	Lavaca	-3.7	-2.9	-8.5
	Wharton (P)	-43.8	-27.7	-10.7
2030	Jackson	-14.2	-17.7	-10.5
	Lavaca	-5.4	-3.9	-11.7
	Wharton (P)	-54.1	-33.6	-16.8
2040	Jackson	-16.6	-19.9	-13.9
	Lavaca	-6.9	-4.6	-14.5
	Wharton (P)	-60.6	-37.6	-22.8
2050	Jackson	-18.3	-21.5	-17.3
	Lavaca	-8.2	-5.3	-16.9
	Wharton (P)	-65.0	-40.4	-28.8
2060	Jackson	-19.4	-22.6	-20.6
	Lavaca	-9.3	-5.7	-19.2
	Wharton (P)	-67.9	-42.4	-34.6

Table 4-3
Conjunctive Use Electric Cost by County and Aquifer

Year	County	Cost per Acre-Foot ($) for All Users		
		Chicot	*Evangeline*	*Jasper*
2010	Jackson	5.61	9.58	3.18
	Lavaca	1.58	1.60	4.35
	Wharton (P)	24.96	17.30	4.58
2020	Jackson	10.08	13.59	6.54
	Lavaca	3.43	2.71	7.96
	Wharton (P)	40.87	25.83	10.02
2030	Jackson	13.29	16.50	9.79
	Lavaca	5.04	3.61	10.94
	Wharton (P)	50.47	31.34	15.66
2040	Jackson	15.55	18.57	13.00
	Lavaca	6.42	4.33	13.53
	Wharton (P)	56.64	35.09	21.34
2050	Jackson	17.08	20.06	16.15
	Lavaca	7.63	4.91	15.84
	Wharton (P)	60.73	37.73	26.94
2060	Jackson	18.14	21.14	19.23
	Lavaca	8.66	5.37	17.92
	Wharton (P)	63.50	39.63	32.37

A similar procedure was carried out for diesel and natural gas fuel sources. The cost per acre-foot was estimated using the equation:

Equation 4-2

$$Cost = \frac{(1.371)(H)(C_{unit})}{(E_e)(E_d)(P_c)}$$

Where:
H = drawdown in feet
E_e = engine efficiency
E_d = drive efficiency
C_{unit} = unit fuel cost
Pc = pumping plant fuel criterion (energy content per unit)

Efficiencies for pumps and engines were assumed to be 75 percent, while right angle drive efficiency was assumed to be 95 percent. Pumping plant fuel criteria were from the Nebraska Pumping Plant Criteria assuming 75 percent pump efficiency. Values were 12.5 water horsepower-hours per gallon for diesel and 61.7 water horsepower-hours per 1,000 ft^3 for natural gas. Unit costs for natural gas ($8.98 per 1,000 ft^3) and diesel ($3.80 per gallon) were assumed to be equal to the highest annual per-unit cost for Texas or the Gulf Coast for the 2004-2008 period as reported by the United States Department of Energy - Energy Information Administration. Costs were developed by county and basin using a methodology similar to that for electric power and showed a similar distribution of cost, with the highest cost for conjunctive use for each decade occurring in the LRWPA portion of Wharton County, especially in the Chicot and Evangeline aquifers.

For all three power sources, the per acre-foot cost by county and basin were multiplied by the use per county and aquifer and summed by year to yield a total annual regional cost of conjunctive use for each decade of the planning period. Total annual cost was then divided by total regional demand to yield decadal average costs per acre-foot of conjunctive use. Average cost by decade is given in *Table 4-4*.

Table 4-4
Average Conjunctive Use Cost

			Average Cost ($/ac-ft)		
Year	**Total Cost ($)**	**Pumpage (ac-ft)**	**Electric**	**Natural Gas**	**Diesel**
2010	$3,784,580	229,172	$16.51	$4.95	$9.99
2020	$6,056,300	229,316	$26.41	$7.93	$16.00
2030	$7,487,590	229,315	$32.65	$9.80	$19.78
2040	$8,434,361	229,217	$36.80	$11.04	$22.26
2050	$9,077,721	229,131	$39.62	$11.87	$23.95
2060	$9,524,887	229,086	$41.58	$12.45	$25.12

Depending on the power source for pumping, the average cost of conjunctive use ranges from $4.95 per ac-ft to $41.58 per ac-ft. Natural gas is the least expensive alternative, with electricity being the most costly option. While petroleum fuel sources are used more extensively in the region than electricity for pumping, the electric cost was chosen to represent the strategy cost for conjunctive use as it is the most conservative cost. While the electrical energy cost for years 2040 through 2060 is higher than the value of $33 per ac-ft estimated in the 2006 RWP, it remains below the maximum cost of $50 per ac-ft established by the LRWPG and is the lowest cost water management strategy examined. At a more discrete spatial scale, users in LRWPA-Wharton County pumping from the Evangeline Aquifer could experience a cost per acre-foot in excess of $50 for drought persisting to

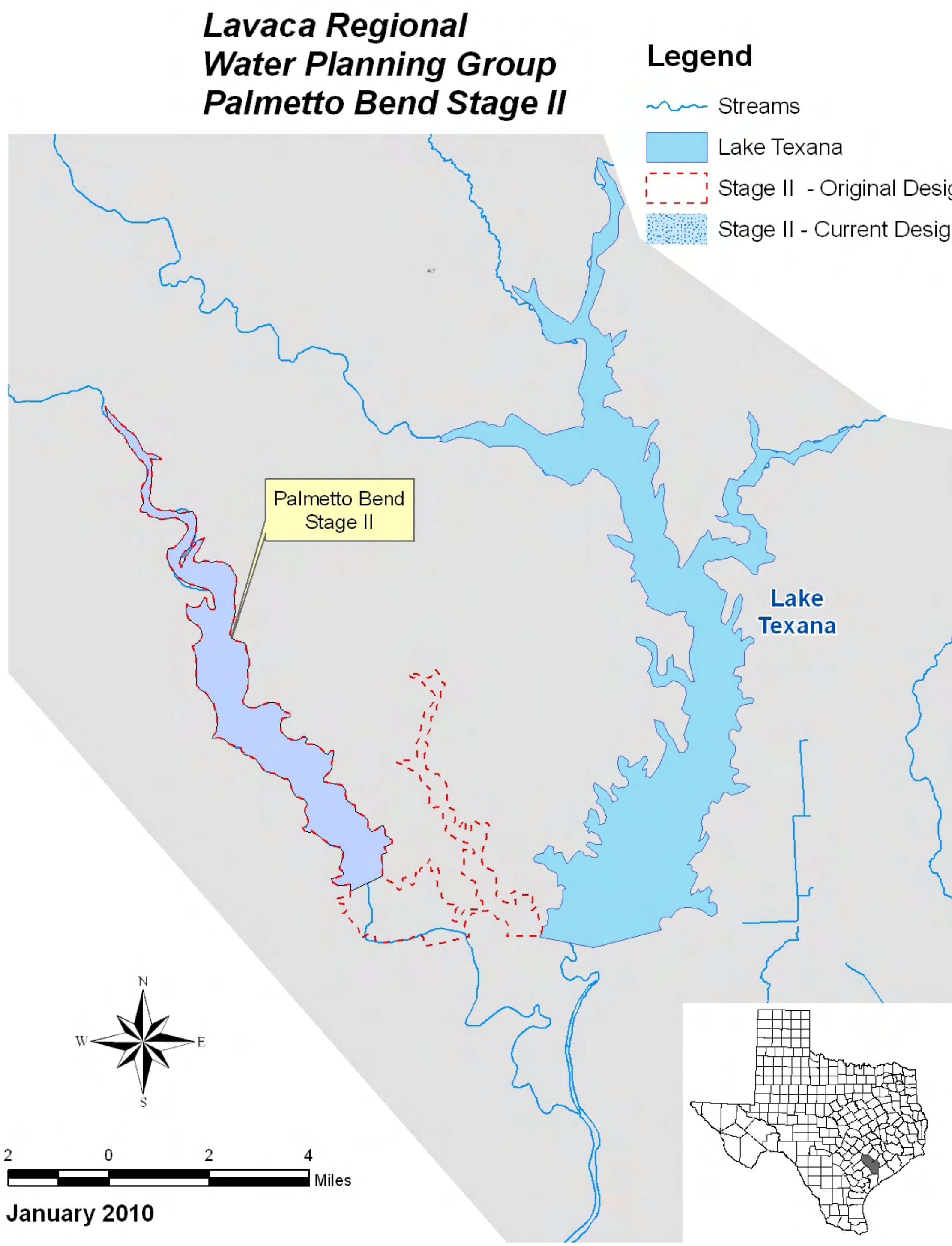
2030 and beyond, as shown in *Table 4-3*. However, conjunctive use remains the most cost-effective strategy and, as noted earlier, drought conditions are not expected to exist for the full duration of the planning period. The costs listed in *Tables 4-3* and *4-4* do not reflect total pumping cost but only reflected the additional pumping cost associated with overcoming increased drawdown.

4.6 Updated Palmetto Bend Stage II Strategy

As noted in *Chapter 3*, the proposed on-channel Palmetto Bend Stage II Reservoir has been designated as a unique reservoir site (URS). It is one of 19 sites (17 major and 2 minor) recommended by the 2007 SWP and designated by the 80th Texas Legislature as sites of unique value. Since the original design and permitting of the reservoir, a number of changes have been made to the proposed Stage II project. The most significant of these changes is the relocation of the reservoir from its originally-proposed location to a point 1.4 miles upstream along the Lavaca River. The original design proposed by the U.S. Bureau of Reclamation involved Lake Texana and the Stage II reservoir sharing a common storage pool. Subsequent studies indicated that separation of the storage pools and moving Stage II upstream would be more cost effective. Both the original and revised reservoir locations are shown in *Figure 4-1*. Due to this change and a resultant alteration of yield, the Certificate of Adjudication for Stage II will need to be revised if the reservoir is to be constructed.

Construction of an on-channel Stage II was considered as a potential management strategy to meet shortages in the 2001 and 2006 RWPs for LRWPA as well as the current planning round. In previous water plans, construction of Stage II has not been selected as a strategy for LRWPA as costs have been prohibitive for meeting water shortages for irrigation. However, Region N (Coastal Bend Regional Water Planning Group) recommended the Stage II reservoir as a water management strategy to meet year 2060 shortages projected for the City of Corpus Christi and others.

Figure 4-1
Palmetto Bend Stage II Reservoir



The current Stage II design was recently summarized in *TWDB Report 370: Reservoir Site Protection Study*. The current reservoir design would have a footprint of 4,564 acres and a total capacity at the top of the conservation pool of 52,046 acre-feet. Storage-frequency curves developed for the reservoir show that the reservoir will be more than half full 90 percent of the time and completely full 38 percent of the time. The firm yield of the proposed reservoir has been reduced from 35,000 acre-feet per year for the original design to 22,964 acre-feet per year for the current design. This firm yield estimate differs slightly from that given by Regions N and L in their 2001 RWPs; TWDB's analysis was based on the Lavaca Basin WAM (rather than the SIMDLY model used the Regions L and N) and contained improved area-capacity-elevation data. Modeling applied Consensus Criteria for Environmental Flow Needs and included a conservation pool elevation of 44 feet above mean sea level.

TWDB Report 370 lists the total construction cost of the dam and reservoir as $159,190,827, with an annual debt service amount of $10,579,822 (at 6% for 40 years) and an annual O&M cost of $1,257,323. A substantial amount of the project cost would stem from resolving facility conflicts, which is estimated to represent approximately 29 percent of construction cost. Expected infrastructure and facility conflicts include oil and gas wells and pipelines, water wells, power lines, and rod and railway areas. Total annual costs for debt service and O&M equate to $515 per acre foot of firm yield, far in excess of the $50 per acre foot specified by the LRWPG. Additional information on this management strategy can be found in *Appendix 4B*.

As noted earlier, development of an off-channel reservoir supply on the Lavaca River is also under consideration. The initial assessment indicates a site approximately 10 miles west of Lake Texana. The reservoir would allow LNRA to capture and store high flows from the river, firming up otherwise interruptible water. Preliminary analysis indicates a firm yield of 26,242 acre-feet per year for a 75,000 acre-foot reservoir with a maximum pumping rate of 200 million gallons per day (mgd). A more detailed preliminary analysis, provided by LNRA, can be found in *Appendix 4D*.

Regions N and L have included the potential off-channel reservoir as a recommended WMS in their 2011 Draft Initially Prepared Regional Water Plans, with the on-channel impoundment for Palmetto Bend Stage II included as an alternate strategy.

4.7 Garwood Supply Diversion

The City of Corpus Christi currently holds an agreement with LCRA for the purchase of up to 35,000 acre-feet per year of water from a right formerly held by the Garwood Irrigation Company (prior to purchase by LCRA). This water right, which is permitted for 168,000 acre-feet per year at a maximum rate of 1,488 acre-feet per day, is the most senior right in the Lower Colorado River Basin with a priority date of November 1, 1900. An amendment (granted in October 1998) to the certificate of adjudication for the total Garwood right authorizes Corpus Christi's diversion of 35,000 acre-feet per year at a maximum rate of 150 cfs (297.5 acre-feet per day). The amendment also subordinates Corpus Christi's purchase to the remainder of the right by setting a priority date of November 2, 1900. The Region N 2006 RWP summarized a number of options for the interbasin transfer of this water from its source in the Lower Colorado River Basin to Corpus Christi. While several options dealt with transmission of water via pipeline, one option considered conveying water through canals and natural stream segments for part of the transfer length. Specifically, the water would be conveyed from the diversion point on the Colorado River through the Town Canal and into West Mustang Creek in the Lavaca River Basin. The water would then move through West Mustang Creek and into Lake Texana. From this point, the water would be conveyed through the Mary Rhodes Pipeline to the City of Corpus Christi. The LRWPG opted to include a study of the impacts of this IBT on surface water resources as part of the 2011 RWP. Subsequent to scope development and approval by TWDB and during development of the RWP, the City of Corpus Christi elected to transfer the IBT water entirely by pipeline; the scenario included in the scope of the 2011 RWP for LRWPA is no longer under consideration. Analysis of the hypothetical bed-and-banks transfer is included in *Appendix 4E*.

4.8 Socioeconomic Impacts of Not Meeting Demands

For the 2011 RWP, TWDB prepared the report *Socioeconomic Impacts of Projected Water Shortages for the Lavaca Regional Water Planning Area*, along with corresponding reports for each of the other 15 regional water planning areas. The socioeconomic impacts within Jackson, Lavaca, and Wharton Counties were summarized in this report for LRWPA. It should be noted that the impacts presented in this report are based on a shortage of just under 68,000 acre-feet annually of irrigation water. This amount of water represents approximately 32 percent of the total demand for these user groups in Jackson and Wharton Counties. A detailed discussion of the socioeconomic impacts analysis methodology and a full copy of the study are included in Chapter 9 of the RWP.

The socioeconomic impacts analysis examined multiple potential impacts of unmet water needs, including repercussions to tax revenues, income, employment, population, and school enrollment. The results of the study indicate income losses of $16.3 million for irrigated agriculture and tax revenue losses of $1.89 million if needs are not met during a 1-year drought period. Unmet needs would result in the loss of an estimated 215 agricultural jobs, a population reduction of 258 people, and a decline in school enrollment of 73 students.

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Appendix 4A

WUGs with Anticipated Shortages in LRWPA

Table 4A.1 - WUGs With Anticipated Shortages in the Lavaca Regional Water Planning Area

WUG Name	WUG No.	RWPG User	City No.	County	Basin	Type of Source	Alpha Provider	RWPG Source	County Source	Basin Source	Source Id. No.	Source Name	2010	2020	2030	2040	2050	2060
IRRIGATION	2976	P	1004	JACKSON	COLORADO-LAVACA	01		P	JACKSON	COLORADO-LAVACA	12015	GULF COAST AQUIFER	-5,053	-5,053	-5,053	-5,053	-5,053	-5,053
Jackson County Total													-5,053	-5,053	-5,053	-5,053	-5,053	-5,053
IRRIGATION	2980	P	1004	WHARTON	COLORADO-LAVACA	01		P	WHARTON	COLORADO-LAVACA	24115	GULF COAST AQUIFER	-1,490	-1,490	-1,489	-1,489	-1,490	-1,489
IRRIGATION	2981	P	1004	WHARTON	LAVACA	01		P	WHARTON	LAVACA	24115	GULF COAST AQUIFER	-61,196	-61,196	-61,197	-61,197	-61,196	-61,197
Wharton County Total													-62,686	-62,686	-62,686	-62,686	-62,686	-62,686
Regional Total													-67,739	-67,739	-67,739	-67,739	-67,739	-67,739

Appendix 4B

Potential Management Strategies and Impacts

Strategy J-IL-1 Conjunctive Use of the Gulf Coast Aquifer – Jackson County

Identified Shortage Jackson County Irrigation

Shortage Amount Jackson County Irrigation – 5,054 acre-feet

Supply Quantity 5,054 acre-feet

Water Source Jackson County Groundwater

Quality No Change

Reliability 100 percent

Cost ($/acre-foot) $42 Calculated as the additional pumping cost for estimated additional drawdown due to overdrafting. As an additional cost for pumping water would be experienced by all groundwater users in the LRWPA, the unit cost was multiplied over the demand for the entire region and then divided over the total amount of irrigation shortages to determine this value. Only a portion of this cost would be paid by the irrigators experiencing the shortage. This cost would only be assessed when needed. It is further assumed that surface water would be used when available and the aquifer would recover between droughts.

Environmental Impacts

The continued use of current levels of irrigation water would have the environmental benefit of ensuring that current or near-current volumes of agricultural return flows will continue to be discharged to the streams in the region. As noted in Task 3, there are no springs so diminished springflow from reduced aquifer levels is not a concern. If overdrafting continues over a long period of time, there is a potential for land subsidence with attendant environmental effects.

Impacts on other Water Resources of the State

The Gulf Coast Aquifer underlying Jackson County has a sufficient amount of water in storage to meet short term demands in drought-of-record conditions, so the localized impacts of overdrafting would be unlikely to impact other water resources of the state. However, in a widespread drought, the adjacent regions are likely to be overdrafting as well, with some potential for additional drawdown.

Impacts on Threats to Agriculture and other Natural Resources of the State

Availability of water for irrigation purposes reduces the threats to agriculture. Additionally, wildlife habitat will benefit from sustained return flows in drought.

Socioeconomic Impacts of not meeting Needs

See Appendix 9A

Strategy J-IL-2 Conversion of Ganado and Edna to surface water

Identified Shortage Jackson County Irrigation

Shortage Amount Jackson County Irrigation – 5,054 acre-feet

Supply Quantity 1,740 acre-feet per year

Water Source Lake Texana water recalled from Corpus Christi Contract

Quality No Change in treated water quality to end user

Reliability 100 percent

Cost ($/acre-foot) $970. Calculated based on a plant located south of Hwy 59 between the cities, with the supply from the plant being pumped into existing distribution storage. Includes all treatment, transmission and pumping costs, as well as a raw water cost (based on current Corpus Christi contract). Does not include costs of wells to use groundwater conserved in irrigation. Assumes wells already in place. Costs from the 2006 RWP have been scaled to the ENR September 2008 Construction Cost Index.

Environmental Impacts

Water that is currently leaving the basin would be used, treated, and then discharged to streams in the basin. At least a portion of agricultural demand would continue to be met, with associated discharges to the watercourses of agricultural return flows

Impacts on other Water Resources of the State

Water to Corpus Christi would be reduced under this scenario. While Corpus Christi has additional rights in the Colorado River at Garwood, the infrastructure to move that water to Corpus Christi currently does not exist.

Impacts on Threats to Agriculture and other Natural Resources of the State

Availability of water for irrigation purposes reduces the threats to agriculture, and as noted previously, provides for wildlife habitat as well.

Socioeconomic Impacts of not meeting Needs

See Appendix 9A

Strategy W-I-1 Conjunctive Use of the Gulf Coast Aquifer – Wharton County

Identified Shortage Wharton County Irrigation

Shortage Amount Wharton County Irrigation – 62,686 acre-feet

Supply Quantity 62,686 acre-feet/year

Water Source Wharton County Groundwater

Quality No Change

Reliability 100 percent

Cost ($/acre-foot) $42 Calculated as the additional pumping cost for estimated additional drawdown due to overdrafting. As an additional cost for pumping water would be experienced by all groundwater users in the LRWPA, the unit cost was multiplied over the demand for the entire region and then divided over the total amount of irrigation shortages to determine this value. Only a portion of this cost would be paid by the irrigators experiencing the shortage. This cost would only be assessed when needed. It is further assumed that surface water would be used when available and the aquifer would recover between droughts.

Environmental Impacts

The continued use of current levels of irrigation water would have the environmental benefit of ensuring that current or near-current volumes of agricultural return flows will continue to be discharged to the streams in the region. As noted in Task 3, there are no springs so diminished springflow from reduced aquifer levels is not a concern. If overdrafting continues over a long period of time, there is a potential for land subsidence with attendant environmental effects.

Impacts on other Water Resources of the State

The Gulf Coast Aquifer underlying Wharton County has a sufficient amount of water in storage to meet short term demands in drought-of-record conditions, so the localized impacts of overdrafting would be unlikely to impact other water resources of the state. However, in a widespread drought, the adjacent regions are likely to be overdrafting as well, with some potential for additional drawdown. Additionally, in the event of prolonged drought overdrafting within the LRWPA portion of Wharton County could create increased drawdowns in adjacent counties and regions

Impacts on Threats to Agriculture and other Natural Resources of the State

Availability of water for irrigation purposes reduces the threats to agriculture. Additionally, wildlife habitat will benefit from sustained return flows in drought.

Socioeconomic Impacts of not meeting Needs

See Appendix 9A

Strategy JLW-IL-1 Reuse of municipal effluent

Identified Shortage Jackson County Irrigation
Wharton County Irrigation

Shortage Amount Jackson County Irrigation – 5,054 acre-feet
Wharton County Irrigation – 62,686 acre-feet

Supply Quantity 1,350 acre-feet per year (75% of combined effluents from El Campo, Edna, and Ganado)

Water Source Groundwater based municipal wastewater effluents

Quality Increased dissolved solids and bacterial content, plus some beneficial nutrients

Reliability 100 percent

Cost ($/acre-foot) Range: $137 to $427; Calculated based on irrigation of lands currently being irrigated with groundwater or unreliable surface water supplies until all effluent used. No costs for additional treatment of effluent to meet Type 2 requirements included. Costs from the 2006 RWP have been scaled to the ENR September 2008 Construction Cost Index.

Environmental Impacts

Water that is currently discharged into streams in the basin would be consumed instead. In addition, effluent reused for agricultural use would start with higher dissolved solids levels than either groundwater or surface water in the area. Agricultural use would further increase dissolved solids levels. Agricultural demand would continue to be met, with associated discharges to the watercourses of agricultural return flows.

Impacts on other Water Resources of the State

Stress on the groundwater in the area would be reduced. However, return flows to the streams in the area would also be reduced and dissolved solids concentrations would increase slightly. The overall effect would be minimal because of the limited amount of effluent available.

Impacts on Threats to Agriculture and other Natural Resources of the State

Availability of water for irrigation purposes reduces the threats to agriculture, and as noted previously, provides for wildlife habitat as well.

Socioeconomic Impacts of not meeting Needs

See Appendix 9A

Lavaca Regional Water Planning Area
Potential Management Strategies for Meeting Shortages

Strategy JW-IL-1 Construction of Palmetto Bend Phase II on the Lavaca River

Identified Shortage Jackson County Irrigation
Wharton County Irrigation

Shortage Amount Jackson County Irrigation – 5,054 acre-feet
Wharton County Irrigation – 62,686 acre-feet

Supply Quantity 22,964 acre-feet per year

Water Source Lavaca River

Quality No change in treated water quality to end user

Reliability 100 percent

Cost ($/acre-foot) $515. Calculated in TWDB Report 370 including direct infrastructure costs, infrastructure conflict resolution, land acquisition, debt service, and operations and maintenance. Assumes no other distribution costs and no treatment of any kind. This strategy does not completely meet the expected shortage. It is assumed that this approach would be used in conjunction with another water management plan. Due to the extreme cost of implementation, no further investigation was done for this strategy beyond an initial cost estimate and comparison. Additionally, the water form Palmetto Bend Phase II would likely be contracted to customers outside of the region and not used within the basin.

Environmental Impacts
Water that is currently leaving the basin would be used and then discharged to streams in the basin. Agricultural demand would continue to be met, with associated discharges to the watercourses of agricultural return flows. The Phase II portion of the lake is currently permitted, and the construction of the lake would provide additional habitat, although some existing habitats would be destroyed.

Impacts on other Water Resources of the State
Stress on the groundwater in the area would be reduced. Since the minimum streamflow requirements for the Palmetto Bend Phase II have not been established, the impacts on other water resources are unknown.

Impacts on Threats to Agriculture and other Natural Resources of the State
Availability of water for irrigation purposes reduces the threats to agriculture, and as noted previously, provides for wildlife habitat as well.

Socioeconomic Impacts of not meeting Needs
See Appendix 9A

Lavaca Regional Water Planning Area
Potential Management Strategies for Meeting Shortages

Strategy JW-IL-2 Construction of Lavaca River Off-Channel Reservoir Diversion Project

Identified Shortage Jackson County Irrigation
Wharton County Irrigation

Shortage Amount Jackson County Irrigation – 5,054 acre-feet
Wharton County Irrigation – 62,686 acre-feet
Region L Municipal, Manufacturing, and Steam Electric Power
Region N Municipal, Manufacturing, and Steam Electric Power

Supply Quantity Project yield is under development. Current estimates indicate that approximately 25,000 acre-feet per year is available on a firm yield basis after provisions for freshwater releases are made. Project yield based on 75,000 acre-feet of off-channel storage and 200 MGD diversion capacity on the Lavaca River.

Water Source Lavaca River

Quality No change in treated water quality to end user

Reliability 100 percent

Cost ($/acre-foot) Project costs are under $700 to $800 (in development). Facilities would include approximately 75,000 acre-feet of off-channel storage (3,000 acres), a 200 MGD raw water intake and pump station on the Lavaca River, a 20 to 30 MGD raw water delivery pump station at the off –channel reservoir, and associated pipelines and appurtenances to pump water from the Lavaca River and deliver to the East and West Pump Stations at Palmetto Bend Reservoir.

Environmental Impacts

Approximately 3,000 acres of agricultural land would be inundated to accommodate the 75,000 acre-feet of off-channel reservoir. However, the new reservoir would also provide some additional habitat to the area. A schedule for freshwater releases will be established during permitting of the project. Some provision for these releases has been made during analysis of project yield.

Impacts on other Water Resources of the State

Stress on the groundwater in the area would be reduced. The freshwater release schedule, to be established during permitting, will minimize impacts to other water resources.

Impacts on Threats to Agriculture and other Natural Resources of the State

The long-term availability of a water supply to meet irrigation demands will minimize threats to agriculture. In addition, the construction of an off-channel reservoir will provide wildlife habitat.

Socioeconomic Impacts of not meeting Needs

See Appendix 9A

Lavaca Regional Water Planning Area
Potential Management Strategies for Meeting Shortages

Notes:

1. Per 31 TAC §357.5(l), Regional Planning Groups are required to consider in the Plan the environmental water needs of bay and estuary inflows. For the Lavaca Region, this would include freshwater inflows into Matagorda and Lavaca Bays. It is important to note that water demands in the Lavaca Region are currently met almost entirely by groundwater, with this trend expected to continue into the foreseeable future. Thus, the Plan is not anticipated to have a significant impact on bay and estuary inflows. The only water management strategy deemed feasible and recommended in the Plan is Conjunctive Use of Groundwater. During periods of drought, return flows from increased groundwater usage could maintain some portion of streamflow and in turn contribute freshwater inflows to the bay system. The volume and timing of any freshwater contributions from irrigation return flows would be dependent on the intensity and duration of drought conditions as well as the magnitude of non-agricultural streamflows.

2. Per 31 TAC §357.7, Regional Planning Groups are required to consider in the Plan a quantitative assessment of environmental factors for each potentially feasible water management strategy evaluated. Because of the Lavaca Region's predominant dependence on surface water supplies and the fact that any projected shortages would be limited to irrigated agriculture, all potential strategies but one were deemed infeasible due to implementation costs in excess of the level that could be supported by irrigators. Thus, a detailed environmental assessment was not carried out for these strategies as they were not viable options for meeting needs. The sole recommended water management strategy was Conjunctive Use of Groundwater. An assessment of the impacts of this strategy on aquifer storage is included in Chapter 3. Impacts of irrigation return flows and the Conjunctive Use of Groundwater WMS are discussed in greater detail in *Sections 4.4* and *4.5* of *Chapter 4*. It should be noted that the analysis of demand and supply was done assuming certain acreages were in agricultural production during the DOR conditions. The overpumping will occur only if peak agricultural production is combined with DOR hydrological conditions. It is possible that the acreages of rice grown would be reduced during record drought conditions to the extent that pumping of the aquifer beyond the sustainable yield amounts would not occur.

Appendix 4C

Management Strategy Evaluation and Selection

Table 4C.1 - Potentailly Feasible Water Management Strategies

ProviderName	WUGName	MWP Alpha#	WUG Num	RWPG	Seq#	City#	County#	Basin#	Strategy Type	RPG Source	County Source	Basin Source	Source ID	Source Name	Capital Cost	AnnCost 2010	AnnCost 2020	AnnCost 2030	AnnCost 2040	AnnCost 2050	Ann Cost 2060	Supply 2010	Supply 2020	Supply 2030	Supply 2040	Supply 2050	Supply 2060	Comments
	IRRIGATION		161004120	P	1004	1004	120	15	4b1	P	120	16	36331	Direct Reuse	$347,472	$427	$427	$427	$427	$427	$427	123	123	123	123	123	123	Reuse of Ganado municipal effluent
	IRRIGATION		161004120	P	1004	1004	120	15	4b2	P	120	16	36331	Direct Reuse	$539,902	$137	$137	$137	$137	$137	$137	630	630	630	630	630	630	Reuse of Edna municipal effluent
	IRRIGATION		161004120	P	1004	1004	120	15	4e1	P	120	16	12015	Gulf Coast Aquifer	$8,809,450	$970	$970	$970	$970	$970	$970	1,730	1,730	1,730	1,692	1,683	1,683	Conversion of Edna and Ganado to SW*
	IRRIGATION		161004120	P	1004	1004	120	15	4i1	P	120	16	16020	Palmetto Bend II	$159,190,827	$515	$515	$515	$515	$515	$515	5,053	5,053	5,053	5,054	5,053	5,053	Palmetto Bend Stage II
	IRRIGATION		161004120	P	1004	1004	120	15	4o	P	120	15	12015	Gulf Coast Aquifer	$0	$42	$42	$42	$42	$42	$42	5,053	5,053	5,053	5,054	5,053	5,053	Conjunctive Use of Gulf Coast Aquifer
	IRRIGATION		161004120	P	1004	1004	120	15	4i1	P	120	16	TBD	Lavaca Off-Channel	TBD	$800	$800	$800	$800	$800	$800	5,053	5,053	5,053	5,054	5,053	5,053	Off-Channel Stage II Alternative
	IRRIGATION		161004241	P	1004	1004	241	15	4b3	P	120	16	36331	Direct Reuse	$1,112,035	$0	$284	$284	$284	$284	$284	89	89	89	83	83	83	Reuse of El Campo municipal effluent
	IRRIGATION		161004241	P	1004	1004	241	16	4b3	P	120	16	36331	Direct Reuse		$0	$284	$284	$284	$284	$284	506	506	506	512	512	512	Reuse of El Campo municipal effluent
	IRRIGATION		161004241	P	1004	1004	241	15	4i1	P	120	16	16020	Palmetto Bend II		$515	$515	$515	$515	$515	$515	1,490	1,490	1,489	1,489	1,490	1,489	Palmetto Bend Stage II
	IRRIGATION		161004241	P	1004	1004	241	16	4i1	P	120	16	16020	Palmetto Bend II		$515	$515	$515	$515	$515	$515	16,421	16,421	16,422	16,421	16,421	16,422	Palmetto Bend Stage II
	IRRIGATION		161004241	P	1004	1004	241	15	4o	P	241	15	24115	Gulf Coast Aquifer	$0	$42	$42	$42	$42	$42	$42	1,490	1,490	1,489	1,489	1,490	1,489	Conjunctive Use of Gulf Coast Aquifer
	IRRIGATION		161004241	P	1004	1004	241	16	4o	P	241	16	24115	Gulf Coast Aquifer	$0	$42	$42	$42	$42	$42	$42	61,196	61,196	61,197	61,197	61,196	61,197	Conjunctive Use of Gulf Coast Aquifer
	IRRIGATION		161004241	P	1004	1004	241	15	4i1	P	120	16	TBD	Lavaca Off-Channel	TBD	$800	$800	$800	$800	$800	$800	1,490	1,490	1,489	1,489	1,490	1,489	Off-Channel Stage II Alternative
	IRRIGATION		161004241	P	1004	1004	241	16	4i1	P	120	16	TBD	Lavaca Off-Channel	TBD	$800	$800	$800	$800	$800	$800	16,421	16,421	16,422	16,421	16,421	16,422	Off-Channel Stage II Alternative

Note: * Edna and Ganado would convert from groundwater to Lake Texana supply. They would enact their right to recall up to 10,400 ac-ft/yr from the Corpus Christi contract with LNRA.

Table 4C.2 - Reccommended Water Management Strategies

Region	ID	Reccommended Water Management Strategy	Total Capital Costs	First Decade Estimated Annual Average Unit Cost ($/acre-	Water Supply Volume (acre-feet per year) 2010	2020	2030	2040	2050	2060	Year 2060 Estimated Annual Average Unit Cost ($/acre-foot-year)
P	J-IL-1	Conjunctive Use of the Gulf Coast Aquifer - Jackson County	$0	$42	5,053	5,053	5,053	5,053	5,053	5,053	$42
P	W-I-1	Conjunctive Use of the Gulf Coast Aquifer - Wharton County	$0	$42	62,686	62,686	62,686	62,686	62,686	62,686	$42

Appendix 4D

Lavaca River Diversion and
Off-Channel Reservoir Project

LAVACA RIVER DIVERSION AND OFF-CHANNEL RESERVOIR

Description

The Lavaca River Diversion Off-Channel Reservoir Project is currently being developed by the Lavaca-Navidad River Authority as a potential alternative configuration to the current recommended strategy for Palmetto Bend Stage II Reservoir. The Lavaca River Diversion project involves building a large off-channel reservoir (OCR) approximately 10 miles west of Lake Texana. The reservoir is assumed to be square in order to minimize design and construction costs, with the exact sizing to be discussed further detail below. The proposed OCR would be constructed in a manner allowing LNRA to divert high flows from the Lavaca-Navidad to the reservoir, where it can then be pumped at a constant rate to end users of the water. This creates a mechanism to firm up what is an otherwise interruptible water source in order to serve area needs. The pump station and pipeline sizing will also be discussed further in the following text.

Proposed Off-Channel Reservoir

The proposed location for the OCR is approximately 10 miles to the west of Lake Texana. Four alternative reservoir sizes were assessed as part of this study including a 25,000 acre-feet, 50,000 acre-feet, 75,000 acre-feet, and 100,000 acre-feet storage reservoir. The process of determining the optimum size of the reservoir is discussed in further detail below. The location and orientation of the proposed OCR can be seen in Figure 1. The OCR will be generally square in shape, have side slopes of 4:1, and will include provisions for hurricane protection as discussed below.

Reservoir Wave Run-Up Protection

The freeboard for the OCR was determined based upon the wave action from potential hurricanes. Categories 4 and 5 were reviewed, with these categories referring to maximum wind speeds of 145 and 179 mph, respectively. Because of the location and final configuration of the OCR, this situation would require freeboard levels of 10 feet for

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LAVACA-NAVIDAD RIVER AUTHORITY

Water Supply Project

Map of Palmetto Bend
Proposed Off Channel Reservoir

0 4,000 8,000 Feet

FIGURE 1

Date: Friday, December 04, 2009 Updated By: MJA File: H:\PIPES_PUMPS\FINAL_EXHIBITS\Fig14_OCRes_mja.mxd a category 4 hurricane and 12 feet for a category 5. For the estimate of probable cost, a category 4 hurricane was assumed.

Proposed River Intake and Pump Station

The river intake pumping station, which will be located approximately 50 feet off of the east bank of the Lavaca-Navidad River, will be required to pump a maximum of 309 cfs of water to the reservoir. This flowrate was determined while choosing the reservoir size, which is discussed further in Section 4.5. Using this maximum flowrate, the optimal pipe size will be 66 inches in diameter. This was chosen because it is the largest diameter pipe that can be practically used while also reducing the yearly electricity costs to LNRA. The design of the pumping station for this intake will include a 50-feet wide by 85-feet long building that will house the pumps and the electrical equipment.

Proposed Raw Water Delivery System

The raw water delivery system will transport the water from the OCR using a pumping station located on the reservoir, and pump the raw water approximately seven miles to the East Delivery System Pump Station. This water will be pumped at a rate of 6,200 gpm, which equates to 10,000 acre-feet per year. The pipeline transporting the water will be 66 inches in diameter.

This pipeline will be made of poly-coated steel and bar-wrapped concrete cylinder piping. The pipeline will also be required to cross back under the Lavaca-Navidad River in order to connect to the existing delivery system located on Lake Texana. The pumping station will be housed in a building approximately 30 feet wide by 60 feet long, and will house the pumps and the electrical equipment.

Project Yield

Firm yields were determined for the proposed off-channel reservoir by running the Lavaca River Basin Water Availability Model (WAM) with the modifications discussed in Appendix A, Section 1. The firm yield estimates are based on the premises and assumptions reflected in the model. In addition to the four storage scenarios previously discussed (i.e. 25,000 acre-feet, 50,000 acre-feet, 75,000 acre-feet, and 100,000 acre-feet), five pump station diversion rates were modeled (i.e. 50 mgd, 100 mgd, 200 mgd, 500 mgd, and no limit) for a total of twenty simulations. The results of the analyses are presented in Appendix A, Section 2, in Table 1 and Figures 1 and 2.

The maximum theoretical firm yield considering instream flow requirements occurs when the pumping rate is not limited by the capacity of the pump. This situation is represented by the "no limit" simulations. In Appendix A, Section 2, Table 1 and Figure 1 show that for a reservoir with a capacity of 25,000 acre-feet, a pump capable of diverting 200 mgd is needed to maximize the firm yield. In other words, a pump with a larger capacity is unnecessary in this case. For a reservoir with a capacity of 50,000 acre-feet, a pump capable of diverting 200 mgd is needed to maximize the firm yield. A pump capable of diverting just over 200 mgd is also necessary to maximize the firm yield of a reservoir with a capacity of 75,000 acre-feet. For a reservoir with a capacity of 100,000 acre-feet, a pump capable of diverting 500 mgd is needed to maximize the firm yield.

In Appendix A, Section 2, Table 1 and Figure 1 show that as reservoir capacity increases by increments of 25,000 acre-feet, maximum firm yield increases by around 6,000 acre-feet per year. The firm yield for a reservoir with a storage capacity of 100,000 acre-feet and a pumping rate of 100 mgd is smaller than a reservoir of 75,000 acre-feet with the same pumping rate. This is more than likely due to greater evaporation rates from the reservoir with 100,000 acre-feet of storage. Based on the results of the yield study provided in Appendix A, the optimum yield for the Lavaca River Diversion and Off-Channel Reservoir Project is approximately 26,242 acre-feet when coupled with an off-channel reservoir of 75,000 acre-feet and a 309 cfs diversion rate from the Lavaca River. This size reservoir is estimated to take up approximately 3,000 acres of land. While the 75,000 acre-feet reservoir is the most optimal in terms of cost per acre-foot of water, a different size may be chosen based upon the final decision of how much water is ultimately needed.

Estimates of Probable Cost

The detailed cost estimate for this option can be found in Appendix B. The cost estimate is divided up into four major components: the river intake pumping station and pipeline, the reservoir pumping station and pipeline, the raw water reservoir, and the general costs associated with the construction and permitting. The largest cost for this option will be the OCR, which has an estimated cost of approximately $124,000,000 when using a category 4 hurricane surge protection.

The overall project, including contingencies and engineering, is estimated to cost approximately $208,000,000. Assuming a firm yield of 26,242 acre-feet per year, this equates to a cost of $686 per acre-foot, and $2.11 per 1,000 gallons during amortization. After amortization, the costs drop to $132 per acre-foot, and $0.41 per 1,000 gallons.

Potential Water Use

The development of the OCR will result in approximately 26,242 acre-feet of water. There is currently an existing industrial need of approximately 10,000 acre-feet for an existing industrial customer of LNRA in Calhoun County, leaving 16,242 acre-feet for water supply contract and/or project participation by other interested parties. It is currently expected that this excess water will be used for municipal and agricultural uses to meet future needs in Region P (Jackson County), Region L, or Region N.

Local Issues and Concerns

The development of the OCR would result in an increased water supply of approximately 26,242 acre-feet for the region. However, 10,000 acre-feet of this supply is being developed for industrial entity located in Calhoun County, with the remaining 16,242 acre-feet available for contract by other interested parties. While Jackson County has a relatively large demand for agricultural water, demand in Jackson County for municipal and/or industrial water supply is low. In addition, the OCR would result in a unit cost of water far in excess of what agricultural interests could afford. Therefore, it is very likely that the water supply created by the construction of the OCR would benefit other regions outside of Jackson County. The construction of the OCR is expected to inundate approximately 3,000 acres of land at 75,000 acre-feet of storage capacity, therefore impacting landowners in Jackson County.

While the potential property impacts from this option are less than those expected for Palmetto Bend Stage II Reservoir, this option is also likely to result in at least some local resistance. The transport of a local resource (i.e., local surface water) for the economic benefit of other regions is an issue of significant importance to many people. It is expected that concessions, economic or otherwise, would be required by the ultimate end users and benefactors of the project, to enhance the acceptance of this project by the local community.

Water Rights Permit Modifications

Under Certificates of Adjudication No. 16-2095, 16-2095A, 16-2095B, 16-2095C, and 16-2095D. LNRA is authorized to impound and divert water in the Lavaca and Navidad River basins for municipal, industrial, and recreational uses. These permits allow the use of water from two separate reservoirs, one on the Navidad River (existing Palmetto Bend Dam / Lake Texana) and one on the Lavaca River (proposed Palmetto Bend Stage II).

LNRA is authorized to impound up to 170,300 acre-feet of water in Lake Texana on the Navidad River and an additional 93,340 acre-feet in the proposed Palmetto Bend Stage II reservoir on the Lavaca River. LNRA is authorized to divert and use up to 79,000 acre-feet from Lake Texana for municipal and industrial uses and an additional 36,000 acre-feet (not including bay and estuary maintenance flows) from Palmetto Bend Stage II reservoir for municipal and industrial uses. Diversions are currently limited by location to two points on Lake Texana (East and West Delivery System Pump Stations) and by rate to up to 330 cubic feet per second total from Lake Texana. The impoundment and diversions of water each have a priority date of May 15, 1972.

In addition to the permit limitations specified above, the impoundment and diversion of water from Lake Texana is further subject to a bay and estuary release schedule. Inflows into Lake Texana are subject to release from Lake Texana as a function of both reservoir capacity and season. The existing permits further specify that prior to commencement of construction of Palmetto Bend Stage II reservoir, or any diversion of water from Stage II reservoir, upon the joint recommendation of LNRA, Texas Water Development Board (TWDB), and Texas Parks and Wildlife Department (TPWD), LNRA shall submit an application to the Texas Commission on Environmental Quality (TCEQ) to establish a schedule for the release of freshwater inflows from Stage II reservoir. In establishing the Stage II release schedule, the TCEQ may consider the modification to the Lake Texana release schedule. LNRA shall retain the right to withdraw its application at any time prior to any final decision by the TCEQ and upon withdrawal the Lake Texana release schedule shall remain unchanged.

The existing water rights permits for Lake Texana and Stage II reservoirs would need to be modified to incorporate changes associated with the proposed Lavaca River Off-Channel Reservoir project. These modifications may include an additional diversion point on the Lavaca River, the impoundment of water in an off-channel reservoir as opposed to the currently permitted on-channel Stage II reservoir, likely changes in the amounts and distribution currently permitted for industrial and municipal uses, potential addition of agricultural use, and a proposed bay and estuary release (i.e., pass through) schedule for the proposed Lavaca River Off-Channel Reservoir project.

It should be noted that these changes in conditions to the existing permit would likely require a major permit modification and require public notification. In addition, it should also be noted that any of these permit modifications, and specifically the required bay and estuary release schedule, could potentially reduce the project yield from the existing Lake Texana and/or the proposed Lavaca River Off-Channel Reservoir project.

Impact of the Lavaca River Off-Channel Reservoir Project to the Yield of Palmetto Bend Stage II Reservoir

Table 3 in Appendix A provides the impact and reduction in projected firm yield of the Stage II reservoir as a result of implementing the proposed Lavaca River Off-Channel Reservoir project. Based on the results of this analysis and depending on the storage capacity and diversion rate for the Lavaca River Off-Channel Reservoir project, the firm yield of Stage II is reduced from between 38% and 78% of its original amount. The optimum configuration specified as a result of this study for the Lavaca River Off-Channel Reservoir project of 75,000 acre-feet and a 200 mgd diversion rate, results in a reduction in the firm yield of Palmetto Bend Stage II of 42%.

This reduction in yield of Stage II due to implementation of the proposed Lavaca River Off-Channel Reservoir project will likely result in any future consideration of Stage II not feasible. The reduction in yield for Stage II would further increase the unit cost of the project and likely make it longer economically viable compared to other alternatives. Therefore, it is likely that the implementation of the proposed Lavaca River Off-Channel Reservoir would negate the future construction of Stage II. Based on this, the assessment of Stage II and the proposed Lavaca River Off-Channel Reservoir should probably be evaluated as an either/or condition, with the potential for implementing both projects very remote.

APPENDIX A

Modifications to the Lavaca WAM

The use coefficients (UC records) and the instream flow targets (IF record field 3) shown below are taken from Table 1. Four dummy control points (i.e. WQ002A, WQ002B, WQ002C, and WQ002D) were added to facilitate allocation of instream flow targets in order of least restrictive to most restrictive. The dummy control points are necessary because within WRAP this occurs in upstream to downstream order. The other added control point (i.e. NEWOCR) is for the off-channel reservoir. Because it is an off-channel reservoir, there is no point downstream of the reservoir and no naturalized flows at this point. The model assumes the drainage area for the off-channel reservoir itself is minimal.

The priority date for Palmetto Bend - Stage 2 Reservoir (Stage 2) was changed from 05/15/1972 to 01/01/2011 to make it subordinate to the off-channel reservoir, which has a priority date of 12/31/2010. The priority date for the Bay and Estuary flows included in the WAM was changed from 10/06/1993 to 01/01/2011 to subordinate them to the CCEFN flows. The CCEFN flows are considered more restrictive because they tend have a greater bypass requirement (Table 2). The storage capacity for Stage 2 (WS record Field 3) was changed from 62,454 acre-feet to 52,046 acre-feet to agree with the Reservoir Site Protection Study (TWDB, 2008). The storage volume versus storage area relationship (SV/SA records) was updated accordingly (Table A.1 and Figure A.2).

Dummy water rights are used to check if diversions can be made under the 50^{th} percentile (median) and 25^{th} percentile instream flow requirements. If there is still water available in the stream after the median flow has been passed, then the median flow is set for the target that month, otherwise the 25^{th} percentile flow requirement is used. If no water is available for a hypothetical diversion after the 25^{th} percentile flow is passed, then the 7Q2 requirement is used.

The linear relationships between surface area and storage capacity presented in Equations 7 through 10 are input to the WS records for the different reservoir storage volumes. These distinct reservoir designs are activated sequentially. The ML records place maximum limits on the amount of water that can be transferred from the stream (control point WQ002) to the off-channel reservoir (control point NEWOCR). These records simulate pumping rates and are also activated sequentially.

Flow distribution (FD record) and watershed parameters (WP record) which includes drainage area (field 3), curve number (field 4), and average precipitation (field 5) for the added control points are the same as for control point WQ002. This is because although technically downstream of WQ002 for modeling purposes, these points are actually physically located at the same point.

Figure A.1: Additions made to the Lavaca WAM run 3

```
****************** Use Coefficients for OCR *********************
**
UCMEDIAN    3874   5154   4728   4695   5669   5094
UC          2921   2294   2452   2410   2874   3388
UC25THPT    1605   2166   2312   2190   2177   2186
UC          1396   1328   1285   1328   1285   1494
UC   7Q2    1328   1200   1328   1285   1328   1285
UC          1328   1328   1285   1328   1285   1328
**
****************** CP Records for OCR ***************************
**
CP WQ002   20955                        5            GS300      -2
CP 20955  WQ002A                        5            GS300      -2
CPNEWOCR     OUT                        2      NONE  GS300      -3
CPWQ002A  WQ002B                        5             NONE      -2
CPWQ002B  WQ002C                        5             NONE      -2
CPWQ002C  WQ002D                        5             NONE      -2
CPWQ002D   DV212                        5             NONE      -2
**
************** Stage II - Palmetto Bend Reservoir ****************
**
**begin Stage 2 of Texana Project
** STS: Make Stage 2 subordinate to OCR by changing priority date from 19720515 to 20110101 (one day junior)
** Bay and Estuary flows (2095_5)subordinate to CCEFN flows. Change priority date from 19931006 to 20110101
** STS: Change storage capacity from 62454 to 52046 to agree with Reservoir Site Protection Study (TWDB, 2008)
WR WQ002    7150        120110101   1   1    0.00                        61602095_3 TEXANA2
WSSTAGE2   52046
WR WQ002   22850        220110101   1   1    0.00                        61602095_4 TEXANA2
WSSTAGE2   52046
WR WQ002   18122  BAYES120110101   1   1     1.0   20955                     2095_5
**
**WR WQ002   18122  BAYES119931006   1   1     0.0                           2095_5
**end Stage 2 of Texana Project
**
************** CCEFN Instream Flows for OCR *********************
**
** Use dummy water rights to check if diversions can be made under the 2 highest levels of instream
** flow requirements.  Return flows diverted by dummy rights to same control point from which diverted
** to preserve mass balance.
**
IFWQ002A   45553  MEDIAN20101231       1             IFMETESTON
WRWQ002A    12.0        20101231   1   1     1.0  WQ002A                   METEST     OCR
IFWQ002A       0  MEDIAN20101231       1             IFMETESTOF
**
IFWQ002A   20752  25THPT20101231       1             IF25TESTON
WRWQ002A    12.0        20101231   1   1     1.0  WQ002A                   25TEST     OCR
IFWQ002A       0  25THPT20101231       1             IF25TESTOF
**
** Utilize diversions made by dummy water rights to set the appropriate instream flow
** requirement for median and 25th percentile flows.  Since WRAP model protects downstream
** water rights, IF requirement to protect downstream senior rights is unecessary and is
** commented out.
**
**MEDIAN IF
IFWQ002D   45553  MEDIAN20101231       1             MEDIAN-REG
TO     6             LIM     0.1   10.0                          METEST
**25TH PERCENTILE IF
IFWQ002C   20752  25THPT20101231       1             25THPT-REG
TO     6             LIM     0.1   10.0                          25TEST
**WATER QUALITY PROTECTION (7Q2) IF
IFWQ002A   15636     7Q220101231       1                7Q2-REG
**
```

Figure A.1: *(continued)*

```
*************** Diversion for off-channel reservoir ***************
**
WRNEWOCR        0       120101231   1   1                                    FYNEWOCR
** 25,000 ac-ft capacity
WS   OCR   25000  0.0024         1  969.85
** 50,000 ac-ft capacity
**WS   OCR   50000  0.0017         1  1957.3
** 75,000 ac-ft capacity
**WS   OCR   75000  0.0014         1  2947.7
**100,000 ac-ft capacity
**WS   OCR  100000  0.0012         1  3939.5
SO                          WQ002
**  50 mgd (56,045 ac-ft/yr) pump station diversion rate. ML record in ac-ft/mo.
ML4756.8  4334.8 4756.76 4603.32 4756.77 4603.32 4756.77 4756.77 4603.32 4756.77 4603.32 4756.77
** 100 mgd (112,091 ac-ft/yr) pump station diversion rate. ML record in ac-ft/mo.
**ML9513.5  8669.6 9513.54 9206.65 9513.54 9206.65 9513.54 9513.54 9206.65 9513.54 9206.65 9513.54
** 200 mgd (224,182 ac-ft/yr) pump station diversion rate. ML record in ac-ft/mo.
**ML 19027 17339.2 19027.1 18413.3 19027.1 18413.3 19027.1 19027.1 18413.3 19027.1 18413.3 19027.1
** 500 mgd (560,455 ac-ft/yr) pump station diversion rate. ML record in ac-ft/mo.
**ML 47568   43348 47567.7 46033.2 47567.7 46033.2 47567.7 47567.7 46033.2 47567.7 46033.2 47567.7
** STS: End of Diversion additions
**
*************** Palmetto Bend Area-Capacity Data *******************
**
** area capacity of Stage 2 taken from HDR document to RPG dated 10/19/1999
** STS: commented out
**SVSTAGE2   62454   57676   40543   23475   11695    4980    1819     596     152       0
**SA          4887    4679    3888    2940    1774     914     352     138      40       0
** STS: Change SV/SA for STAGE2 to agree with Reservoir Site Protection Study (TWDB, 2008)
SVSTAGE2         0       5     161     507    1127    2927    8360   19182   35152   52046
SA               0      16      49      92     159     609    1649    2725    3688    4564
**
*************** The following changes were made to the DIS file ********************************
**
FD WQ002    GS300       -1
** STS: added the following FD records
FDWQ002A    GS300       -1
FDWQ002B    GS300       -1
FDWQ002C    GS300       -1
FDWQ002D    GS300       -1
** STS: end addition of FD records
**
WP WQ002  832.31    71.12   41.26     1.0
** STS: added WP records for new CPs
WPWQ002A  832.31    71.12   41.26     1.0
WPWQ002B  832.31    71.12   41.26     1.0
WPWQ002C  832.31    71.12   41.26     1.0
WPWQ002D  832.31    71.12   41.26     1.0
** STS: end additions of WP records
**
```

SECTION 2 – WATER AVAILABILITY MODEL TABLES AND FIGURES FOR OPTION 3

Table 1: Firm Yields for Different Storages and Pumping Rates

Storage (ac-ft)	Pumping Rate (mgd)	Firm Yield (ac-ft/yr)
25,000	0	0
	50	9,818
	100	13,050
	200	14,308
	500	14,308
	no limit	14,308
50,000	0	0
	50	11,222
	100	17,235
	200	20,510
	500	20,510
	no limit	20,510
75,000	0	0
	50	11,572
	100	18,154
	200	26,242
	500	26,483
	no limit	26,483
100,000	0	0
	50	11,076
	100	17,838
	200	26,632
	500	32,459
	no limit	32,459

Figure 1: Firm Yields for Different Storages as a Function of Pumping Rate

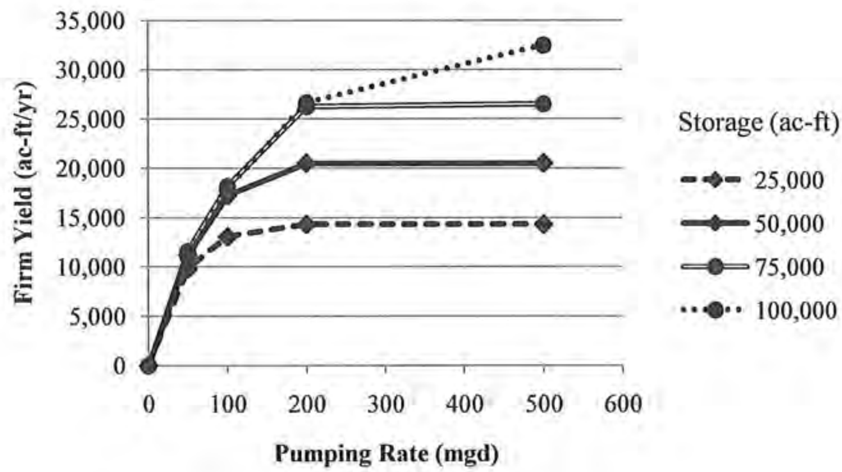


Figure 2: Firm Yields for Different Pumping Rates as a Function of Storage

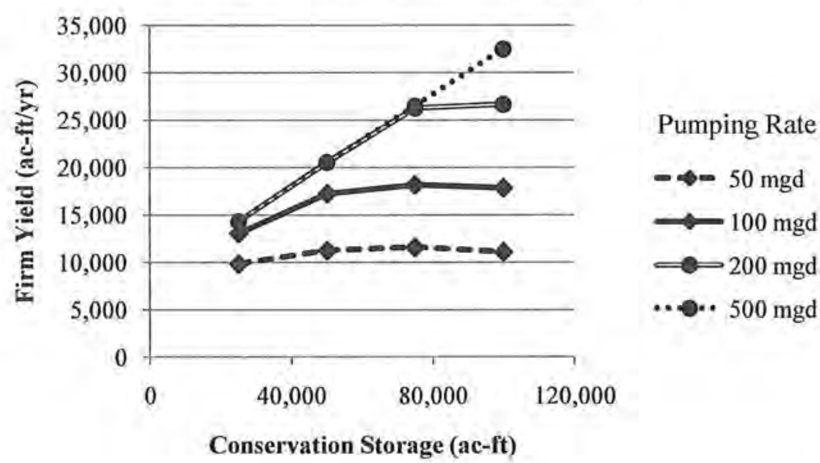


Figure 3: Storage Plot for 100,000 Acre-Foot Off-Channel Reservoir with a Pumping Rate of 50 mgd
(Annual diversion is 11,076 acre-feet)

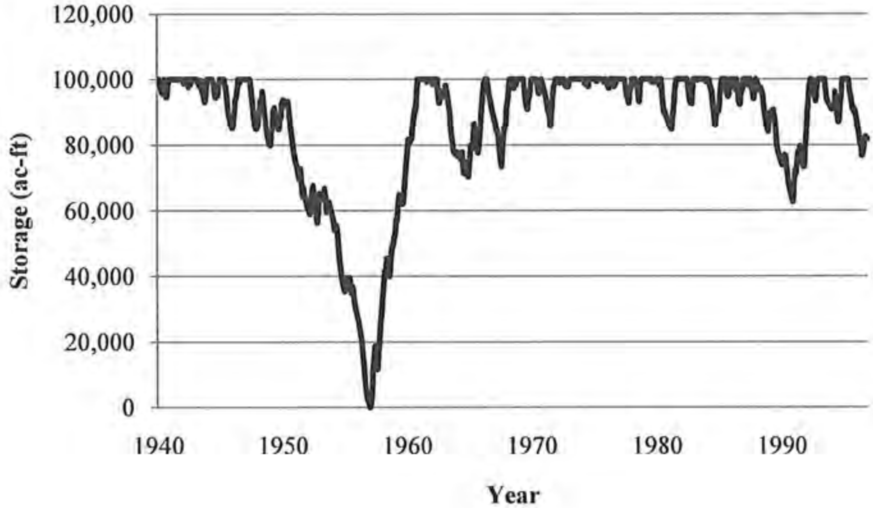


Figure 4: Storage Plot for 100,000 Acre-Foot Off-Channel Reservoir with a Pumping Rate of 500 mgd
(Annual diversion is 32,459 acre-feet)

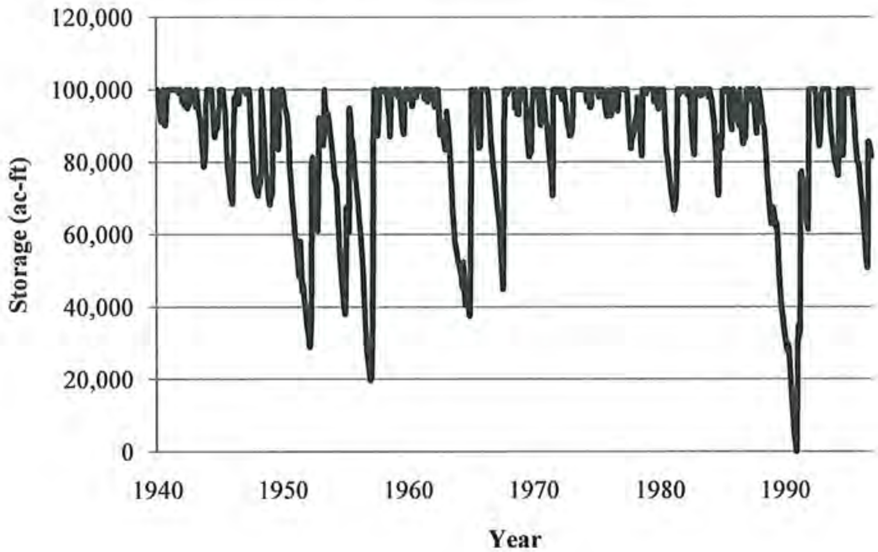


Table 2: Critical Draw-Down Period as a Function of Pumping Rate

Storage Capacity (ac-ft)	Pumping Rate (mgd)	Storage Jan 1957 (% capacity)	Storage Dec 1990 (% capacity)	Critical Draw-Down Period	Duration of Critical Draw-Down Period (months)	Month of Least Storage
25,000	50	0	44	10/1953 to 10/1957	49	Jan 1957
	100	0	18	10/1953 to 4/1957	43	Jan 1957
	200	0	3	9/1955 to 3/1957	19	Jan 1957
	500	0	3	9/1955 to 3/1957	19	Jan 1957
50,000	50	0	53	7/1950 to 9/1958	99	Jan 1957
	100	0	20	10/1953 to 10/1957	49	Jan 1957
	200	15	0	1/1988 to 11/1991	47	Dec 1990
	500	17	0	1/1988 to 3/1991	39	Dec 1990
75,000	50	0	58	6/1947 to 12/1959	151	Jan 1957
	100	0	33	2/1950 to 4/1958	99	Jan 1957
	200	0	1	5/1953 to 9/1957	52	Jan 1957
	500	22	0	1/1988 to 3/1991	39	Dec 1990
100,000	50	0	63	6/1947 to 10/1960	161	Jan 1957
	100	0	44	6/1947 to 1/1959	140	Jan 1957
	200	0	17	2/1950 to 12/1957	95	Jan 1957
	500	20	0	1/1988 to 11/1991	47	Dec 1990

Table 3: Firm Yields for Off-Channel Reservoir and Palmetto Bend - Stage 2 Reservoir for Different Storages and Pumping Rates

Storage (ac-ft)	Pumping Rate (mgd)	Firm Yield (ac-ft/yr)	Firm Yield Stage 2 (ac-ft/yr)	Stage 2 Yield (% Reduction due to OCR)
25,000	0	0	18,529	0
	50	9,818	11,566	38
	100	13,050	10,664	42
	200	14,308	10,664	42
	500	14,308	10,664	42
	no limit	14,308	10,664	42
50,000	0	0	18,529	0
	50	11,222	10,995	41
	100	17,235	10,664	42
	200	20,510	10,664	42
	500	20,510	9,608	48
	no limit	20,510	9,608	48
75,000	0	0	18,529	0
	50	11,572	10,995	41
	100	18,154	10,664	42
	200	26,242	10,664	42
	500	26,483	7,698	58
	no limit	26,483	7,698	58
100,000	0	0	18,529	0
	50	11,076	10,995	41
	100	17,838	10,664	42
	200	26,632	10,664	42
	500	32,459	3,936	79
	no limit	32,459	4,166	78

Figure 5: Firm Yields for Off-Channel Reservoir and Palmetto Bend – Stage 2 Reservoir for Different Storages as a Function of Pumping Rate

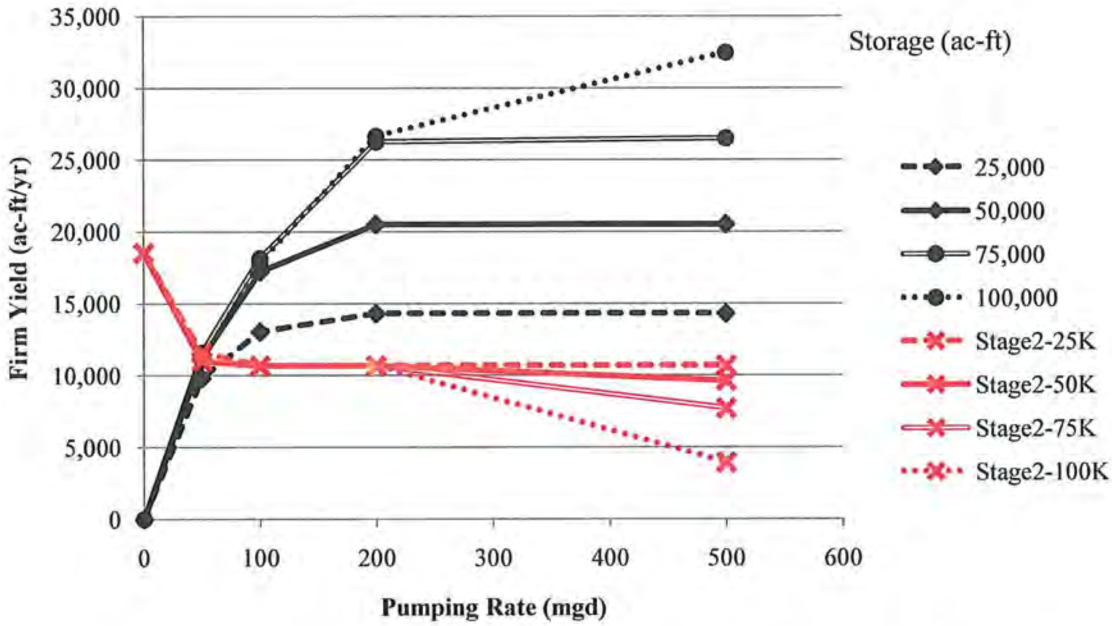
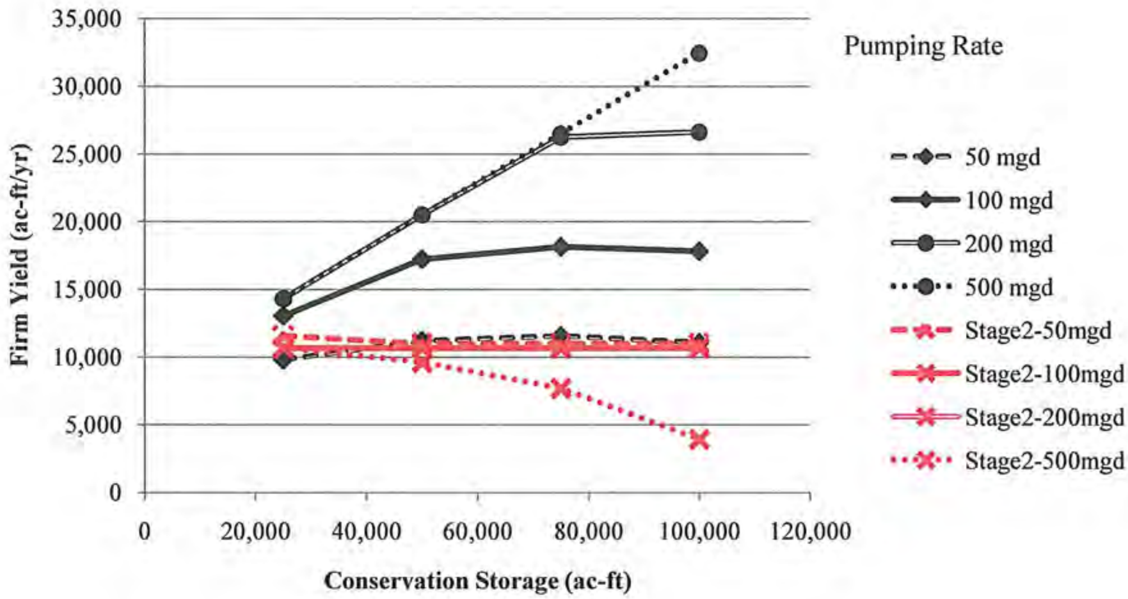


Figure 6: Firm Yields for Off-Channel Reservoir and Palmetto Bend – Stage 2 Reservoir for Different Pumping Rates as a Function of Storage



Pumping Rate
50 mgd
100 mgd
200 mgd
500 mgd
Stage2-50mgd
Stage2-100mgd
Stage2-200mgd
Stage2-500mgd
Firm Yield (ac-ft/yr)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
20,000
40,000
60,000
80,000
100,000
120,000
Conservation Storage (ac-ft)

APPENDIX B

FREESE AND NICHOLS

LAVACA-NAVIDAD RIVER AUTHORITY
OCR WATER RIGHTS AND FACILITIES

OPINION OF PROBABLE CONSTRUCTION COST
RAW WATER PUMP STATIONS, PIPELINES, & RESERVOIR

NOVEMBER 2, 2009

ESTIMATOR	CHECKED BY	ACCOUNT NO
JWE		LVA09297

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	RIVER INTAKE PUMPING STATION & PIPELINE				**$12,317,025**
1	MOBILIZATION (5%)	1	LS	$586,525	$586,525
	PIPELINE	-	-	-	-
2	66" DIAMETER PIPELINE	7,500	LF	$330	$2,475,000
3	PIPELINE ROW CLEARING AND RESTORATION	9	AC	$2,500	$22,500
4	EASEMENT ACQUISITION	9	AC	$5,000	$45,000
5	CATHODIC PROTECTION	7,500	LF	$10	$75,000
6	6" AIR VALVES	4	EA	$12,000	$48,000
7	12" BLOW-OFF VALVES	1	EA	$15,000	$15,000
	PUMP STATION	-	-	-	-
8	SITEWORK	1	LS	$325,000	$325,000
9	CONCRETE	1	LS	$450,000	$450,000
10	PIPING, VALVES, AND EQUIPMENT	1	LS	$3,500,000	$3,500,000
11	ELECTRICAL	1	LS	$950,000	$950,000
12	BUILDING	1	LS	$400,000	$400,000
13	INTAKE STRUCTURE	1	LS	$75,000	$75,000
14	FLOW METER VAULT	1	LS	$50,000	$50,000
15	PUMPS	4	EA	$825,000	$3,300,000
	RESERVOIR PUMPING STATION & PIPELINE				**$18,183,375**
16	MOBILIZATION (5%)	1	LS	$865,875	$865,875
	PIPELINE	-	-	-	-
17	48" DIAMETER PIPELINE	39,600	LF	$240	$9,504,000
18	PIPELINE ROW CLEARING AND RESTORATION	45	AC	$2,500	$112,500
19	EASEMENT ACQUISITION	45	AC	$5,000	$225,000
20	CATHODIC PROTECTION	39,600	LF	$10	$396,000
21	3" AIR VALVES	20	EA	$7,500	$150,000
22	6" BLOW-OFF VALVES	8	EA	$10,000	$80,000
23	CREEK CROSSINGS	4	EA	$400,000	$1,600,000
	PUMP STATION	-	-	-	-
24	SITEWORK	1	LS	$225,000	$225,000
25	CONCRETE	1	LS	$300,000	$300,000
26	PIPING, VALVES, AND EQUIPMENT	1	LS	$2,250,000	$2,250,000
27	ELECTRICAL	1	LS	$800,000	$800,000
28	BUILDING	1	LS	$350,000	$350,000
29	FLOW METER VAULT	1	LS	$50,000	$50,000
30	PUMPS	3	EA	$425,000	$1,275,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	RAW WATER RESERVOIR				**$124,479,289**
31	MOBILIZATION (5%)	1	LS	$5,645,761	$5,645,761
32	CARE OF WATER (2%)	1	LS	$2,258,304	$2,258,304
33	SITE PREP AND RESTORATION	346	AC	$10,000	$3,460,000
34	EROSION AND SEDIMENTATION CONTROLS	1	LS	$200,000	$200,000
35	EXCAVATION - STRIPPING	398,267	CY	$5.00	$1,991,335
36	EXCAVATION - CORE TRENCH	381,481	CY	$2.50	$953,703
37	EXCAVATION - BORROW RESERVOIR POOL AREA	13,696,330	CY	$2.00	$27,392,660
38	COMPACTED FILL	12,291,333	CY	$3.50	$43,019,666
39	SOIL CEMENT - U/S SLOPE	447,968	CY	$65	$29,117,920
40	TOE DRAIN SYSTEM	73,244	CY	$75	$5,493,300
41	GRASSING	160	CY	$7,500	$1,200,000
42	FLEXIBLE BASE - ACCESS ROADS	34,333	CY	$80	$2,746,640
43	MISC. INSTRUMENTATION	1	LS	$1,000,000	$1,000,000
	GENERAL				**$2,425,000**
44	PERMITTING	1	LS		$0
45	LAND PURCHASE (RESERVOIR)	400	AC	$2,000	$800,000
46	SURVEYING	1	LS	$1,500,000	$1,500,000
47	GEOTECHNICAL	1	LS	$125,000	$125,000
		SUBTOTAL:			$157,405,000
		ESCALATION		0%	$0
		SUBTOTAL:			$157,405,000
		CONTINGENCY		20%	$31,481,000
		SUBTOTAL:			$188,886,000
		OH & P		10%	$18,889,000
PROJECT TOTAL (2009 DOLLARS)					**$207,775,000**

Unit Cost of Water - Option 3		
Project Capital Costs		
Pipeline Construction Costs (2009 Dollars)	$	20,440,728
Pump Station Construction Costs (2009 Dollars)	$	19,819,800
Reservoir Construction Costs (2009 Dollars)	$	164,312,661
General Costs (2009 Dollars)	$	3,201,000
Total Project Costs	**$**	**207,774,189**
Annual Costs		
Debt Service for Land (3% for 20 years)	$	134,431
Debt Service for Eng./Permitting (3% for 20 years)	$	586,153
Financing for Construction (6% for 40 years)	$	13,808,992
Reservoir O&M (1.50% of Reservoir Costs)	$	2,464,690
Delivery System O&M (2.50% of Delivery System Costs)	$	1,006,513
Subtotal Annual Costs	**$**	**18,000,779**
Water Supply Created		
Firm Yield (acre-feet per annum)		26,242
Unit Cost of Water (during Amortization)		
Per Acre Foot	**$**	**685.95**
Per 1,000 Gallons	**$**	**2.11**
Unit Cost of Water (after Amortization)		
Per Acre Foot	**$**	**132.28**
Per 1,000 Gallons	**$**	**0.41**

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Appendix 4E

Analysis of Garwood IBT

Analysis of Garwood IBT

The City of Corpus Christi currently holds an agreement with LCRA for the purchase of up to 35,000 acre-feet per year of water from a right formerly held by the Garwood Irrigation Company (prior to purchase by LCRA). This water right, which is permitted for 168,000 acre-feet per year at a maximum rate of 1,488 acre-feet per day, is the most senior right in the Lower Colorado River Basin with a priority date of November 1, 1900. An amendment (granted in October 1998) to the certificate of adjudication for the total Garwood right authorizes Corpus Christi's diversion of 35,000 acre-feet per year at a maximum rate of 150 cfs (297.5 acre-feet per day). The amendment also subordinates Corpus Christi's purchase to the remainder of the right by setting a priority date of November 2, 1900.

1.1 Bed and Banks Transfer Option

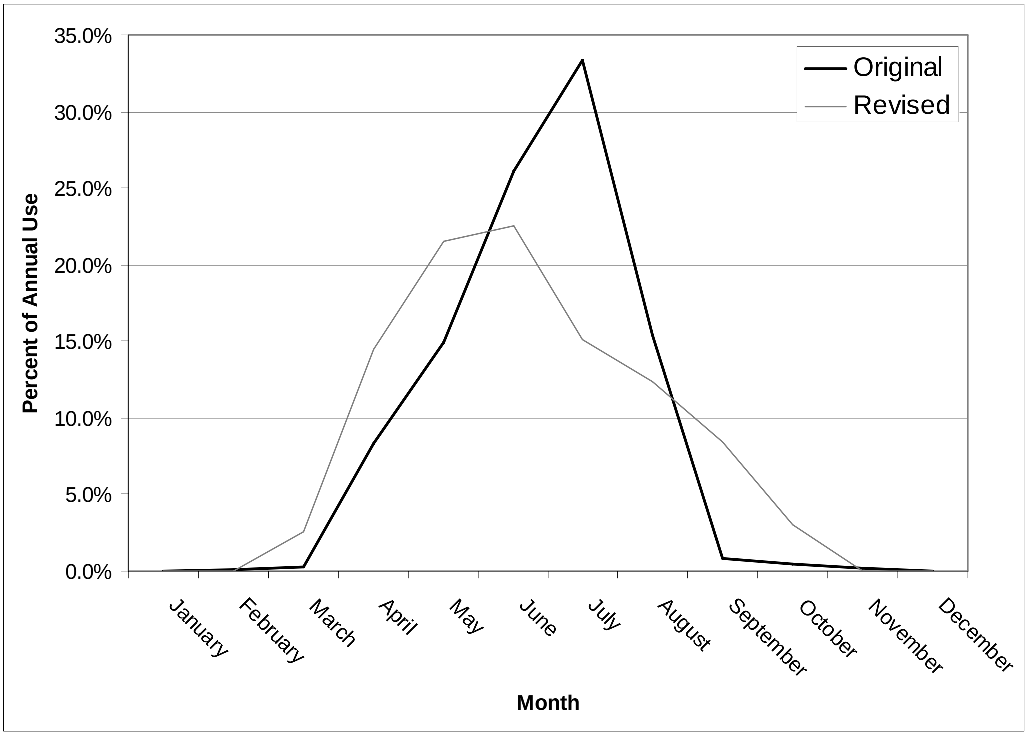
The Region N 2006 RWP summarized a number of options for the interbasin transfer of this water from its source in the Lower Colorado River Basin to Corpus Christi. While several options dealt with transmission of water via pipeline, one option considered conveying water through canals and natural stream segments for part of the transfer length. Specifically, the water would be conveyed from the diversion point on the Colorado River through the Town Canal and into West Mustang Creek in the Lavaca River Basin. The water would then move through West Mustang Creek and into Lake Texana. From this point, the water would be conveyed through the Mary Rhodes Pipeline to the City of Corpus Christi.

While this option would reduce construction costs for the City of Corpus Christi, there are a number of factors that complicate this option. Due to the potential for impacts to water users both within and outside of LRWPA, the 2011 RWP includes analysis of this transfer. There are a number of complex and interrelated ways in which the transfer of the Garwood water supply through West Mustang Creek and Lake Texana could impact users in the Lavaca basin. Current operating rules for Lake Texana allow upstream irrigators access to interruptible supply when the reservoir level is at or above 43 feet above mean sea level. The influx of additional water into the reservoir potentially alters the lake level and, in turn, access to interruptible supplies.

Also of concern is the environmental flow restriction established in the permit for the Lake Texana water right. When the reservoir is at or above 78.18 percent of capacity (approximately 40.9 feet above MSL), it must pass all inflows up to the historical monthly median flow for January, February, March, July, November, and December. For the remaining months with the requisite stored volume, all inflows up the historical monthly average flow. If the Garwood supply water is diverted from the Lavaca Basin via a bed and banks permit senior to Lake Texana, this could potentially result in Lake Texana being forced to pass more water for environmental flows (due to the greater total inflow) without any benefit from the transferred water.

The potential impacts of the Garwood interbasin transfer on the Lavaca Basin were assessed using the latest Run 3 Water Availability Model (WAM) from TCEQ. The Run 3 WAM for the Lavaca Basin models streamflow and water right diversions at a monthly timestep with full authorized diversions for all water rights and consumptive use for most categories except irrigation. Two changes were made to the TCEQ WAM to develop a base model for the study. The first change was alteration of the model's water demand distribution for irrigated agriculture. Because the water rights along West Mustang Creek are predominantly for irrigation, using a reliable pattern for these rights is important. The model's default irrigation demand distribution was examined by LG Raun and by Neil Hudgins (CBGCD). Both provided similar field data for rice irrigation which was used to replace the default pattern in the model. While not all crops grown in the region have the same water demand distribution as rice, the strong predominance of rice in regional water demand supports this assumption. A comparison of the default and revised irrigation patterns is shown in *Figure 4D-1* below.

Figure 4D-1
Irrigation Water Distribution for Lavaca WAM



The second change made to the TCEQ model was a refinement of the environmental flows restriction for Lake Texana. As noted earlier, Lake Texana must pass all inflows **up to** certain historical averages or medians. The original model did not contain a provision for months where inflows would be less than the monthly median or average, thus forcing upstream junior rights to pass additional flow so that inflows will meet the target. A minor change was made to the model to correct this.

After incorporating these two changes, the resultant base model was executed to determine behavior of the Lavaca Basin without the Garwood interbasin transfer. A second model was then developed from the base model to represent the Lavaca Basin with the Garwood transfer. The water for the IBT enters West Mustang Creek near its headwaters using a monthly input distribution derived from the diversion distribution in the Colorado Basin WAM. The diversion of the IBT water out of the stream system occurs at the same model control point as Lake Texana. Because there is no provision for Garwood supply water to be stored in the Lake, the full amount entering West Mustang Creek must be diverted in the same month.

While the mechanics of modeling the Garwood IBT were relatively simple, a major consideration in determining the outcome of the model is the priority date assigned to the diversion of the Garwood supply water back out of Lake Texana. It is highly unlikely that the City of Corpus Christi would elect to use this IBT method if granted a bed and bank permit with a junior priority, due to the substantial losses that would occur to senior irrigators along West Mustang Creek, as well as to meeting the environmental flows restriction for Lake Texana. Preliminary analysis using a junior diversion for the Garwood IBT indicated that losses would average approximately 70 percent and in some years would consume the entire 35,000 acre-feet. For this reason, the Garwood IBT was modeled at a priority senior to the other rights in the basin. The Lavaca WAM includes no channel losses for the portion of West Mustang Creek between the entry point for the IBT and Lake Texana. Therefore, no provisions were incorporated for losses, as would typically be written into a bed and banks permit.

1.2 Impacts to Lake Texana Storage and Passthrough Flows

While the Garwood IBT is not authorized to store water in Lake Texana and must therefore withdraw the IBT water in the same timestep that it enters the system, there is still the potential for the IBT to alter storage levels in the lake due to alteration of monthly environmental flow passthrough requirements for Lake Texana. Median monthly lake levels for the base and IBT model runs are shown in *Table 4D-1.*

Table 4D-1
Median Lake Levels for WAM Simulations

Month	Median Storage Volume (ac-ft)			Median Water Surface Elevation (ft above MSL)		
	Base	IBT	Change	Base	IBT	Change
1	170,300	170,300	0	45.0	45.0	0.0
2	166,521	168,245	1,725	44.0	44.5	0.5
3	165,987	165,987	0	43.9	43.9	0.0
4	158,489	157,611	-878	41.9	41.6	-0.2
5	155,283	151,919	-3,364	41.0	40.1	-0.9
6	152,412	149,710	-2,702	40.3	39.6	-0.7
7	147,873	145,401	-2,472	39.1	38.4	-0.7
8	141,754	138,987	-2,767	37.5	36.7	-0.7
9	143,025	139,887	-3,138	37.8	37.0	-0.8
10	140,423	138,738	-1,685	37.1	36.7	-0.4
11	149,932	147,883	-2,049	39.6	39.1	-0.5
12	167,534	166,453	-1,082	44.3	44.0	-0.3

As shown in the table, during the period of January through March, median levels in Lake Texana are either unchanged or slightly increased due to the Garwood IBT. However, for the remainder of the year median lake levels are decreased by as much as 0.9 feet (approximately 11 inches). This reduction in Lake Texana storage is due primarily on the Garwood IBT's interaction with the environmental flow restriction on Lake Texana. As noted earlier, when Lake Texana is above 78.18 percent capacity, it must pass all inflows up to the historical monthly median flow for January, February, March, July, November, and December and all inflows up to the historical monthly average for the rest of the year. For a significant number of months in the base model, the inflow into the lake is well below the monthly upper limit, meaning that any additional inflow up to the limit would also have to be passed for environmental flows. Thus, there are a number of months where the increased inflow due to the Garwood IBT means that the passthrough flow requirement for Lake Texana is increased. However, the IBT is senior to the rights in Lake Texana and the environmental flows restriction and is thus diverted without regard to passthrough flows. This leaves the lake and ROR river rights responsible for making up the difference. To meet the new passthrough requirement, upstream junior rights must pass more water, and Lake Texana would have to in turn pass water that otherwise may have contributed to refilling reservoir storage. As a net effect, Lake Texana would experience a reduction in median storage levels.

The increase in median storage levels for February seemingly contradicts this; however, closer examination of reservoir levels reveals that for all but two years in the 57-year simulation period, storage levels in February are reduced or unchanged. The two months that increase do so substantially, leading to a positive change in median. For these two months, it is actually the drop in lake level caused by the IBT in previous months that allows these large increases in storage. Under the Garwood IBT, storage for these months begins below the 78.18 percent threshold and thus a much lower passthrough level is required, while the base model must still pass flows at a higher level. This means that when a substantial inflow is available in these months, the IBT model can use more of the inflow to refill storage in Lake Texana.

One potential solution that could reduce the impacts to Lake Texana would be an agreement between the City of Corpus Christi and LNRA subordinating part of the IBT to the environmental flow restriction on Lake Texana; that is, the City of Corpus Christi would be responsible for meeting any increases in Lake Texana passthroughs due to the Garwood IBT. Due to the complex interactions between streamflow, reservoir storage, and environmental flow restrictions in the Lavaca basin and the tendency for changes in reservoir levels to propagate in subsequent months, this scenario was investigated in a simplified spreadsheet form. The spreadsheet calculated the environmental flows requirement for Lake Texana based on reservoir levels and inflows for the base model. Passthrough requirements were then recalculated after adjusting inflows for the Garwood IBT. A comparison of the two passthrough volumes was then generated to determine the approximate amount of water "owed" by the City of Corpus Christi to LNRA. For the 57-year model simulation period, this increase in required passthroughs ranged from 0 to over 24,000 acre-feet per year. The average annual difference was slightly over 12,000 acre-feet per year (median difference of approx 13,000 acre-feet per year). Average changes for each month are shown in *Table 4D-2* below. While the volume of the IBT owed to LNRA would vary considerably from year to year, over the long run the City of Corpus Christi would lose approximately 35 percent of the Garwood IBT to meet the increases in environmental flow passthroughs for Lake Texana.

Table 4D-2
Average Lake Texana Passthrough Target for WAM Simulations

Month	Average Passthrough Requirement (ac-ft)		
	Base	IBT	Change
1	3,420	3,647	227
2	5,650	5,841	192
3	4,069	4,365	296
4	20,578	22,074	1,496
5	38,569	40,108	1,539
6	28,799	30,159	1,360
7	5,208	6,255	1,048
8	5,485	7,437	1,951
9	17,321	17,964	643
10	13,733	15,792	2,058
11	2,667	2,708	42
12	3,155	3,275	120

1.3 Impacts to Basin Rights

The TCEQ WAM for the Lavaca River Basin includes diversions for 55 run-of-river (ROR) water rights. Model results indicated that implementation of the Garwood IBT, as described above, would potentially impact 36 of these rights. Eight rights experience an increase in median and/or average flows. The total increase in minimum annual diversion for all eight rights combined is about 550 acre feet, but the average annual change is smaller than this. These rights are fairly senior in the basin (priority years from 1924 to 1966). The increased streamflow from the IBT allows these rights to divert more water from West Mustang Creek. Other junior rights in other parts of the basin are in turn forced to pass more flows to Lake Texana to meet the Garwood diversion back out of the Lake at its outlet. The Garwood diversion is still met and the net effect is an overall reduction in average yield for junior rights in the basin. For the other 28 impacted rights, average annual diversions were reduced by 1 to 12 percent. Because most of these rights were completely unable to divert during some years of the drought of record, they were not considered firm and thus the Garwood IBT had no impact on their firm yield. Only for one firm right did the Garwood IBT reduce the minimum annual diversion.

Decreases in diversions due to the Garwood IBT occur primarily in western Wharton County and southeastern Jackson County. The majority of these rights are junior to Lake Texana. The eight increasing rights, which are relatively senior in the basin, are located along West Mustang Creek. The remaining rights, which were primarily senior rights or located far upstream of Lake Texana, were not impacted by the Garwood IBT.

The rights for water stored in Lake Texana were not impacted by the Garwood IBT. For all 57 years of the simulation period, the full diversion target of 74,500 acre-feet was met with or without the Garwood transfer. Because Lake Texana is the only surface water supply source within LRWPA, surface water availability given in *Chapter 3* would not need to be revised in the event that the Garwood IBT was implemented. There were, however, some changes to the availability of interruptible supply out of Lake Texana. These changes will be discussed in *Chapter 5* of this RWP.

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Contents

List of Tables

List of Figures

List of Appendices

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Chapter 5 – Impacts of Water Management Strategies on Key Parameters of Water Quality and Impacts of Moving Water From Rural and Agricultural Areas

5.1 Scope of Work

The overall project scope consists of preparing a regional water supply plan for LRWPG, representing all of Lavaca and Jackson Counties as well as the Precinct 3 and City of El Campo portions of Wharton County. LRWPG is one of 16 state water supply planning groups defined by TWDB. RWPs prepared by each RWPG will be combined into a comprehensive state water plan. The planning effort is part of a consensus-based planning effort to include local concerns in the statewide planning effort.

This chapter presents the results of Task 5 of the project scope, which addresses impacts of water management strategies on key parameters of water quality and impacts of moving water from rural and agricultural areas. Note that the scope contains items related to an interbasin transfer of water from the City of Corpus Christi's Garwood supply right. Subsequent to scope development and approval by TWDB and during development of the RWP, the City of Corpus Christi elected to transfer the IBT water entirely by pipeline; the scenario included in the scope of the 2011 RWP for LRWPA is no longer under consideration. Analysis of the hypothetical bed-and-banks transfer is included in *Appendix 5B.*

5.2 Impacts of Water Management Strategies on Key Parameters of Water Quality

The potential impacts that water management strategies might have on water quality are discussed herein. The identified water quality parameters deemed important to the use of the water resources within the region as well as how they are impacted by the water management strategies are also discussed below.

Key water parameters identified within LRWPA are:

- Bacteria
- pH
- DO
- TDS
- TSS
- Chlorides
- Nutrients (nitrogen, phosphorus)
- Salinity

The water quality parameters and water management strategies selected by LRWPG were evaluated to determine the impacts on water quality as a result of these recommended strategies. This evaluation used the data available to compare current conditions to future conditions with LRWPG management strategies in place. For the Lavaca Region, the predominant water use is for agricultural purposes, with 95 percent of the water used for irrigation and livestock watering. The water for municipal and manufacturing use is less than 4 percent of the total demand. In addition, the Gulf Coast aquifer in this area currently has a sufficient amount of water in storage, and it is assumed that all of the municipal and manufacturing demands will be met because these users will be better able to drill deeper wells and accommodate the cost of increased pumping lifts to a much greater extent than will agricultural users.

Approximately 87 percent of the irrigation demand is used for growing rice. As a result of the predominance of agricultural water use, the Lavaca Region is very price sensitive, and the review of management strategies tends to focus heavily on cost. If the price is too high, the strategy will not be implemented because the users will be unable to afford it. For the 2001 RWP, a value of $100 per acre foot (ac-ft) was selected as the upper limit of what the agricultural interests would be able to pay for irrigation water. Based on local experience of members of the LRWPG, this limit is currently set at $50 per acre-foot because of the continuing economic pressure on agricultural users, although there was some sentiment in the Planning Group that even this figure was too high. For this reason, conjunctive use of the Gulf Coast aquifer during DOR was determined to be the only feasible strategy. For additional information, see *Chapter 4*.

5.2.1 Water Quality Overview

Water quality records were obtained from TWDB for wells completed in the Chicot, Evangeline, and Jasper aquifers in the Lavaca Region. Records available from TWDB include water quality data dating back to the 1930s through 2005, with limited data available for 2009. Of the key water parameters identified in the Lavaca Region, TWDB includes records for pH, TDS, and chloride for groundwater. Irrigation, domestic, municipal, manufacturing, and livestock supplies are the main uses for water in LRWP.

The most recent TWDB water chemistry results available are from 2005-2006. Some data are available for 2009 but are limited to specific conductance and pH measurements. Data from TWDB show that the groundwater in the Lavaca Region continues to be of good quality and that the quality has not changed significantly throughout the years. For the constituents examined, recent data indicates average concentrations near or below the historical average. Recent data indicate TDS levels generally range from about 300 to 700 mg/L in wells within the Lavaca Region. The principal constituents are generally bicarbonate with smaller amounts of calcium, sodium, chloride, and sulfate. The chloride values generally range from about 30 to 200 mg/L in wells sampled in 2005 and 2006. The TDS content of the water generally is in the range of 300 to 750 mg/L, but can be as much as 970 mg/L at a few locations in Jackson County.

Analysis of TWDB water quality data does not indicate substantial areas where the groundwater quality is changing. There are a few industrial wells located in the very southern part of Jackson County along SH 35 that have chloride levels that have increased some over the years. The wells are located near Carancahua Bay where there is a limited thickness of fresh groundwater.

Comparison of available water quality records for periods of high use in the Lavaca Region during the 1980s to the recent 2005 and 2006 TWDB water quality records do not indicate a change in the water quality. Available data for wells sampled in the 1980s and recent years have water quality constituents with similar values with only slight differences noted. Samples taken from wells in 2005 or 2006 that are located near wells sampled in the late 1970s through late 1990s also tend to have similar reported values for the water quality constituents.

As discussed previously, a water supply strategy within the Lavaca Region includes pumping groundwater as needed to satisfy the regional water demands. This strategy includes pumping a larger quantity of groundwater in some years than estimated to be available on a sustainable basis and also pumping less groundwater than the estimated sustainable availability during years when precipitation is higher than normal and the demand for water for irrigation is lower.

For Lavaca County, the estimate of water demand is less than the estimate of overall groundwater availability. While the total groundwater availability of Jackson County (about 87,876 ac-ft/yr) exceeds groundwater demands, the portion of this groundwater available in the Colorado-Lavaca coastal basin is less than the irrigation need in the corresponding area. This localized shortage is about 5,050 ac-ft/yr. Thus, for these two counties the pumping of groundwater from the aquifers is less than or just about equal to the estimate of groundwater availability. Historical data show that in Jackson County groundwater pumping averaged about 66,000 ac-ft/yr from 1990 through 2000 and had been as high as 136,000 ac-ft/yr in 1980.

In Wharton County, it is estimated that groundwater pumping in some years could exceed the estimate of groundwater availability within the Lavaca Region in Wharton County. Estimated groundwater demand in 2030 is 152,813 ac-ft/yr. As noted previously, this groundwater demand represents peak agricultural demand combined with drought conditions. Pumpage for the last ten years in the Lavaca Region of Wharton County has ranged from about 78,000 ac-ft/yr to an estimated 132,000 ac-ft/yr. Chemical analyses available for wells within the Lavaca Region of Wharton County show TDS that averaged about 495 mg/L in the period of the early 1980s and averaged about 539 mg/L for samples collected in 2005. The data show very little change in the overall mineralization of the water during a period of relatively intense irrigation and water use. It is estimated, based on the available data and stable TDS content of the groundwater, that the strategy of overpumping the aquifers during years when water demand is higher and precipitation is lower and pumping less groundwater from the aquifers during years when precipitation is higher and irrigation demand is lower should not have a significant effect on the quality of the groundwater. The Chicot and Evangeline aquifers provide a prolific water source within most of the Lavaca Region, and the Jasper aquifer provides groundwater in the northern and central parts of Lavaca County. The aquifers should continue providing good quality groundwater for the pumping regime that is estimated to occur in future decades as water is utilized for irrigation, public supply, domestic, industrial, and livestock uses.

5.2.2 Conservation Impacts

Another issue of concern is the application of conservation measures to minimize agricultural shortages as a first strategy. This works well as a strategy for those farms which are family owned and operated and for as long as matching grants are available through EQIP. EQIP provides funding for conservation in the rice industry in particular through grants for precision leveling and multiple inlets as well as canal lining. Additional support to further reduce the out-of-pocket costs to the farmer is also needed to ensure more widespread implementation of water conserving practices. While the EQIP grants are helpful, it is still difficult for farmers to justify the expense of the remaining 50 percent matching share. It is also noted that much of the region relies upon tenant farmers who have only a year-to-year contract with a landowner. Typically tenant farmers are unwilling to put up any money for conservation purposes since they may not be able to gain the benefit of the improvements beyond the year in which they are built. In addition, since there is an agricultural shortage and not a municipal shortage in the region, there is not an incentive for any of the municipalities to pay for on-farm conservation in exchange for the water saved. Whoever pays for the conservation will have to take less water than the amount of water saved in order for there to be any additional water for resolving the shortages. As a result of the issues noted above, the only feasible management strategy is pumping additional groundwater during drought conditions. This strategy is somewhat self limiting in that surface water is cheaper to pump than groundwater because of the greater cost of pumping groundwater to the surface. As a result, when surface water is available, the farmers are going to use it because there is a cost advantage in doing so. As a result, extra groundwater will only be pumped during the driest years, and the groundwater pumpage will be reduced again as soon as surface water is available. Therefore, the extra pumpage is temporary and is not anticipated to have a long-term impact on aquifer levels in the region.

Water conservation, including municipal, industrial, and agricultural, can have a positive impact on water quality under some conditions but a negative impact during other conditions. Conventional municipal and industrial wastewater treatment plants are strictly regulated with regard to suspended solids and oxygen demanding materials. A wastewater treatment plant that provides lower flows with the same limits on suspended solids and oxygen demanding materials will put less pounds of these materials in the waters of the state. However, these plants face much less regulation on dissolved solids in the effluent if, in fact, dissolved solids are regulated at all. Municipal and industrial conservation will likely cause increases in dissolved solids concentrations because the dilution with freshwater is less. As a result, discharge of more concentrated effluent from a dissolved solids standpoint during dry weather conditions may have a negative effect on water quality.

Water that is applied to irrigated acreage carries nutrients, sediments, salts, and other pollutants from the farmland. While it is intuitive that reduced flow could have a positive impact on water quality, it is possible that the same dissolved solids loadings noted above could also provide a potential negative impact. In the case of irrigation return flows, however, the discharge of these flows tends to occur during low streamflow conditions, and the water from this discharge provides additional needed streamflow for environmental purposes during these times.

A review of WAM for the Lavaca River Basin identified a number of stream segments that have no streamflow during the driest months of prolonged drought. Since all of the municipal, nearly all of the manufacturing water, and 80 percent or more of the irrigation water is derived from groundwater, the reduction of the return flows through conservation will have a negative impact on streamflows during the DOR. Municipal and manufacturing return flows are returned to the stream throughout the year, but they are more or less constant in both the wetter and drier months depending upon the condition of the individual wastewater collection systems. The agricultural return flows occur primarily in early spring and then again in July. The July return flows are particularly important since July is a historically dry month, and the return flows can often be the only flow moving in a stream reach at that time.

Dry land agriculture would also have a similar effect on stream habitat by denying return flows to stream segments in the lower basin. The land in LRWPA is also of such a type that makes it of limited value for economically producing large volumes of crops other than rice, and the infrastructure in place for rice production would not be easily converted for other crops.

5.3 Potential Changes to Aquifer Quality Due to Overdrafting

5.3.1 Distribution of Dissolved Solids

As part of the analysis of water quality for the 2011 RWP, the LRWPG elected to perform an analysis of which aquifer layers display the highest dissolved solids concentrations. This data, in conjunction with water level or pumpage information, could allow the GAM model output (discussed in *Chapter 3*) to provide some indication of the effects of overdrafting on groundwater quality and dissolved solids levels. A two-part process was applied to determine which wells and which aquifer layers displayed the highest levels of dissolved solids. The data used in this analysis came from the TWDB Groundwater Database. Well records typically listed the well number, depth, aquifer unit, and solute results in mg/L. For wells within Jackson County, wells were listed as being in the Gulf Coast Aquifer rather than specifying a particular aquifer unit. Analyses of relative solute levels were limited to the period from 1990 to 2009 to focus on current aquifer conditions.

For the first stage of the investigation, the minimum, maximum, median, and average concentration for each of ten constituents was determined for each aquifer layer. Not all constituents were sampled simultaneously within all wells in an aquifer layer, but the majority of wells were sampled several times over the period of interest. Results for each layer were then compared to the others to determine if one or more aquifer layers displayed relatively high solids concentrations. Due to the potential for a small number of high readings to skew results for average concentration, an aquifer layer was considered to have a high solute concentration only if both the median and average concentration for the layer were distinctly higher than for other aquifer units. This process revealed six constituents (sodium, potassium, sulfate, fluoride, nitrate, and total dissolved solids or TDS) which appeared to have higher concentrations in some locations, while the remaining constituents occurred at more uniform levels across the region. See *Appendix 5A* for more detailed constituent statistics.

A second analytical stage was then applied to confirm the results of the first stage. For the six constituents of concern listed above, histograms of concentration values were calculated using ten bins of equal size for each constituent. These histograms were then inspected for distinctive break points in the concentration-frequency distribution, with samples with concentrations above the break point being classed as high concentration locations. An example histogram for sodium is shown in *Table 5-1*, with concentrations considered relatively high in ***bold italic*** text.

Table 5-1
Frequency Distribuition for Sodium Concentration

Conc. (mg/L)	Frequency
0	0
42	12
84	51
126	46
168	22
210	15
252	***5***
294	***8***
336	***10***
378	***2***
420	***1***
More	0

Above approximately 210 mg/L of sodium, there is a sharp decline in the number of samples. Therefore, wells with samples of 252 mg/L or higher concentration of sodium were considered to be high concentration sites. For sodium, theses wells were primarily in the Jasper aquifer, the Catahoula sandstone, and unspecified portions of the Gulf Coast Aquifer, along with two wells in the Evangeline aquifer, as shown in *Figure 5-1* at the end of the chapter. This closely mirrors the results of the first stage of analysis. Histograms for constituents of concern can be found in *Appendix 5A*.

The highest average concentrations for potassium were calculated for the Catahoula sandstone and Jasper Aquifer. However, wells with relatively high potassium were additionally found in a number of other geologic formations. Most of these wells are located in the northern half of Lavaca County; two wells, in an unspecified portion of the Gulf Coast Aquifer, are located in Jackson County south of Lake Texana (*Figure 5-2* at the end of the chapter). Relatively high sulfate levels were only identified for a small number of wells. The majority of these were located in the northern half of Lavaca County in the Jasper and Evangeline aquifers. A single well in the Gulf Coast Aquifer south of Lake Texana also displayed high relative sulfate levels, as shown in *Figure 5-3* at the end of the chapter. The highest average sulfate levels were in the Jasper aquifer.

While the highest average fluoride levels occurred in the Burkeville confining unit, the majority of wells showing high fluoride were in the unspecified Gulf Coast Aquifer south of Lake Texana (*Figure 5-4* at the end of the chapter). High concentrations were also found in several wells in various geologic units in northern Lavaca County. A single well in the Chicot aquifer, located in western Wharton

County near the headwater of East Carancahua Creek, showed high fluoride concentrations. High relative nitrate concentrations were identified for only a small number of wells; these consist of three wells in the Evangeline aquifer in Lavaca County and two wells in the Chicot aquifer in western Wharton County, as shown in *Figure 5-5* at the end of the chapter. This corresponds with calculations of average concentration by aquifer, which identified the highest average nitrate concentrations in the Chicot and Chicot-Evangeline aquifers. The southernmost of these two wells is southwest of a former aluminum plant in El Campo that is the source of a trichloroethylene plume extending southwest from the plant. Due to the close proximity to the contamination source, water quality at this well may be influenced by the contaminant plume from the plant; however, this relationship is not certain.

While the analysis of average and median concentrations for TDS did not reveal high relative concentrations for a particular geologic unit, concentrations were examined in detail due to the importance of TDS as a water quality indicator. Wells with higher TDS levels were found in the Gulf Coast, Evangeline, Chicot-Evangeline, Jasper-Catahoula, and Jasper Aquifers as well as the Catahoula sandstone (*Figure 5-6* at the end of the chapter). While there were more of these wells in unspecified Gulf Coast Aquifer than for the other units, there appears to be no clear pattern of higher TDS in any particular geologic unit.

Figure 5-7 at the end of the chapter is a composite which includes all wells identified as having high relative concentrations of at least one major constituent. As shown in the figure, there is a clear geographic pattern to the location of wells with higher solute concentrations. These wells are principally clustered in the northern half of Lavaca County and in Jackson County south and west of Lake Texana. Additionally there are a few higher concentration wells in Wharton County near El Campo or in areas of agricultural production. This, combined with the number of aquifers showing wells with high relative solute levels, indicates that solute concentrations within LRWPA may be more of a function of geographic location rather than just geologic unit.

5.3.2 Relationship Between Drawdown and Dissolved Solids

In order to determine any relationships between aquifer drawdown and solute concentration, time series of concentrations for the higher-concentration wells identified above were compared to historical drawdown records. However, due to the limited quantity of available data, comparisons of solute concentration and drawdown could not be made for all of the wells identified in *Section 5.3.1.* (as shown in *Figure 5-7*). In order for any potential trends to be examined, analysis was limited to wells with more than two data points for drawdown and for the constituents of interest. Additionally, the date ranges of the datasets for drawdown and solute concentration must overlap. Out of the 38 points identified as having high relative dissolved solids, only five met these criteria. Four of these were in northern Lavaca County in the Evangeline, Jasper, Burkeville, and Catahoula units, while one was in the Gulf Coast Aquifer between Brushy Creek and the Navidad River near the northern end of Lake Texana. Time series graphs of solute concentration and aquifer drawdown (in terms of depth from Initially Surveyed Depth, or ISD) are included in *Figures 5-8* through *5-12* at the end of the chapter.

Due to the limited number of water quality samples taken for any single well, no clear relationship between aquifer drawdown and solute concentrations could be determined from available data. Thus, it is not possible to use the results of the GAM Runs from *Chapter 3* to make any direct estimates of the effect of increased groundwater use in LRWPA on groundwater quality. If a relationship between drawdown and water quality does exist for the region, it could become apparent after an extended period of aquifer overdrafting. Based on the GAM results shown in Chapter 3, any change in quality tied to pumpage would likely be expressed most strongly for wells in Jackson County and particularly for western Wharton County, as these were the areas which showed the greatest drawdowns for the GAM Runs. Drawdown was fairly minor in the northern portion of Lavaca County, where a significant number of high-solute wells were identified.

5.4 Recommendations for Future Drawdown and Quality Investigation

As noted in *Section 5.3* above, the limited amount of water quality and aquifer drawdown data in LRWPA precludes determination of any clear relationship between drawdown and groundwater quality. As such, additional groundwater monitoring in addition to data collection currently implemented by TWDB is recommended for the LRWPA to refine regional impacts of overpumping on aquifer levels and in turn on water quality. Given the large amount of labor involved in sampling wells and measuring depths and the cost for sample analysis, it would not be feasible to increase sampling to a monthly or year-round basis for all wells. However, increased monitoring of a limited number wells and increased monitoring under particular conditions could provide useful information on drawdown and water quality. The wells identified as having high relative solute concentrations are recommended for increased sampling. Coordination with Coastal Bend Groundwater Conservation District (CBGCD) is also recommended to determine if CBGCD has suggestions for target wells or detailed data on water quality for wells within or adjacent to LRWPA. In addition to targeting specific wells, target wells should be monitored more frequently during periods of high pumpage. Sampling of selected wells in rice-producing areas during the growing season may provide some indication of the relationship between aquifer drawdown and water quality. Additionally, increasing sampling frequency during prolonged low rainfall periods could help reveal longer-term trends in water table decline and groundwater quality. For all sampling, water level information should be collected at the same day as water sample collection. It is highly recommended that any expanded sampling program involve coordination with LRWPG, LNRA, CBGCD, and the TWDB.

5.5 Impacts of Moving Water From Rural and Agricultural Areas

Currently, the water used in rural (livestock) and agricultural areas represents 95 percent of the total water used in the Lavaca Region. The potential impacts of moving water from rural and agricultural areas are mainly associated with socio-economic impacts to these third parties. As noted previously, much of the water demand for irrigation in the Lavaca Region is associated with rice production. While other crops, such as corn, cotton, milo, and similar row crops can be grown either with or without irrigation, no such option exists for rice. In addition, the type of land that is suitable for rice is such that it is often difficult for rice producers to find an alternative crop for those years when the land is being rested from rice production. This results in more intensive economic pressure, since the production from this land for any other crop is marginal at best. In much of the Lavaca Region, the marginal quality land has already been forced out of rice production because of economic conditions. It is further noted that for most agricultural commodities, the price is highly variable. For this reason, the farmers need the flexibility to plant additional acreages during periods of higher than normal prices to try to recover from years with marginal economics. If the water needed to produce additional acreage is no longer there because it has been sold to a municipality, the economics of farming is further impacted.

One additional area of concern from an economic standpoint is the current decline in the infrastructure to support the rice industry. Further decreases in rice production of even a temporary nature further threaten the economic picture for the support industries of milling, hauling, etc. Once infrastructure for milling is taken out of service, it increases the cost of doing business for the remaining producers in the area.

As noted previously, the impacts of moving water from rural and agricultural areas is primarily economic. *Chapter 9* contains the specific calculations of socio-economic impacts prepared by TWDB for the Lavaca Region.

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FIGURES

Figure 5-1
Wells Exhibiting High Relative Sodium Concentrations

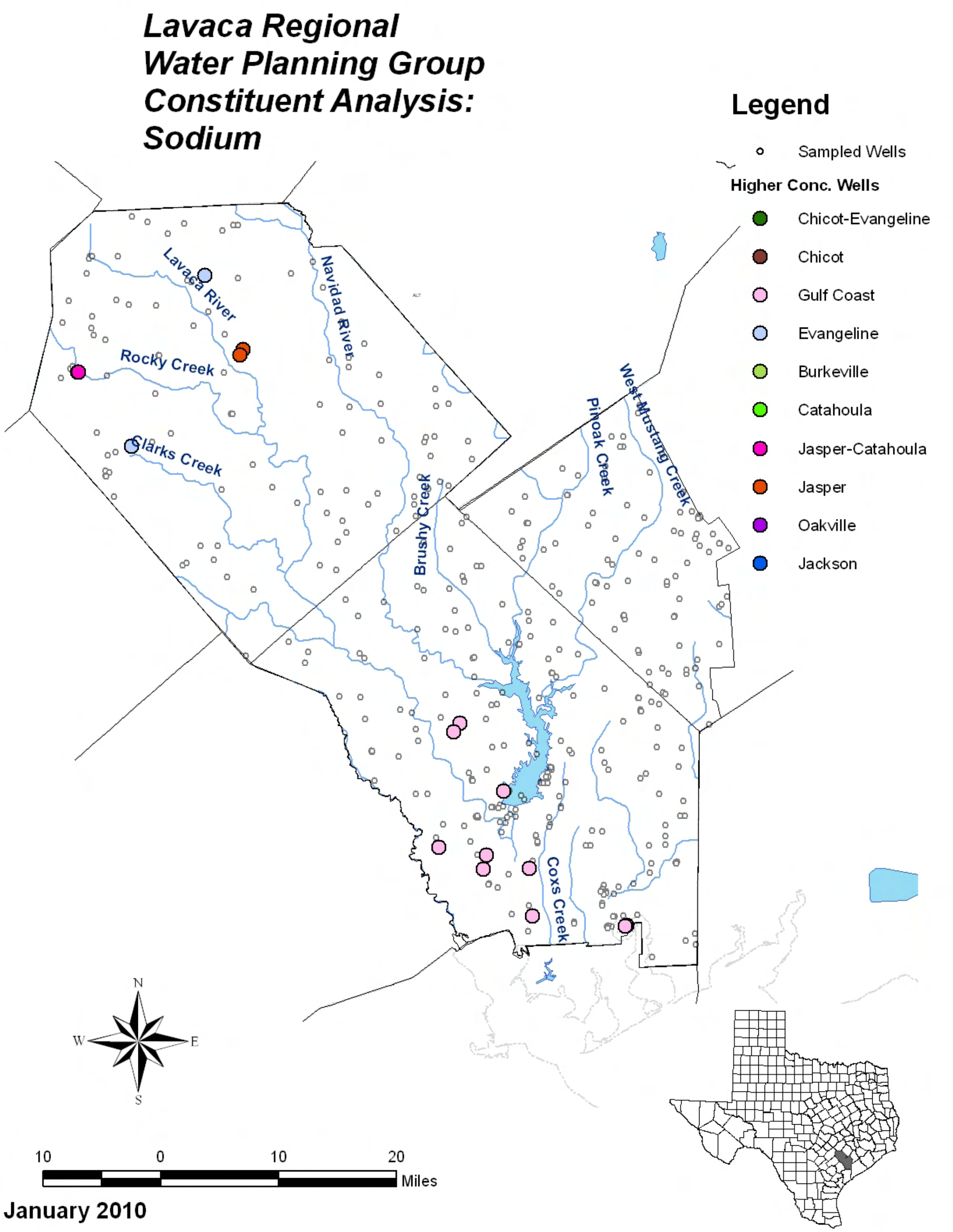


Figure 5-2
Wells Exhibiting High Relative Potassium Concentrations

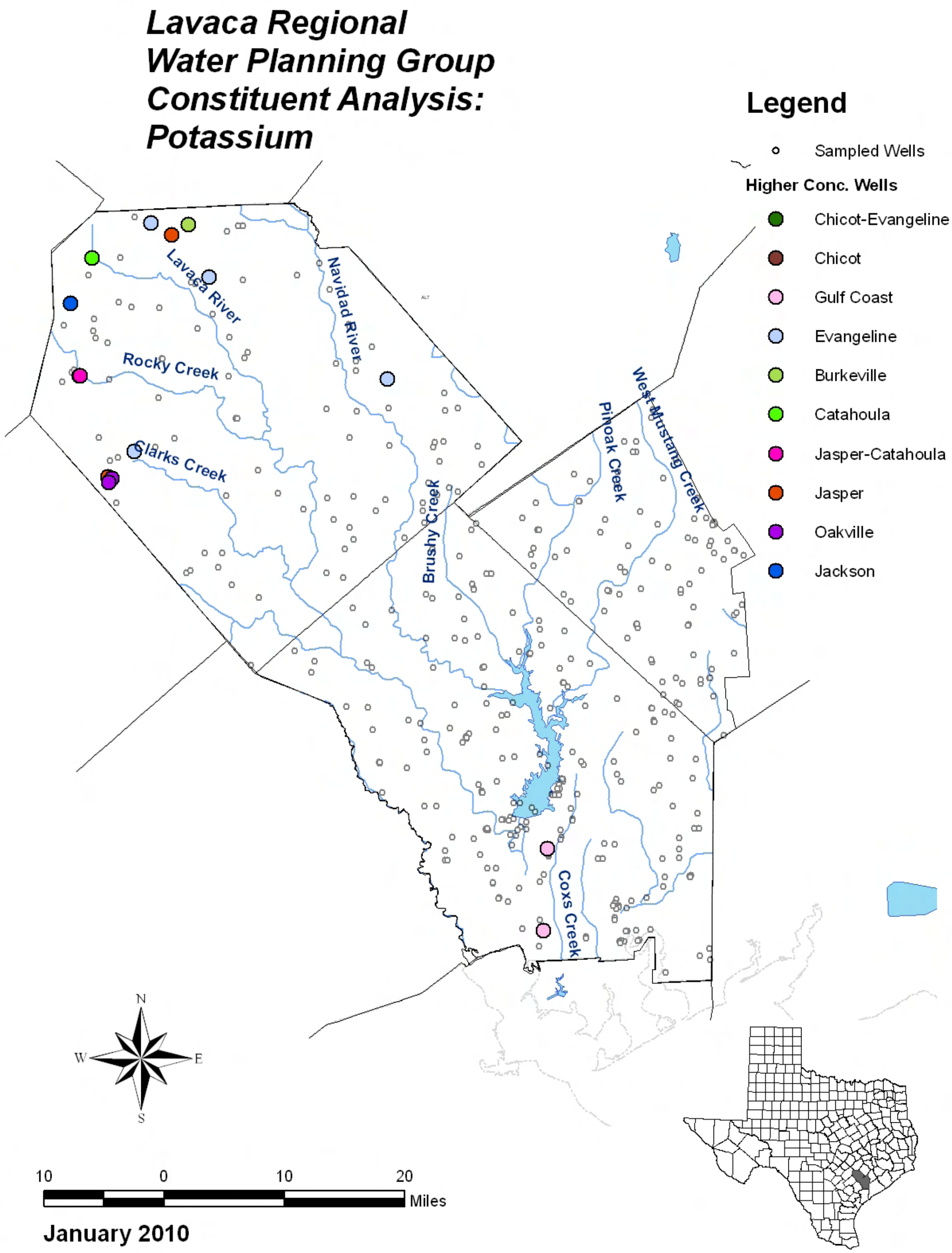


Figure 5-3
Wells Exhibiting High Relative Sulfate Concentrations

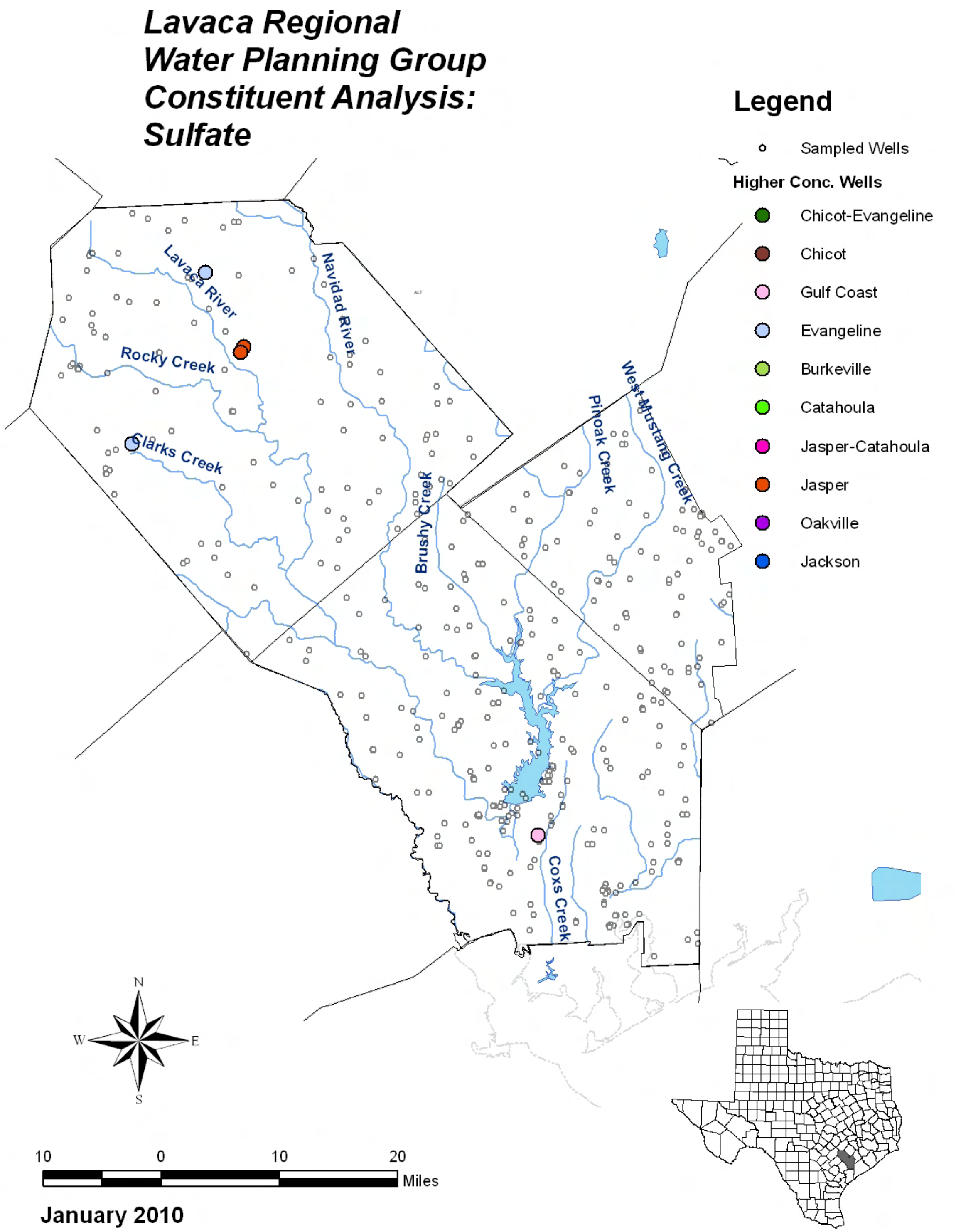


Figure 5-4
Wells Exhibiting High Relative Fluoride Concentrations

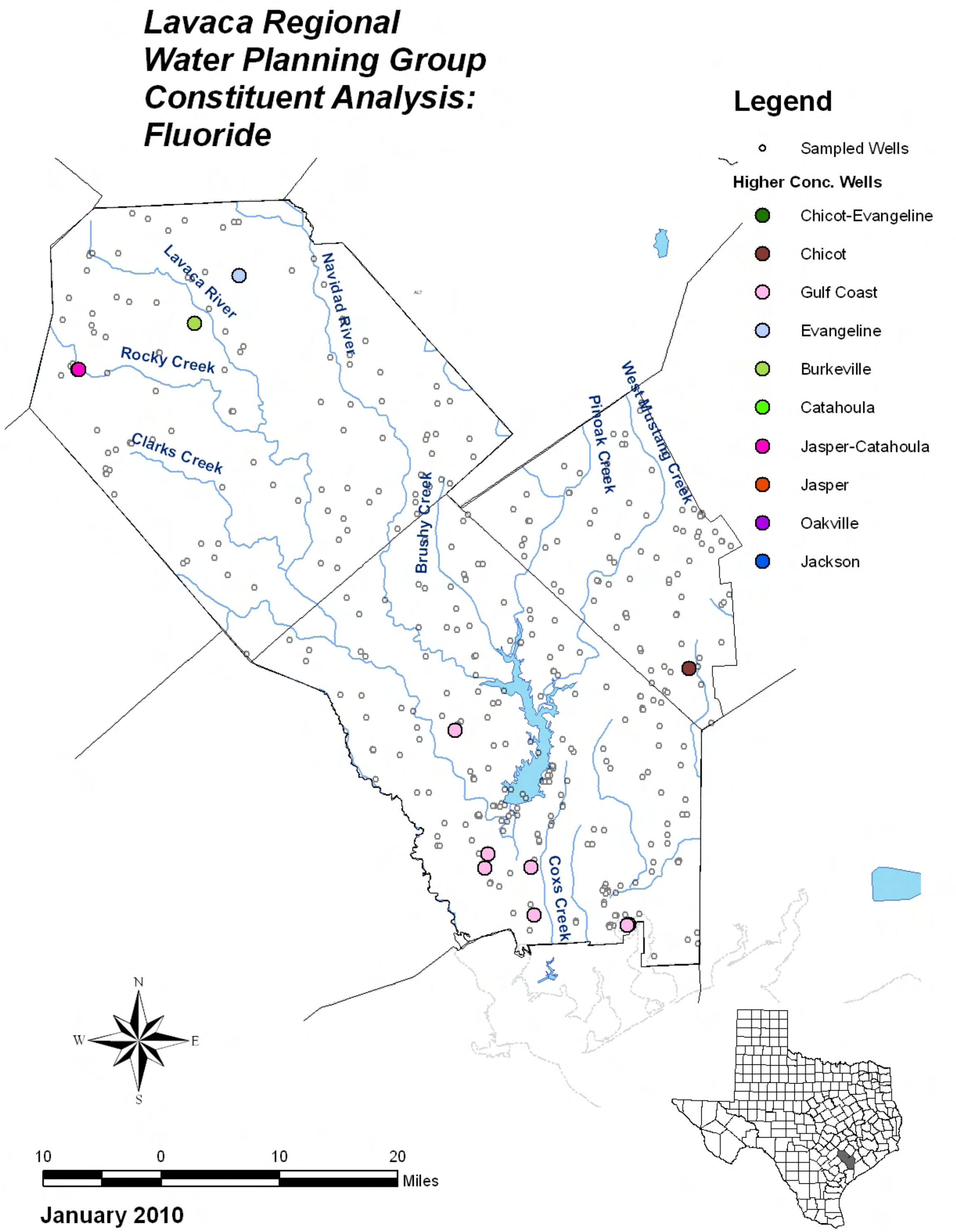


Figure 5-5
Wells Exhibiting High Relative Nitrate Concentrations

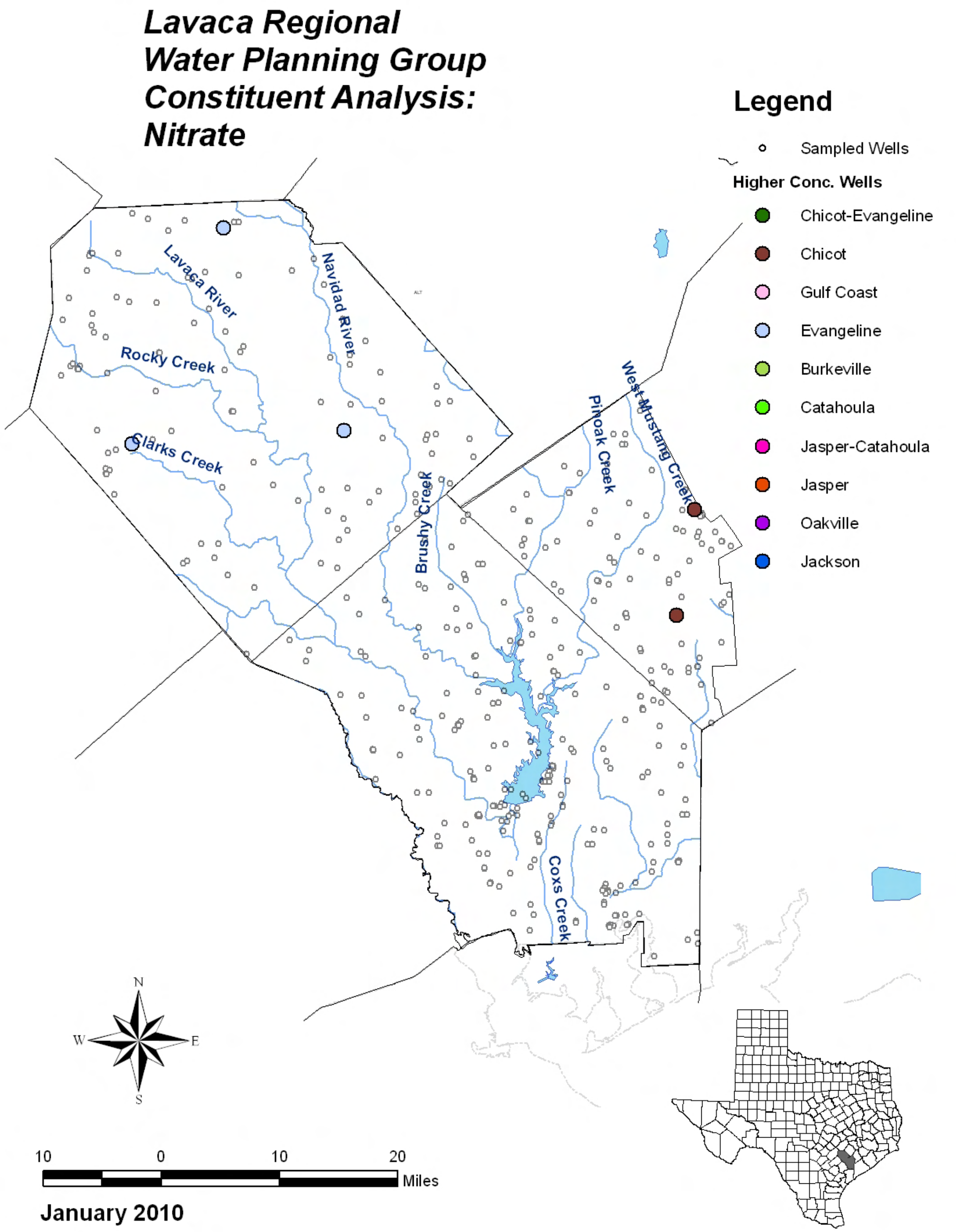


Figure 5-6
Wells Exhibiting High Relative TDS Concentrations

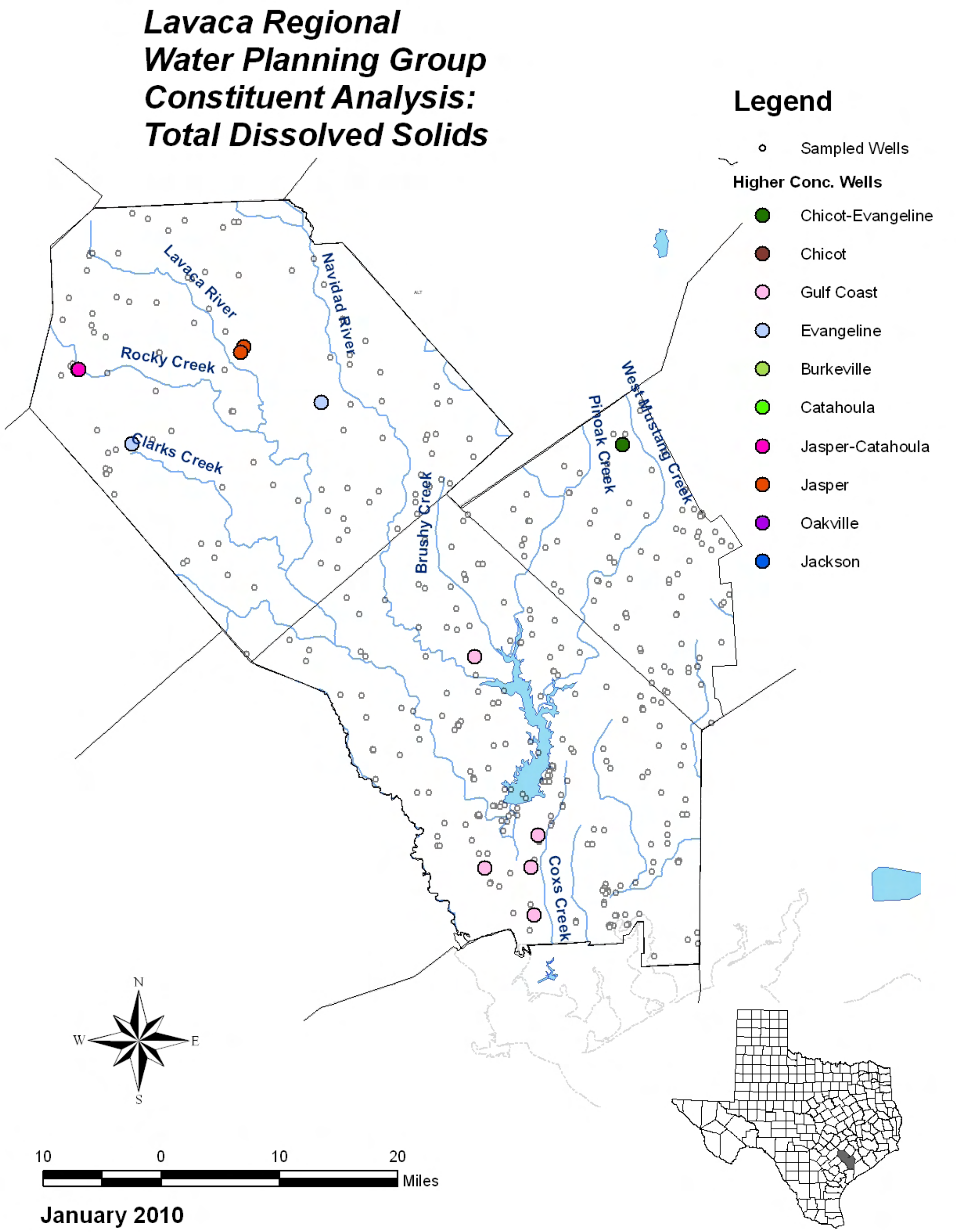


Figure 5-7
All Wells Exhibiting High Relative Dissolved Solids Concentrations

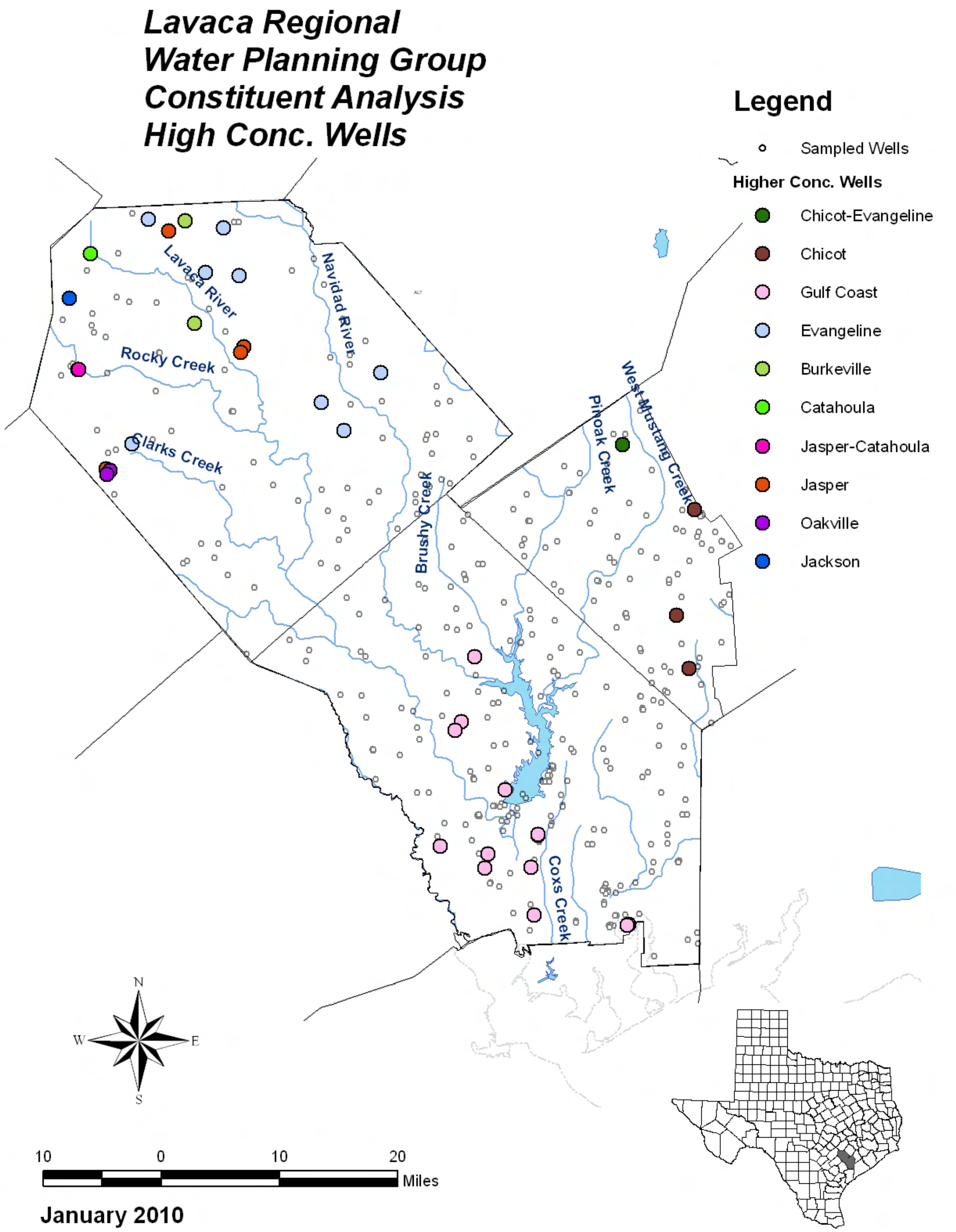


Figure 5-8
Concentration and Drawdown Time Series for Well 6625103

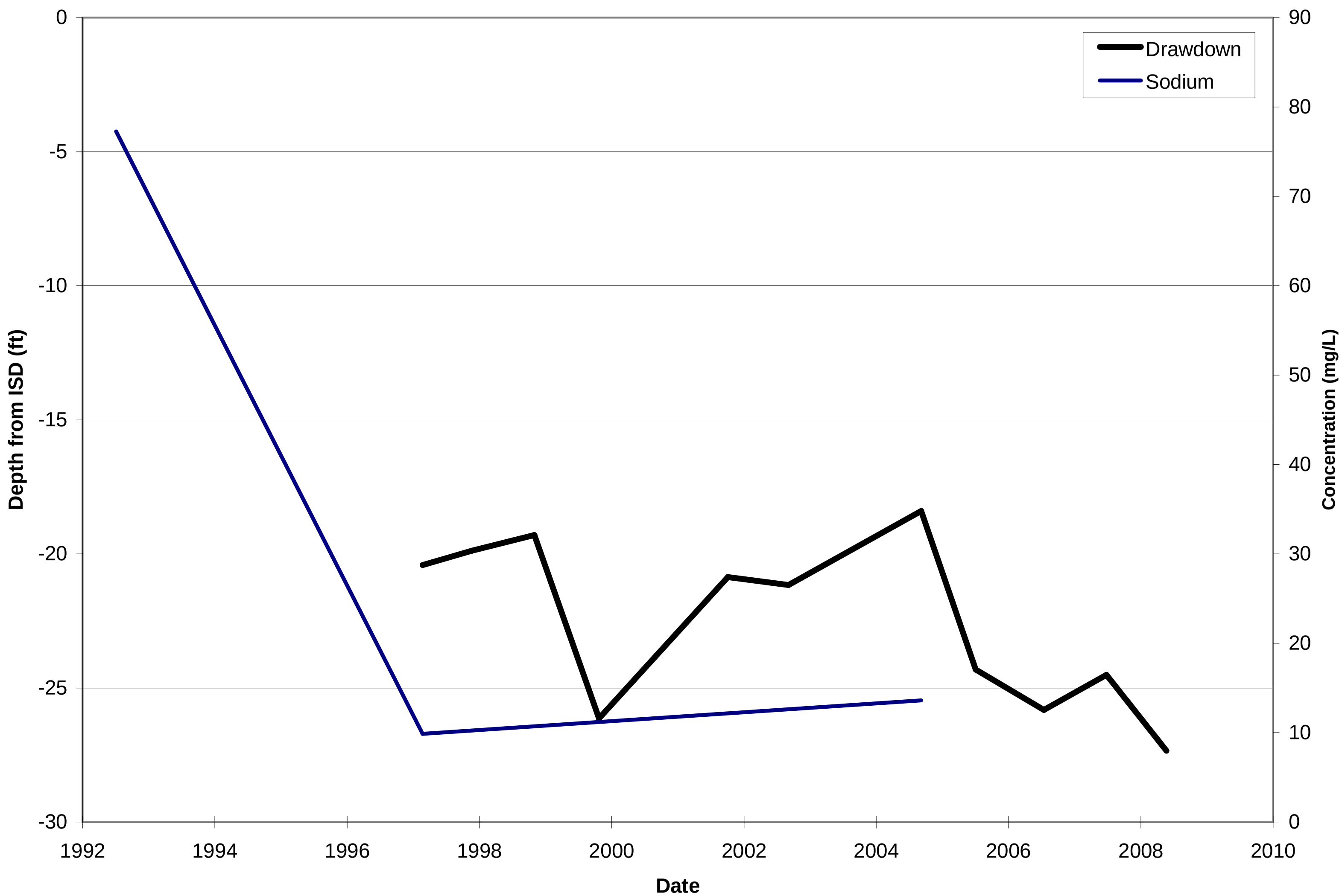


Figure 5-9
Concentration and Drawdown Time Series for Well 6633507

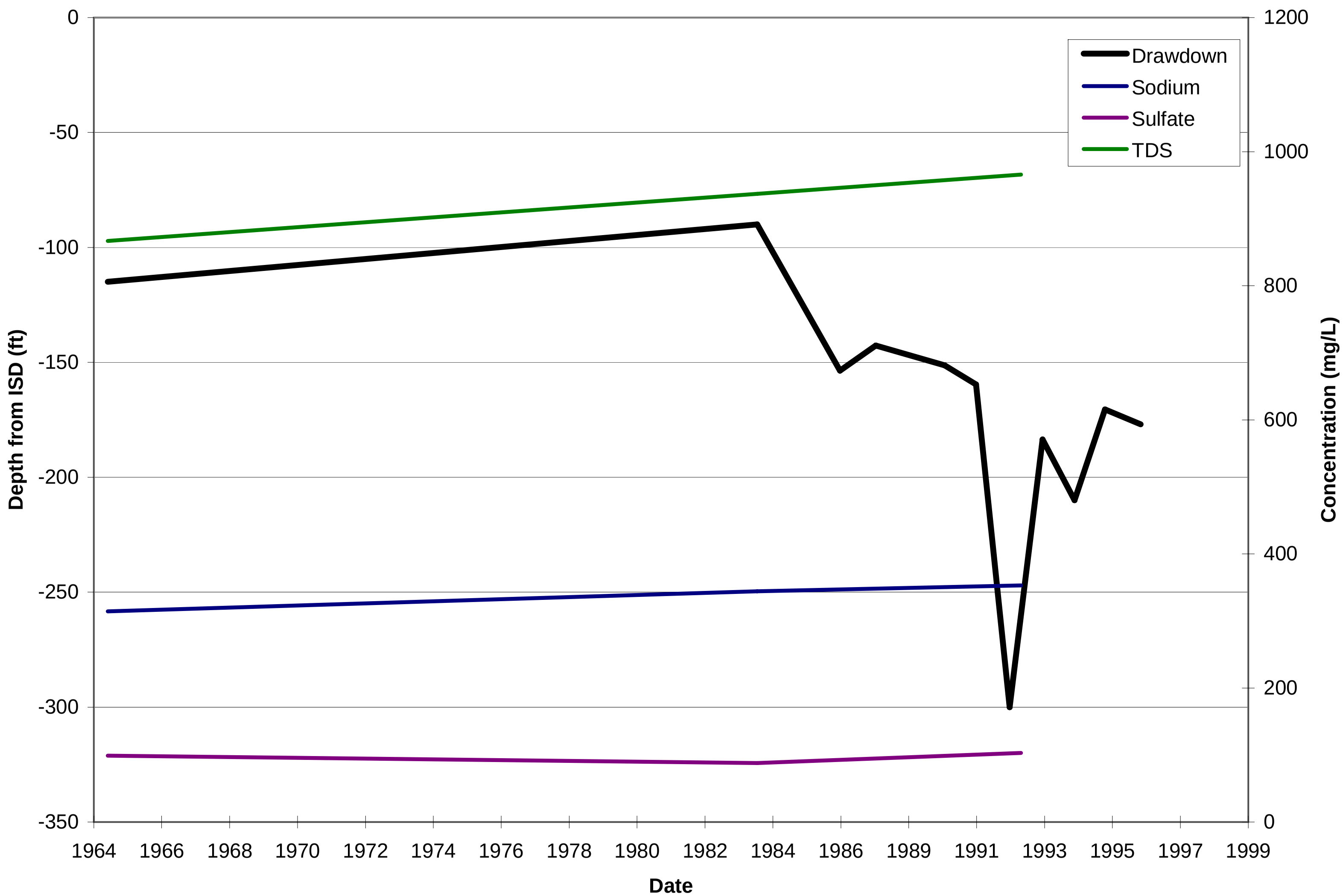


Figure 5-10
Concentration and Drawdown Time Series for Well 6660401

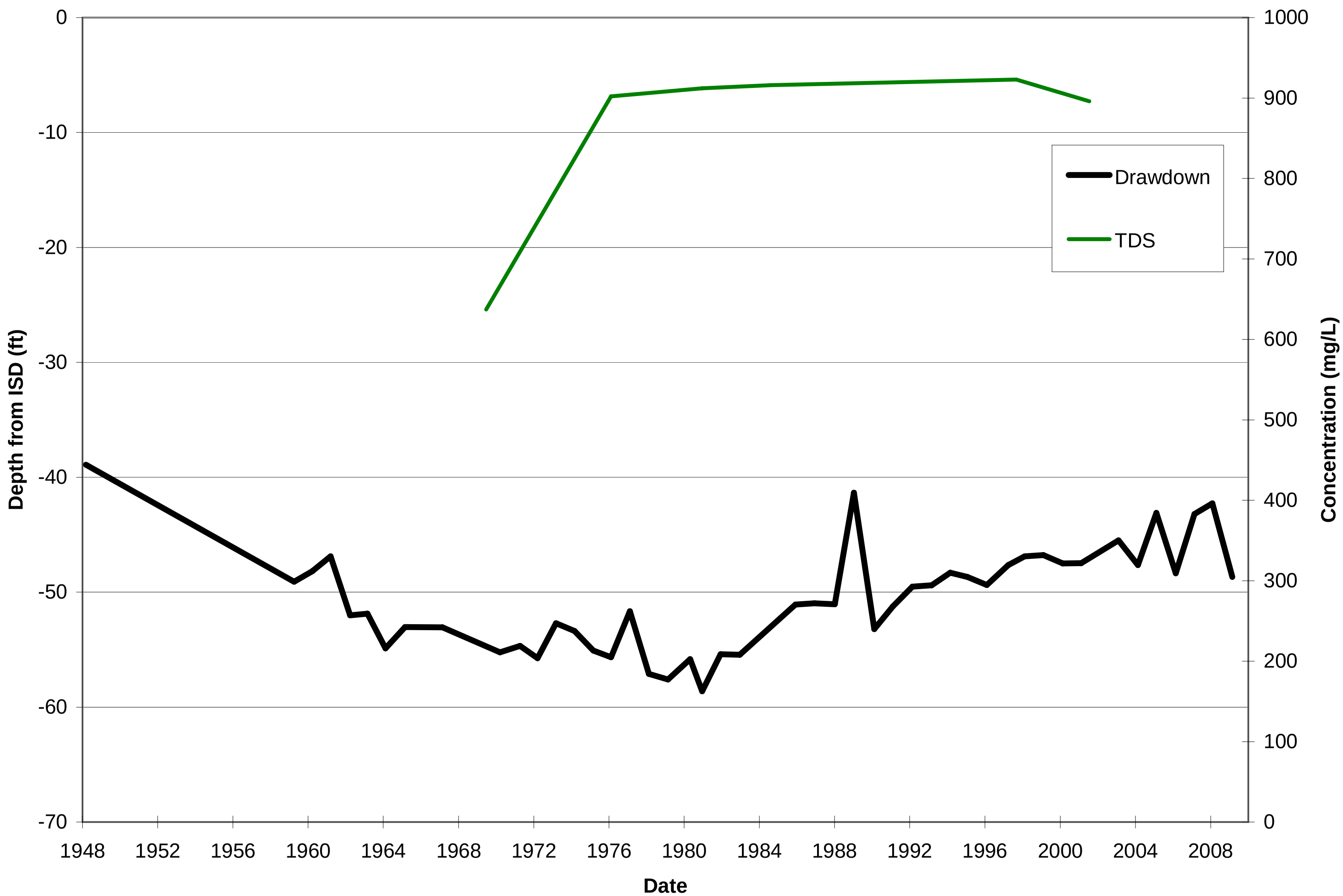


Figure 5-11
Concentration and Drawdown Time Series for Well 6731602

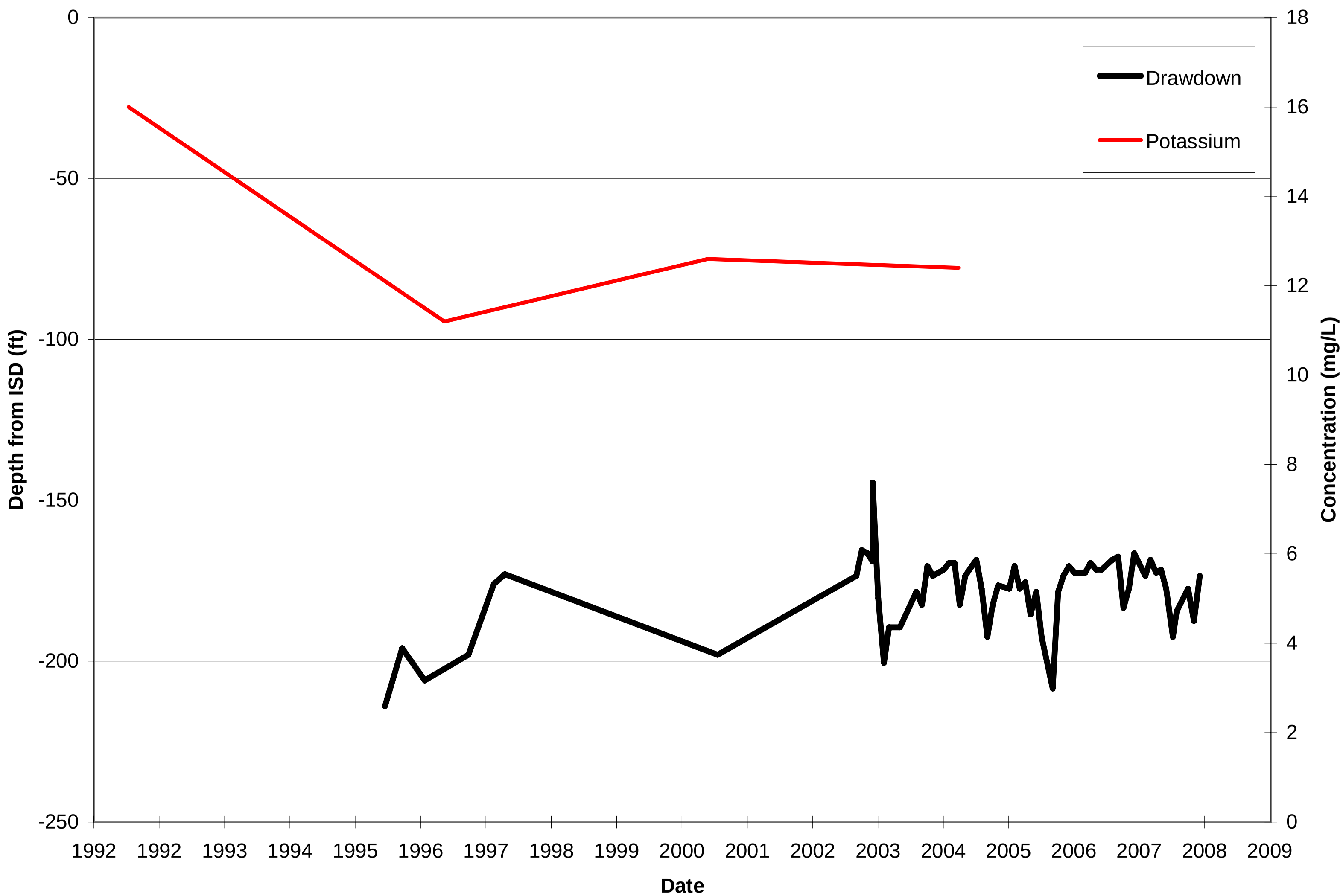
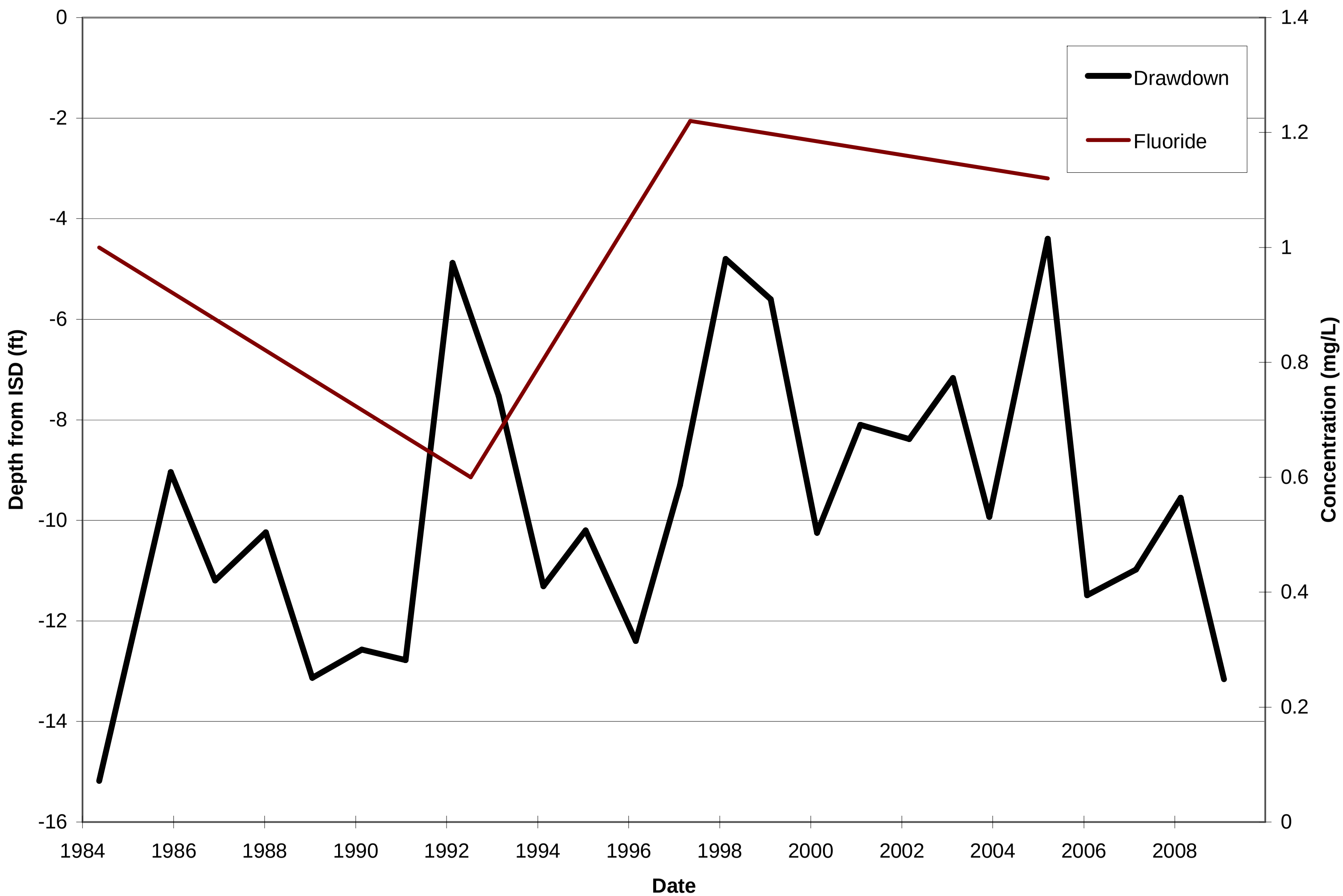


Figure 5-12
Concentration and Drawdown Time Series for Well 6740301



Appendix 5A

Water Quality Data

Table 5A.1 - Average and median Solute Concentration by Geologic Unit

	Aquifer	pH	Silica (SiO2) MG/L	Calcium (Ca) MG/L	Magnesium (Mg) MG/L	Sodium (Na) MG/L	Potassium (K) MG/L	Carbonate (CO3) MG/L	Bicarbonate (HCO3) MG/L	Sulfate (SO4) MG/L	Chloride (Cl) MG/L	Flouride (F) MG/L	Nitrate (NO3) MG/L	Dissolved Solids MG/L	Specific Conductance micromohs	Hardness (CaCO3) MG/L	% Sodium	SAR	RSC
Min	BMNT	7.20	14.00	92.00	14.00	39.00	2.00	0.00	247.73	3.80	41.00	0.30	1.60	427.00	775.00	287.00	13.00	0.95	0.00
	CEVG	6.32	25.60	38.20	8.94	67.90	1.00	0.00	239.18	14.10	73.90	0.14	2.24	356.00	648.00	132.00	32.00	2.19	0.00
	CHCT	6.31	0.70	43.80	5.93	31.10	0.52	0.00	195.26	3.00	20.00	0.11	0.18	278.00	464.00	140.00	20.00	0.95	0.00
	GLFC	6.24	0.60	2.62	2.20	47.40	1.21	0.00	1.22	0.05	28.00	0.14	0.09	389.00	658.00	26.00	25.00	1.17	0.00
	EVGL	6.58	23.00	6.70	0.50	27.50	0.51	0.00	258.71	6.36	24.30	0.13	0.09	361.00	624.00	19.00	15.00	0.68	0.00
	BKVL	6.65	26.80	84.70	6.18	74.50	1.42	0.00	331.93	24.00	74.80	0.60	0.09	485.00	538.00	238.00	40.00	2.11	0.00
	CTHL	6.65	19.00	5.40	0.20	36.40	1.60	0.00	284.34	1.00	52.40	0.30	0.09	420.00	704.00	17.00	21.00	0.93	0.00
	JSPR	6.65	19.00	9.06	0.20	36.40	1.60	0.00	301.43	1.00	52.40	0.30	0.09	420.00	704.00	24.00	21.00	0.93	0.00
Med	BMNT	7.50	23.00	144.00	22.00	53.00	2.00	0.00	363.66	7.20	179.00	0.40	5.20	619.00	1200.00	449.00	20.00	1.13	0.00
	CEVG	6.90	31.50	103.30	11.20	90.05	2.11	0.00	267.87	28.95	172.90	0.28	2.77	577.50	670.00	303.50	41.50	2.37	0.34
	CHCT	6.93	37.75	99.95	10.65	60.50	1.55	0.00	298.37	20.10	112.00	0.27	1.39	514.00	792.00	299.50	37.00	1.84	0.00
	GLFC	7.30	17.60	40.70	11.60	139.00	2.46	0.00	348.09	17.00	132.00	0.47	0.18	539.00	981.50	172.00	62.00	5.96	0.99
	EVGL	6.92	37.30	93.95	7.78	83.10	1.85	0.00	344.75	26.90	94.95	0.46	1.48	520.00	907.00	268.00	39.50	2.19	0.00
	BKVL	6.83	28.30	88.20	8.51	94.90	2.09	0.00	383.18	24.80	91.20	1.12	0.18	535.00	755.00	256.00	43.00	2.50	0.78
	CTHL	7.35	25.40	24.85	4.30	184.50	4.76	0.00	370.37	48.80	163.50	0.61	0.09	707.50	1210.00	80.00	84.00	9.54	0.03
	JSPR	7.52	21.40	21.30	4.15	209.00	3.45	0.00	391.73	50.60	113.00	0.51	0.09	619.00	1073.00	72.00	89.00	12.38	4.60
Avg	BMNT	7.58	23.29	240.65	35.24	72.88	2.00	0.00	349.16	7.85	435.24	0.38	7.10	994.00	2086.71	744.88	19.29	1.19	0.09
	CEVG	6.89	31.58	109.13	11.47	92.43	2.03	0.00	269.29	33.70	195.70	0.25	3.43	612.17	1037.00	319.83	41.50	2.37	0.48
	CHCT	6.94	36.68	101.53	13.83	74.02	1.83	0.00	302.09	22.42	125.31	0.32	2.00	529.61	855.00	310.46	34.70	1.86	0.16
	GLFC	7.62	21.72	51.04	13.95	161.51	2.67	0.66	339.36	26.69	162.50	0.60	0.46	609.07	1098.32	185.33	64.05	8.34	1.93
	EVGL	6.95	38.24	97.16	10.17	86.29	2.07	0.00	342.92	29.95	113.40	0.50	2.90	549.43	939.85	284.79	39.14	2.96	0.61
	BKVL	6.82	35.23	88.73	8.05	90.47	2.91	0.00	368.54	26.47	90.33	0.98	0.15	525.33	746.00	255.67	43.00	2.46	0.71
	CTHL	7.27	39.33	50.00	6.25	197.40	6.56	0.00	390.51	48.05	160.51	0.62	0.21	701.63	1184.55	151.19	71.63	10.66	2.59
	JSPR	7.42	33.89	29.84	3.40	226.04	4.97	0.00	407.19	55.23	148.80	0.56	0.28	703.67	1186.08	88.78	81.44	13.02	3.46
Max	BMNT	8.30	27.00	692.00	94.00	198.00	2.00	0.00	400.27	12.00	1680.00	0.50	16.00	2819.00	6355.00	2113.00	27.00	1.88	0.80
	CEVG	7.33	37.80	184.00	13.60	124.00	2.89	0.00	308.75	59.30	342.00	0.34	6.34	910.00	1617.00	516.00	52.00	2.57	1.46
	CHCT	7.38	59.40	190.00	36.90	133.00	4.09	0.00	396.61	50.20	236.00	0.98	5.30	779.00	1368.00	524.00	45.00	2.94	1.07
	GLFC	30.00	43.50	162.00	42.40	418.00	7.19	18.72	414.92	383.00	569.00	1.90	6.07	1217.00	2370.00	544.00	95.00	25.54	6.20
	EVGL	7.79	64.10	179.00	25.00	264.00	5.93	0.00	525.96	102.00	419.00	1.21	13.63	1148.00	1646.00	550.00	97.00	26.50	8.24
	BKVL	6.96	50.60	93.30	9.47	102.00	5.22	0.00	390.51	30.60	105.00	1.22	0.18	556.00	936.00	273.00	46.00	2.78	1.30
	CTHL	7.72	82.40	110.00	21.30	320.00	12.60	0.00	668.75	90.30	279.00	1.23	1.59	911.00	1660.00	310.00	97.00	31.53	10.61
	JSPR	7.72	82.40	110.00	5.42	320.00	11.50	0.00	630.91	90.30	279.00	1.23	1.59	911.00	1660.00	288.00	97.00	26.69	9.87

Note: Red text indicates geologic units of high relative solute concentration.

Table 5A.2 - Constituent Frequency Histograms

Sodium		
Conc (mg/l)	**Sample Count**	
0	0	0%
42	12	7%
84	51	37%
126	46	63%
168	22	76%
210	15	85%
252	*5*	88%
294	*8*	92%
336	*10*	98%
378	*2*	99%
420	*1*	100%
More	0	

Potassium	
Conc (mg/l)	**Sample Count**
0	0
1.7	47
3.4	81
5.1	23
6.8	*9*
8.5	*5*
10.2	*1*
11.9	*3*
13.6	*2*
15.3	*0*
17	*2*
More	0

Sulfate	
Conc (mg/l)	**Sample Count**
0	0
39	136
78	29
117	*6*
156	*1*
195	*0*
234	*0*
273	*0*
312	*0*
351	*0*
390	*1*
More	0

Fluoride	
Conc (mg/l)	**Sample Count**
0	1
0.22	24
0.44	70
0.66	38
0.88	20
1.1	*4*
1.32	*6*
1.54	*3*
1.76	*3*
1.98	*1*
2.2	*1*
More	0

Nitrate	
Conc (mg/l)	**Sample Count**
0	0
8	153
16	*5*
24	*1*
32	*0*
40	*0*
48	*0*
56	*0*
64	*0*
72	*0*
80	*1*
More	0

TDS	
Conc (mg/l)	**Sample Count**
0	0
137	0
274	0
411	29
548	55
685	39
822	30
959	*14*
1096	*2*
1233	*2*
1370	*1*
More	0

Note: Concentrations shown in *blue italic* considered relatively high.

Figure 5A.1 - Constituent Frequency Histogram for Sodium

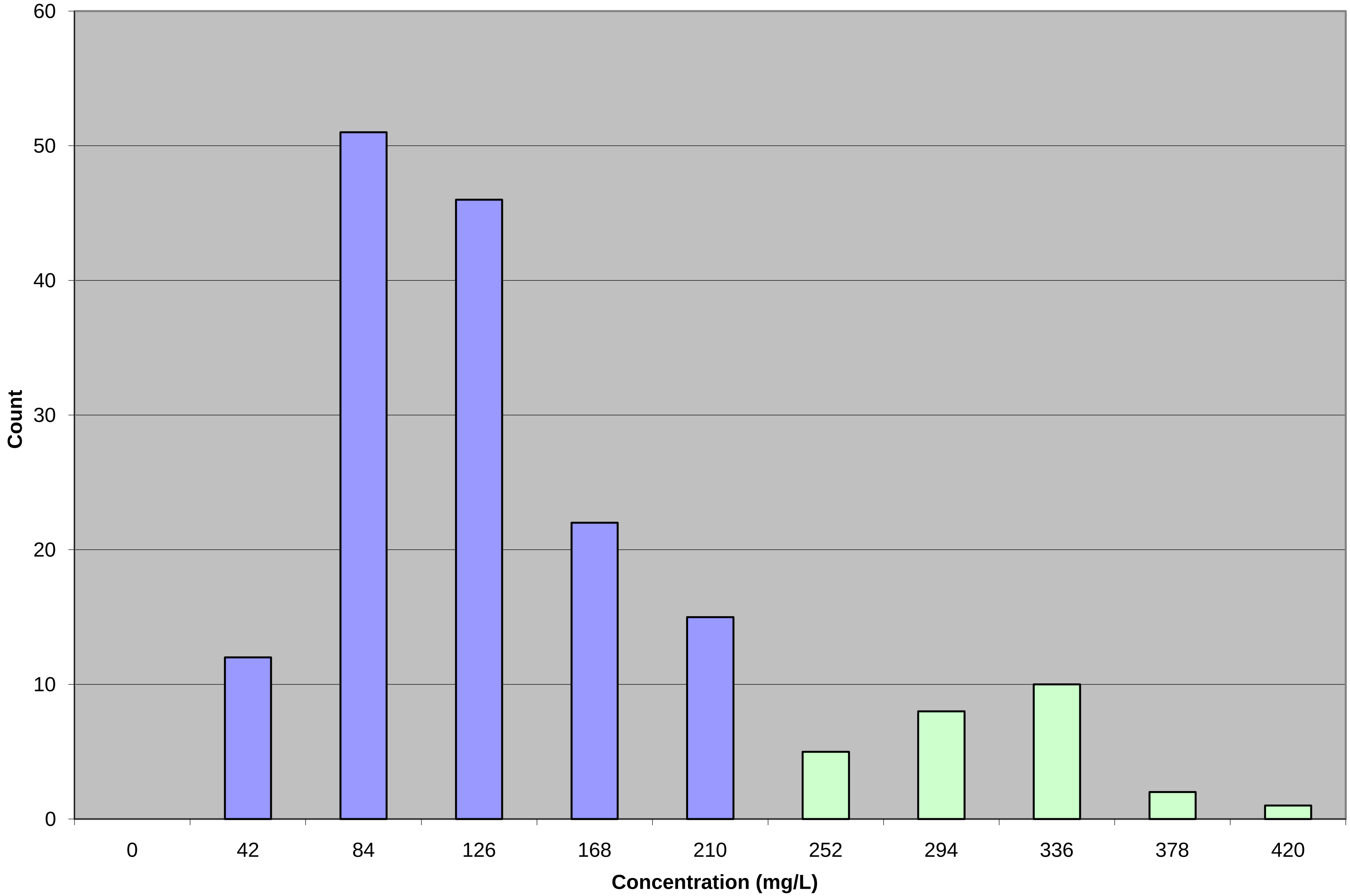


Figure 5A.2 - Constituent Frequency Histogram for Potassium

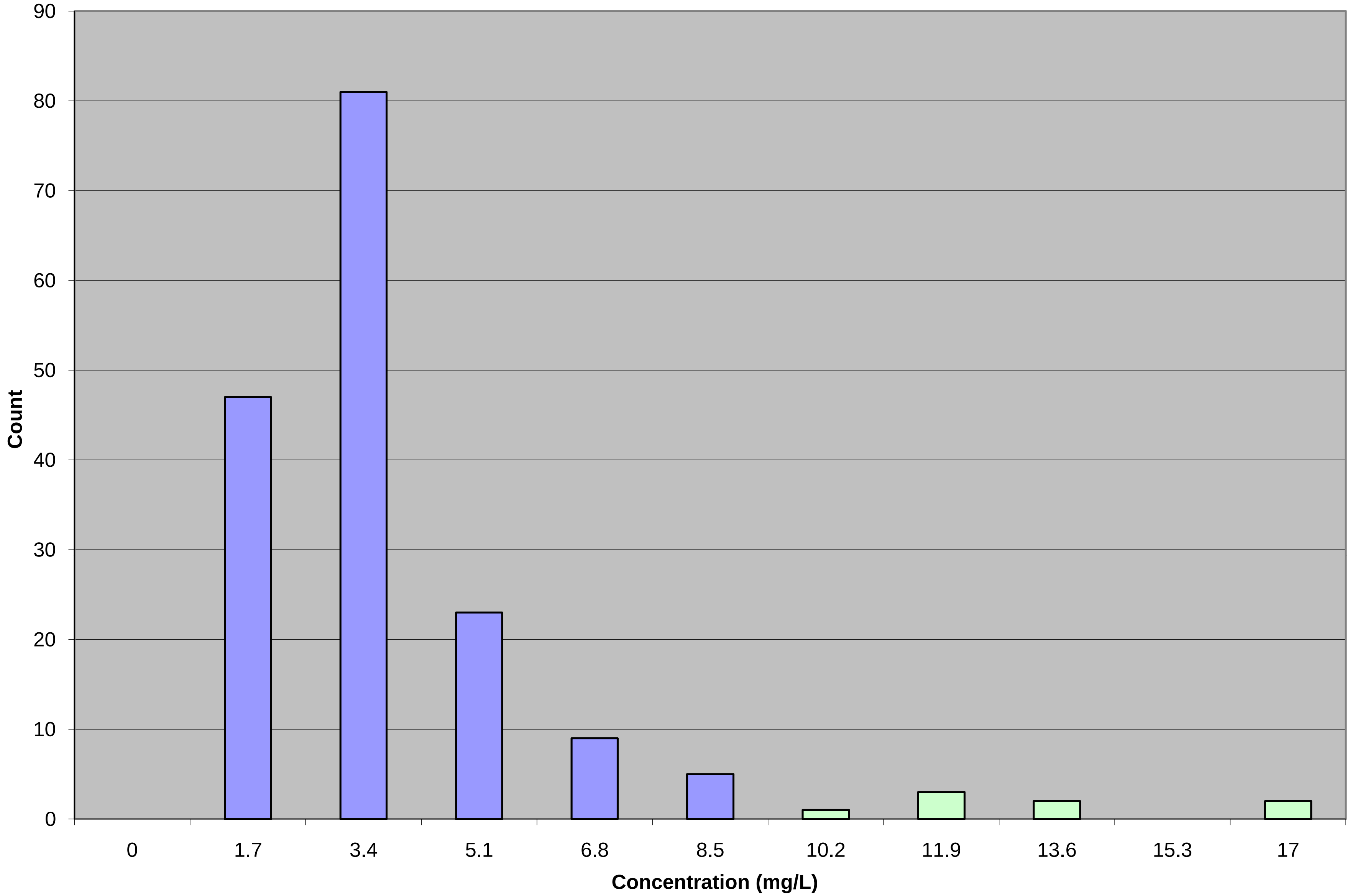


Figure 5A.3 - Constituent Frequency Histogram for Sulfate

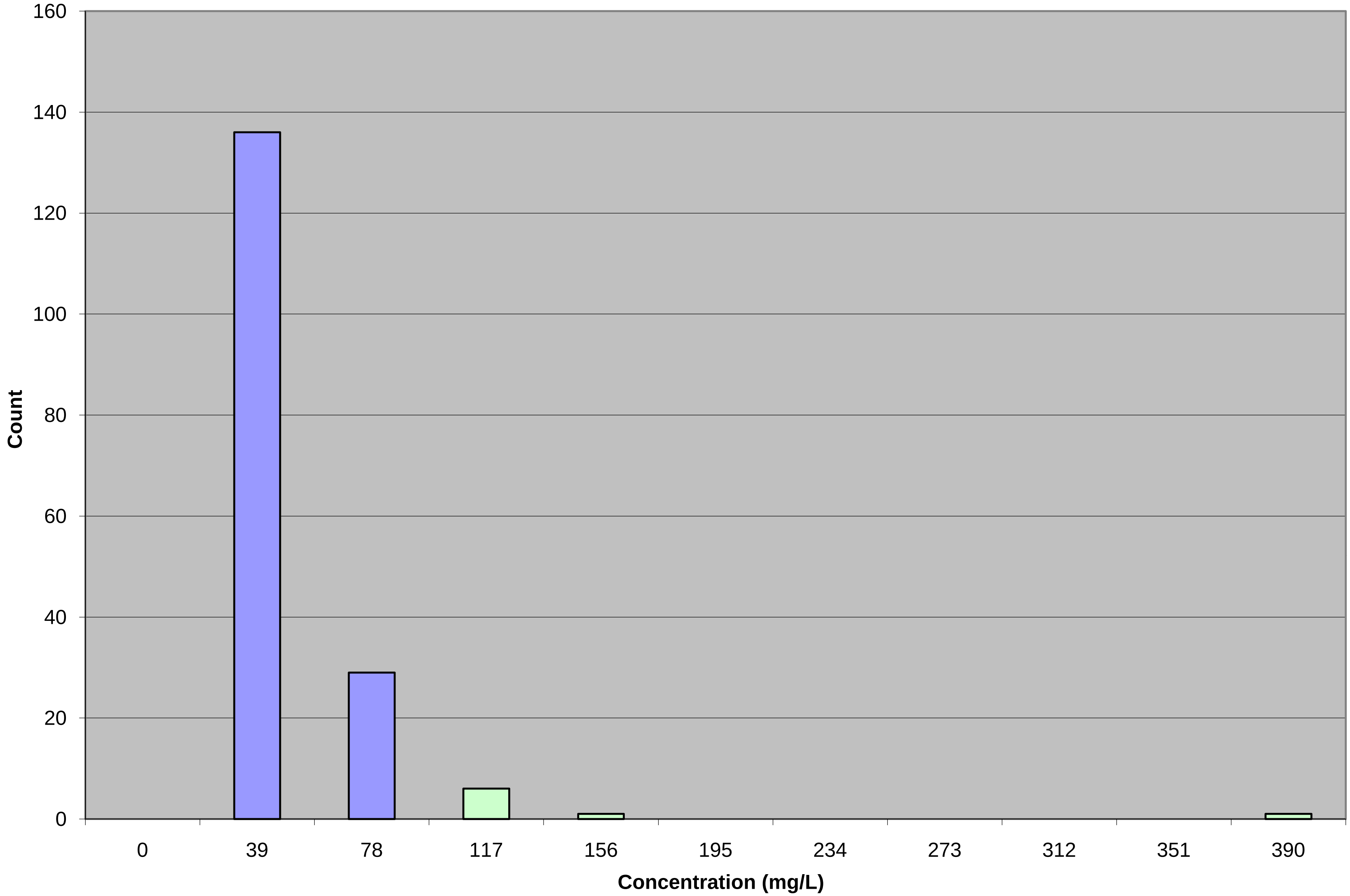


Figure 5A.4 - Constituent Frequency Histogram for Fluoride

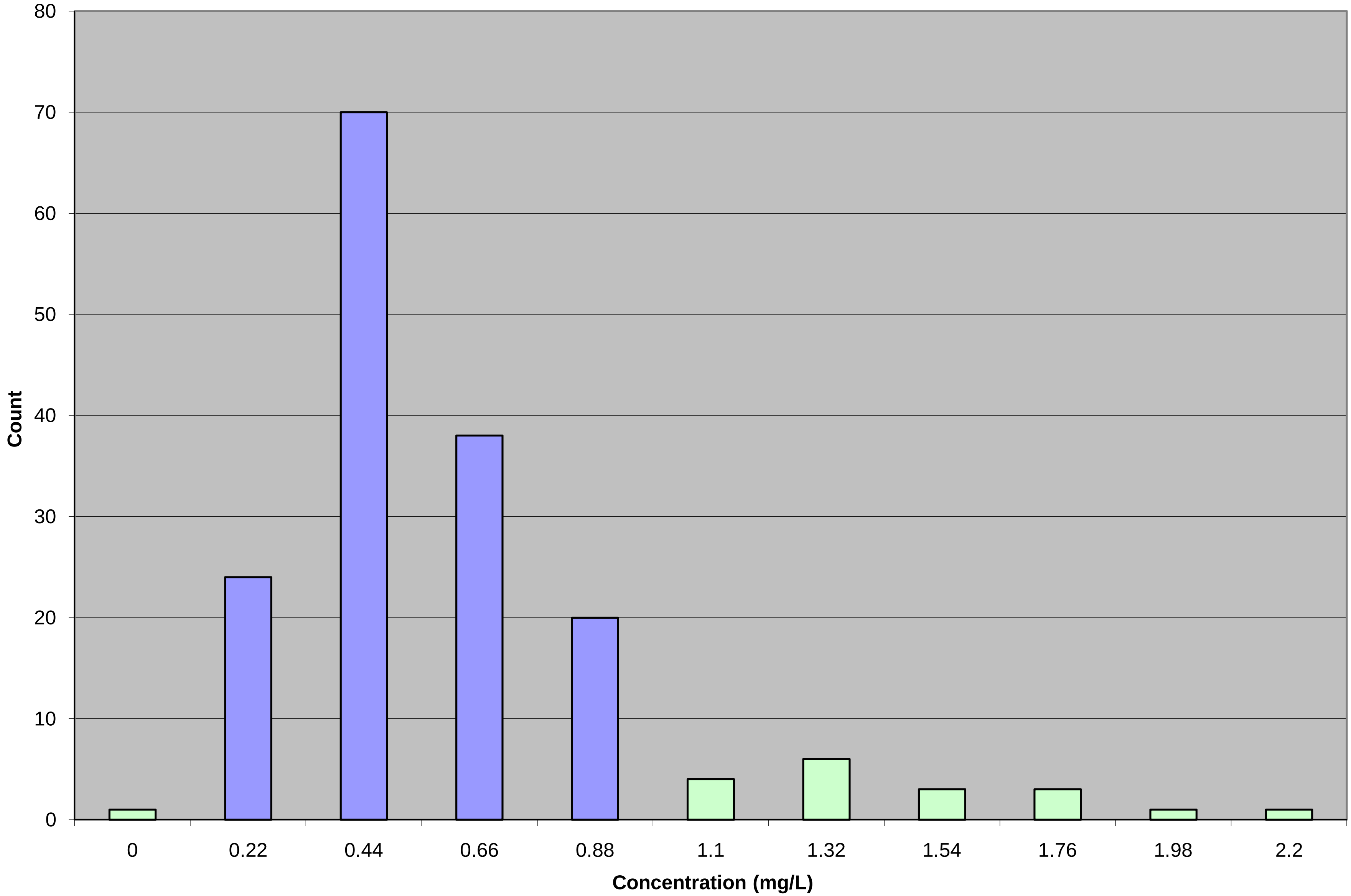


Figure 5A.5 - Constituent Frequency Histogram for Nitrate

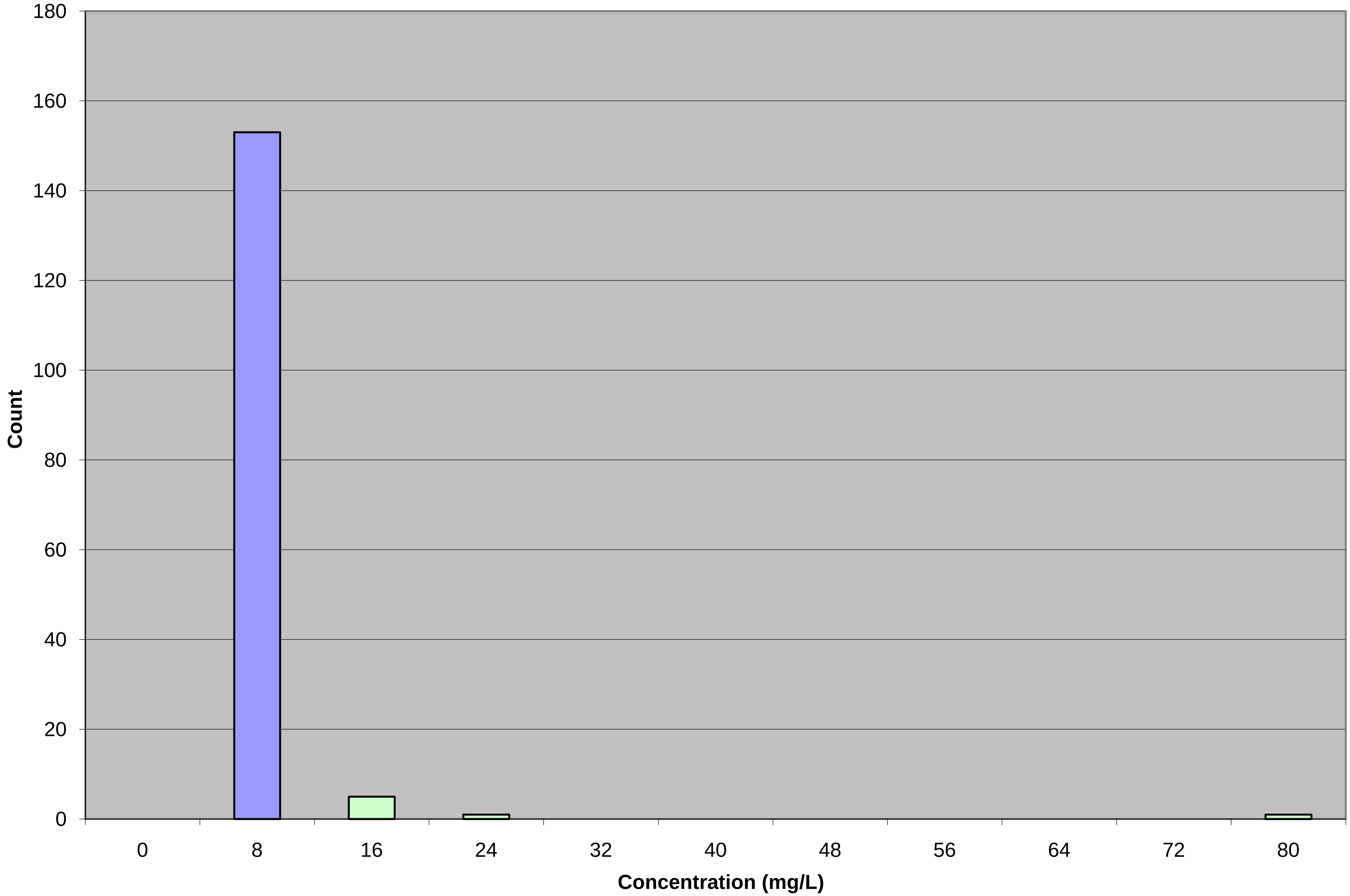
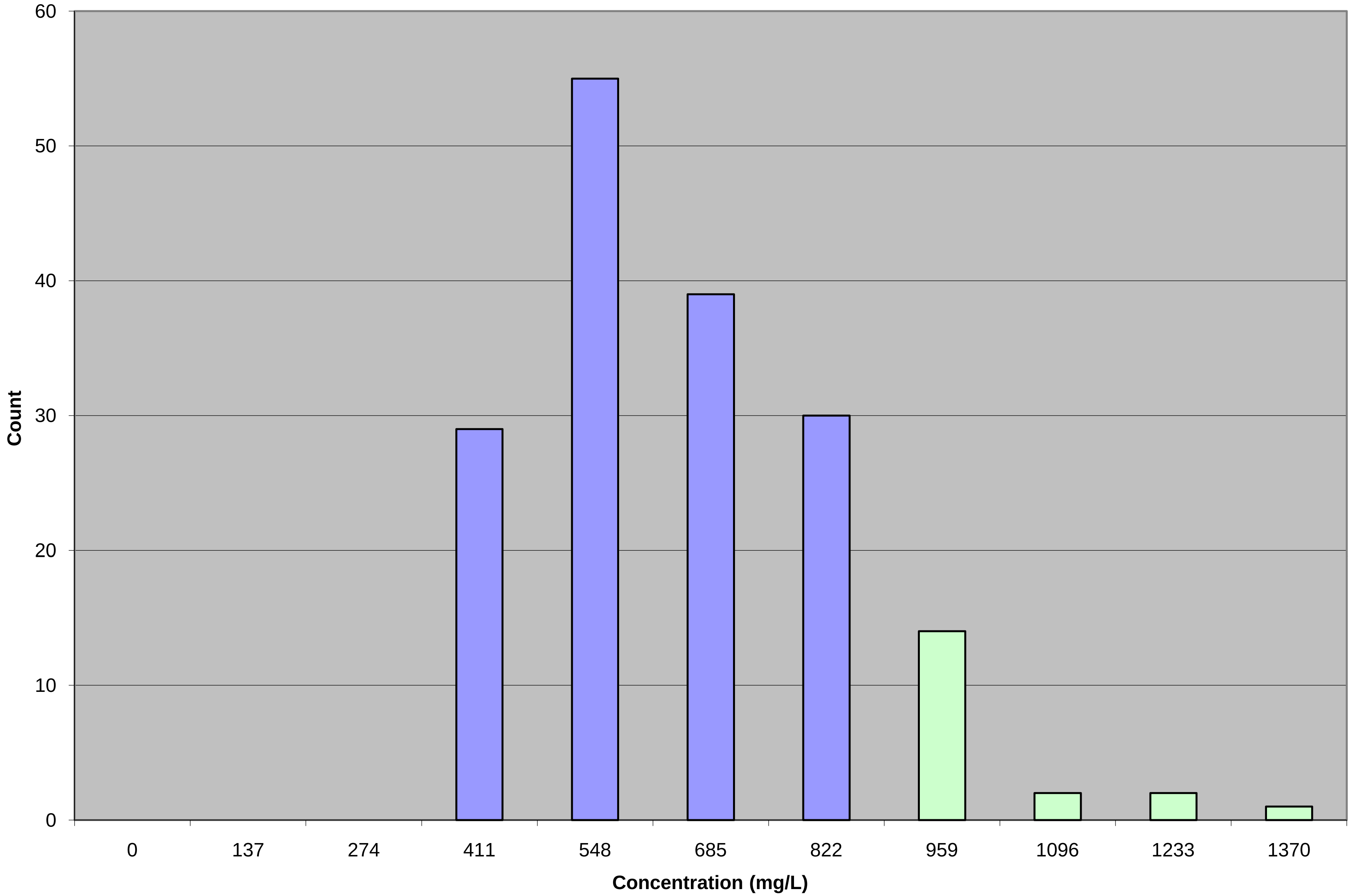


Figure 5A.6 - Constituent Frequency Histogram for TDS



Appendix 5B

Garwood Impacts Analysis

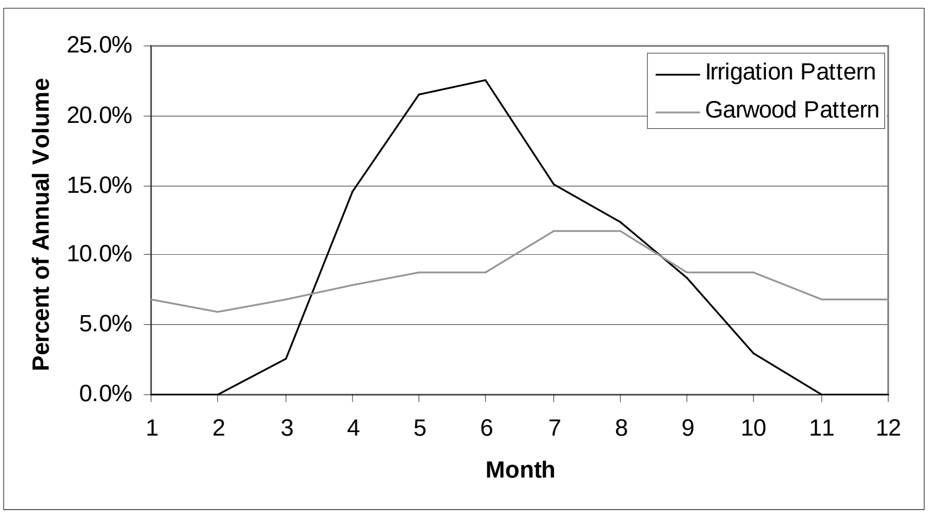
Analysis of Garwood IBT

Chapter 4 discussed a number of potential impacts within the Lavaca River Basin caused by a hypothetical Garwood IBT through a bed and banks conveyance in the Lavaca Basin. Due to the potential for alteration of Lake Texana Levels (which was confirmed in *Chapter 4*) and associated impacts on environmental flow and interruptible supply triggers, LRWPG elected to perform additional analysis of the Garwood IBT. The way in which Lake Texana would be used to convey water from the Corpus Christi's Garwood right may impact local irrigators who have the opportunity to divert interruptible supplies from the reservoir when lake levels are above a certain threshold. In turn, these operating rules may impact the volume of water that can be successfully diverted through Lake Texana to Corpus Christi.

1.1 Overview

As noted in *Chapter 4*, the monthly distribution of the Garwood IBT was obtained from the Colorado Basin WAM. This pattern, along with the monthly usage distribution for irrigation, is shown in *Figure 5-13*.

Figure 5-13
Monthly Use Distribution for Irrigation and Garwood IBT



The irrigation distribution pattern is strongly peaked for the middle of the year, with relatively little use during the winter months. This pattern is based on typical rice irrigation, which dominates water demands in the region. The pattern of the Garwood IBT shows some mild peaking around July and August but due to its more municipal nature is relatively flat in comparison with the irrigation pattern. There is, however, some overlap in the peaks for the IBT and irrigation diversions. In the event that the IBT were junior to Lake Texana, the increased reservoir inflows would potentially increase reservoir levels during the summer months; in turn, this could raise the reservoir level above 43 feet and give upstream irrigators increased acces to water when their demand is the highest. However, as noted in *Chapter 4*, the IBT would likely not be judged feasible unless the bed and banks transfer was senior to Lake Texana and upstream irrigators. Additionally, *Chapter 4* demonstrated that at a senior priority the Garwood IBT would result in lower storage levels in the lake. The impacts of the Garwood IBT on lake levels and interruptible supply during the drought of record (DOR) is discussed in greater detail below. For purposes of this study, the drought of record was conceded to include 1950 through 1957. The analyses below rely on the same model runs discussed in *Chapter 4* and are centered on the subset of the results during the DOR.

1.2 Reservoir Levels

Changes to monthly median reservoir levels and storage volume are shown in *Table 5-2*.

Table 5-2
Median DOR Lake Levels for WAM Simulations

	Median Storage Volume (ac-ft)			Median Water Surface Elevation (ft above MSL)		
Month	**Base**	**IBT**	**Change**	**Base**	**IBT**	**Change**
1	99,493	98,484	-1,009	26.3	26.0	-0.3
2	99,903	98,901	-1,002	26.4	26.1	-0.3
3	104,211	103,249	-962	27.5	27.3	-0.3
4	124,547	124,364	-184	32.9	32.9	0.0
5	131,725	131,519	-206	34.8	34.8	-0.1
6	130,957	128,794	-2,164	34.6	34.0	-0.6
7	119,628	117,488	-2,140	31.6	31.0	-0.6
8	108,594	107,343	-1,251	28.7	28.4	-0.3
9	116,753	115,688	-1,065	30.9	30.6	-0.3
10	117,574	116,534	-1,041	31.1	30.8	-0.3
11	111,539	110,506	-1,033	29.5	29.2	-0.3
12	105,519	104,499	-1,020	27.9	27.6	-0.3

As with the results for the entire period of record discussed in *Chapter 4*, reservoir levels during the DOR are reduced due to the Garwood IBT. This decrease was previously noted to be due to the Garwood IBT increasing the environmental flows passthrough requirement for Lake Texana without contributing water toward meeting those flows. The connection is less obvious for the DOR since the stricter level of environmental flow restriction is enacted when Lake Texana is above 78.18 percent capacity (approx. 35 ft elevation) and the median reservoir levels for the base model during the DOR are below that level. Thus, it would appear that since the stricter passthrough requirement is not active for as many months that the impact of the Garwood IBT would be reduced. However, at the beginning of the drought of record reservoir levels were still high enough to require the higher environmental flow restriction. For the model with the Garwood IBT, this means that Lake Texana has to pass more flows rather than refilling, and hence lake levels drop more rapidly than for the base model. As the drought worsens, the lake levels in the Garwood IBT model were already lower and therefore cannot recover as quickly as in the base model.

1.3 Interruptible Supplies

For both the base and Garwood IBT models, access to interruptible irrigation supplies was limited during the drought of record. Out of the eight years included in the drought of record analysis, only during four (50 percent) were interruptible supplies available. This is substantially lower than the simulation period as a whole, for which at least some interruptible supplies are available 74 percent of the time on an annual basis. Annual interruptible supply diversions for the DOR are included in *Table 5-3*.

Table 5-3
Annual Interruptible Supply Diversions for DOR

Year	Interruptible Supply Diversion (ac-ft)	
	Base	IBT
1950	646	646
1951	0	0
1952	2,786	2,729
1953	748	756
1954	0	0
1955	0	0
1956	0	0
1957	5,163	5,148

For four of the eight years in the drought of record, interruptible supplies were completely unavailable. For the remaining four years examined in the DOR, the presence of the Garwood IBT caused no change in one years, an increase in available supply for one year, and a decrease for two years. However, these changes are small, amounting to a change of two percent or less for any given year and a decrease of 0.7 percent across the DOR. For the entire 57-year simulation period, the Garwood IBT reduces the availability of interruptible supply for irrigation by 4.1 percent. Under true DOR conditions this reduction may have limited impact from an irrigation perspective. It is possible that during prolonged drought conditions irrigators would either resort to overpumping of groundwater or be forced to reduce crop acreage in response to limited water resources. Should crop acreage be substantially reduced during drought conditions, irrigators may not be able to take full advantage of interruptible supplies.

1.4 Lake Texana Passthroughs

Impacts of the Garwood IBT on environmental passthrough flows for Lake Texana were discussed in *Chapter 4* for the entire model simulation period. As noted previously, inflows to Lake Texana with and without the Garwood IBT were used to estimate the change in passthrough requirements caused by the additional IBT flow. For the DOR period, this change is presented in *Table 5-4*.

Table 5-4
Increase in Lake Texana Passthroughs
From Garwood IBT

Year	**Total Δ (ac-ft)**
1950	14,468
1951	0
1952	11,324
1953	17,657
1954	2,402
1955	0
1956	0
1957	11,324

As shown in the table, the additional environmental flows passthrough caused by the Garwood IBT ranges from 0 to nearly 18,000 acre-feet per year (average of 7,147 acre-feet per year). Over the DOR period, the Garwood right would have to sacrifice 20 percent of its volume if required to make up this difference. This is less than the 35 percent loss for the full simulation period, due to reservoir levels being largely below 78.18 percent capacity during DOR. However, this still represents a significant loss over a relatively small portion of the transmission distance to Corpus Christi.

Contents

List of Tables

List of Appendices

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Chapter 6 – Water Conservation and Drought Management Plans

This chapter presents the minimum necessary requirements for conservation plans and drought contingency plans as well as the model conservation plans and drought contingency plans for the various water user categories. The model conservation plans and drought contingency plans were developed specifically for the Lavaca Region in accordance with and as described in *Texas Water Code 11.1271* and *11.1272*. It is recognized that the predominant water use in LRWPA is for irrigation purposes. The greatest impact in reducing water usage in the Lavaca Region will be from conservation in the irrigation of rice, which represents a projected 82 percent of the total water used. However, the current rules for conservation plans and for drought contingency plans are geared more toward wholesale and retail water public water suppliers. The following sections discuss who is required to have plans and what the plans, if required, must contain. Sample drought contingency plans are included at the end of the chapter.

Additionally, LRWPG opted to survey each municipal WUG concerning water conservation measures implemented and measures planned, as well as any measured impacts of conservation and drought contingency practices which have already been implemented. The survey also requested information on water accountability and steps taken to increase accountability. A sample cover letter and survey form are included in *Appendix 6A*. Surveys were mailed to the WUGs on May 4th, 2009. If no response was received within one month, a minimum of three follow up calls were made to the WUGS (*Appendix 6B*). A total of five responses were received; of these, only El Campo and Hallettsville have approved new drought contingency plans since the 2006 RWP and only Moulton has enacted its drought contingency plan. The new drought contingency plan for Hallettsville is identical to that used in the 2006 RWP, and only minor changes were made in the El Campo Plan. The most recent water conservation and drought contingency plans for LRWPA are included in *Appendix 6C*. Survey results for both water conservation and drought contingency measures are discussed in greater detail below.

6.1 Existing Water Conservation and Drought Management Plans in LRWPA

For the 2006 RWP, drought contingency plans were obtained from all seven of the municipal water providers in LRWPA to serve as a summary of existing drought planning within LRWPA. The drought contingency plan for the only WWP in the region, LNRA, was also compiled into this regional summary. These documents are found in *Appendix 6B,* with updated drought contingency plans replacing those from the 2006 RWP where available.

A variety of triggers have been specified by the different water supplies as initiators of water shortage conditions. These triggers include a threshold level of total water use, well levels, and conditions caused by mechanical failure of water service systems. Strategies planned for dealing with drought conditions included restrictions on water use for irrigation, vehicle washing, and construction. The amount of water saved for each drought response conditions varied by community. *Table 6.1* shows the ranges of expected water conservation for each stage of response.

Table 6-1
Range of Anticipated Savings From Drought Contingency Plans

Response Level	Shortage Condition	Lower Limit % Savings	Upper Limit % Savings
1	Mild	5	10
2	Moderate	10	20
3	Severe	15	30
4	Critical	20	40
5	Emergency	25	50
6	Water Allocation	Unspecified	Unspecified

Water conservation plans were also included with the drought contingency plans for the Cities of Shiner and Yoakum for the 2006 RWP. El Campo included a water conservation plan along with their new drought contingency plan for the 2011 RWP. These documents include the following recommendations for reducing municipal water demands:

- **Public Education** – distribution of conservation materials through mail distribution and published articles.
- **Plumbing Code** – setting plumbing standards for new construction and replacement in existing structures.
- **Retrofit Program** – encouraging the replacement of plumbing devices with water saving devices by informing the public on where to obtain these devices and encouraging the sale of such fixtures.
- **Water Rate Structure** – using a conservation water rate structure to discourage the excessive use of water.
- **Metering** – scheduling regular meter testing programs.
- **Water Conservation Landscaping** – encouraging the use of plants with low water demands through public education.
- **Leak Detection and Repair** – through electronic and traditional monitoring of water use and water system infrastructure.

6.1.1 Municipal Uses by Public Water Suppliers[1]

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

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

- A utility profile including, but not limited to, information regarding population and customer data, water use data, water supply system data, and wastewater system data.

- Specification of conservation goals including, but not limited to, municipal per capita water use goals, the basis for the development of such goals, and a time frame for achieving the specified goals (until May 1, 2005).

- Specific, quantified 5- and 10-year targets for water savings to include goals for water loss programs and goals for municipal use in gallons per capita per day (gpcd). The goals established by a public water supplier under this subparagraph are not enforceable.

- Metering device(s) within an accuracy of plus or minus 5.0 percent in order to measure and account for the amount of water diverted from the source of supply.

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

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

- A program of continuing public education and information regarding water conservation.

- A water rate structure which is not "promotional," i.e., a rate structure which is cost-based and which does not encourage the excessive use of water.

- A reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin in order to optimize available water supplies.

- A means of implementation and enforcement which should be shown by either of the following:

    1. A copy of the ordinance, resolution, or tariff indicating official adoption of the water conservation plan by the water supplier, or

    2. A description of the authority by which the water supplier will implement and enforce the conservation plan.

- Documentation of coordination with LRWPG for the service area of the public water supplier to ensure consistency with the appropriate, approved Lavaca RWP.

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

- A program of leak detection, repair, and water loss accounting for the water transmission, delivery, and distribution system to control unaccounted-for uses of water.

- A record management system to record water pumped, water deliveries, water sales, and water losses that allows for the desegregation of water sales and uses into residential, commercial, public and institutional, and industrial users.

- A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of this chapter.

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

- Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates.

- Adoption of ordinances, plumbing codes, and/or rules requiring water-conserving plumbing fixtures to be installed in new structures and existing structures undergoing substantial modification or addition.

- A program encouraging the replacement or retrofit of existing structures built prior to 1991 with water conserving plumbing fixtures.

- Reuse and/or recycling of wastewater and/or graywater.

- A program for pressure control and/or reduction in the distribution system and/or for customer connections.

- A program and/or ordinance(s) for landscape water management.

- A method for monitoring the effectiveness and efficiency of the water conservation plan.

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

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

Beginning May 1, 2005, a public water supplier for municipal use shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5- and 10-year targets and any other new or updated information. The public water supplier for municipal use shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with LRWPG's RWP update.

6.1.2 Industrial or Mining[2]

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

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

- Until May 1, 2005, specification of conservation goals, the basis for the development of such goals, and a time frame for achieving the specified goals.

- Beginning May 1, 2005, specific, quantified 5- and 10-year targets for water savings and the basis for the development of such goals. The goals established by industrial or mining water users under this paragraph are not enforceable.

- A description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.

- Leak-detection, repair, and accounting for water loss in the water distribution system.

- Application of state-of-the-art equipment and/or process modifications to improve water use efficiency.

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

Beginning May 1, 2005, an industrial or mining water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5- and 10-year targets and any other new or updated information. The industrial or mining water user shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with LRWPG RWP update.

6.1.3 Agriculture[3]

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

- For an individual agricultural user other than irrigation:

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

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

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

- Until May 1, 2005, specification of conservation goals, the basis for the development of such goals, and a time frame for achieving the specified goals.

- Beginning May 1, 2005, specific, quantified 5- and 10-year targets for water savings and the basis for the development of such goals. The goals established by agricultural water users under this subparagraph are not enforceable.

- A description of the device(s) and/or method(s) within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.

- Leak-detection, repair, and accounting for water loss in the water distribution system.

- Application of state-of-the-art equipment and/or process modifications to improve water use efficiency.

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

For an individual irrigation user:

- A description of the irrigation production process which shall include, but is not limited to, the type of crops and acreage of each crop to be irrigated, monthly irrigation diversions, any seasonal or annual crop rotation, and soil types of the land to be irrigated.

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

- A description of the device(s) and/or methods within an accuracy of plus or minus 5.0 percent to be used in order to measure and account for the amount of water diverted from the source of supply.

- Until May 1, 2005, specification of conservation goals including, where appropriate, quantitative goals for irrigation water use efficiency and a pollution abatement and prevention plan.

- Beginning May 1, 2005, specific, quantified 5- and 10-year targets for water savings including, where appropriate, quantitative goals for irrigation water use efficiency and a pollution abatement and prevention plan. The goals established by an individual irrigation water user under this subparagraph are not enforceable.

- Water-conserving irrigation equipment and application system or method including, but not limited to, surge irrigation, low pressure sprinkler, drip irrigation, and nonleaking pipe.

- Leak-detection, repair, and water-loss control.

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

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

- Tailwater recovery and reuse.

- Any other water conservation practice, method, or technique which the user shows to be appropriate for preventing waste and achieving conservation.

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

- A system inventory for the suppliers:

    - Structural facilities including the supplier's water storage, conveyance, and delivery structures.

    - Management practices, including the supplier's operating rules and regulations, water pricing policy, and a description of practices and/or devices used to account for water deliveries.

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

- Until May 1, 2005, specification of water conservation goals, including maximum allowable losses for the storage and distribution system.

- Beginning May 1, 2005, specific, quantified 5- and 10-year targets for water savings including maximum allowable losses for the storage and distribution system. The goals established by a system providing agricultural water to more than one user under this subparagraph are not enforceable.

- A description of the practice(s) and/or device(s) which will be utilized to measure and account for the amount of water diverted from the source(s) of supply.

- A monitoring and record management program of water deliveries, sales, and losses.

- A leak-detection, repair, and water loss control program.

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

- A requirement in every wholesale water supply contract entered into or renewed after official adoption of the plan (by either ordinance, resolution, or tariff), and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements in this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter.

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

- Any other water conservation practice, method, or technique which the supplier shows to be appropriate for achieving conservation.

- Documentation of coordination with RWPGs in order to ensure consistency with appropriate approved regional water plans.

A water conservation plan prepared in accordance with the rules of the U.S. Department of Agriculture's NRCS, TSSWCB, or other federal or state agencies and substantially meeting the requirements of this section and other applicable commission rules may be submitted to meet application requirements in accordance with a memorandum of understanding between the commission and that agency.

Beginning May 1, 2005, an agricultural water user shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5- and 10-year targets and any other new or updated information. An agricultural water user shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with LRWPG RWP update.

6.1.4 Wholesale Water Providers[4]

A water conservation plan for a WWP must provide information in response to each of the following paragraphs. If the plan does not provide information for each requirement, WWP shall include in the plan an explanation of why the requirement is not applicable. All water conservation plans for WWPs must include the following elements:

- A description of the wholesaler's service area, including population and customer data, water use data, water supply system data, and wastewater data.

- Until May 1, 2005, specification of conservation goals including, where appropriate, target per capita water use goals for the wholesaler's service area, maximum acceptable unaccounted-for water, the basis for the development of these goals, and a time frame for achieving these goals.

- Beginning May 1, 2005, specific, quantified 5- and 10-year targets for water savings including, where appropriate, target goals for municipal use in gpcd for the wholesaler's service area, maximum acceptable unaccounted-for water, and the basis for the development of these goals. The goals established by wholesale water suppliers under this subparagraph are not enforceable.

- A description as to which practice(s) and/or device(s) will be utilized to measure and account for the amount of water diverted from the source(s) of supply.

- A monitoring and record management program for determining water deliveries, sales, and losses.

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

- A program of metering and leak detection and repair for the wholesaler's water storage, delivery, and distribution system.

- A requirement in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of this chapter. If the customer intends to resell the water, the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with applicable provisions of this chapter.

- A reservoir systems operations plan, if applicable, providing for the coordinated operation of reservoirs owned by the applicant within a common watershed or river basin. The reservoir systems operations plans shall include optimization of water supplies as one of the significant goals of the plan.

- A means for implementation and enforcement, which shall be evidenced by a copy of the ordinance, rule, resolution, or tariff, indicating official adoption of the water conservation plan by the water supplier; and a description of the authority by which the water supplier will implement and enforce the conservation plan.

- Documentation of coordination with RWPGs for the service area of the wholesale water supplier in order to ensure consistency with the Lavaca Regional Water Plan.

Additional Conservation Strategies

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

- Conservation-oriented water rates and water rate structures such as uniform or increasing block rate schedules, and/or seasonal rates, but not flat rate or decreasing block rates.

- A program to assist agricultural customers in the development of conservation pollution prevention and abatement plans.

- A program for reuse and/or recycling of wastewater and/or graywater.

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

Review and update requirements. Beginning May 1, 2005, WWP shall review and update its water conservation plan, as appropriate, based on an assessment of previous 5- and 10-year targets and any other new or updated information. WWP shall review and update the next revision of its water conservation plan no later than May 1, 2009, and every five years after that date to coincide with the Lavaca Regional Water Planning Group's RWP update.

6.1.5 Other Water Uses[5]

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

Model water conservation plans specifically for the Lavaca Region were developed for each water use category and are located at the end of this chapter.

6.2 Drought Contingency Plan[6]

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

- The commission shall by commission rule require wholesale and retail public water suppliers and irrigation districts to develop drought contingency plans consistent with the appropriate approved regional water plan to be implemented during periods of water shortages and drought.

- The wholesale and retail public water suppliers and irrigation districts shall provide an opportunity for public input during preparation of their drought contingency plans and before submission of the plans to the commission.

Beginning in May 2005, the following are additional requirements in the drought contingency plan:

- Specific, quantified targets for water use reductions are to be achieved during periods of water shortages and drought. The entity preparing the plan shall establish the targets.

- The commission and the board by joint rule shall identify quantified target goals for drought contingency plans that wholesale and retail public water suppliers, irrigation districts, and other entities may use as guidelines in preparing drought contingency plans. Goals established under this subsection are not enforceable requirements.

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

6.2.1 Municipal Uses by Public Water Suppliers[7]

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

- Preparation of the plan shall include provisions to actively inform the public and affirmatively provide opportunity for public input. Such acts may include, but are not limited to, having a public

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

[6] Model drought contingency plans specifically for Lavaca Region were developed for each water use category and are located at the end of this chapter.

[7] Information in this subsection was obtained from the *Texas Administrative Code*, TAC Title 30 Part 1 Chapter 288 Subchapter A Rule 288.20

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

- Provisions shall be made for a program of continuing public education and information regarding the drought contingency plan.

- The drought contingency plan must document coordination with RWPGs for the service area of the retail public water supplier to ensure consistency with the appropriate approved regional water plans.

- The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.

- The drought contingency plan must include drought or emergency response stages providing for the implementation of measures in response to at least the following situations:

    - Reduction in available water supply up to a repeat of DOR.
    - Water production or distribution system limitations.
    - Supply source contamination.
    - System outage due to the failure or damage of major water system components (e.g., pumps).

- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.

- The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:

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

- The drought contingency plan must include the procedures to be followed for the initiation or termination of each drought response stage, including procedures for notification of the public.

- The drought contingency plan must include procedures for granting variances to the plan.

- The drought contingency plan must include procedures for the enforcement of mandatory water use restrictions, including specification of penalties (e.g., fines, water rate surcharges, discontinuation of service) for violations of such restrictions.

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

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

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

6.2.2 Irrigation Uses[8]

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

- Preparation of the plan shall include provisions to actively inform and to affirmatively provide opportunity for users of water from the irrigation system to provide input into the preparation of the plan and to remain informed of the plan. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the water users and providing written notice to the water users concerning the proposed plan and meeting.

- The drought contingency plan must document coordination with the RWPGs to ensure consistency with the appropriate approved regional water plans.

- The drought contingency plan must include water supply criteria and other considerations for determining when to initiate or terminate water allocation procedures, accompanied by an explanation of the rationale or basis for such triggering criteria.

- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this subparagraph are not enforceable.

- The drought contingency plan must include methods for determining the allocation of irrigation supplies to individual users.

- The drought contingency plan must include a description of the information to be monitored by the water supplier and the procedures to be followed for the initiation or termination of water allocation policies.

- The drought contingency plan must include procedures for use in accounting during the implementation of water allocation policies.

- The drought contingency plan must include policies and procedures, if any, for the transfer of water allocations among individual users within the water supply system or to users outside the water supply system.

[8] Information in this subsection was obtained from the *Texas Administrative Code*, specifically TAC Title 30 Part 1 Chapter 288 Subchapter A Rule 288.21

- The drought contingency plan must include procedures for the enforcement of water allocation policies, including specification of penalties for violations of such policies and for wasteful or excessive use of water.

- Wholesale water customers. Any irrigation water supplier that receives all or a portion of its water supply from another water supplier shall consult with that supplier, and shall include in the drought contingency plan appropriate provisions for responding to reductions in that water supply.

- Protection of public water supplies. Any irrigation water supplier that also provides or delivers water to a public water supplier(s) shall consult with that public water supplier(s) and shall include in the plan, mutually agreeable and appropriate provisions to ensure an uninterrupted supply of water necessary for essential uses relating to public health and safety. Nothing in this provision shall be construed as requiring the irrigation water supplier to transfer irrigation water supplies to non-irrigation use on a compulsory basis or without just compensation.

Irrigation water users shall review and update, as appropriate, the drought contingency plan at least every five years, based on new or updated information such as adoption or revision of the Lavaca RWP.

6.2.3 Wholesale Water Providers[9]

A drought contingency plan for a WWP should include at a minimum the following information:

- Preparation of the plan shall include provisions to actively inform the public, to affirmatively provide opportunity for user input in the preparation of the plan and for informing wholesale customers about the plan. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.

- The drought contingency plan must document coordination with LRWPG for the service area of WWP to ensure consistency with the Lavaca Regional Water Plan.

- The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.

- The drought contingency plan must include a minimum of three drought or emergency response stages providing for the implementation of measures in response to water supply conditions during a repeat of DOR.

- The drought contingency plan must include the procedures to be followed for the initiation or termination of drought response stages, including procedures for notification of wholesale customers regarding the initiation or termination of drought response stages.

- The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this paragraph are not enforceable.

[9] Information in this subsection was obtained from the *Texas Administrative Code*, specifically TAC Title 30 Part 1 Chapter 288 Subchapter A Rule 288.22

- The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:
  - Pro rata curtailment of water deliveries to or diversions by wholesale water customers as provided in *Texas Water Code §11.039*
  - Utilization of alternative water sources with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).
- The drought contingency plan must include a provision in every wholesale water contract entered into or renewed after adoption of the plan, including contract extensions, that in case of a shortage of water resulting from drought, the water to be distributed shall be divided in accordance with *Texas Water Code, §11.039*. The drought contingency plan must include procedures for granting variances to the plan.
- The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions, including specification of penalties (e.g., liquidated damages, water rate surcharges, discontinuation of service) for violations of such restrictions.

WWP shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan. WWP shall review and update, as appropriate, the drought contingency plan at least every five years, based on new or updated information such as adoption or revision of the Lavaca RWP.

6.3 Drought Contingency and Water Conservation Survey Results

As noted at the beginning of the chapter, municipal WUGs were surveyed concerning their drought contingency and water conservation practices. While five WUGs responded to the survey, only a limited amount of quantitative data was available to assess the impacts of drought contingency and water conservation. Survey results did, however, reveal some general trends, particularly regarding water conservation practices.

6.3.1 Drought Contingency Results

Survey results were unable to provide much information on the efficacy of local drought contingency plans, as most of the municipalities had not enacted drought contingency measures as of the survey date. Of the five respondents, only the City of Moulton has enacted its drought contingency plan. Activation of the plan was caused due to high demand and declining static water levels. The survey response from the City of Moulton indicated that static water levels recovered due to enacting the drought contingency plan. While it is unlikely that water supplies for all municipalities would respond in exactly the same way to drought contingency measures, the improvement of water levels in this case indicates that drought contingency plans in LRWPA can have a measurable positive effect. For the next planning cycle, it is anticipated that additional data will be available concerning the effects of drought conservation plans. The recent period of high temperatures and low rainfall have resulted in much of the Texas Gulf Coast being classified as suffering from extreme or exceptional drought

6.3.2 Water Conservation Results

WUGs were surveyed about water use rates as well as implementation of a variety of municipal and industrial water conservation measures and any observed effects of these measures. Per-capita water use rates for surveyed WUGs vary widely across the region, ranging from 90 gallons per capita per day (gpcd) to approximately 200 gpcd. This variability in rates is likely caused by a combination of varying rates and types of industry along with socioeconomic factors. A summary of survey results for potential conservation practices is given in *Table 6-2* below.

Table 6-2
Survey Results for Water Conservation Measures

Practice	# WUGS[1]	Would Consider	Effectiveness[2]	Annual Savings (ac-ft)	Annual Cost ($)
Municipal Conservation					
Water System Audits	3	1	1-4	----	----
Leak Detection	1	2	4	----	Varies
Prohibition on Wasting Water	0	2	----	----	----
Low Flow Plumbing Requirements	3	1	2-3	----	0
Clothes Washer Incentive Program	0	2	----	----	----
Conservation / Tiered Pricing	2	2	2-3	----	0
Public Education or Outreach	5	----	2-3	----	200-1000
School Education	1	1	2	----	----
Athletic & Golf Course Conser.	1	1	3	----	----
Industrial Conservation					
Industrial Water Audit	0	2	----	----	----
Industrial Water Waste Reduction	0	2	----	----	----
Alt. Water Sources / Process Reuse	0	2	----	----	----
Site Specific Industrial Conser.	0	2	----	----	----
Industrial Landscape	0	2	----	----	----
Other Conservation Measures					
Municipal WWTP Effluent Reuse	1	----	4	30.7	----

[1]Total number of survey respondents that either are currently implementing a practice or have done so in the past.

[2]Respondents were asked to rate effectiveness on a five point scale, from ineffective (1) to very effective (5).

The surveyed WUGs were unable to provide detailed information quantifying water savings from the majority of applied conservation practices. This could be due to a number of reasons. For at least one WUG, the selected conservation measure had not been in place long enough to get an accurate measurement of savings. For the remaining WUGs, the impacts of conservation practices may be difficult to determine without a longer history of implementation. Due to variations in water demand caused by year-to-year differences in rainfall, it can be difficult to differentiate between demand changes caused by weather and those due to conservation practices. An exception to this is water system auditing, due to availability of meter readings at both the WUG water plant(s) and at points of use. Two WUGs reported improved conditions due to system audits; one reported an 11.5 percent reduction in water losses, while another reported that system audits and meter replacement reduced water losses from 40 percent to 15 percent.

Public education and outreach was the most common practice, having been implemented at some point by all five of the WUGs responding to the survey. However, effectiveness was considered to be moderate at best. Assessments of efficacy were similar for low-flow plumbing requirements and conservation or tier pricing. These two practices do have the advantage that they do not generate a direct cost to the municipality. The remaining municipal conservation strategies have seen no or limited implementation. While leak detection was only used by one WUG, it considered the annual application of leak detection to be an effective conservation practice. This WUG also noted that it implemented municipal wastewater treatment plant effluent reuse in 1995, leasing to annual water savings of approximately 30.7 acre-feet (10,000,000 gallons). While the annual cost of this practice was unknown, it is likely that a significant capital expenditure was required to design and install the reuse facilities. Currently, industrial conservation is not practiced by any of the respondents, although two of the WUGs were willing to consider implementing industrial conservation measures in the future.

Overall, there seems to be very limited support in the municipal WUGs for water conservation practices, and relatively few measures have been implemented. Results from the survey indicate that annual budgets for conservation measures are either nonexistent or small; the largest annual budget indicated was $1000. Because changes in demand may be hard to measure, WUGs may not want to devote funds to changing their systems or operations without being able to quantify the benefit from their investment. Regional population dynamics also provide limited incentive for municipal water conservation. As shown in *Chapter 4*, none of the ten municipal WUGs (seven named WUGs and three County-Other) is projected to have a water availability shortage over the planning horizon. At the same time, population growth between 2010 and the 2060 planning horizon is limited for all WUGs other than Hallettsville. For the remaining nine WUGs, population change over the planning period ranges from -46 percent to 17 percent. The net population increase for the region between 2010 and 2060 is projected to be only 172 persons. Thus, there is little motivation for WUGs to conserve water when existing levels of production will be able to meet demands for an extended period of time. Similarly, there is little incentive for industrial conservation due to low total demand, gradual growth in demand, and adequate water supply throughout the planning period. For these reasons, it is unlikely that there will be much additional application of municipal and industrial water conservation in LRWPA except in the form of temporary measures due to enacting drought contingency plans.

6.4 Irrigation Conservation

Irrigated agriculture is the largest single water demand source within LRWPA, with irrigation demands dominated by flood irrigation of rice. As noted in the *Agricultural Water Demands Analysis* and in *Chapter 4*, approximately 15 percent of rice acreage for the 2005-2006 period was identified as improved acreage. This conversion is thought to have already created significant water savings, estimated as 9,044 acre-feet of water per year. Given this demand reduction, conservation improvements to remaining irrigated rice acreage would create substantial additional demand reductions and potentially reduce aquifer overdrafting during periods of inadequate rainfall. A report prepared by Dr. James W. Stansel (Texas Agricultural Experiment Station) for the Region H Water Planning Group for their 2006 RWP was used as a basis for calculating water savings from additional conservation improvements.

Several assumptions were made in determining additional water savings from irrigation conservation practices. It is unlikely that conservation practices could be applied to all remaining acreage due to physical or economic constraints. Therefore, a maximum of 85 percent of rice acreage was assumed to be improvable. Secondly, it was assumed that potential future improvements would consist of precision leveling combined with multiple water inlets rather than sequential flooding of levees. Based on the Stansel report, this combination results in first crop water savings of approximately one acre-foot per improved acre. Note that this savings only refers to acreage actively being irrigated; since rice acreage is often rotated in and out of production on a two or three year cycle, several times as much acreage would need to be improved to maintain this savings from year to year. Savings are also dependent on the acreage and water usage rates of ratoon crop rice, as conservation improvements will reduce the water demand of ratoon crops as well. The Agricultural Water Demands Analysis indicated that on average 46 percent of the first crop is rationed for LRWPA and that the water usage rate of the ratoon crop is 50 percent of that for the first crop. From the *Agricultural Water Demands Analysis*, the annual utilized rice acreage was estimated as 50,249 acres. Potential additional water savings from irrigation conservation were then calculated using the following equation derived from the Stansel Report:

Equation 6-1 $$Savings = (A_m - A_c)(A_p)(R_s + (S_p)(R_s)(S_r))$$

Where:
A_m = maximum improvable area in acres
A_c = currently improved area in acres
A_p = area planted for a single growing season in acres
R_s = rate of savings in ac-ft/ac
S_p = percent of first crop ratooned
S_r = ratoon crop percent of first crop water rate

For the assumptions made above, this results in additional savings of 43,393 acre-feet per year of savings. However, for this savings rate to be maintained for all years of a multi-year rotation, acreage irrigated in subsequent years of the rotation must also be improved.

As discussed in *Chapter 4*, there are a number of complicating factors relating to irrigation conservation. Conservation savings would not result in a reduction of capital expenditures but a forced expenditure of funding to garner any savings. As noted previously by several of the group members, there is a finite upper limit to the amount of money that can be spent to conserve agricultural water and still be supported by on-farm income. Additionally, many streams in LRWPA are dependent on irrigation return flows for some or all of their base flow. Thus, additional conservation for irrigated rice acreage could diminish flows as a consequence of more efficient water use and may reduce or impair existing aquatic and riparian habitat.

6.5 TWDB Water Loss Report

House Bill 3338, passed by the 78th Texas Legislature, requires public utilities providing potable water to file water audits with the TWDB once every five years giving the most recent year's water loss. TWDB subsequently commissioned a study of available loss data. For the first phase of water auditing, a number of issues have been identified with the data provided, and work to correct inconsistencies is ongoing. Year 2005 water loss audit information was provided to LRWPG by TWDB and was available for eight public utilities in LRWPA. Calculations from data provided in the audit are shown in *Table 6-3 below*. Please note that data was provided to LRWPG in gallons but has been converted to acre-feet to maintain consistency with the rest of the RWP.

Table 6-3
Water Loss Audit Data for LRWPA

Utility	Annual Production (ac-ft)	Total Loss (ac-ft)	Balancing Error (ac-ft)	% Loss
City of Edna	755.6	92.8	0.0	12.3%
City of Ganado	221.0	4.1	13.1	7.8%
Jackson County WCID 2	44.4	4.4	0.5	11.0%
City of Hallettsville	606.9	5.6	64.6	11.6%
City of Moulton	186.3	2.9	51.0	28.9%
City of Shiner	554.2	72.3	0.0	13.0%
City of El Campo	2,114.0	305.6	0.0	14.5%

Values in the table indicate a broad range of water loss rates for Year 2005 data, ranging from relatively low loss rates (<10 percent) to nearly 30 percent. While the loss rates listed are not generally considered severe, they still warrant examination. These losses may vary annually and could currently be higher or lower than the values shown here. As discussed in *Section 6.3*, there is the potential for water system auditing to substantially reduce losses.

Total losses as presented here are not limited to loss from known leaks, although for some utilities leakage is responsible for a majority of lost water. Total loss also includes meter inaccuracy, unmetered or unauthorized water use, line leaks, and storage overflows. “Balancing error” is a catch-all term used by TWDB for the 2005 data and refers to all water unaccounted for after known or measured losses are subtracted from system inputs. Reliability of the 2005 dataset is limited by considerable error in the water balance for a number of utilities; for several utilities, the water balance error is higher than the estimated total water loss. It is hoped that data submitted to TWDB for subsequent water audits will more accurately portray water balance components for the utilities in LRWPA.

6.6 Sample Water Conservation and Drought Contingency Plans

The following section provides sample water conservation and drought contingency plans for municipal, industrial and mining, and agricultural uses as well as for wholesale water providers.

Model Water Conservation Plan Template

Municipal Uses

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Model Water Conservation Plan Template – Municipal Uses
Introduction and Background

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

1. Purpose

Purpose is to identify and establish principles, practices, and standards to effectively conserve and efficiently use available water supplies and water distribution system capacity. Possibly provide historical annual average residential water demands and the goals for reductions in municipal demand included in the plan.

2. Location

General location of WUG and its service area

3. Customer Data

Population and Service Area Data

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

Active Connections

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

High Volume Customers

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

4. Water Use Data

Water Accounting Data

- Provide amount of water use monthly for previous five years in 1,000 gallons and indicate whether the water is raw water diverted or treated water distributed.
- Provide source/method of obtaining monthly water use for previous five years.

- Provide amount of water in 1,000 gallons delivered as recorded by user type (residential, commercial, industrial, wholesale, other).
- Provide previous five year records for unaccounted for water use.
- Provide previous five year records for annual peak-to-average daily use ratio.
- Provide municipal per capita water use for previous five years.
- Provide seasonal water use for previous five years (gpd).

Projected Water Demands

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

5. Water Supply System

Water Supply Sources

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

Treatment and Distribution System

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

6. Wastewater Utility System

Wastewater System Data

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

Wastewater Data for Service Area

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

7. Utility Operating Data

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

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

Other relevant data

8. Water Conservation Goals

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

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

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

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

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

Estimation for reducing per capita water use:

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

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

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

Needed reduction in per capita to meet planning goal

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

Supplier:

A method for tracking the implementation and effectiveness of the plan

Metering Program

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

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

Measures to Determine and Control Unaccounted for Water

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

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

Reservoir System Operating Plan

Customer:

Education Programs

- Media Campaign School Programs
- Public Exhibitions

Water Rate Structure

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

Supplier:

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

Customer:

- Reuse and Recycling of Wastewater and Graywater

10. Regional Water Planning and Coordination

11. Authority and Adoption

- Means of implementation and enforcement

Model Water Conservation Plan Template

Industrial and Mining Uses

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

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

1. Purpose

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

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

2. Location

General location of WUG and its service area

3. Water Use Data

Water Accounting Data

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

Projected Water Demands

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

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

4. Water Conservation Goals

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

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

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

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

A method for tracking the implementation and effectiveness of the plan

Metering Program

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

Measures to Determine and Control Unaccounted for Water

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

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

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

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

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

6. Regional Water Planning and Coordination

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

Model Water Conservation Plan Template

Agricultural Uses

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Model Water Conservation Plan Template – Agricultural Uses
Introduction and Background

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

1. Purpose

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

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

2. Location and General Information

General location of WUG and its service area

System Providing Agricultural Water to More Than One User

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

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

3. Water Use Data

Water Accounting Data

Agricultural User Other than Irrigation

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

Individual Irrigation User

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

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

All Agricultural Users

Projected Water Demands

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

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

4. Water Conservation Goals

All Agricultural Users

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

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

All Agricultural Users

- A method for tracking the implementation and effectiveness of the plan

- Metering Program

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

- Measures to Determine and Control Unaccounted for Water

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

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

Agricultural User Other than Irrigation

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

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

Individual Irrigation User

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

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

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

- Tailwater recovery and reuse

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

System Providing Agricultural Water to More Than One User

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

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

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

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

6. Regional Water Planning and Coordination

System Providing Agricultural Water to more than one User

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

7. Adoption of Plan

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

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

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Model Water Conservation Plan Template

Wholesale Water Providers

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

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

1. Purpose

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

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

2. Location

General location of WWP and its service area

3. Customer Data

Population and Service Area Data

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

Active Connections

- Provide current number of active connections by user type and whether they are metered or not-metered (Metered Residential, Not-metered Residential, Metered Commercial, Not-metered Commercial, Metered Industrial, Not-metered Industrial, Metered Public, Not-metered Public, Metered Other, Not-metered Other)

- Provide net number of new connections/year for most recent three years by user type

High Volume Customers

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

4. Water Use Data

Water Accounting Data

- Provide amount of water use monthly for previous five years in 1,000 gallons and indicate whether the water is raw water diverted or treated water distributed

- Provide source/method of obtaining monthly water use for previous five years
- Provide amount of water in 1,000 gallons delivered as recorded by user type (residential, commercial, industrial, wholesale, other)
- Provide previous five year records for unaccounted for water use
- Provide previous five year records for annual peak-to-average daily use ratio
- Provide municipal per capita water use for previous five years
- Provide seasonal water use for previous five years (gpd)

Projected Water Demands

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

5. Water Supply System

Water Supply Sources

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

Treatment and Distribution System

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

6. Wastewater Utility System

Wastewater System Data

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

Wastewater Data for Service Area

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

7. Utility Operating Data

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

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

Other relevant data

8. Water Conservation Goals

Goals for WWPs established to maintain/reduce consumption measured in

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

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

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

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

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

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

Supplier:

- A method for tracking the implementation and effectiveness of the plan
- Metering Program
    - A master meter(s) to measure and account for the amount of water diverted from the source of supply
- Measures to Determine and Control Unaccounted for Water
    - Measures to determine and control unaccounted-for uses of water (e.g., periodic visual inspections along distribution lines; annual or monthly audit of the water system to determine illegal connections, abandoned services, etc.)
- Leak Detection and Repair (a program for leak detection, repair, and water loss accounting for the water storage, delivery, and distribution system in order to control unaccounted-for uses of water)
- Reservoir System Operating Plan
    - Water Rate Structure (should be conservation oriented)
- Program to assist agricultural customers in the development of conservation pollution prevention and abatement plans.
- Program for Reuse and Recycling of Wastewater and Greywater (if not feasible explain why)
- Any other conservation measure which the WWP shows to be appropriate for achieving the stated goal or goals of the water conservation plan.

10. Regional Water Planning and Coordination

11. Authority and Adoption

Means of implementation and enforcement

Model Drought Contingency Plan Template

Utility/Water Supplier

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

Include information such as

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

Section I: Declaration of Policy, Purpose, and Intent

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 __________________ (name of your water supplier) hereby adopts the following regulations and restrictions on the delivery and consumption of water through an ordinance/or resolution (see Appendix C for an example).

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

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the

______________ (name of your water supplier) by means of ________________ (describe methods

used to inform the public about the preparation of the plan and provide opportunities for input; for

example, scheduling and providing public notice of a public meeting to accept input on the Plan).

Section III: Public Education

The ______________ (name of your water supplier) will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of __________________ (describe methods to be used to provide information to the public about the Plan; for example, public events, press releases or utility bill inserts).

Section IV: Coordination with Regional Water Planning Groups

The service area of the _____________ (name of your water supplier) is located within the ____________ (name of regional water planning area or areas) and ___________ (name of your water supplier) has provided a copy of this Plan to the ____________ (name of your regional water planning group or groups).

Section V: Authorization

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

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the __________________ (name of your water supplier). The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan**,** the following definitions shall apply:

<u>Aesthetic water use</u>: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

<u>Commercial and institutional water use</u>: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

<u>Conservation</u>: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

<u>Customer</u>: any person, company, or organization using water supplied by _________________ (name of your water supplier).

<u>Domestic water use</u>: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

<u>Even number address</u>: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

<u>Industrial water use</u>: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

<u>Landscape irrigation use</u>: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

<u>Non-essential water use</u>: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;

(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The ________________ (designated official) or his/her designee shall monitor water supply and/or demand conditions on a __________ (example: daily, weekly, monthly) basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified ■triggers• are reached.

The triggering criteria described below are based on ______________________________________
____
(*provide a brief description of the rationale for the triggering criteria; for example, triggering criteria / trigger levels based on a statistical analysis of the vulnerability of the water source under drought of record conditions, or based on known system capacity limits*).

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation
Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII■Definitions, when

____
(*Describe triggering criteria / trigger levels; see examples below*).

Following are examples of the types of triggering criteria that might be used in one or more successive stages of a drought contingency plan. One or a combination of such criteria must be defined for each drought response stage, but usually not all will apply. Select those appropriate to your system:

Example 1: *Annually, beginning on May 1 through September 30.*

Example 2: *When the water supply available to the _______ (name of your water supplier) is equal to or less than _______ (acre-feet, percentage of storage, etc.).*

Example 3: *When, pursuant to requirements specified in the _____________(name of* ***your*** *water supplier) wholesale water purchase contract with ____________ (name of your wholesale water supplier), notification is received requesting initiation of Stage 1 of the Drought Contingency Plan.*

Example 4: *When flows in the _______ (name of stream or river) are equal to or less than ____cubic feet per second.*

Example 5: *When the static water level in the ____________ (name of your water supplier) well(s) is equal to or less than _____ feet above/below mean sea level.*

Example 6: *When the specific capacity of the __________________ (name of your water supplier) well(s) is equal to or less than _____ percent of the well's original specific capacity.*

Example 7: *When total daily water demand equals or exceeds ______ million gallons for ___consecutive days of ____ million gallons on a single day (example: based on the "safe" operating capacity of water supply facilities).*

Example 8: *Continually falling treated water reservoir levels which do not refill above __ percent overnight (example: based on an evaluation of minimum treated water storage required to avoid system outage).*

The public water supplier may devise other triggering criteria which are tailored to its system.

<u>Requirements for termination</u>
Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g. 3) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

<u>Requirements for initiation</u>
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when ____________ (*describe triggering criteria; see examples in Stage 1*).

<u>Requirements for termination</u>
Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

<u>Requirements for initiation</u>
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when ____________ (*describe triggering criteria; see examples in Stage 1*).
<u>Requirements for termination</u>
Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

<u>Requirements for initiation</u>
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when ____________ (*describe triggering criteria; see examples in Stage 1*).

Requirements for termination
Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when ____________ (designated official), or his/her designee, determines that a water supply emergency exists based on:

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

2. Natural or man-made contamination of the water supply source(s).

Requirements for termination
Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation
Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when ____________ (describe triggering criteria, see examples in Stage 1).

Requirements for termination - Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (example: 3) consecutive days.

Note: The inclusion of WATER ALLOCATION as part of a drought contingency plan may not be required in all cases. For example, for a given water supplier, an analysis of water supply availability under drought of record conditions may indicate that there is essentially no risk of water supply shortage. Hence, a drought contingency plan for such a water supplier might only address facility capacity limitations and emergency conditions (example: supply source contamination and system capacity limitations).

Section IX: Drought Response Stages

The _______________ (designated official), or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification
Notification of the Public:
The _________ (designated official) or his/ her designee shall notify the public by means of:

Examples:
publication in a newspaper of general circulation,
direct mail to each customer,
public service announcements,
signs posted in public places

take-home fliers at schools.

Additional Notification:
The _________ (designated official) or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Examples:
Mayor / Chairman and members of the City Council / Utility Board
Fire Chief(s)
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety
TCEQ *(required when* mandatory *restrictions are imposed)*
Major water users
Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers

Note: The plan should specify direct notice only as appropriate to respective drought stages.

Stage 1 Response -- MILD Water Shortage Conditions

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

Best Management Practices for Supply Management:

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

Voluntary Water Use Restrictions for Reducing Demand :

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

(b) All operations of the ______________ (name of your water supplier) shall adhere to water use restrictions prescribed for Stage 2 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

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

Best Management Practices for Supply Management:

Describe additional measures, if any, to be implemented directly by ____________ (name of your water supplier) to manage limited water supplies and/or reduce water demand. Examples include: reduced or discontinued flushing of water mains, reduced *or discontinued irrigation of public landscaped areas; use of an alternative supply source(s); use of reclaimed water for non-potable purposes.*

Water Use Restrictions for Demand Reduction:

Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

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

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

(c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the ___________________ (name of your water supplier).

(f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the _______________ (name of your water supplier), the facility shall not be subject to these regulations.

(g) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(h) The following uses of water are defined as non-essential and are prohibited:

1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;

3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

<u>Target</u>: Achieve a ___ percent reduction in __________ (example: total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

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

<u>Water Use Restrictions for Demand Reduction</u>:
All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the ____________________ (name of your water supplier).

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

<u>Target</u>: Achieve a ___ percent reduction in __________ (example: total water use, daily water demand, etc.).

<u>Best Management Practices for Supply Management</u>:

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

<u>Water Use Restrictions for Reducing Demand:</u>. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi-type pools is prohibited.

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

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

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

Best Management Practices for Supply Management:

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

Water Use Restrictions for Reducing Demand. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the ____________ (designated official) is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

“Household” means the residential premises served by the customer’s meter. “Persons per household” include only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer’s household is comprised of two (2) persons unless the customer notifies the _____________ (name of your water supplier) of a greater number of persons per household on a form prescribed by the ____________ designated official). The _________ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer’s responsibility to go to the ____________ (name of your water supplier) offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the __________ (designated official). When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the _________ (name of water supplier) on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the _________(name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the _________ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the ____________ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than $________.

Residential water customers shall pay the following surcharges:

$____ for the first 1,000 gallons over allocation.
$____ for the second 1,000 gallons over allocation.
$____ for the third 1,000 gallons over allocation.
$____ for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (example: apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer’s meter serves two dwelling units unless the customer notifies the ____________ (name of your water supplier) of a greater number on a form prescribed by the __________ (designated official). The _________ (designated official) shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer’s responsibility to go to the ____________ (name of your water supplier) offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the __________ (designated official). If the number of dwelling units served by a master meter is reduced, the customer shall notify the _________(name of your water supplier) in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the _________ (designated official) shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the ____________ (name of your water supplier) of a reduction in the number of person in a household shall be fined not less than $________. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$____ for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$____, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$____, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$ ____, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the __________ (designated official), or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately __ (e.g. 75%) percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, __ percent of whose monthly usage is less than ____ gallons, shall be allocated ____ gallons. The _________ (designated official) shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the ____________ (name of your water supplier) to determine the allocation. Upon request of the customer or at the initiative of the ___________ (designated official), the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the ___________ (designated official or alternatively, a special water allocation review committee). Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through ______ gallons per month:

$____ per thousand gallons for the first 1,000 gallons over allocation.
$____ per thousand gallons for the second 1,000 gallons over allocation.
$____ per thousand gallons for the third 1,000 gallons over allocation.
$____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is ______ gallons per month or more:

___ times the block rate for each 1,000 gallons in excess of the

allocation up through 5 percent above allocation.
___ times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
___ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
___ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, “block rate” means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Industrial Customers

A monthly water allocation shall be established by the __________ (designated official), or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately __ (example: 90%) percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to __ (example: 85%) percent of the customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the ______ month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than ___ months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The _________ (designated official) shall give his/her best effort to see that notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the ____________ (name of your water supplier) to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the ___________ (designated official), the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the ___________ (designated official or alternatively, a special water allocation review committee). Industrial customers shall pay the following surcharges:

Customers whose allocation is _____ gallons through _______ gallons per month:

$____ per thousand gallons for the first 1,000 gallons over allocation.
$____ per thousand gallons for the second 1,000 gallons over allocation.
$____ per thousand gallons for the third 1,000 gallons over allocation.
$____ per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is ______ gallons per month or more:

___ times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
___ times the block rate for each 1,000 gallons from 5 percent

through 10 percent above allocation.
___ times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
___ times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section X: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the __________________ (name of your water supplier) for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by _____________(designated official), or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than _______ dollars ($__) and not more than ______ dollars ($__). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the _____________ (designated official) shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at $______, and any other costs incurred by the ___________________ (name of your water supplier) in discontinuing service. In addition, suitable assurance must be given to the ________________ (designated official) that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(c) Any person, including a person classified as a water customer of the ______________ (name of your water supplier), in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

d) Any employee of the _______________ (name of your water supplier), police officer, or other _____ employee designated by the ___________ (designated official), may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the _____________ (example: municipal court) on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in

_________ (example: municipal court) to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in __________ (example: municipal court), a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in __________ (example: municipal court) before all other cases.

Section XI: Variances

The ________________ (designated official), or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the _________________ (name of your water supplier) within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the __________ (designated official), or his/her designee, and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

EXAMPLE RESOLUTION FOR ADOPTION OF A

DROUGHT CONTINGENCY PLAN

RESOLUTION NO. __________

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

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

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

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

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

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

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

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

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

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

____

President, Board of Directors
ATTESTED TO:

____
Secretary, Board of Directors

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Model Drought Contingency Plan Template

Irrigation Uses

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Model Drought Contingency Plan Template (Irrigation Uses)

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

Section I: Declaration of Policy, Purpose, and Intent

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

Section II: User Involvement

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

Section III: User Education

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

Section IV: Authorization

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

Section V: Application

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

Section VI: Initiation of Water Allocation

The __________ (designated official) shall monitor water supply conditions on a __________ (e.g. weekly, monthly) basis and shall make recommendations to the Board regarding irrigation of water allocation. Upon approval of the Board, water allocation will become effective when _________________ (describe the criteria and the basis for the criteria):

Below are examples of the types of triggering criteria that might be used; singly or in combination, in an irrigation district's drought contingency plan:

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

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

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

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

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

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

Section VII: Termination of Water Allocation

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

Section VIII: Notice

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

Section IX: Water Allocation

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

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

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

Example 1: **An account balance of less than ______ irrigations for each flat**

rate acre (i.e. ____ acre-feet).

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

Example 3: **An account balance of less than _ ___ acre-feet of water.** (c) The amount of water charged against a user's water allocation will be ____ (e.g. eight inches) per irrigation, or one allocation unit, unless water deliveries to the land are metered. Metered water deliveries will be charges based on actual measured use. In order to maintain parity in charging use against a water allocation between non-metered and metered deliveries, a loss factor of ____ percent of the water delivered in a metered situation will be added to the measured use and will be charged against the user's water allocation. Any metered use, with the loss factor applied, that is less than eight (8) inches per acre shall be credited back to the allocation unit and will be available to the user. It shall be a violation of the Rules and Regulations for a water user to use water in excess of the amount of water contained in the users irrigation account.

(d) Acreage in an irrigation account that has not been irrigated for any reason within the last two (2) consecutive years will be considered inactive and will not be allocated water. Any landowner whose land has not been irrigated within the last two (2) consecutive years, may, upon application to the District expressing intent to irrigate the land, receive future allocations. However, irrigation water allocated shall be applied only upon the acreage to which it was allocated and such water allotment cannot be transferred until there have been two consecutive years of use.

Section X: **Transfers of Allotments**

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

(b) A water allocation may not be transferred to land owned by a landowner outside the District boundaries.

or

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

(c) Water from outside the District may not be transferred by a landowner for use within the District.

or

Water from outside the District may be transferred by a landowner for use within the

District. The District will divert and deliver the water on the same basis as District water is delivered, except that a ___ percent conveyance loss will be charged against the amount of water transferred for use in the District as the water is delivered.

Section XI: Penalties

Any person who willfully opens, closes, changes or interferes with any headgate or uses water in violation of these Rules and Regulations, shall be considered in violation of Section 11.0083, Texas Water Code, *Vernon's Texas Codes Annotated*, which provides for punishment by fine of not less than $10.00 nor more than $200.00 or by confinement in the county jail for not more than thirty (30) days, or both, for each violation, and these penalties provided by the laws of the State and may by enforced by complaints filed in the appropriate court jurisdiction in ______ County, all in accordance with Section 11.083; and in addition, the District may pursue a civil remedy in the way of damages and/or injunction against the violation of any of the foregoing Rules and Regulations.

Section XII: Severability

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

Section XIII: Authority

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

Section XIV: Effective Date of Plan

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

EXAMPLE RESOLUTION FOR ADOPTION OF A DROUGHT CONTINGENCY PLAN

RESOLUTION NO. __________

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

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

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

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

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

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

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

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

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

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

____
President, Board of Directors

ATTESTED TO:

____
Secretary, Board of Director

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Model Drought Contingency Plan Template

Wholesale Water Providers

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

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

Section I: Declaration of Policy, Purpose, and Intent

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

Section II: Public Involvement

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

Section III: Wholesale Water Customer Education

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

Section IV: Coordination with Regional Water Planning Groups

The water service area of the _______________ (name of your water supplier) is located within the ________________ (name of regional water planning area or areas) and the ______________ (name of your water supplier) has provided a copy of the Plan to the _____________ (name of your regional water planning group or groups).

Section V: Authorization

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

Section VI: Application

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

Section VII: Criteria for Initiation and Termination of Drought Response Stages

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

The triggering criteria described below are based on:

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

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation -- The _____________ (name of your water supplier) will recognize that a mild water shortage condition exists when______________(*describe triggering criteria, see examples below).*

> ***Below are examples of the types of triggering criteria that might be used in a wholesale water supplier's drought contingency plan. One or a combination of such criteria may be defined for each drought response stage:***
>
> ***Example 1:*** ***Water in storage in the _________ (name of reservoir) is equal to or less than _______ (acre-feet and/or percentage of storage capacity).***
>
> ***Example 2:*** ***When the combined storage in the __________ (name of reservoirs) is equal to or less than ______ (acre-feet and/or percentage of storage capacity).***
>
> ***Example 3:*** ***Flows as measured by the U.S. Geological Survey gage on the ________ (name of river) near ________, Texas reaches ___ cubic feet per second (cfs).***
>
> ***Example 4:*** ***When total daily water demand equals or exceeds ______ million gallons for ___consecutive days or ____ million gallons on a single day.***

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

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

Stage 2 Triggers -- MODERATE Water Shortage Conditions

<u>Requirements</u> <u>for</u> <u>initiation</u> ▪ The _____________ (name of your water supplier) will recognize that a moderate water shortage condition exists when______________(describe triggering criteria).

<u>Requirements</u> <u>for</u> <u>termination</u> **-** Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative. The _________ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 1 of the Plan.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

<u>Requirements</u> <u>for</u> <u>initiation</u> ▪ The _____________ (name of your water supplier) will recognize that a severe water shortage condition exists when______________(*describe triggering criteria; see examples in Stage 1*).

<u>Requirements</u> <u>for</u> <u>termination</u> **-** Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative. The _________ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 2 in the same manner as the notification of initiation of Stage 3 of the Plan.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

<u>Requirements</u> <u>for</u> <u>initiation</u> - The _____________ (name of your water supplier) will recognize that an emergency water shortage condition exists when______________(*describe triggering criteria*; *see examples below*).

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

Example 2. ***Natural or man-made contamination of the water supply source(s).***

<u>Requirements</u> <u>for</u> <u>termination</u> **-** Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of ___ (e.g., 30) consecutive days. The _________ (name of your water supplier) will notify its wholesale customers and the media of the termination of Stage 4.

Section VIII: Drought Response Stages

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

Stage 1 Response -- MILD Water Shortage Conditions

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

Best Management Practices for Supply Management:

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

Water Use Restrictions for Reducing Demand:

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

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

Stage 2 Response -- MODERATE Water Shortage Conditions

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

Best Management Practices for Supply Management:

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

Water Use Restrictions for Reducing Demand:

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

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

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

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

Stage 3 Response -- SEVERE Water Shortage Conditions

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

<u>Best Management Practices for Supply Management</u>:

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

Water Use Restrictions for Reducing Demand:

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

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

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

Stage 4 Response -- EMERGENCY Water Shortage Conditions

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

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

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

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

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

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

Section IX: Pro Rata Water Allocation

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

Section X: Enforcement

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

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

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

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

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

The above surcharges shall be cumulative.

Section XI: Variances

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

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

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Plan shall file a petition for variance with the _________________ (designated official) within 5 days after pro rata allocation has been invoked. All petitions for variances shall be reviewed by the __________ (governing body), and shall include the following:

(a) Name and address of the petitioner(s).
(b) Detailed statement with supporting data and information as to how the pro rata allocation of water under the policies and procedures established in the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(c) Description of the relief requested.
(d) Period of time for which the variance is sought.
(e) Alternative measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(f) Other pertinent information.

Variances granted by the ___________________ (governing body) shall be subject to the following conditions, unless waived or modified by the ____________ (governing body) or its designee:

(a) Variances granted shall include a timetable for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section XII: Severability

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

If you have any questions on how to fill out this form or about the ___________________________ program, please contact us at 512/239-_______.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512-239-3282.
CITY ATTORNEY

EXAMPLE RESOLUTION FOR ADOPTION OF A

DROUGHT CONTINGENCY PLAN

RESOLUTION NO. __________

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

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

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

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

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

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

SECTION 1. That the Drought Contingency Plan attached hereto as “Exhibit A” and made

part hereof for all purposes be, and the same is hereby, adopted as the official policy of the ________________ (name of water supplier).

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

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

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

____

President, Board of Directors

ATTESTED TO:

____

Secretary, Board of Directors

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Appendix 6A

Sample Water Conservation and Drought Contingency Survey

AECOM

AECOM
5757 Woodway, Suite 101 W, Houston 77057 USA
T 713.780.4100 www.aecom.com

May 4, 2009

[Addressee or Company Name]
[Street Address]
[City, State Zip]

Subject: Lavaca Regional Water Planning Group Water Conservation and Drought Management for 2011 Regional Water Plan

Dear Water System Representative:

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

The consultant team is currently compiling information on water conservation and drought contingency measures for water systems in our Region. As part of the data collection process, we are conducting surveys of best management practices (BMPs) for water conservation. This survey seeks to determine the cost and efficacy for water conservation BMPs that have already been implemented, as well as identifying planned conservation practices that are not yet in place.

This information will be used to evaluate water conservation and drought management in the Lavaca Region and to make recommendations in the 2011 RWP. Your input in this matter is critical to our planning and we appreciate any assistance you may be able to provide. Due to the accelerated timeline of this planning round, please respond to the attached survey at your earliest convenience.

If you have any questions regarding this matter or wish to discuss further, please feel free to call me at (713) 267-3122 or email me at Jason.Afinowicz@aecom.com.

Sincerely,

Jason D. Afinowicz, P.E.
Project Manager

JDA:PIT

c: Project File

Lavaca Regional Water Planning Group
Water Conservation and Drought Contingency Survey

1. Contact Information	
a. City / Water System:	b. Contact Person:
c. Title:	d. Telephone Number:
e. Fax Number:	f. Email Address:
g. Mailing Address:	
2. Existing Water Conservation Measures	
a. What is the water system's average per-capita water demand?	
b. When was this estimate last updated?	
c. What water conservation measures or programs are currently in place for the water system?*	
d. What water conservation measures were used in the past?*	
e. What are the measurable impacts, if any, of current water measures?*	
f. What are the expected impacts of existing measures in the future?*	
g. What is the approximate annual budget for water conservation measures for the water system?*	
h. Has the water system coordinated its public outreach for water conservation with other water systems? If so, who has the water system partnered with?	

*Please indicate the water system response on the attached Water Conservation and Drought Contingency Survey Form

3. Proposed Water Conservation Measures
a. What additional water conservation measures are planned for the water system?*
b. What is the expected efficacy of proposed conservation measures?*
c. If known, what is the approximate annual budget for these proposed measures?*
4. Accountability
a. Do any existing water conservation measures target water system accountability, such as leak detection or water system audits?
b. If so, please describe the impacts of these programs on water system accountability. Quantify any changes if possible.
5. Water Conservation / Drought Contingency Plans
a. Has the water system revised or updated its Water Conservation Plan or Drought Contingency Plan since 2006? If so, please submit a copy of the plan along with the response to this survey.
b. Has the water system enacted its drought contingency plan?
c. If so, what event or events triggered activation of drought contingency measures?
d. What were the measured or observed impacts of enacting drought contingency measures?

* Please indicate the water system response on the attached Water Conservation and Drought Contingency Survey Form

6. Other comments
Please include any additional comments relating to water conservation.

* Please indicate the water system response on the attached Water Conservation and Drought Contingency Survey Form

Lavaca Regional Water Planning Group 2011 RWP
Water Conservation and Drought Contingency Survey Form

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

Appendix 6B

Survey Follow-Up Call Log

AECOM
5757 Woodway Drive, Suite 101W, Houston, Texas 77057-1599
T 713.780.4100 F 713.780.0838 www.aecom.com

Memorandum

Date	July 2009
To	Lavaca Regional Water Planning Group
From	Jason D. Afinowicz, P.E.
Subject	LRWPG 2011 Regional Water Plan Chapter 6 Conservation Survey Call Log

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The Water Conservation and Drought Contingency Survey was mailed to named municipal WUGs on May 4, 2009. A minimum of three follow-up calls were made to each WUG not responding within a month of the mail out date. This technical memorandum catalogs the dates, times, and results of follow-up calls as shown in *Table 6B-1* below. A total of five surveys were received prior to the LRWPG regular meeting on August 4, 2009.

Table 6B-1
Water Conservation and Drought Contingency Survey Call Log

WUG	Follow Up	Date	Time	Result
City of Edna	1	6/11/2009	10:47	Survey not received, consultant resends on 6/12/2009
	2	7/6/2009	15:07	WUG checking status of survey
	3	7/7/2009	15:22	Unable to contact WUG representative
	4	7/14/2009	13:35	Unable to contact WUG representative
City of El Campo	NA	NA	NA	No follow-up required
City of Ganado	1	6/11/2009	11:17	Survey not received, consultant resends on 6/12/2009
	2	7/6/2009	15:12	Unable to contact WUG representative
	3	7/7/2009	15:20	Unable to contact WUG representative
	4	7/14/2009	13:38	Unable to contact WUG representative
City of Hallettsville	NA	NA	NA	No follow-up required
City of Moulton	1	6/11/2009	?	Unable to contact WUG representative
	2	7/6/2009	15:18	Survey not received, consultant resends on 7/7/2009
	3	7/13/2009	15:45	WUG contacted and sends survey via e-mail
City of Shiner	1	6/11/2009	10:50	Survey not received, consultant resends on 6/12/2009
	2	7/6/2009	15:27	Survey in progress, later sent by mail
City of Yoakum	NA	NA	NA	No follow-up required

Appendix 6C

Water Conservation and Drought Contingency Plans for LRWPA

LAVACA-NAVIDAD RIVER AUTHORITY

DROUGHT CONTINGENCY PLAN

MAY 2005

DROUGHT CONTINGENCY PLAN

1.0 INTRODUCTION

Droughts and other uncontrollable circumstances can disrupt the normal availability of water supplies from either ground or surface sources. During drought periods, consumer demand is typically 15 to 25 percent higher than under normal conditions. Limitations on the supply of either ground or surface water, or on facilities to pump, treat, store, or distribute water can also present a public water supply utility with an emergency demand management situation.

The Drought Contingency Plan (DCP) establishes temporary methods designed to be used as long as the emergency exists. The purpose of the DCP is to specify how LNRA will contract and supply stored water supplies during a repetition of the critical drought of record. Consistent with Texas Commission on Environmental Quality (TCEQ) regulations, the LNRA has recommended that, as appropriate, its wholesale water customers consider adoption of drought contingency measures to be implemented in response to LNRA trigger conditions. As a provision of their respective water supply contracts, all LNRA customers have drought contingency plans on file with the TCEQ.

LNRA's DCP includes the following measures:

a. Trigger conditions signaling the start of an emergency period;
b. Designation of drought contingency measures;
c. Public information and education; and
d. Notification actions for drought termination

2.0 TRIGGERING CONDITIONS

As a wholesale water supply utility and a water resource manager, the LNRA will initiate drought contingency measures upon occurrence of the following conditions:

<u>Condition One:</u>	Compromised Reservoir Condition One Reservoir elevation is at or below elevation 43.00 msl
<u>Condition Two:</u>	Compromised Reservoir Condition Two Reservoir elevation is at or below elevation 40.15 msl
<u>Condition Three:</u>	Severe Local Drought Condition -- Compromised Groundwater Supply Reduction of local groundwater supplies to critical levels.

3.0 DROUGHT CONTINGENCY MEASURES

The following actions should be taken when trigger conditions are met. As a wholesale water supplier, the LNRA continuously monitors Lake Texana water levels and communicates with local communities as to the condition of water supplies in the Lavaca River Basin.

Condition One: Compromised Reservoir Condition One

A trigger condition has been established by an agreement between the LNRA and specified water rights permit holders upstream of Lake Texana using surface water for irrigation purposes. Trigger condition one impacts permit holders upstream of Lake Texana who divert water for irrigation purposes. Diversions for irrigation purposes are limited to times that Lake Texana is at or above elevation 43.00 msl. Prior to any initiating diversions, permittees must confirm the level of Lake Texana with either the LNRA or the TCEQ Watermaster. Diversions must cease within 24 hours following the time when the reservoir level drops below elevation 43.00 msl. The goal for water use reduction under Condition One is a 3% percent reduction of the use that would have occurred in the absence of drought contingency measures.

Upon reaching Condition One, LNRA will implement the following relevant actions:

a. Notify the TCEQ Watermaster of reservoir condition.
b. Inform public, giving notice of reservoir condition to the customers served by the LNRA system and upstream water rights permit holders.
c. Through the news media, the public should be advised of the trigger condition situation. Include in the information to the public a recommendation that water users look for ways to conserve water.

Resumption of normal operation and termination of Condition One should occur when reservoir levels are equal to or greater than elevation 43.00 msl.

Condition Two: Compromised Reservoir Condition Two

A trigger condition has been established by an agreement between LNRA, Texas Parks and Wildlife Department and Texas Water Development Board, whereby upon Lake Texana reaches elevation 40.15 or roughly 78% of the reservoir capacity, LNRA may reduce the volume of freshwater releases to bays and estuaries to 5 cubic feet per second. The goal for water use reduction under Condition Two is a 5% percent reduction of the use that would have occurred in the absence of drought contingency measures.

Upon reaching Condition Two, the LNRA will implement the following relevant actions:

a. Notify the TCEQ Watermaster of reservoir condition.
b. Inform public, giving notice of reservoir condition to the customers served by the LNRA system and include in the information recommendations for water conservation.

Resumption of normal operation and termination of Condition Two should occur when reservoir levels are equal to or greater than elevation 40.15 msl.

Condition Three: Severe Local Drought Condition- Compromised Groundwater Supply

All communities in the Lavaca River Basin use groundwater as their primary water supply source. Lowering of groundwater supplies to critical levels in these communities will impact the health and safety of the public. The water sales contract between the LNRA and the City of Corpus Christi allows for the return of 10,400 acre-feet for meeting the needs of Jackson County. The goal for water use reduction under Condition Three is a 7% percent reduction of the use that would have occurred in the absence of drought contingency measures.

Upon reaching Condition Three, the LNRA will implement the following relevant actions:

a. Notify the TCEQ Watermaster of the compromised condition.
b. The affected community(s) should continue implementation of relevant DCP and water conservation actions
c. Upon authorization by the TCEQ Watermaster, the LNRA will enact contractual provisions and assist the affected community as appropriate
d. Certain industrial and commercial water uses which are not essential to the health and safety of the community should be prohibited; and
e. Through the news media, the public should be advised daily of the trigger conditions.

4.0 INFORMATION AND EDUCATION

Once trigger conditions have been reached for the LNRA system, LNRA will notify the TCEQ Watermaster and its customers, whereby customers should notify the public within their jurisdictions of conditions and measures to be taken. The process for notifying the public should include:

a. Posting the Notice of Drought conditions at City Hall, County Courthouse, Post Office, Public Library, Senior Citizens Center, and Major Supermarkets;
b. Copy of notice to newspapers and hold press conferences; and
c. Copy of notice to local radio and television stations.

5.0 TERMINATION NOTIFICATION

Termination of the drought contingency measures should take place when the trigger conditions that initiated the drought contingency measures have subsided, and an emergency situation no longer exists. LNRA will notify the TCEQ Watermaster and its customers. Customers should notify the public within their jurisdiction of termination of the drought contingency measures in the same manner they were informed of initiation of the drought contingency measures through the city officials in charge.

6.0 LNRA ENVIRONMENTAL ASSURANCE PROGRAM

LNRA participates in the TCEQ sponsored Texas Clean Rivers Program, conducting water quality assessments of the Lavaca River Basin. The purpose of the water quality assessment is to identify issues affecting water quality in the Lavaca River Basin, and to develop solution techniques for improving water quality. The assessment program is divided into two phases. LNRA's Clean Rivers Program involves collecting, reviewing, and analyzing past and present water quality data, addressing public opinion, and identifying areas of potential pollution. The program has required the implementation of a comprehensive data management system, the establishment of a water quality monitoring network, and the identification of specific water quality concerns throughout the Lavaca River Basin. LNRA is providing water quality and water conservation information to citizens throughout the Lavaca River Basin as a means of public education. The LNRA Clean Rivers Program will assist in the protection of the water resources in the Lavaca River Basin.

APPENDIX A

Texas Administrative Code, Section 288.22

APPENDIX A

Texas Commission on Environmental Quality Rules on Drought Contingency Plans for Wholesale Water Suppliers

TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 288	WATER CONSERVATION PLANS, DROUGHT CONTINGENCY PLANS, GUIDELINES AND REQUIREMENTS
SUBCHAPTER B	DROUGHT CONTINGENCY PLANS
RULE § 288.22	**Drought Contingency Plans for Wholesale Water Suppliers**

(a) A drought contingency plan for a wholesale water supplier must include the following minimum elements.

(1) Preparation of the plan shall include provisions to actively inform the public and to affirmatively provide opportunity for user input in the preparation of the plan and for informing wholesale customers about the plan. Such acts may include, but are not limited to, having a public meeting at a time and location convenient to the public and providing written notice to the public concerning the proposed plan and meeting.

(2) The drought contingency plan must document coordination with the regional water planning groups for the service area of the wholesale public water supplier to ensure consistency with the appropriate approved regional water plans.

(3) The drought contingency plan must include a description of the information to be monitored by the water supplier and specific criteria for the initiation and termination of drought response stages, accompanied by an explanation of the rationale or basis for such triggering criteria.

(4) The drought contingency plan must include a minimum of three drought or emergency response stages providing for the implementation of measures in response to water supply conditions during a repeat of the drought-of-record.

(5) The drought contingency plan must include the procedures to be followed for the initiation or termination of drought response stages, including procedures for notification of wholesale customers regarding the initiation or termination of drought response stages.

(6) The drought contingency plan must include specific, quantified targets for water use reductions to be achieved during periods of water shortage and drought. The entity preparing the plan shall establish the targets. The goals established by the entity under this paragraph are not enforceable.

(7) The drought contingency plan must include the specific water supply or water demand management measures to be implemented during each stage of the plan including, but not limited to, the following:

(A) A pro rata curtailment of water deliveries to or diversions by wholesale water customers as provided in Texas Water Code, § 11.039; and

(B) utilization of alternative water sources with the prior approval of the executive director as appropriate (e.g., interconnection with another water system, temporary use of a non-municipal water supply, use of reclaimed water for non-potable purposes, etc.).

(8) The drought contingency plan must include a provision in every wholesale water contract entered into or renewed after adoption of the plan, including contract extensions, that in case of a shortage of water resulting from drought, the water to be distributed shall be divided in accordance with Texas Water Code, § 11.039.

(9) The drought contingency plan must include procedures for granting variances to the plan.

(10) The drought contingency plan must include procedures for the enforcement of any mandatory water use restrictions including specification of penalties (e.g., liquidated damages, water rate surcharges, discontinuation of service) for violations of such restrictions.

(b) The wholesale public water supplier shall notify the executive director within five business days of the implementation of any mandatory provisions of the drought contingency plan.

(c) The wholesale public water supplier shall review and update, as appropriate, the drought contingency plan, at least every five years, based on new or updated information, such as adoption or revision of the regional water plan.

Source Note: The provisions of this § 288.22 adopted to be effective February 21, 1999, 24 TexReg 949; amended to be effective April 27, 2000, 25 TexReg 3544; amended to be effective October 7, 2004, 29 TexReg 9384.

APPENDIX B

Letter to Customers

APPENDIX B
Example Letter to Wholesale Water Customers

Date

[Customer]
[Address]

Dear [Customer]:

The Lavaca-Navidad River Authority has prepared a draft Drought Contingency Plan which, when adopted by the Board of Directors of the Lavaca-Navidad River Authority, will be used by the Authority as a component of its Water Management Plan. As a wholesale water customer of the Authority, we are seeking your input and comments on the draft Drought Contingency Plan. I have enclosed a copy of the Plan for your review.

Public comments regarding the draft Drought Contingency Plan may be made at the Public Meeting to be held by the Lavaca-Navidad River Authority Board of Directors on April 20, 2005. Written comments on the draft Drought Contingency Plan will be accepted through close of business on Tuesday, April 19, 2005.

We appreciate your input and interest in the water resources in the Lavaca River Basin.

Sincerely,

Patrick Brzozowski
General Manager
Lavaca-Navidad River Authority

APPENDIX C

Letter to Regional Water Planning Groups

APPENDIX C
Example Letter to Regional Water Planning Groups
[Planning Groups P and N]

Date

[Chairman]
Chair, Region__ Water Planning Group
[Address]

Dear [Chairman]:

Enclosed please find a copy of the draft Drought Contingency Plan for the Lavaca-Navidad River Authority. I am submitting a copy of this plan to the Region __ Water Planning Group in accordance with the Texas Water Development Board and Texas Commission on Environmental Quality rules.

Please review the draft plan for consistency with the approved Regional Water Plan. Public comments regarding the draft Drought Contingency Plan may be made at the Public Meeting to be held by the Lavaca-Navidad River Authority Board of Directors on April 20, 2005. Written comments on the draft Drought Contingency Plan will be accepted through close of business on Tuesday, April 19, 2005.

Sincerely,

Patrick Brzozowski
General Manager
Lavaca-Navidad River Authority

APPENDIX D

Texas Water Code, Section 11.039

APPENDIX D

Texas Water Code Section 11.039

§ 11.039. Distribution of Water During Shortage

(a) If a shortage of water in a water supply not covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the water to be distributed shall be divided among all customers pro rata, according to the amount each may be entitled to, so that preference is given to no one and everyone suffers alike.

(b) If a shortage of water in a water supply covered by a water conservation plan prepared in compliance with Texas Natural Resource Conservation Commission or Texas Water Development Board rules results from drought, accident, or other cause, the person, association of persons, or corporation owning or controlling the water shall divide the water to be distributed among all customers pro rata, according to:

(1) the amount of water to which each customer may be entitled; or

(2) the amount of water to which each customer may be entitled, less the amount of water the customer would have saved if the customer had operated its water system in compliance with the water conservation plan.

(c) Nothing in Subsection (a) or (b) precludes the person, association of persons, or corporation owning or controlling the water from supplying water to a person who has a prior vested right to the water under the laws of this state.

Amended by Acts 1977, 65th Leg., p. 2207, ch. 870, § 1, eff. Sept. 1, 1977.

Amended by Acts 2001, 77th Leg., ch. 1126, § 1, eff. June 15, 2001.

APPENDIX E

Board Resolution to Adopt the Drought Contingency Plan

Lavaca-Navidad River Authority
Resolution No. 2005-002
Board Resolution Adopting the Drought Contingency Plan

Resolution Adopting a Drought Contingency Plan for the Lavaca-Navidad River Authority, Authorizing Submittal of the Drought Contingency Plan to the Texas Commission on Environmental Quality and the Texas Water Development Board for Approval, and Authorizing Incorporation of Provisions into All Water Sales Contracts used by the Lavaca-Navidad River Authority

BE IT RESOLVED by the Board of Directors of the Lavaca-Navidad River Authority that a Drought Contingency Plan attached hereto as Exhibit A, prepared in conformance with the requirements of the Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board (TWDB) is hereby adopted;

BE IT FURTHER RESOLVED by the Board of Directors of the Lavaca-Navidad River Authority that the General Manager is directed to submit the adopted Lavaca-Navidad River Authority Drought Contingency Plan to TCEQ and TWDB and for their approval; and

BE IT FURTHER RESOLVED by the Board of Directors of the Lavaca-Navidad River Authority that the General Manager, in accordance with state law, is directed to incorporate provisions into all water sales contracts used by the Lavaca-Navidad River Authority to require purchasers of water from the Lavaca-Navidad River Authority to implement water conservation and demand reduction measures in accordance with the adopted Lavaca-Navidad River Authority Drought Contingency Plan.

Passed and approved this 20th day of April, 2005.

Vée Strauss, President
Board of Directors
Lavaca-Navidad River Authority

ATTEST:

Willard Ulbricht, Secretary-Treasurer
Board of Directors
Lavaca-Navidad River Authority

CITY OF EDNA
DROUGHT CONTINGENCY PLAN

Section I: Declaration of Policy, Purpose, and Intent

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 Edna hereby adopts the following regulations and restrictions on the delivery and consumption of water.

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

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Edna by means of scheduling and providing public notice of a public meeting to accept input on the Plan.

Section III: Public Education

The City of Edna will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of public events, press releases or utility bill inserts.

Section IV: Coordination with Regional Water Planning Groups

The service area of the City of Edna is located within the LNRA Planning Group and the City has provided a copy of this Plan to the Lavaca Regional Water Planning Group.

Section V: Authorization

The City Manager or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The City Manager, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Edna. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entitles.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by the City of Edna.
Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street address, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;

(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable lake(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

<u>Odd numbered address</u>: street address, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The City Manager or his/her designee shall monitor water supply and/or demand conditions on a daily basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified "triggers" are reached.

The triggering criteria described below are based on the amount of water the City is able to pump in a day.

Stage 1 Triggers -- MILD Water Shortage Conditions

<u>Requirements for initiation</u>
Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII – Definitions, when total daily water demand equals or exceeds 1.25 million gallons for three (3) consecutive days or 1.50 million gallons on a single day (e.g., based on the "safe" operating capacity of water supply facilities.)

<u>Requirements for termination</u>
Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

<u>Requirements for initiation</u>
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section IX of this Plan when total daily for three (3) consecutive days 1.50 MGD or 1.75 MGD on a single day.

Requirements for termination
Stage 2 of the Plan may be restricted when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when total daily for three (3) consecutive days 1.75 MGD or 2.00 MGD on a single day.

Requirements for termination
Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when total daily for three (3) consecutive days 2.00 MGD for 2.25 MGD on a single day.

Requirements for termination
Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the City Manager or his/her designee, determines that a water supply emergency exists based on:

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

2. Nature or man-made contamination of the water supply source(s).

Requirements for termination
Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

Requirements for initiation
Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when total daily water demand equals or exceeds 90% of water system production capability for three (3) consecutive days.

Requirements for termination
Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days.

Section IX: Drought Response Stages

The City Manager, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public
The City Manager or his/her designee shall notify the public by means of publication in a newspaper of general circulation, and cable TV

Additional Notification
The City Manager or his/her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Examples:
Mayor / and members of the City Council
Fire Chief
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety
TNRCC (required when mandatory restrictions are imposed)
Major water users
Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers
Emergency Medical Director

Stage 1 Response – MILD Water Shortage Conditions

Goal: Achieve a voluntary five- (5) percent reduction in daily water demand (e.g., total water use, daily water demand, etc.).

Supply Management Measures:

(a) Reduced or disconnected flushing of water mains.
(b) No Bulk Water Sales

Voluntary Water Use Restrictions:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6, or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7, or 9), and to irrigate landscapes between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

(b) All operations of the City of Edna shall adhere to water use restrictions prescribed for Stage 2 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response --MODERATE Water Shortage Conditions

Goal: Achieve a ten (10%) percent reduction in daily water demand (e.g., total water use, daily water demand, etc.).

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) Reduced or discontinued irrigation of public landscaped areas.
(c) No Bulk Water Sales.

Water Use Restrictions. Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

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

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

(c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under a special permit for the City of Edna.

(f) Use of water for the irrigation of golf courses greens, tees, and fairways is prohibited except on designated watering days between the hour's 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the City of Edna, the facility shall not be subject to these regulations.

(g) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(h) The following uses of water are defined as non-essential and are prohibited:

1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and

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

Stage 3 Response -- SEVERE Water Shortage Conditions

Goal: Achieve a fifteen (15%) percent reduction in daily water demand.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) Reduced or discontinued irrigation of public landscaped areas.
(c) No Bulk Water Sales.

Water Use Restrictions. All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the City of Edna.

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Goal: Achieve a twenty (20%) percent reduction in daily water demand.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) Reduced or discontinued irrigation of public landscaped areas.
(c) No Bulk Water Sales.

Water Use Restrictions. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10:00 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi-type pools is prohibited.

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

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Goal: Achieve a twenty-five (25%) percent reduction in daily water demand.

Supply Management Measures:

(a) Reduced or disconnected flushing of water mains.
(b) Reduced or disconnected irrigation of public landscaped areas.
(c) No Bulk Water Sales.

Water Use Restrictions. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.
(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane, or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the City Manager is hereby authorized to allocate water according to the following allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

"Household" means the residential premises served by the customer's meter. "Persons per household" includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the City of Edna if a greater number of persons per household on a form prescribed by the City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Edna offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the City Manager. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of Edna on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the City of Edna in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the City Manager shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the City of Edna of a reduction in the number of persons in a household shall be fined not less than five hundred dollars $500.00.

Residential water customers shall pay the following surcharges:

$10.00 for the first 1,000 gallons over allocation.
$20.00 for the second 1,000 gallons over allocation.
$30.00 for the third 1,000 gallons over allocation.
$40.00 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the City of Edna of a greater number on a form prescribed by the City Manager. The City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Edna offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the City Manager. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City of Edna in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, served by a master meter or fails to timely notify the City of Edna of a reduction in the number of person in a household shall be fined not less than five hundred dollars ($500.00). Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$10.00, for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$20.00, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$30.00, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$40.00 , thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the City of Edna or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately seventy-five (75%) percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, seventy-five (75%) percent of whose monthly usage is less than 6,000 gallons, shall be allocated 5,000 gallons. The City Manager shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Edna to determine the allocation. Upon request of the customer or at the initiative of the City Manager, the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Council. Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is 6,000 gallons through 10,000 gallons per month:

$10.00 per thousand gallons for the first 1,000 gallons over allocation.
$20.00 per thousand gallons for the second 1,000 gallons over allocation.
$30.00 per thousand gallons for the third 1,000 gallons over allocation.
$40.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 10,000 gallons per month or more:

Two (2) times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
Three (3) times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
Four (4) times the block rate for each 1,000 gallons from 10 percent through 15 percent above all allocation.
Five (5) times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Industrial Customers

A monthly water allocation shall be established by the City Manager, or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately ninety (90%) percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the twelve (12) month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than twelve (12) months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The City Manager shall give his/her best effort to see that the notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Edna to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the City Manager the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer had added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Council. Industrial customers shall pay the following surcharges:

Customers whose allocation is 10,000 gallons through 10,000 gallons per month:

$10.00 per thousand gallons for the first 1,000 gallons over allocation.
$20.00 per thousand gallons for the second 1,000 gallons over allocation.
$30.00 per thousand gallons for the third 1,000 gallons over allocation.
$40.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 100,000 gallons per month or more:

Two (2)	times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
Three (3)	times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
Four (4)	times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
Five (5)	times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section X: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the City of Edna for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by the City Manager, or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of no less than one hundred dollars (***$100.00***) and not more than one thousand dollars ($1000.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the City Manager shall, upon due notice to the customer, be authorized to discontinue under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at twenty dollars $20.00, and any other costs incurred by the City of Edna in discontinuing service. In addition, suitable assurance must be given to the City Manager that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(c) Any person, including a person classified as a water customer of the City of Edna in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttal presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan, and that the parent could not have reasonably known of the violation.

(d) Any employee of the City of Edna, police officer, or other City employee designated by the City Manager, may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the Municipal Court on the date shown on the citation for which the date shall not be less than three (3) days nor more than five (5) days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over fourteen (14) years of age who is member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in Municipal Court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in Municipal Court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in Municipal Court before all other cases.

Section XI: Variances

The City Manager, or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of Edna within five (5) days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the City Manager, or his/her designee, and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

Variances granted by the City of Edna shall be subject to the following conditions, unless waived of modified by the City Manager or his/her designee:

(a) Variances granted shall include for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

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CITY OF EL CAMPO
ORDINANCE NO. 2009-14

AN ORDINANCE ADOPTING A WATER CONSERVATION AND DROUGHT CONTINGENCY AND WATER EMERGENCY RESPONSE PLAN FOR THE CITY OF EL CAMPO, TEXAS, TO PROMOTE RESPONSIBLE USE OF WATER; PROVIDING FOR PENALTIES AND/OR THE DISCONNECTION OF WATER SERVICE FOR NONCOMPLIANCE WITH THE PROVISIONS OF THE WATER CONSERVATION AND DROUGHT CONTINGENCY AND WATER EMERGENCY RESPONSE PLAN; PROVIDING FOR A PENALTY CLAUSE; AND PROVIDING FOR SEPARABILITY AND SETTING AN EFFECTIVE DATE.

WHEREAS, the City of El Campo, Texas, (the "City"), recognizes that the amount of water available to its water customers is limited; and

WHEREAS, the City recognizes that due to natural limitations, drought conditions, system failures and other acts of God which may occur, the City cannot guarantee an uninterrupted water supply for all purposes at all times; and

WHEREAS, the Water Code and the regulations of the Texas Commission on Environmental Quality (the Commission") require that the City adopt a Water Conservation and Drought Contingency and Water Emergency Response Plan; and

WHEREAS, the City has determined an urgent need in the best interest of the public to adopt a Water Conservation and Drought Contingency and Water Emergency Response Plan; and

WHEREAS, pursuant to Chapter 54 of the Local Government Code, the City is authorized to adopt such Ordinances necessary to preserve and conserve its water resources; and

WHEREAS, the City Council of the City of El Campo, Texas, desires to adopt attached **"EXHIBIT A", The City of El Campo Water Conservation and Drought Contingency and Water Emergency Response Plan**, as the official policy for the conservation of water; now therefore

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EL CAMPO:

SECTION 1. That the City of El Campo hereby approves and adopts the attached **"EXHIBIT A", The City of El Campo Water Conservation and Drought Contingency and Water Emergency Response Plan**, as if recited verbatim herein.

SECTION 2. That the City Council of the City of El Campo, Texas, commits to implement the requirements and procedures set forth in the adopted Plan.

SECTION 3. That any customer, defined pursuant to 30 Tex. Admin. Code Chapter 291, failing to comply with the provisions of the plan shall be subject to a fine of up to two thousand dollars ($2,000.00) and/or discontinuance of water service by the City. Proof of a culpable mental state is not required for a conviction of an offense under this section. Each day a customer fails to comply with the Plan is a separate violation. The City's authority to seek injunctive or other civil relief available under the law is not limited by this section.

SECTION 4. That any customer, as previously defined, once notified by the City that a water leak exists on the customer's side of the water meter, shall be required to remedy the leak immediately, or be subject to discontinuance of water service.

SECTION 5. That the City Council of the City of El Campo, Texas, does hereby find and declare that sufficient written notice of the date, hour, place and subject of the meeting adopting this Ordinance was posted at the designated place convenient to the public for the time required by law preceding the meeting, that such place of posting was readily accessible at all time to the general public, and that all of the foregoing was done as required by law at all times during which this Ordinance and the subject matter thereof has been discussed, considered and formally acted upon. The City Council further ratifies, approves and confirms such written notice and the posting thereof.

SECTION 6. That If any court of competent jurisdiction rules that any section, subsection, sentence, clause, phrase, or portion of this ordinance is invalid or unconstitutional, any such portion shall be deemed to be a separate, distinct, and independent provision, and any such ruling shall not affect the validity of the remaining portions hereof.

SECTION 7. That the City Manager or designee is hereby directed to file a copy of the Plan and this Ordinance with the Commission in accordance with Title 30, Chapter 288 of the Texas Administrative Code.

SECTION 8. That the City Secretary is hereby authorized and directed to cause publication of the descriptive caption of this Ordinance as an alternative method of publication provided by law.

SECTION 9. That Ordinance No. 2005 -08, adopted on July 26, 2005, is hereby repealed.

SECTION 10. That this Ordinance shall become effective on the 6th day of July, 2009.

PASSED, APPROVED AND ADOPTED by the City Council of the City of El Campo, Texas, this 22nd day of June, 2009.

CITY OF EL CAMPO, TEXAS

Phillip Spenrath

PHILLIP SPENRATH, Mayor

ATTEST:

Cindy Cerny

Cindy Cerny, City Secretary

EXHIBIT A

The City of El Campo
Water Conservation and Drought Contingency and Emergency Water Response Plan

Introduction

This document outlines the Water Conservation and Emergency Water Management Plan for the City of El Campo in Wharton County Texas, as approved by the El Campo City Council on June 22, 2009. The plan is divided into two sections: (1) Water Conservation and (2) Drought Contingency Plan. The objective of the conservation program is to identify strategies for controlling the consumption of water, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water and for preventing the pollution of water. The drought contingency section addresses procedures for voluntary and mandatory actions to be put into effect to temporarily reduce the demand placed upon the City's water supply system during a water shortage due to drought or other water supply emergency. Drought contingency procedures include conservation measures, but may also include prohibition of certain water uses. This plan has been developed to meet the requirements of Texas Administrative Code Title 30, Environmental Quality, Chapter 288, Subchapter A (Water Conservation Plans) and Subchapter B (Drought Contingency Plans).

Planning Area and Project Description

The planning area is the total area within the current city limits of El Campo, which is approximately 8.1 square miles. The planning area also includes providing water for two adjacent areas to the city limits that has approximately 375 accounts. The project is the total water system, owned and operated by the City of El Campo, which distributes potable water to all water customers within the planning area. Currently, the population of the service area is approximately 12,800. This number is the result of an estimated number of residents recently annexed. This number will not correspond with the tables found in other parts of this report.

Water Conservation Plan

Program Goals

The objectives of the Water Conservation Plan are (1) to control consumption of water by educating the citizens of El Campo about conservation practices through an assertive public information program and (2) to maintain system controls and procedures that will minimize water loss. Many communities throughout the United States have used conservation measures to successfully cope with various water and wastewater problems. While El Campo has an adequate supply of water and has not experienced water shortages in the past, municipal governments have an environmental obligation to seek ways to conserve the water supply, and this Plan defines the methods the City intends to use to fulfill that obligation.

Effective October 7, 2004, Title 30 Chapter 288 of the Texas Administrative Code (TAC) entitled Water Conservation Plans, Drought Contingency Plans, Guidelines and Requirements requires the submission and implementation of a water conservation plan meeting the requirements of Subchapter A of Chapter 288 (Ref. 6). The requirements for the plans are:

- **Utility Profile:** The regulation requires specific information regarding population and customer data, water use date, water supply system data, and wastewater system data.
- **Goals:** Beginning May 1. 2009, specific quantified five-year and ten-year targets for water savings to include goals for water loss programs and goals for municipal use, in GPD are required.
- **Accurate Metering devices:** The Texas Commission on Environmental Quality (TCEQ) requires metering devices with an accuracy of plus or minus 5 percent for measuring water diverted from source supply.
- **Universal Metering, Testing, Repair, and Replacement:** The TCEQ requires that there be a program for universal metering of both customer and public uses of water, for meter testing and repair, and for periodic meter replacement.

- **Non-Promotional Rate Structure:** Chapter 288 requires a water rate structure that is not "promotional", i.e., rates that discourage increased water usage such as increasing block instead of volume discounts.

- **Leak Detection, Repair, and Control of Unaccounted for Water:** Measures to determine and control unaccounted for water are required. These measures may include periodic visual inspections along distribution lines, and periodic audits of the water system for illegal connections or abandoned services.

- **Continuing Public Education Program:** TCEQ requires a continuing public education and information program for water conservation.

- **A Means to Implementation and Enforcement:** A means to implement and enforce the water conservation plan, evidenced by and ordinance, resolution, or tariff a description of the authority by which the conservation plan is enforced is required in the regulations.

- **Coordinate with Regional Water Planning Groups:** The water conservation plan should document the coordination with the Regional Water Planning Group for the service area of the public water supplier to demonstrate consistency with the appropriate approved regional water plan.

- **Additional Conservation Strategies:** Strategies not previously referred to include adoption of ordinances, plumbing codes or rules requiring water-conserving fixtures in existing structures; reuse and/or recycling of wastewater and/or gray water; a program for pressure control and/or reduction in distribution system and/or customer connections; a program and/or ordinance(s) for landscape water management; a method for monitoring the effectiveness and efficiency of the water conservation plan.

- **Update of the Plan:** The public water supplier must review and update its water conservation plan, as necessary, based on an assessment of previous five-year and ten-year targets and any other new or updated information.

City of El Campo Utility Profile

I. CUSTOMER DATA

A. Population and Customer Data

1. Service area size (square miles) 8.1
2. Current population of service area 12,800
3. Current population served:
   a. Water 12,800
   b. Wastewater 12,200
4. Population served by water utility for the previous five years. / Projected population for service area in the following decades.

Year	Population
2008	11,065
2007	11,113
2006	11,216
2005	10,784
2004	10,741

Year	Population
2020	12,236
2030	12,662
2040	12,906
2050	12,912
2060	12,775

5. Source/method for the calculation and projected population:
   Texas Water Development Board: City Population Projections for 2000-2060.

B. Active Connections

1. Current number of active connections. Multi-family service is counted as Residential ________ or Commercial ____x____

Treated water users:	Metered	Not-metered	Total
Residential	3,726		3,726
Commercial	594		594

Public	29	29

2. Current number of new meter connections for last three years.

Year	2008	2007	2006
Residential	16	18	15
Commercial	4	4	6

B. High Volume Customers:

Annual water use for the five highest customers.

(Indicate if treated or raw water delivery)

	Customer	Use (1,000 gal./yr)	Treated/ Raw Water
(1)	Win Cup	16,106	Treated
(2)	I MUD	14,365	Treated
(3)	Housing Authority	8,528	Treated
(4)	Mission Care Center	4,926	Treated
(5)	Country Aire	4,374	Treated

II. WATER USE DATA FOR SERVICE AREA

A. Water Accounting Data

1. Amount of water use for previous five years (in 1,000 Gal.):

Please indicate: Diverted Water ______

Treated Water X

Year	2008	2007	2006	2005	2004
January	43,747	41,509	44,915	44,253	40,162
February	40,879	38,368	41,586	40,757	37,672
March	46,125	45,568	51,824	51,123	42,447
April	50,517	44,609	59,306	49,561	41,777
May	62,416	51,200	71,672	52,798	46,182

June	63,125	52,123	60,161	68,148	48,401
July	60,929	45,374	56,469	63,192	56,037
August	65,065	50,953	61,983	72,074	73,805
September	54,835	53,286	60,010	70,533	67,748
October	54,992	56,585	51,606	66,108	73,980
November	47,970	48.257	48,382	47,587	68,708
December	46,702	42,569	43,474	43,765	56,712
Total	**637,302**	**570,401**	**651,448**	**669,899**	**653,631**

The above figures were determined from Master Meters located where raw water enters the treatment plants.

2. Amount of water (in 1000 Gal.) delivered (sold) as recorded by the following account types for the past five years.

Year	Residential	Commercial	Wholesale	Total
2008	347,416	185,125	16,632	549,173
2007	309,684	175,520	15,372	500,576
2006	363,034	177,143	13,635	553,812
2005	353,713	178,096	13,906	545,715
2004	274,508	130,433	13,122	418,063

3. Previous five years for water loss (the difference between water diverted (or treated) and water delivered (sold)).

Year	Amount (gal.)	%
2008	88,129,000	13.8
2007	69,825,000	12.2
2006	97,631,000	15.0
2005	124,184,000	18.5
2004	235,568,000	36.0

4. Annual peak-to-average daily use ratio for previous five years.

Year	Average MGD	Peak MGD	Ratio
2008	1,746,000	3,303,000	1.89

2007	1,562,000	2,503,000	1.60
2006	1,784,000	3,575,000	2.00
2005	1,835,000	3,817,000	2.08
2004	1,790,000	3,983,000	2.22

5. Total per capita water use for previous five years.

Year	**Population**	**Total Diverted (or Treated Less Wholesale Sales (1000 gal.)**	**Per Capita (gpcd)**
2008	11,065	532,541	131.9
2007	11,113	485,204	119.6
2006	11,216	540,177	131.9
2005	10,784	531,809	135.1
2004	10,741	404,941	103.3

6. Seasonal water use for the previous five years (in gallons per person per day)

Year	**Population**	**Base Per Capita Use**	**Summer Per Capita Use**
2008	11,065	109.38	151.12
2007	11,113	102.45	125.99
2006	11,216	103.83	150.17
2005	10,784	91.81	162.56
2004	10,741	87.05	127.35

B. Projected Water Demand

Year	**Population**	**Number Of Active Services**	**Total Water Pumped (1000 gal)**
2009	11,265	4,395	542,130
2010	11,575	4,531	551,346
2011	11,641	4,656	552,365
2012	11,707	4,682	553,360
2013	11,768	4,707	551,948

2014	11,829	4,732	554,809
2015	11,890	4,756	553,330
2016	11,951	4,780	553,988
2017	12,012	4,805	554,624
2018	12,073	4,829	555,237
2019	12,134	4,854	555,828
2020	12,231	4,892	558,039

Population and Household projections are based on Texas Water Development Board projections for 2010 and 2020; the projections for interim years are interpolations. At this time, the TWDB projections appear to present a realistic forecast of future population and water use.

Actual water demands will depend upon the type of economic development within undeveloped sectors. In addition, the City of El Campo has annexed additional properties. The addition of these properties and their potential development will also impact future water demands. Proposed conservation efforts could help relieve or lessen some future water demands.

III. WATER SUPPLY SYSTEM DATA

The City of El Campo water system consists of ground water pumped from the Gulf Coast Aquifer, water treatment facilities, distribution and collection systems, and wastewater treatment plant.

A. Water Supply Sources

The City of El Campo has five water wells ranging from 1000 ft. to 1400 ft. in depth. Total current pumping capacity is 8 Million Gallons Per Day.

B. Treatment and Distribution System

Treated water storage capacity For the City of El Campo totals 3.3 Million Gallons; 1.05 Million Gallons in Elevated Storage and 2.25 Million Gallons in Ground Storage. There are four ground storage tanks, and three elevated tanks. All storage tanks are positioned strategically throughout the distribution system to provide adequate pressure and storage. El Campo has approximately 81 miles of water line ranging in size from 2" to 12".

Plant #	Elevated Storage	Ground Storage	Number of Wells
1	300,000 gal	750,000 gal	2
2	250,000 gal	500,000 gal	1
3	500,000 gal	500,000 gal	1
4	N/A	500,000 gal	1

Plant No.1 is located at 302 W. Monseratte with a total storage capacity of 1,050,000 gallons.

Plant No. 2 is located at 1610 Avenue F and has a total storage capacity of 750,000 gallons.

Plant No. 3 is located at 1401 Kentucky St, and has a total storage capacity of 1,000,000 gallons.

Plant No. 4 is located at 2131 Wilson Rd. and has a total storage capacity of 500,000 gallons.

IV WASTEWATER UTILITY SYSTEM

A. Wastewater System Data

1. Design capacity of wastewater treatment plant: 2.628 MGD
2. Is treated effluent used for irrigation on-site __yes__, off-site_no_, plant washdown___yes___, or chlorination/dechlorination___no___?

   Approximately 936,000 gallons per month of treated effluent is being re-used at the wastewater plant.
3. The City of El Campo wastewater plant is an activated sludge system, the sludge is processed through Aerobic Digestion, solids dewatering and final

disposal. Final discharge from the treatment enters Tres Palacios Creek, which flows to Matagorda Bay.

The City of El Campo Wastewater Treatment Plant is owned and operated by The City of El Campo under TCEQ/TPDES permit # WQ0010844001.

B. Wastewater Data for Service Area

1. Percent of water service area served by wastewater system: 96 %
2. Monthly volume treated for previous three years (in 1,000 gallons):

Year	**2008**	**2007**	**2006**
January	37,326	54,322	30,243
February	35,250	25,364	25,547
March	32,225	42,140	29,341
April	27,273	32,512	28,981
May	28,345	39,524	31,713
June	29,395	29,820	31,835
July	30,276	72,819	37,412
August	36,392	36,787	31,487
September	33,522	32,671	30,842
October	29,539	29,794	29,794
November	29,539	29,794	29,794
December	27,796	29,686	29,686
Total	**376,262**	**455,009**	**366,451**

Conservation Goals

The City of El Campo's objective is to implement a Water Conservation Plan which will reduce per capita usage by increasing water use efficiency, thereby reducing water demands without adversely affecting the benefits of continued population and economic growth.

Efforts at conservation in water use must affect all of these areas in order to accomplish a measurable and significant reduction over time. There are many ways to accomplish conservation and the practices are not new. In fact, some significant conservation efforts have been made throughout the state of Texas through plumbing fixture modifications.

Other conservation efforts focus on appliance efficiencies, reduction in landscape irrigation, and the modification of personal behaviors.

The primary water conservation goal for The City of El Campo utility service area is to reduce per capita water use. The emphasis of The City of El Campo Water Conservation Plan is to sustain reductions in per capita water consumption as measured by gallons per capita per day. This will be accomplished through continued compliance with plumbing code requirements, landscape irrigation conservation, a non-promotional cost of service based water rate structure, educating the public on efficient water use, and water reuse. The City of El Campo will additionally emphasize continued efforts to manage unaccounted water uses. This is to be accomplished through renewal and rehabilitation of the distribution system, meter replacement as needed, leak detection and repair, and water system audits in compliance with TWDB requirements, maintaining the level of unaccounted water in the City of El Campo system at or below 10%.

Five and Ten Year Targets and Goals

1. **Goals of the Program (5 year target and goals)**

   The City of El Campo goals are to achieve a municipal water use of 120.4 gallons per capita per day for the first 5 years beginning in the year 2009 and also achieve a municipal use water loss goal of 26.0 gallons per capita per day for the next 5 years beginning in the year 2009.

2. **Goals of the Program (10 year target and goals)**

   The City of El Campo goals are to achieve a municipal water use of 116.0 gallons per capita per day for the next 10 years beginning in 2010 and also achieve a municipal use water loss of 18.0 per capita per day for the next 10 years beginning in the year 2009.

The above five and ten year targets are based off averages from the previous five years. Average per capita per day municipal water use was 124.4, while the average per capita per day water loss was 30.8.

Implementing the Plan to Achieve Targets and Goals

The City of El Campo will adhere to the following schedule, to achieve the targets and goals for water conservation:

- Calibrations of meters for all treated water deliveries are conducted semi-annually
- The City of El Campo meter replacement program is as follows:
  - ♦ Meters will continue to be monitored for accuracy annually and replaced on a fifteen-year cycle.
- Water audits are conducted annually
  - ♦ Real water losses are identified and corrected
  - ♦ Real water losses are minimized by replacement of deteriorating water mains and appurtenances, as is conducted by City Staff on an on-going basis
- The City of El Campo will mail out materials developed by the staff, and obtained from the Texas Water Development Board, Texas Commission on Environmental Quality or other sources semi-annually to raise public awareness of water conservation and encourage efficient water use and promote the City's water conservation measures. The City will also encourage local media coverage of water conservation issues and the importance of water conservation.

Tracking Targets and Goals

The staff shall track targets and goals by utilizing the following procedures:

- Logs shall be maintained for meter calibration, meter testing and meter replacement programs.
- Annual water audits shall be documented and kept in the Utility Department files.
- Staff shall keep a record of the number of mail-outs distributed semi-annually.
- Rates are tracked by means of ordinances adopted.

- Logs shall be maintained for the utility's Leak Detection Program, including but not limited to the following.
    - ♦ Annual inspections and soundings of water fittings and connections.

Leak Detection And Repair

In order to maintain water delivery service, and to reduce unaccounted water losses, the City of El Campo water utilities maintains constant observation of its pumping equipment and regularly inspects pipeline routes to detect leaks and pipeline breaks. Once identified, leaks and breaks are quickly repaired.

Measures to control unaccounted water are part of the routine operations of the City. Field operations and meter services personnel look for and report evidence of leaks in the water distribution system. Field operations crews respond quickly to repair leaks. Areas of the water distribution system in which numerous leaks and line breaks occur are systematically prioritized and scheduled for replacement as funds are available.

Public Education Goals

The City of El Campo intends to raise public awareness of water conservation and encourage water users to utilize water efficient fixtures and appliances so that less water is consumed. This includes practices such as washing full loads of clothes and dishes, using a pail of water instead of a flowing hose to wash automobiles, turning the water off while brushing teeth or washing hands, and watering lawns, gardens, and shrubs during evening as opposed to daytime hours during the heat of the day.

The continuing public education and information campaign on water conservation for the City of El Campo includes the following elements:

♦ Promote the City's water conservation measures.

♦ Include billing inserts on water conservation.

♦ Encourage local media coverage of water conservation issues and the importance of water conservation.

This public education program will guide water users toward using water-efficient plumbing fixtures and appliances, to utilize drought tolerant, native and adaptive plants which require less water and pesticides for landscaping, to find and repair plumbing leaks, and to take advantage of water conservation incentives where available.

City of El Campo Water Rates

The City of El Campo Water Utilities has a water rate structure that is "non-promotional", i.e. a rate structure, which is cost of service based, and does not promote or encourage excessive use of water.

Water Rates

Monthly Rate

a) Residential: Single Family only

First 3,000 Gallons	$10.15
Balance exceeding 3,000gallons	$ 1.49 per thousand gallons

b) Non-residential: all other uses, excluding single family and schools.

First 3,000 gallons	$10.15
Balance exceeding 3,000	$ 1.72 per thousand gallons

c) Schools

First 3,000 gallons	$10.15
Balance exceeding 3,000	$ 2.77 per thousand gallons

d) Bulk Rate	$0.05 per gallon

Sewer Rates

a) Residential:

The monthly sewer charge for residential customers shall be determined by averaging the water consumption during the months of December, January and February.

First 3,000 gallons	$ 12.15
Balance exceeding 3,000	$ 3.27 per thousand gallons

b) Non-residential

The rates shall be calculated each month

First 3,000 gallons	$ 12.15
Balance exceeding 3,000	$ 2.91 per thousand gallons

c) **Schools**

Rates shall be calculated each month

First 3,000 gallons	$ 12.15
Balance Exceeding 3,000	$ 3.79

Implementation and Enforcement

Implementation and Enforcement of this Water Conservation Plan is by resolution adopted by the City Council.

SEVERABILITY

If any of the terms, sections, subsections, sentences, clauses, phrases, provisions, covenants, or conditions of this plan are for any reason held to be invalid, void or unenforceable, the remainder of the terms, sections, subsections, sentences, clauses, phrases, provisions, covenants, or conditions of this plan shall remain in full force and effect and shall in no way be affected, impaired, or invalidated.

CITY OF EL CAMPO
DROUGHT CONTINGENCY PLAN

Section I: Declaration of Policy, Purpose, and Intent

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, safety and minimize the adverse impacts of water supply shortage or other water supply emergency conditions, the City of EI Campo hereby adopts the following regulations and restrictions on the delivery and consumption of water.

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

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of EI Campo by means of public meetings at which time input from citizens was received. Notice of public meetings were announced on the radio, printed in the newspaper and presented on the local schedule of events on cable TV.

The City of EI Campo will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of public events, press releases or utility bill inserts.

Section III: Public Education

The City of El Campo will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of local newspaper, radio station, cable TV, and City Council Meetings.

Section IV: Coordination with Regional Water Planning Groups

The service area of the city of EI Campo is located within the Lavaca Regional Planning Group. The City has provided a copy of this plan to the Lavaca Regional Planning Group and TNRCC.

Section V: Authorization

The City Manager, or his/her designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The City Manager, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency *response* measures as described in this Plan.

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Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of El Campo. The term "customer" as used in the Plan includes individuals, corporations, partnerships, associations, private utility districts and all other legal entities.

Section VII: Definitions

For the purpose of this Plan, the following definitions shall apply:

<u>Aesthetic water use:</u> water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

<u>Commercial and institutional water use:</u> water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels, motels, restaurants, office buildings and other similar uses.

<u>Conservation:</u> those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved· and made available for future or alternative uses.

<u>Customer:</u> any person, company, or organization using water supplied by the City of EI Campo.

<u>Domestic water use:</u> water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

<u>Even-numbered address:</u> street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

<u>Industrial water use:</u> the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

<u>Landscape irrigation use:</u> water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, rights-of-way and medians.

<u>Non-essential water use:</u> water uses that are not essential nor required for the protection of public health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalk, walkway, driveway, parking

lot, tennis courts, or other hard-surfaced areas;

(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;

(e) flushing gutters or permitting water to run or accumulate in any gutter or street;

(f) use of water to fill, refill or add to any indoor or outdoor swimming pool or jacuzzi-type pool;

(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;

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

(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd-numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The City Manager, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified "triggers" are reached.

The triggering criteria described below are based on the amount of water the City is able to pump in a day.

Stage 1 Triggers - MILD Water Shortage Conditions

Requirements for initiation

Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VI - Definitions, when total daily water demand equals or exceeds 3.75 million gallons for three (3) consecutive days or 4 million gallons on a single day.

Requirements for termination

Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days.

Stage 2 Triggers - MODERATE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section VIII of this Plan when total daily water demand equals or exceeds 4 MGD for three (3) consecutive days or 4.5 million gallons on a single day.

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers - SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section VIII of this Plan when total daily water demand equals or exceeds 4.5 MGD for three (3) consecutive days or 5.0 million gallons on a single day.

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers - CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section VIII of this Plan when total daily water demand equals or exceeds 5.0 MGD for three (3) consecutive days or 5.5 million gallons on a single day.

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers - EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions provided in Section VIII of this Plan when the City Manager, or his/her designee, determines that a water supply emergency exists based on:

1. Major water line breaks, or pump or system failures occur, which cause unprecedented loss of capability to provide water service; or
2. Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days. Upon termination of Stage 5, Stage 4 becomes operative.

Stage 6 Triggers - WATER ALLOCATION

Requirements for initiation
Customers shall be required to comply with the water allocation plan prescribed in Section VIII of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when total daily water demand equals or exceeds 90% of water system production capability, or 7 MGD for three (3) consecutive days.

Requirements for termination
Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three (3) consecutive days.

Section VIII: Drought Response Stages

The City Manager, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

Notification of the Public:
The City Manager, or his/her designee, shall notify the public by means of publication in a newspaper of general circulation, radio announcements and cable T.V.

Additional Notification:
The City Manager, or his/her designee, shall notify directly, or cause to be notified directly, the following individuals and entities:

Mayor / and members of the City Council
Fire Chief
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety TNRCC (required when mandatory restrictions are imposed) Major water users
Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers
Emergency Medical Director

Stage 1 Response - MILD Water Shortage Conditions

Goal: Achieve a voluntary five (5) percent reduction in daily water pumpage.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.

Voluntary Water Use Restrictions:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.rn. to midnight on designated watering days.

(b). All operations of the City of El Campo shall adhere to water use restrictions prescribed for Stage 2 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response - MODERATE Water Shortage Conditions

Goal: Achieve a ten (10%) percent reduction in daily water pumpage.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) Reduced or discontinued irrigation of public landscaped areas.

Water Use Restrictions: Under threat of penalty for violation, the following water use restrictions shall apply to all persons.

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

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

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

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that the use of water from designated fire hydrants for construction purposes may be allowed under special permit from the City of EI Campo.

(f) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(g) The following uses of water are defined as non-essential and are prohibited:

1. wash down of any sidewalk, walkway, driveway, parking lot, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response - SEVERE Water Shortage Conditions

Goal: Achieve a fifteen (15%) percent reduction in daily water pumpage.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) Reduced or discontinued irrigation of public landscaped areas.

Water Use Restrictions: All requirements of Stage 2 shall remain in effect during Stage 3 except: .

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The use of water for construction purposes from designated fIre hydrants under special permit is to be discontinued.

Stage 4 Response - CRITICAL Water Shortage Conditions

Goal: Achieve a twenty (20%) percent reduction in daily water pumpage.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.
(b) ·Reduced or discontinued irrigation of public landscaped areas.

Water Use Restrictions: All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days' between the hours of 6:00 a.m and 10:00 a.m. and between 8:00 p.m and, 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems is prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane, or other vehicle not occurring on the premises of a commercial car wash or commercial service station and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes or commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m and between 6:00 p.m and 10:00 p.m

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.

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

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains or water service facilities of any kind shall be approved. Time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response - EMERGENCY Water Shortage Conditions

Goal: Achieve a twenty-five (25%) percent reduction in daily water pumpage.

Supply Management Measures:

(a) Reduced or discontinued flushing of water mains.

(b} Reduced or discontinued irrigation of public landscaped areas.

Water Use Restrictions: All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except;

(a) Irrigation of landscaped areas is absolutely prohibited.

(b). Use of water to wash any motor vehicle, ;motorbike, boat" trailer, airplane or, other vehicle is absolutely prohibited.

Stage 6 Response - Water Allocation

In the event that water shortage conditions threaten public health, safety, and welfare, the City Manager is hereby authorized to allocate water according to the following water allocation plan.

Single - Family residential customers

The allocation to residential water customers residing in a single-family dwelling shall be s

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

"Household" means the residential premises served by the customer's meter. "Persons per household" includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the City of El Campo of a greater number of persons per household on a form prescribed by the City Manager. The City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of EI Campo offices, 315 E. Jackson Street, to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the City Manager. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of EI Campo on such form and the change will be implemented in the next practical billing period. If the number of persons in a household is reduced, the customer shall notify the City of El Campo in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the City Manager shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household, or, fails to timely notify the City of EI Campo of a reduction in the number of persons in a household, shall be fined not less than five hundred dollars $500.00.

Residential water customers shall pay the following surcharges:

$10.00 for the first 1,000 gallons over allocation.
$20.00 for the second 1,000 gallons over allocation.
$30.00 for the third 1,000 gallons over allocation.
$40.00 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter, which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be 6,000 gallons per month for each dwelling unit. It shall be the customer's responsibility to provide the City of EI Campo with the total number of residential units per water meter. It shall be assumed that each individual residential dwelling unit is comprised of two (2) persons per household unless the customer notifies the City of EI Campo of a greater number on a form prescribed by the City Manager. The City Manager shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of EI Campo offices, 315 E. Jackson Street, to complete and sign the form claiming more than two (2) persons per household per unit. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the City Manager. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City ofEI Campo in writing within (2) days. In prescribing the method for claiming more than two (2) persons per household per unit, the City Manager shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units and persons per household per unit served by a master meter or fails to timely notify the City of EI Campo of a reduction in the number of persons in a household shall be fined not less than five hundred dollars $500.00. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$10.00 - for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$20.00 - thereafter for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$30.00 - thereafter for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$40.00 - thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial customers

A monthly water allocation shall be established by the City Manager or his/her designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately seventy-five (75%) percent of the customer's usage for the previous corresponding 12 month billing period. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided that if the (75%) of the monthly usage is less than 6,000 gallons, the customer shall be allocated 5,000 gallons. The City Manager shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however a customer does not receive such notice, it shall be the customer's responsibility to contact the City of EI Campo to determine the allocation. Upon request of the customer or the initiative of the City Manager, the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customers normal water usage. (2) One nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Council. Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is 6,000 gallons through 10,000 gallons per month:

$10.00 per thousand gallons for the first 1,000 gallons over allocation.
$20.00 per thousand gallons for the second 1,000 gallons over allocation.
$30.00 per thousand gallons for the third 1,000 gallons over allocations .
. $40.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 10,000 gallons per month or more:

Two (2) times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.

Three (3) times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation

Four (4) times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.

Five (5) times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharge shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Industrial Customers

A monthly water allocation shall be established by the City Manager, or his/her designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately ninety (90%) percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to eighty-five (85%) percent of the customer's water usage baseline. The industrial customer's water use baseline will be computed on the average water use for the (12) month period ending prior to the date of implementation of Stage 2 of the plan. If the industrial water customer's billing history is shorter than twelve (12) months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The City Manager shall give his/her best effort to see that notice of each industrial customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of El Campo to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the City Manager the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water use· because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce water use is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Council. Industrial customers shall pay the following surcharges:

Customers whose allocation is 10,000 gallons through 100,000 per month:

$10.00 per thousand gallons for the first 1,000 gallons over allocation.

$20.00 per thousand gallons for the second 1,000 gallons over allocation.

$30.00 per thousand gallons for the third 1,000 gallons over allocation.

$40.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 100,000 gallons or more per month:

Two (2) times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.

Three (3) times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.

Four (4) times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.

Five (5) times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharge shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section IX: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the City of El Campo for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by City Manager, or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty ofa misdemeanor and, upon conviction shall be punished by a fine of not less than one hundred dollars ($100.00) and not more than one thousand dollars ($1000.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the City Manager shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at twenty dollars ($20.00), and any other costs incurred by the City of EI Campo in discontinuing service. In addition, suitable assurance must be given to the City Manager that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(c) Any person, including a person classified as a water customer of the City of EI Campo in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(d) Any employee of the City of EI Campo, may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the Municipal Court on the date shown on the citation for which the date shall not be less than three (3) days nor more than five (5) days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over fourteen (14) years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in Municipal court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in Municipal Court, a warrant for hislher arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in Municipal Court before all other cases.

Section X: Variances

The City Manager, or his/her designee, may, in writing, grant a temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance, and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect. (b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of EI Campo within five (5) days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the City Manager, or his/her designee, and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if the petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

Variances granted by the City of EI Campo shall be subject to the following conditions, unless waived or modified by the City Manager or his/her designee:

(a) Variances granted shall include a timetable for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

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WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN FOR THE CITY OF GANADO

Section I: Declaration of Policy, Purpose, and Intent

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 Ganado hereby adopts the following regulations and restrictions on the delivery and consumption of water.

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

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Ganado by means of City Council meetings.

Section III: Public Education

The City of Ganado will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of newsletters and/or fliers.

Section IV: Coordination with Regional Water Planning Groups

The service area of the City of Ganado is located within the Lavaca water planning area and the City of Ganado has provided a copy of this Plan to the Lavaca Water Planning Group.

Section V: Authorization

The Director of Public Works or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The Director of Public Works or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Ganado. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

<u>Aesthetic water use</u>: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

<u>Commercial and institutional water use</u>: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

<u>Conservation</u>: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

<u>Customer</u>: any person, company, or organization using water supplied by the City of Ganado.

<u>Domestic water use</u>: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

<u>Even number address</u>: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

<u>Industrial water use</u>: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII: Criteria for Initiation and Termination of Drought Response Stages

The Director of Public Works or his/her designee shall monitor water supply and/or demand conditions on a bi-weekly basis and shall determine when conditions warrant initiation or termination of each stage of the Plan, that is, when the specified "triggers" are reached.

The triggering criteria described below are based on weather conditions, water levels, and system storage capacity.

Stage 1 Triggers -- MILD Water Shortage Conditions

Requirements for initiation
Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII – Definitions, when any one (1) or more triggering criteria's exist:

Criteria 1: ***Annually, beginning on May 1 through September 30.***

Criteria 2: ***When the water supply available to the City of Ganado is equal to or less than ninety (90)***

Criteria 3: ***When, the pumping level in the City of Ganado's wells is equal to or less than three hundred and seventy (370) feet in well # 4 or one hundred and eighty (180) feet in well #5.***

Criteria 4: ***When total water demand equals or exceeds two hundred and fifty thousand (250,000) gallons for three (3) consecutive days or five hundred thousand (500,000) gallons on a single day.***

Requirements for termination
Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days.

Stage 2 Triggers -- MODERATE Water Shortage Conditions

Requirements for initiation
Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for stage 2 of this Plan when any one (1) or more of the following exist:

Criteria 1: **Annually, beginning on May 1 through September 30.**

Criteria 2:	When the water supply available to the City of Ganado is equal to or less than eighty (80) percent of storage.
Criteria 3:	When the pumping level in the City of Ganado's wells is equal to or less than three hundred and seventy (370) feet in well #4 or one hundred and eighty (180) feet in well #5.
Criteria 4:	When total water demand equals or exceeds two hundred and fifty thousand (250,000) gallons for three (3) consecutive days or five hundred thousand (500,000) gallons on a single day.

Requirements for termination

Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

Stage 3 Triggers -- SEVERE Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when one (1) or more of the following exist:

Criteria 1:	When the water supply available to the City of Ganado is equal to or less than seventy (70) percent of storage.
Criteria 2:	When the pumping level in the City of Ganado's wells is equal to or less less than three hundred and seventy (370) feet in well #4 or one hundred eighty (180) feet in well #5.
Criteria 3:	When total daily water demand equals or exceeds two hundred and fifty thousand (250,000) gallons for three (3) consecutive days or five hundred thousand (5000,000) gallons on a single day.

Requirements for termination

Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

Stage 4 Triggers -- CRITICAL Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when any one (1) or more of the following exist:

Criteria 1: When the water supply available to the City of Ganado is equal to or less than sixty (60) percent of storage.

Criteria 2: When the pumping level in the City of Ganado's wells is equal to or less than three hundred and seventy (370) feet in well #4 or one hundred and eighty (180) feet in well #5.

Criteria 3: When total water demand equals or exceeds two hundred and fifty thousand (250,000) gallons for three (3) consecutive days or five hundred thousand (5000,000) gallons on a single day.

Requirements for termination

Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

Stage 5 Triggers -- EMERGENCY Water Shortage Conditions

Requirements for initiation

Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the Director of Public Works or his/her designee, determines that a water supply emergency exists based on:

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

2. Natural or man-made contamination of the water supply source(s).

Requirements for termination

Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days.

Stage 6 Triggers -- WATER ALLOCATION

<u>Requirements for initiation</u>

Customers shall be required to comply with the water allocation plan prescribed in Section IX of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when any one (1) or more of the following exist:

<u>Requirements for termination</u> **– Water allocation may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of five (5) consecutive days.**

Section IX: Drought Response Stages

The Director of Public Works or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of this Plan, shall determine that a mild, moderate, severe, critical, emergency or water shortage condition exists and shall implement the following notification procedures:

Notification

<u>Notification of the Public:</u>

The Director of Public Works or his/ here designee shall notify the public by means of any *one (1) or more of the following:*

publication in a newspaper of general circulation,
direct mail to each customer,
signs posted in public places.

Additional Notification:
The Director of Public Works or his/ her designee shall notify directly, or cause to be notified directly, the following individuals and entities:

Mayor / Chairman and members of the City Council / Utility Board
Fire Chief(s)
City and/or County Emergency Management Coordinator(s)
County Judge & Commissioner(s)
State Disaster District / Department of Public Safety
TNRCC (required when mandatory *restrictions are imposed)*
Major water users
Critical water users, i.e. hospitals
Parks / street superintendents & public facilities managers

Stage 1 Response -- MILD Water Shortage Conditions

Goal: Achieve a voluntary ten (10) percent reduction in total water use.

Supply Management Measures:

The City of Ganado will closely monitor the distribution system for leaks, reduce or discontinue flushing of water mains, and discontinue the sale of bulk water.

Voluntary Water Use Restrictions:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m to midnight on designated watering days.

(b) All operations of the City of Ganado shall adhere to water use restrictions prescribed for Stage 1 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 Response -- MODERATE Water Shortage Conditions

Goal: Achieve a fifteen (15) percent reduction in total water use.

Supply Management Measures:

The City of Ganado will closely monitor the distribution system for leaks, reduce or discontinue flushing of water mains, and discontinue the sale of bulk water.

Water Use Restrictions. Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

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

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

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

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the City of Ganado.

(f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the City of Ganado, the facility shall not be subject to these regulations.

(g) All restaurants are prohibited from serving water to patrons except upon request of the patron.

(h) The following uses of water are defined as non-essential and are prohibited:

1. wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2. use of water to wash down buildings or structures for purposes other than immediate fire protection;
3. use of water for dust control;
4. flushing gutters or permitting water to run or accumulate in any gutter or street; and
5. failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 Response -- SEVERE Water Shortage Conditions

Goal: Achieve a twenty (20) percent reduction in total water use.

Supply Management Measures:

The City of Ganado will closely monitor the distribution system for leaks, reduce or discontinue flushing water mains and discontinue the sale of bulk water.

Water Use Restrictions. All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the City of Ganado.

(c) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 Response -- CRITICAL Water Shortage Conditions

Goal: Achieve a twenty-five (25) percent reduction in total water use.

Supply Management Measures:

The City of Ganado will closely monitor the distribution system for leaks, reduce or discontinue flushing water mains and discontinue the sale of bulk water.

Water Use Restrictions. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.

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

(e) No application for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be approved, and time limits for approval of such applications are hereby suspended for such time as this drought response stage or a higher-numbered stage shall be in effect.

Stage 5 Response -- EMERGENCY Water Shortage Conditions

Goal: **Achieve a thirty (30) percent reduction in total water use.**

Supply Management Measures:

The City of Ganado will closely monitor the distribution system for leaks, reduce or discontinue flushing water mains and discontinue the sale of bulk water.

Water Use Restrictions. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Stage 6 Response -- WATER ALLOCATION

In the event that water shortage conditions threaten public health, safety, and welfare, the Director of Public Works is hereby authorized to allocate water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

"Household" means the residential premises served by the customer's meter. "Persons per household" includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the City of Ganado of a greater number of persons per household on a form prescribed by the Director of Public Works. The Director of Public Works shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the Ganado City Hall to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the Director of Public Works. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of Ganado on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the City of Ganado in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the Director of Public Works shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the City of Ganado of a reduction in the number of person in a household shall be fined not less than two hundred dollars (200.00).

Residential water customers shall pay the following surcharges:

$10.00 for the first 1,000 gallons over allocation.
$15.00 for the second 1,000 gallons over allocation.
$20.00 for the third 1,000 gallons over allocation.
$25.00 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the City of Ganado of a greater number on a form prescribed by the Director of Public Works. The Director of Public Works shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Ganado to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the Director of Public Works. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City of Ganado in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the Director of Public Works shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the City of Ganado of a reduction in the number of person in a household shall be fined not less than two hundred dollars (200.00). Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$10.00, for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$15.00, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$20.00, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$25.00, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water allocation shall be established by the Director of Public Works or his/her designee, for each nonresidential commercial customer other than an industrial customer

who uses water for processing purposes. The non-residential customer's allocation shall be approximately seventy-five (75) percent of the
billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the City of Ganado will determine a fair and reasonable allocation. The Director of Public Works shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Ganado to determine the allocation. Upon request of the customer or at the initiative of the Director of Public Works, the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the Director of Public Works or the Ganado City Council. Nonresidential commercial customers shall pay the following surcharges:

$10.00 per thousand gallons for the first 1,000 gallons over allocation.
$15.00 per thousand gallons for the second 1,000 gallons over allocation.
$20.00 per thousand gallons for the third 1,000 gallons over allocation.
$25.00 per thousand gallons for each additional 1,000 gallons over allocation.

Section X: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the City of Ganado for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by Director of Public Works or his/her designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than twenty-five dollars ($25.00) and not more than five hundred dollars ($500.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the Director of Public Works shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at two hundred and forty-five dollars ($245.00) and any other costs incurred by the City of Ganado in discontinuing service. In addition, suitable assurance must be given to the Director of Public Works that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(c) Any person, including a person classified as a water customer of the City of Ganado, in apparent con
to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(d) Any employee of the City of Ganado, police officer, or other city employee designated by the Director of Public Works or Ganado City Council, may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the municipal court on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in the municipal court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in the municipal court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in the municipal court before all other cases.

Section XI: Variances

The Director of Public Works or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

(a) Compliance with this Plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the Plan is in effect.
(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of Ganado within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the Director of Public Works and/or the Ganado City Council, and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

Variances granted by the City of Ganado shall be subject to the following conditions, unless waived or modified by the Director of Public Works and/or the Ganado City Council:

(a) Variances granted shall include a timetable for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

EDUCATION AND INFORMATION

The most readily available and lowest cost method of promoting water conservation is to inform water users about ways to save water inside homes and other buildings, in landscaping and lawn uses, and recreational uses. Average residential in-home water use data indicate that about 40 percent is used for toilet flushing, 35 percent for bathing, 11 percent for kitchen uses, and 14 percent for clothes washing. Water saving methods that can be practiced by the individual water user are listed below.

IN THE BATHROOM

- Take a shower instead of filling the tub and taking a bath. Showers usually use less water than tub baths.

- Install a low-flow shower head which restricts the quantity of flow to no more than 3.0 gallons per minute.

- Reduce the level of water being used in a bath tub by one or two inches if a shower is not available.

- Turn water off when brushing teeth until it is time to rinse.

- Hold hot water in the basin when shaving instead of letting the faucet continue to run.

- Test toilets for leaks. To test for a leak, a few drops of food coloring can be added to the water in the tank. The toilet should not be flushed. The customer can then watch to see if the coloring appears in the bowl within a few minutes. If it does, the fixture needs adjustment or repair.

- Use a toilet displacement device. A one-gallon plastic milk bottle can be filled with stones or with water, recapped, and placed in the toilet tank. This will reduce the amount of water in the tank, but still provide enough for flushing.

IN THE KITCHEN

- Use a pan of water (or place a stopper in the sink) for rinsing pots and pans and cooking implements when cooking rather than turning on the water faucet each time a rinse is needed.

- Never run the dishwasher without a full load. In addition to saving water, expensive detergent will last longer and a significant energy saving will appear on the utility bill.

- Keep a container of drinking water in the refrigerator. Running water from the tap until it is cool is wasteful.

- Use a pan of water for rinsing when hand washing dishes rather than running the faucet.

- Always keep water conservation in mind, and think of other ways to save in the kitchen.

IN THE LAUNDRY ROOM

- Wash only a full load when using an automatic washing machine (32 to 59 gallons are required per load).

- Use the lowest water level setting on the washing machine for light loads whenever possible.

- Use cold water as often as possible to save energy and to conserve the hot water for uses which cold water cannot serve. This is also better for clothing made of today's synthetic fabrics.

FOR APPLIANCES AND PLUMBING

- Check water requirements of various models and brands when considering purchasing any new appliances that use water. Some use less water than others.

- Check all water line connections and faucets for leaks. If the cost of water is $1.00 per 1,000 gallons, one could be paying a large bill for water that simply goes down the drain because of leakage. A slow drip can waste as much as 170 gallons of water EACH DAY, or 5,000 gallons per month, and add as much as $5.00 to the water bill.

- Learn to replace faucet washers so that drips can be corrected promptly. It is easy to do, cost very little, and can represent a substantial amount saved in plumbing and water bills.

- Insulate all hot water pipes to avoid delays (and wasted water) experienced while waiting for the water to "run hot".

- Check for water leakage that the customer may be unaware of, such as a leak between the water meter and the house. To check, all indoor and outdoor faucets should be turned off, and the water meter should be checked. If it continues to run or turn, a leak probably exist and needs to be located.

- Be sure the hot water heater thermostat is not set too high. Extremely hot settings waste water and energy because the water often has to be cooled with cold water before it can be used.

- Use a moisture meter to determine when house plants need water. More plants die from over-watering than from being on the dry side.

OUTDOOR USE

- Water lawns early in the morning during the hotter summer months. Much of the water used on the lawn can simply evaporate between the sprinkler and the grass.

- Turn soaker hoses so the holes are on the bottom to avoid evaporation.

- Water slowly for better absorption, and never water on a windy day.

- Learn to know when grass needs watering. If it has turned a dull grey-green, or if footprints remain visible, it is time to water.

- Use a sprinkler that produces large drops of water, rather than a fine mist, to avoid evaporation.

- Operate automatic sprinkler system only when the demand on the town's water supply is lowest. Set the system to operate between four and six a.m..

- Use a bucket of soapy water and use the hose only for rinsing when washing the car.

- Use a watering can or hand water with the hose in small areas of the lawn that need more frequent watering (those near walks or driveways or in especially hot, sunny spots.

The water conservation plan will need to contain ways to communicate water saving practices, such as those listed above, to the public. Among the methods for public education about water conservation are television, radio, and newspaper announcements and advertisements; posters and public displays; contest and school programs; bill stuffers, flyers and news letters.

WATER CONSERVATION

INDOOR CONSERVATION

Install low-flow showerheads and low-volume toilets.
Turn the water off when brushing your and washing your hands.
Only run the dishwasher and washing machine with full loads.
Use a pan of water for washing and rinsing dishes.
Check all water-line connections and faucets for leaks.

OUTDOOR CONSERVATION

Water your lawn thoroughly, but only as needed - monthly for trees, and ground cover, every five days or so for lawns.
Water early in the morning and use drip irrigation where possible.
Set sprinkler heads to spray large droplets, not a fine mist.
Avoid wasting water on paved areas and from running off your yard.
When you wash your car, use a bucket of soapy water and a cutoff nozzle on your hose.
Don't mow grasses before they reach their proper length : St. Augustine at 3 inches, Bermuda at 1 inch, Zoysia and Centiped at 2 inches.
Add mulch to all beds and around trees to prevent erosion, suppress weeds, and retain soil moisture.
Wed your beds and yard so plants get all the water.
Use native plants that need less water and fertilizer.
Plant new landscaping in the fall so it's better established before the summer heat.

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Exhibit A

DROUGHT CONTINGENCY PLAN
FOR THE CITY OF HALLETTSVILLE
AUGUST 7, 2000

Section I: Declaration of Policy, Purpose, and Intent

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 Hallettsville hereby adopts the following regulations and restrictions on the delivery and consumption of water.

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

Section II: Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Hallettsville by means of scheduling and providing public notice of a public meeting to accept input on the Plan.

Section III: Public Education

The City of Hallettsville will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by one or more of the following: newspaper and radio or utility bill inserts.

Section IV: Coordination with Regional Water Planning Groups

The service area of the City of Hallettsville is located within Region P water planning area and the City of Hallettsville has provided a copy of this Plan to the Region P water planning area.

Section V: Authorization

The Mayor, or designee, is hereby authorized and directed to implement the applicable provisions of this Plan upon determination that such implementation is necessary to protect public health, safety, and welfare. The Mayor, or designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan.

Section VI: Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Hallettsville. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII: Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments and governmental entities such as retail establishments, hotels and motels, restaurants, and office buildings.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by City of Hallettsville.

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Garbage Days: Days residential solid waste is picked up in immediate area. (East of Hwy 77 and North of Hwy 90A on Tuesday and Friday; all other parts of City on Monday and Thursday)

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;
(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;
(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
(d) use of water to wash down buildings or structures for purposes other than immediate fire protection;
(e) flushing gutters or permitting water to run or accumulate in any gutter or street;
(f) use of water to fill, refill, or add to any indoor or outdoor swimming pools or Jacuzzi-type pools;
(g) use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to

support aquatic life;
(h) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and
(i) use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Section VIII: Triggering Criteria for Initiation and Termination of Drought Response Stages

The Mayor, or designee, shall monitor water supply and/or demand conditions on a weekly basis and shall determine when conditions warrant initiation or termination of each stage of the Plan. Public notification of the initiation or termination of drought response stages shall be by means of publication in a newspaper of general circulation, or direct mail to each customer, or signs posted in public places.

The triggering criteria described below are based on lowered water level tables.

(a) Stage 1 - Mild Water Shortage Conditions

Requirements for initiation - Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII when the pumpage of the City of Hallettsville wells is equal to or greater than 1.1 mgal per day for 3 consecutive days.

Requirements for termination - Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 2 consecutive days.

(b) Stage 2 - Moderate Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section VII of this Plan when the pumpage of the City of Hallettsville wells is equal to or greater than 1.25 mgal per day for 3 consecutive days.

Requirements for termination - Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 2 consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

(c) Stage 3 - Severe Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when the pumpage of the City of Hallettsville wells is equal to or greater than 1.5 mgal per day for 3 consecutive days.

Requirements for termination - Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 2 consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

(d) Stage 4 - Critical Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when the pumpage of the City of Hallettsville wells is equal to or greater than 1.75 mgal per day for 3 consecutive days.

Requirements for termination - Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

(e) Stage 5 - Emergency Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the Mayor, or designee, determines that a water supply emergency exists based on:

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

2. Natural or man-made contamination of the water supply source(s).

Requirements for termination – Stage 5 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 1 day and normal storage levels are restored.

(f) Water Allocating

Requirements for initiation - Customers shall be required to comply with the water allocation plan prescribed in Section X of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when a prolonged electricity outage, source contamination, or system capacity limitations.

Requirements for termination - Water allocating may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 1 day and normal storage levels are restored.

Section IX: Drought Response Stages

The Mayor, or designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of the Plan, shall determine that a mild, moderate, severe, critical, or emergency condition exists and shall implement the following actions upon publication of notice in a newspaper of general circulation:

Stage 1 - Mild Water Shortage Condition

Goal: Achieve a voluntary 10% percent reduction in total water use.

Supply Management Measures:

The City of Hallettsville will reduce water demand by reducing flushing of water mains.

Voluntary Water Use Restrictions:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to garbage days and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m. to midnight on designated watering days.

(b) All operations of the City of Hallettsville shall adhere to water use restrictions prescribed for Stage 1 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 - Moderate Water Shortage Conditions

Goal: Achieve a 20% percent reduction in total water use.

Supply Management Measures:

The City of Hallettsville will reduce water demand by reducing flushing of water mains.

Water Use Restrictions. Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

(a) Irrigation of landscaped areas with hose-end sprinklers or automatic irrigation systems shall be limited to garbage days, and irrigation of landscaped areas is further limited to the hours of 12:00 midnight until 10:00 a.m. and between 8:00 p.m. and 12:00 midnight on designated watering days. However, irrigation of landscaped areas is permitted at anytime if it is by means of a hand-held hose, a faucet filled bucket or watering can of five (5) gallons or less, or drip irrigation system.

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

(c) Use of water to fill, refill, or add to any indoor or outdoor swimming pools, wading pools, or Jacuzzi-type pools is prohibited except on designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight.

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the City of Hallettsville.

(f) Use of water for the irrigation of golf course greens, tees, and fairways is prohibited except on designated watering days between the hours 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight. However, if the golf course utilizes a water source other than that provided by the City of Hallettsville, the facility shall not be subject to these regulations.

(g) The following uses of water are defined as non-essential and are prohibited:
1.) wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;
2.) use of water to wash down buildings or structures for purposes other than immediate fire protection.
3.) use of water for dust control, except for street construction and compaction;
4.) flushing gutters or permitting water to run or accumulate in any gutter or street; and
5.) failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s).

Stage 3 - Severe Water Shortage Conditions

Goal: Achieve a 30% percent reduction in total water use.

Supply Management Measures:

The City of Hallettsville will reduce water demand by discontinuing flushing of water mains and use non-potable well for non-potable purposes.

3.) Water Use Restrictions. All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The watering of golf course tees is prohibited unless the golf course utilizes a water source other than that provided by the City of Hallettsville Municipal water system.

(c) The use of water for direct resale will be discontinued.

(d) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

(e) All restaurants are prohibited from serving water to its patrons except when requested.

Stage 4 - Critical Water Shortage Conditions

Goal: Achieve a 40% percent reduction in total water use.

Supply Management Measures:

The City of Hallettsville will reduce water demand by discontinuing flushing of water mains and use non-potable well for non-potable purposes.

Water Use Restrictions. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The uses of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c) The filling, refilling, or adding of water to swimming pools, wading pools, and Jacuzzi type pools is prohibited.

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

(e) No applications for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be allowed or approved.

Stage 5 - Emergency Water Shortage Conditions

Goal: Achieve a 50% percent reduction in total water use.

Supply Management Measures:

The City of Hallettsville will reduce water demand by discontinuing flushing of water mains and use non-potable well for non-potable purposes.

Water Use Restrictions. All requirements of Stage 2, 3, and 4 shall remain in effect during

Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Section X: Water Allocation

In the event that water shortage conditions threaten public health, safety, and welfare, the Mayor is hereby authorized to distribute water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	6,000
3 or 4	7,000
5 or 6	8,000
7 or 8	9,000
9 or 10	10,000
11 or more	12,000

"Household" means the residential premises served by the customer's meter. "Persons per household" includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the City of Hallettsville of a greater number of persons per household on a form prescribed by the Mayor.

The Mayor shall make every effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Hallettsville offices to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the Mayor. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of Hallettsville on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the City of Hallettsville in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the Mayor shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the City of Hallettsville of a reduction in the number of person in a household shall be fined not less than $100.00. Residential water customers shall pay the following surcharges:

$ 5.00 for the first 1,000 gallons over allocation.
$10.00 for the second 1,000 gallons over allocation.
$15.00 for the third 1,000 gallons over allocation.
$20.00 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be allocated 6,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the City of Hallettsville of a greater number on a form prescribed by the Mayor. The Mayor shall make every effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City of Hallettsville offices to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the Mayor. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City of Hallettsville in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the Mayor shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the City of Hallettsville of a reduction in the number of person in a household shall be fined not less than $200.00. Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$ 5.00 for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$10.00, thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$15.00, thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$20.00, thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

A monthly water usage allocation shall be established by the Mayor, or designee, for each nonresidential commercial customer other than an industrial customer who uses water for processing purposes. The non-residential customer's allocation shall be approximately 75% percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, 75% percent of whose monthly usage is less than 6,000 gallons, shall be allocated 6,000 gallons. The Mayor shall make every effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Hallettsville to determine the allocation. Upon request of the customer or at the initiative of the Mayor, the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the Mayor or alternatively, a special water allocation review committee. Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is 1,000 gallons through 20,000 gallons per month:

$2.00 per thousand gallons for the first 1,000 gallons over allocation.
$4.00 per thousand gallons for the second 1,000 gallons over allocation.
$6.00 per thousand gallons for the third 1,000 gallons over allocation.
$8.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 20,000 gallons per month or more:

2 times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
4 times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
6 times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
8 times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Industrial Customers

A monthly water usage allocation shall be established by the Mayor, or designee, for each industrial customer, which uses water for processing purposes. The industrial customer's allocation shall be approximately 90% percent of the customer's water usage baseline. Ninety (90) days after the initial imposition of the allocation for industrial customers, the industrial customer's allocation shall be further reduced to 85% percent of the customer's water usage baseline. The industrial customer's water usage baseline will be computed on the average water usage for the 12-month period ending prior to the date of implementation of Stage 2 of the Plan. If the industrial water customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no billing history exists. The Mayor shall make every effort to see that notice of each industrial customers allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Hallettsville to determine the allocation, and the allocation shall be fully effective notwithstanding the lack of receipt of written notice. Upon request of the customer or at the initiative of the Mayor, the allocation may be reduced or increased, (1) if the designated period does not accurately reflect the customer's normal water usage because the customer had shutdown a major processing unit for repair or overhaul during the period, (2) the customer has added or is in the process of adding significant additional processing capacity, (3) the customer has shutdown or significantly reduced the production of a major processing unit, (4) the customer has previously implemented significant permanent water conservation measures such that the ability to further reduce usage is limited, (5) the customer agrees to transfer part of its allocation to another industrial customer, or (6) if other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the Mayor or alternatively, a special water allocation review committee). Industrial customers shall pay the following surcharges:

Customers whose allocation is 1,000 gallons through 100,000 gallons per month:

$2.00 per thousand gallons for the first 1,000 gallons over allocation.
$4.00 per thousand gallons for the second 1,000 gallons over allocation.
$6.00 per thousand gallons for the third 1,000 gallons over allocation.
$8.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 100,000 gallons per month or more:

2 times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
4 times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
6 times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
8 times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section XI: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the City of Hallettsville for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by Mayor, or designee, in accordance with provisions of this Plan.

(b) Any person who violates this Plan shall be issued a warning for the first violation.

(c) Any person who violates this Plan two or more times is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than one hundred dollars ($100.00) and not more than five hundred dollars ($500.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the Mayor shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at $40.00, and any other costs incurred by the City of Hallettsville in discontinuing service. In addition, suitable assurance must be given to the Mayor that the same action shall not be repeated while the Plan is in effect. Compliance with this plan may also be sought through injunctive relief in the district court.

(d) Any person, including a person classified as a water customer of the City of Hallettsville, in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(e) Any employee of the City of Hallettsville designated by the Mayor or police officer may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the municipal court on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in municipal court to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in municipal court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in municipal court before all other cases.

Section XII: Variances

The Mayor, or designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if City Council determines that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

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

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of Hallettsville within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the Mayor, or designee, before being considered by City Council and shall include the following:

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

Variances granted by the City of Hallettsville shall be subject to the following conditions, unless waived or modified by the City Council:

(a) Variances granted shall include a timetable for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section XIII: Severability

It is hereby declared to be the intention of the Hallettsville City Council that the sections, paragraphs, sentences, clauses, and phrases of this Ordinance are severable and, if any phrase, clause, sentence, paragraph, or section of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the Hallettsville City Council without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

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Exhibit A
Ordinance 9-99

DROUGHT CONTINGENCY PLAN
City of Moulton

Section I. Declaration of Policy, Purpose, and Intent

In order to conserve the available water supply and protect the integrity of water supply facilities, with particular regard for domestic water use, sanitation, 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 Moulton hereby adopts the following regulations and restrictions on the delivery and consumption of water.

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

Section II. Public Involvement

Opportunity for the public to provide input into the preparation of the Plan was provided by the City of Moulton by means of a Public Hearing held on September 9th, 1999.

Section III. Public Education

The City of Moulton will periodically provide the public with information about the Plan, including information about the conditions under which each stage of the Plan is to be initiated or terminated and the drought response measures to be implemented in each stage. This information will be provided by means of newspaper articles or posted notices.

Section IV. Coordination with Regional Water Planning Groups

The service area of the City of Moulton's Water Department is located within Regional Water Planning Area P and the City of Moulton has provided a copy of this Plan to the Planning Area.

Section V. Authorization

The City Administrator, or his/her designee is hereby authorized and directed to implement the applicable provisions of this Plan upon determination by the City Council that such implementation is necessary to protect public health, safety, and welfare. The City Administrator, or his/her designee, shall have the authority to initiate or terminate drought or other water supply emergency response measures as described in this Plan upon direction of the City Council.

Section VI. Application

The provisions of this Plan shall apply to all persons, customers, and property utilizing water provided by the City of Moulton. The terms "person" and "customer" as used in the Plan include individuals, corporations, partnerships, associations, and all other legal entities.

Section VII. Definitions

For the purposes of this Plan, the following definitions shall apply:

Aesthetic water use: water use for ornamental or decorative purposes such as fountains, reflecting pools, and water gardens.

Commercial and institutional water use: water use which is integral to the operations of commercial and non-profit establishments such as retail establishments, hotels and motels, restaurants, office buildings, schools, nursing homes, medical clinics, etc.

Conservation: those practices, techniques, and technologies that reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water or increase the recycling and reuse of water so that a supply is conserved and made available for future or alternative uses.

Customer: any person, company, or organization using water supplied by the City of Moulton.

Domestic water use: water use for personal needs or for household or sanitary purposes such as drinking, bathing, heating, cooking, sanitation, or for cleaning a residence, business, industry, or institution.

Even number address: street addresses, box numbers, or rural postal route numbers ending in 0, 2, 4, 6, or 8 and locations without addresses.

Industrial water use: the use of water in processes designed to convert materials of lower value into forms having greater usability and value.

Landscape irrigation use: water used for the irrigation and maintenance of landscaped areas, whether publicly or privately owned, including residential and commercial lawns, gardens, golf courses, parks, and rights-of-way and medians.

Non-essential water use: water uses that are not essential nor required for the protection of public, health, safety, and welfare, including:

(a) irrigation of landscape areas, including parks, athletic fields, and golf courses, except otherwise provided under this Plan;

(b) use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle;

(c) use of water to wash down any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas; use of water to wash down buildings or structures for purposes other than immediate fire protection; flushing gutters or permitting water to run or accumulate in any gutter or street; use of water to fill, refill, or add to any indoor or outdoor swimming pools or jacuzzi-type pools; use of water in a fountain or pond for aesthetic or scenic purposes except where necessary to support aquatic life; failure to repair a controllable leak(s) within a reasonable period after having been given notice directing the repair of such leak(s); and use of water from hydrants for construction purposes or any other purposes other than fire fighting.

Odd numbered address: street addresses, box numbers, or rural postal route numbers ending in 1, 3, 5, 7, or 9.

Section VIII. Triggering Criteria for Initiation and Termination of Drought Response Stages

The City administrator, or his/her designee, shall monitor water supply and/or demand conditions on a periodic basis and shall request the City Council for determination when conditions warrant initiation or termination of each stage of the Plan. Public notification of the initiation or termination of drought response stages shall be by means of notices published in the Moulton Eagle, signs posted in public places, and public service announcements on KCTI Radio Station and KHLT Radio Station.

The triggering criteria described on the following pages are based on the pumpage capability of the City's water wells. The City of Moulton has four wells capable of pumping 26,400 gallons per hour during periods of normal rainfall and can provide up to 600,000 gallons per day if required.

(a) Stage 1 - Mild Water Shortage Conditions

Requirements for initiation - Customers shall be requested to voluntarily conserve water and adhere to the prescribed restrictions on certain water uses, defined in Section VII – Definitions, when;

A. The static water level in wells No. 1 and 2 drop to 225 feet below ground level, the static water level in well No. 3 drops to 175 feet below ground level and well No. 4 drops to 135 feet below ground level and/or;

B. When the specific capacity of the wells pumpage output is equal to or less than 90 percent of the wells original pumpage capacity and/or;.

C. Loss of use of two or more wells due to mechanical failure which can not be repaired within three days.

Requirements for termination - Stage 1 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of 3 consecutive days.

(b) Stage 2 - Moderate Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses provided in Section VII of this Plan when;

A. The static water level in wells No. 1 and 2 drop to 240 feet below ground level, the static water level in well No. 3 drops to 195 feet below ground level and well No. 4 drops to 155 feet below ground level and/or;

B. When the specific capacity of the wells pumpage output is equal to or less than 80 percent of the wells original pumpage capacity and/or;.

C. Loss of use of two or more wells due to mechanical failure which can not be repaired within three days.

Requirements for termination - Stage 2 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three consecutive days. Upon termination of Stage 2, Stage 1 becomes operative.

(c). Stage 3 - Severe Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 3 of this Plan when;

A. The static water level in wells No. 1 and 2 drop to 250 feet below ground level, the static water level in well No. 3 drops to 205 feet below ground level and well No. 4 drops to 165 feet below ground level and/or;

B. When the specific capacity of the wells pumpage output is equal to or less than 70 percent of the wells original pumpage capacity and/or;.

C. Loss of use of two or more wells due to mechanical failure which can not be repaired within three days.

Requirements for termination - Stage 3 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three consecutive days. Upon termination of Stage 3, Stage 2 becomes operative.

(d) Stage 4 - Critical Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions on certain non-essential water uses for Stage 4 of this Plan when;

A. The static water level in wells No. 1 and 2 drop to 260 feet below ground level, the static water level in well No. 3 drops to 215 feet below ground level and well No. 4 drops to 175 feet below ground level and/or;

B. When the specific capacity of the wells pumpage output is equal to or less than 60 percent of the wells original pumpage capacity and/or;.

C. Loss of use of two or more wells due to mechanical failure which can not be repaired within three days.

Requirements for termination - Stage 4 of the Plan may be rescinded when all of the conditions listed as triggering events have ceased to exist for a period of three consecutive days. Upon termination of Stage 4, Stage 3 becomes operative.

(e) Stage 5 - Emergency Water Shortage Conditions

Requirements for initiation - Customers shall be required to comply with the requirements and restrictions for Stage 5 of this Plan when the City Council determines that a water supply emergency exists based on:

A. Major water line breaks, two or more well or well pump failures, two or more failures of main manifold pumps or a combination of failures occur, which cause unprecedented loss of capability to provide water service; or

B. Natural or man-made contamination of the water supply source.

Requirements for termination – Stage 5 of the Plan may be rescinded when the capability to resume the ability to supply an adequate amount of water for the distribution system has occurred, or the contamination of the water system has been eliminated.

(f) Water Rationing

Requirements for initiation - Customers shall be required to comply with the water allocation plan prescribed in Section X of this Plan and comply with the requirements and restrictions for Stage 5 of this Plan when one of the triggering events is determined to exist.

Requirements for termination - Water rationing may be rescinded when the requirements for termination of Stage 5 have been met.

Section IX: Drought Response Stages

The City Administrator, or his/her designee, shall monitor water supply and/or demand conditions on a daily basis and, in accordance with the triggering criteria set forth in Section VIII of the Plan, shall request determination from the City Council that a mild, moderate, severe, critical, or emergency condition exists and shall implement the following actions upon publication of notice in a newspaper of general circulation:

Stage 1 - Mild Water Shortage Conditions

Goal: Achieve a voluntary 10 percent reduction in daily water demand.

Supply Management Measures:

A. Reduced flushing of water mains.
B. Reduced use of water for MVFD drills.

Voluntary Water Use Restrictions:

(a) Water customers are requested to voluntarily limit the irrigation of landscaped areas to Sundays and Thursdays for customers with a street address ending in an even number (0, 2, 4, 6 or 8), and Saturdays and Wednesdays for water customers with a street address ending in an odd number (1, 3, 5, 7 or 9), and to irrigate landscapes only between the hours of midnight and 10:00 a.m. and 8:00 p.m to midnight on designated watering days.

(b) All operations of the City of Moulton shall adhere to water use restrictions prescribed for Stage 2 of the Plan.

(c) Water customers are requested to practice water conservation and to minimize or discontinue water use for non-essential purposes.

Stage 2 - Moderate Water Shortage Conditions

Goal: Achieve a 15 percent reduction in daily water demand.

Supply Management Measures:

A. Reduced flushing of water mains.
B. Reduced use of water for MVFD drills.
C. Cease any irrigation of public property.
D. Cease washing of all City Vehicles.

Water Use Restrictions Under threat of penalty for violation, the following water use restrictions shall apply to all persons:

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

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

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

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

(e) Use of water from hydrants shall be limited to fire fighting, related activities, or other activities necessary to maintain public health, safety, and welfare, except that use of water from designated fire hydrants for construction purposes may be allowed under special permit from the City of Moulton.

(f) All restaurants are prohibited from serving water to its patrons except when requested.

The following uses of water are defined as ***non-essential and are prohibited:***

(a) Wash down of any sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas;

(b) use of water to wash down buildings or structures for purposes other than immediate fire protection; use of water for dust control;

(c). flushing gutters or permitting water to run or accumulate in any gutter or street; and

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

Stage 3 - Severe Water Shortage Conditions

Goal: Achieve a 20 percent reduction in daily water demand.

Supply Management Measures:

A. Cease flushing of water mains.
B. Cease use of water for MVFD drills.
C. Cease any irrigation of public property.
D. Cease washing of all City vehicles.

__Water Use Restrictions.__ All requirements of Stage 2 shall remain in effect during Stage 3 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 12:00 midnight and 10:00 a.m. and between 8 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, drip irrigation, or permanently installed automatic sprinkler system only. The use of hose-end sprinklers is prohibited at all times.

(b) The use of water for construction purposes from designated fire hydrants under special permit is to be discontinued.

Stage 4 - Critical Water Shortage Conditions

Goal: Achieve a 25 percent reduction in daily water demand.

Supply Management Measures:

A. Cease flushing of water mains.
B. Cease use of water for MVFD drills.
C. Cease any irrigation of public property.
D. Cease washing of all City vehicles.

__Water Use Restrictions__. All requirements of Stage 2 and 3 shall remain in effect during Stage 4 except:

(a) Irrigation of landscaped areas shall be limited to designated watering days between the hours of 6:00 a.m. and 10:00 a.m. and between 8:00 p.m. and 12:00 midnight and shall be by means of hand-held hoses, hand-held buckets, or drip irrigation only. The use of hose-end sprinklers or permanently installed automatic sprinkler systems are prohibited at all times.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle not occurring on the premises of a commercial car wash and commercial service stations and not in the immediate interest of public health, safety, and welfare is prohibited. Further, such vehicle washing at commercial car washes and commercial service stations shall occur only between the hours of 6:00 a.m. and 10:00 a.m. and between 6:00 p.m. and 10 p.m.

(c). The filling, refilling, or adding of water to swimming pools, wading pools, and jacuzzi-type pools is prohibited.

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

(f) No applications for new, additional, expanded, or increased-in-size water service connections, meters, service lines, pipeline extensions, mains, or water service facilities of any kind shall be allowed or approved.

Stage 5 - Emergency Water Shortage Conditions

Goal: Achieve a 30 percent reduction in daily water demand.

Supply Management Measures:

A. Cease flushing of water mains.
B. Cease use of water for MVFD drills.
C. Cease any irrigation of public property.
D. Cease washing of all City Vehicles.

Water Use Restrictions. All requirements of Stage 2, 3, and 4 shall remain in effect during Stage 5 except:

(a) Irrigation of landscaped areas is absolutely prohibited.

(b) Use of water to wash any motor vehicle, motorbike, boat, trailer, airplane or other vehicle is absolutely prohibited.

Section X: Water Rationing

In the event that the City Council determine that water shortage conditions threaten public health, safety, and welfare, the City Administrator or his/her designee, is hereby authorized to ration water according to the following water allocation plan:

Single-Family Residential Customers

The allocation to residential water customers residing in a single-family dwelling shall be as follows:

Persons per Household	Gallons per Month
1 or 2	3,000
3 or 4	4,000
5 or 6	6,000
7 or 8	8,000
9 or 10	10,000
11 or more	12,000

"Household" means the residential premises served by the customer's meter. "Persons per household" includes only those persons currently physically residing at the premises and expected to reside there for the entire billing period. It shall be assumed that a particular customer's household is comprised of two (2) persons unless the customer notifies the City of Moulton of a greater number of persons per household on a form prescribed by the City Administrator. The City Administrator shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every residential customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City Hall offices of the City of Moulton to complete and sign the form claiming more than two (2) persons per household. New customers may claim more persons per household at the time of applying for water service on the form prescribed by the City Administrator. When the number of persons per household increases so as to place the customer in a different allocation category, the customer may notify the City of Moulton on such form and the change will be implemented in the next practicable billing period. If the number of persons in a household is reduced, the customer shall notify the City of Moulton in writing within two (2) days. In prescribing the method for claiming more than two (2) persons per household, the City Administrator or his/her designee shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of persons in a household or fails to timely notify the City of Moulton of a reduction in the number of person in a household shall be fined not less than $ 200.00 (two hundred dollars). Residential water customers shall pay the following surcharges:

$ 5.00 for the first 1,000 gallons over allocation.
$ 7.50 for the second 1,000 gallons over allocation.
$ 10.00 for the third 1,000 gallons over allocation.
$ 15.00 for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Master-Metered Multi-Family Residential Customers

The allocation to a customer billed from a master meter which jointly measures water to multiple permanent residential dwelling units (e.g., apartments, mobile homes) shall be allocated 3,000 gallons per month for each dwelling unit. It shall be assumed that such a customer's meter serves two dwelling units unless the customer notifies the City of Moulton of a greater number on a form prescribed by the City Administrator. The City Administrator shall give his/her best effort to see that such forms are mailed, otherwise provided, or made available to every such customer. If, however, a customer does not receive such a form, it shall be the customer's responsibility to go to the City Hall offices of the City of Moulton to complete and sign the form claiming more than two (2) dwellings. A dwelling unit may be claimed under this provision whether it is occupied or not. New customers may claim more dwelling units at the time of applying for water service on the form prescribed by the City Administrator. If the number of dwelling units served by a master meter is reduced, the customer shall notify the City of Moulton in writing within two (2) days. In prescribing the method for claiming more than two (2) dwelling units, the City Administrator shall adopt methods to insure the accuracy of the claim. Any person who knowingly, recklessly, or with criminal negligence falsely reports the number of dwelling units served by a master meter or fails to timely notify the City of Moulton of a reduction in the number of person in a household shall be fined not less than $ 200.00 (two hundred dollars). Customers billed from a master meter under this provision shall pay the following monthly surcharges:

$ 5.00 for 1,000 gallons over allocation up through 1,000 gallons for each dwelling unit.
$ 7.50 thereafter, for each additional 1,000 gallons over allocation up through a second 1,000 gallons for each dwelling unit.
$ 10.00 thereafter, for each additional 1,000 gallons over allocation up through a third 1,000 gallons for each dwelling unit.
$ 15.00 thereafter for each additional 1,000 gallons over allocation.

Surcharges shall be cumulative.

Commercial Customers

The non-residential customer's allocation shall be approximately 75% percent of the customer's usage for corresponding month's billing period for the previous 12 months. If the customer's billing history is shorter than 12 months, the monthly average for the period for which there is a record shall be used for any monthly period for which no history exists. Provided, however, a customer, 75 percent of whose monthly usage is less than 3,000 gallons, shall be allocated 3,000 gallons. The City Administrator shall give his/her best effort to see that notice of each non-residential customer's allocation is mailed to such customer. If, however, a customer does not receive such notice, it shall be the customer's responsibility to contact the City of Moulton to determine the allocation. Upon request of the customer or at the initiative of the City Administrator the allocation may be reduced or increased if, (1) the designated period does not accurately reflect the customer's normal water usage, (2) one nonresidential customer agrees to transfer part of its allocation to another nonresidential customer, or (3) other objective evidence demonstrates that the designated allocation is inaccurate under present conditions. A customer may appeal an allocation established hereunder to the City Administrator or alternatively to the City Council of the City of Moulton. Nonresidential commercial customers shall pay the following surcharges:

Customers whose allocation is 3,000 gallons through 25,000 gallons per month:

$ 5.00 per thousand gallons for the first 1,000 gallons over allocation.
$ 7.50 per thousand gallons for the second 1,000 gallons over allocation.
$ 10.00 per thousand gallons for the third 1,000 gallons over allocation.
$ 15.00 per thousand gallons for each additional 1,000 gallons over allocation.

Customers whose allocation is 25,000 gallons per month or more:

5 times the block rate for each 1,000 gallons in excess of the allocation up through 5 percent above allocation.
7.5 times the block rate for each 1,000 gallons from 5 percent through 10 percent above allocation.
10 times the block rate for each 1,000 gallons from 10 percent through 15 percent above allocation.
15 times the block rate for each 1,000 gallons more than 15 percent above allocation.

The surcharges shall be cumulative. As used herein, "block rate" means the charge to the customer per 1,000 gallons at the regular water rate schedule at the level of the customer's allocation.

Section XI: Enforcement

(a) No person shall knowingly or intentionally allow the use of water from the City of Moulton for residential, commercial, industrial, agricultural, governmental, or any other purpose in a manner contrary to any provision of this Plan, or in an amount in excess of that permitted by the drought response stage in effect at the time pursuant to action taken by the City Administrator or his/her designee, in accordance with the direction of the City Council and the provisions of this Plan.

(b) Any person who violates this Plan is guilty of a misdemeanor and, upon conviction shall be punished by a fine of not less than two hundred dollars ($ 200.00) and not more than five hundred dollars ($ 500.00). Each day that one or more of the provisions in this Plan is violated shall constitute a separate offense. If a person is convicted of three or more distinct violations of this Plan, the City Administrator shall, upon due notice to the customer, be authorized to discontinue water service to the premises where such violations occur. Services discontinued under such circumstances shall be restored only upon payment of a re-connection charge, hereby established at $ 100.00, all fines assessed by the Municipal Court, and any other costs incurred by the City of Moulton in discontinuing service. In addition, suitable assurance must be given to the City Administrator that the same action shall not be repeated while the Plan is in effect. Compliance with this Plan may also be sought through injunctive relief in the district court.

(c). Any person, including a person classified as a water customer of the City of Moulton in apparent control of the property where a violation occurs or originates shall be presumed to be the violator, and proof that the violation occurred on the person's property shall constitute a rebuttable presumption that the person in apparent control of the property committed the violation, but any such person shall have the right to show that he/she did not commit the violation. Parents shall be presumed to be responsible for violations of their minor children and proof that a violation, committed by a child, occurred on property within the parents' control shall constitute a rebuttable presumption that the parent committed the violation, but any such parent may be excused if he/she proves that he/she had previously directed the child not to use the water as it was used in violation of this Plan and that the parent could not have reasonably known of the violation.

(d) Any employee of the City of Moulton, police officer, or other person or persons designated by the City Administrator may issue a citation to a person he/she reasonably believes to be in violation of this Ordinance. The citation shall be prepared in duplicate and shall contain the name and address of the alleged violator, if known, the offense charged, and shall direct him/her to appear in the Municipal Court of the City of Moulton on the date shown on the citation for which the date shall not be less than 3 days nor more than 5 days from the date the citation was issued. The alleged violator shall be served a copy of the citation. Service of the citation shall be complete upon delivery of the citation to the alleged violator, to an agent or employee of a violator, or to a person over 14 years of age who is a member of the violator's immediate family or is a resident of the violator's residence. The alleged violator shall appear in the Municipal Court of the City of Moulton to enter a plea of guilty or not guilty for the violation of this Plan. If the alleged violator fails to appear in the Municipal Court, a warrant for his/her arrest may be issued. A summons to appear may be issued in lieu of an arrest warrant. These cases shall be expedited and given preferential setting in the Municipal Court before all other cases.

Section XII: Variances

The City Administrator, or his/her designee, may, in writing, grant temporary variance for existing water uses otherwise prohibited under this Plan if it is determined that failure to grant such variance would cause an emergency condition adversely affecting the health, sanitation, or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met:

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

(b) Alternative methods can be implemented which will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of this Ordinance shall file a petition for variance with the City of Moulton within 5 days after the Plan or a particular drought response stage has been invoked. All petitions for variances shall be reviewed by the City Administrator or his/her designee, and shall include the following

(a) Name and address of the petitioner(s).
(b) Purpose of water use.
(c) Specific provision(s) of the Plan from which the petitioner is requesting relief.
(d) Detailed statement as to how the specific provision of the Plan adversely affects the petitioner or what damage or harm will occur to the petitioner or others if petitioner complies with this Ordinance.
(e) Description of the relief requested.
(f) Period of time for which the variance is sought.
(g) Alternative water use restrictions or other measures the petitioner is taking or proposes to take to meet the intent of this Plan and the compliance date.
(h) Other pertinent information.

Variances granted by the City of Moulton shall be subject to the following conditions, unless waived or modified by the City Administrator or his/her designee:

(a) Variances granted shall include a timetable for compliance.
(b) Variances granted shall expire when the Plan is no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of this Plan occurring prior to the issuance of the variance.

Section XIII: Severability

It is hereby declared to be the intention of the City Council of the City of Moulton that the sections, paragraphs, sentences, clauses, and phrases of this Ordinance are severable and, if any phrase, clause, sentence, paragraph, or section of this Plan shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs, and sections of this Plan, since the same would not have been enacted by the City Council of the City of Moulton without the incorporation into this Plan of any such unconstitutional phrase, clause, sentence, paragraph, or section.

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WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN FOR THE CITY OF SHINER

I. INTRODUCTION

The water distribution system and the wastewater collection system in the City of Shiner, Texas, are both owned and operated by the City. Drinking water is obtained from water wells located within the boundaries of the City. Storage is maintained with the use of ground storage and elevated storage facilities. Wastewater is treated at the local wastewater treatment plant which is operated according to Texas Natural Resource Conservation Commission (TNRCC) permits.

A. Purpose of the Project

Although the City has not experienced any outstanding residential growth, recently, major industrial users who are served by the City have recently begun to expand. These expansions have resulted in overloads of both the water and wastewater systems. The expansions are expected continue, and the City has acted to accommodate the anticipated growth in demand for service.

This report outlines the City's water conservation and emergency management programs. The objectives of the water conservation program is intended to reduce the quantity required for each water using activity, insofar as practical, through the implementation of efficient water use practices. The emergency management program provides procedures for voluntary and/or mandatory actions to be put into effect to temporarily reduce the demand placed upon the City's water supply system during a water shortage emergency. Drought contingency procedures include water conservation, but may also include the prohibition of certain practices. Both programs are tools that the City will have available to effectively operate under a large range of situations.

B. Planning Area and Project Description

The City of Shiner, Lavaca County, Texas, is located in Southeast Central Texas, approximately midway between San Antonio and Houston. The water and wastewater service area for the City is shown on Appendix C.

Recent expansions of industries in the City has overloaded the existing water

Recent expansions of industries in the City has overloaded the existing water and wastewater systems and actions are being taken to address these problems. These actions include the installation of additional water supply and storage facilities as well as expansion of the City's water distribution system and wastewater treatment plant. While construction and/or expansion of these facilities will reduce the overload, use of water conservation methods will aid in relieving stress on the City's systems. The City is proposing a water conservation program that will reduce per capita consumption and provide long term relief.

C. Goals of the Program

The City of Shiner experiences diversified water usage. Residential per capita use on an average is normal for a community of its size. However, a large number of residents routinely experience consumptions rarely exceeding the minimum rate set by the City. On the other hand, there are a number of residential users whose usage constantly places them in the top ten category overall.

Commercial and industrial business, while small in number, consititute a large percentage of water and wastewater usage with the Spoetzl Brewery and Kaspar Wire Works as the leaders. Small percent reductions in flows to and from these facilities would provide major yields in the reduction effort.

Because of the diversified use, the City of Shiner has set the following goals to experience moderate reductions across the board.

Proposed reduction of 12%; 2% reduction in household use, 5% reduction in outdoor usage, and 5% reduction from repair and/or replacement of meters.

II. LONG TERM WATER CONSERVATION PLAN

A. *Plan Elements*

Elements critical to the development of the water conservation plan are:

1. *Public Education and Information*
2. *Conservation-oriented Water Rate Structures*
3. *Universal Metering and Meter Repair and/or Replacement.*
4. *Plumbing Fixture Retrofit Program*
5. *Water- Conserving Plumbing Code*
6. *Water-Conserving Landscaping*
7. *Water Recycling and Reuse*
8. *Implementation and Enforcement*
9. *Periodic Review and Evaluation*

1. *Public Education and Information*

a. *First Year Program - will include the distribution of educational materials including, but not limited to, brochures and/or newsletters to all customers at a minimum rate of once (1) per year or on a rate established by the Mayor. The initial distribution will explain the need for water conservation and the scope of the program. The educational materials will promote water conservation by informing customers about ways to save water inside homes, landscaping and lawn uses, and in recreational uses. Conservation methods that will be emphasized by the City will include:*

1) *Bathroom Saving Hints*
2) *Kitchen Saving Hints*
3) *Laundry Saving Hints*
4) *Appliance and Plumbing Practices*
5) *Outdoor Water Conservation*

b. *New Customer Program*

New customers will receive the initial conservation educational materials that describe the water conservation program and other general information when they apply for City services.

c. *Long Term Program*

The long term program will include a distribution of educational materials and new releases annually, as well as public displays, including posters and/or advertisements in the local newspaper.

Emergency news releases will be distributed on an as needed basis.

2. *Conservation-Oriented Water Rates*

The City currently has a rate structure which does not discourage water waste. The current structure is uniform for all users. The City will adopt a policy of raising the over minimum rate whenever the rate structure has to be adjusted. The City will consider a higher rate per thousand gallons after a certain amount of water is used. See Appendix D for current and proposed rate schedules.

3. *Universal Metering and Meter Repairs and Replacement*

The City is 100% metered at the present time: The City will implement a plan to meter users from any unmetered locations.

In addition to the current water accounting and testing program, the City will establish the following meter testing procedures:

a. *Production meters - tested once per year*
b. *meters>1" - tested once per year*
c. *meters <1" - tested once every 10 years*

The City has a policy of testing meters which appear to have abnormally high or low water usage.

Metering and meter repair and/or replacement coupled with the ongoing water accounting will be used in conjunction with other programs such as leak detection and repair to potentially save significant amounts of water.

4. *Leak Detection and Repair Program*

The City has the following policy for leak detection and repair:

Monthly reports are analyzed to detect substantial differences in consumption rates. Upon discovery of such findings, inspections are made at the site. The meter is repaired or replaced as warranted.

If consumers register a complaint on their bill, the City will inspect water and connections at the location for leakage. The meter is repaired or replaced as warranted.

Comparisons between monthly pumping and consumption reports are made to detect differences in amounts. Upon discovery of such a condition, lines are inspected to determine the nature of the problems and repairs will be made if warranted.

5. *Plumbing Fixture Retrofit Program*

   Customers and/or owners of buildings that do not have water conserving plumbing devices will be encouraged to retrofit their old fixtures. The educational program will help inform them of the advantages of installing water saving devices.

6. *Water Conserving Plumbing Code*

   The City of Shiner does not currently have an official plumbing code. The City has been encouraged to adopt such a program. In the interim, residents will be encouraged to install water conserving fixtures.

7. *Water Conserving Landscape*

   The public information and education program will include suggestions on landscaping and irrigation practices which will result in reduced water consumption.

8. *Water recycling and Reuse Programs*

   At this time the City does not have a means of recycling or reusing water, as stated in the goals of the program. There are several industries in Shiner for which a recycling program is feasible. The City will take the necessary measures to insure that these industries research such programs and possibly include them in their processes.

9. *Implementation and Enforcement*

   The water conservation plan will be officially adopted by the City of Shiner which will implement the necessary documents to enforce any regulation which arises from its adoption. The City will appoint personnel responsible for execution of the plan elements.

10. *Periodic Review and Evaluation*

    The City will review the water conservation plan bi-annually to check its progression. An annual report shall be submitted by the administrator of the conservation plan to the City and a copy will be filed with the Executive Administrator of the Texas Water Development Board. The report will *address the program and effectiveness of the water conservation plan and will include:*

a. *A list of all public information which has been issued,*
b. *Public response,*
c. *Consumption data in support of the effectiveness of the water conservation plan, and*
d. *Implementation program and status of the City's water conservation program.*

CITY OF SHINER

EMERGENCY WATER DEMAND MANAGEMENT PROGRAM

EMERGENCY CONTINGENCY PLAN FOR THE WATER & WASTEWATER SYSTEM

Based on weather conditions or 90% of City's plant capacity, the following measures will be implemented:

1. *Inform public by giving notices of a mild emergency to the customers within the system, the posting of the notice, and notifying news media of the mild emergency.*

2. *Included in the information to the public will be the recommendation that water users look for ways to conserve water.*

3. *Public will be advised of the existing condition.*

Emergency Rationing Program adopted for emergency use only during periods of acute water shortage is as follows:

1. *Declaration of Emergency*

   When the system demand exceeds supply or storage capability measured over a twenty-four hour (24) period, and refilling the storage facilities is rendered impossible, the City may declare an emergency to exist, and thereafter ration water in the following manner.

2. *Notice Requirements*

   Written notice of the proposed rationing shall be mailed or delivered to each paying customer seventy-two (72) hours before the City actually starts the program, and shall also be placed in a local newspaper. The customer notice shall contain the following information:

   a. *The date rationing shall begin,*
   b. *The date rationing shall end,*
   c. *The stage (level) of rationing to be employed, and*
   d. *A copy of this rationing authority*

3. *Stage Levels of Rationing*

a. *STAGE I (Mild Rationing Conditions) - Alternate day usage of water for outdoor purposes such as lawns, gardens, car washing, etc. The provisions for alternate day use shall be specified by the City in the written notice.*

b. *STAGE I-A (Limited Water Usage) - The City may limit water usage to a gallonage determined by the water system's supply capability to provide continuous service prorated over all customers served by the water plant. Water restrictors may be installed for customers that exceed the limited gallonage determined by the system's mechanical capability. A flow restrictor shall be installed at the customer's expense (not to exceed actual costs of $500.00). Tampering with the flow restrictor will result in water service termination for seven (7) days. The normal Service Tap Fee of the City shall apply for restoration of service. The maximum number of gallons per meter per month shall be contained in the notice to each customer.*

c. *STAGE II (Moderate Rationing Conditions) - All outdoor water usage is prohibited; however, usage for livestock is exempt.*

d. *STAGE III (Sever Rationing Conditions) - All outdoor water usage is prohibited; livestock may be exempted by the City. All consumption shall be limited to each citizen in one of the following ways:*

(1) *A fixed percentage of each customer's average use in the prior month, the percentage to be uniformly applied on a system wide basis, each customer being notified of the percentage amount, OR*

(2) *A maximum number of gallons per meter per week, with notice to each customer of this number.*

4. *Violation of Emergency Rationing Rules*

a. *First Violation - The City may install a flow restrictor in the line to limit the amount of water which will pass through the meter in a twenty-four (24) hour period. The cost to be charged to the customer's account shall be the actual installed cost to the City, not to exceed $500.00.*

b. *Subsequent Violations - The City may terminate service at the meter for a period of seven (7) days, or until the end of the calendar month, whichever is LESS. The normal Service Tap Fee of the City shall apply for restoration of service.*

5. *Exemptions or Variances From Rationing Rules*

The City may grant any customer an exemption or variance from the uniform rationing program, for good cause. The City shall treat all customers equally concerning exemptions and variances, and shall not employ discrimination in such grants.

6. *Rates*

All existing rate schedules shall remain in effect during the rationing period, and no charges may be levied against a customer other than the charges outlined in this plan.

The purpose of this Emergency Rationing Program is to conserve the total amount of water demanded from the City until the supply can be restored to normal levels. This rationing program shall not exceed sixty (60) days without extension by the City.

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CITY OF YOAKUM

DEWITT AND LAVACA COUNTY

TEXAS

WATER CONSERVATION AND

DROUGHT CONTINGENCY PLAN

SEPTEMBER 1995

HUNTER ASSSOCIATES, INC.
ENGINEERS/PLANERS/SURVEYORS

Dallas
214-369-9171

Austin
512-454-8716

TABLE OF CONTENTS

INTRODUCTION

The City of Yoakum Waterworks System is owned and operated by the City of Yoakum. The City Council has the managing control and operation of the City's waterworks and sewer system. The City Council must approve final budgets and rates.

The system serves approximately 2,880 acres. The City has two water plants. One is located on the Southwest side of the City and the other is located on the North side of the City. All residents and commercial activities use the City water and sewer system.

It is the goal of the City to enact a plan to achieve a 10 percent reduction in water usage per person upon implementation of this plan. Achieving this goal would, in effect, increase the life span of water and sewer facilities.

The unaccounted-for water use in the City of Yoakum is less than 10% which is within reasonable limits compared to other cities of its size.

Appendix A

Texas Water Development Board

MUNICIPAL WATER CONSERVATION PLANNING DATA: UTILITY SURVEY

The following form provides a concise and consistent format to insure that the most important information and data needed for the development of water conservation and emergency water demand management plans are considered. Please complete all blanks as completely and objectively as possible. This data will provide the information needed to establish the conservation goal(s) for your utility. Please see footnotes for assistance with calculations. If you would like assistance in completing this form and in developing your plan, please contact the Municipal Conservation Unit at (512) 475-2057.

Name of Applicant: City of Yoakum

Address: P.O. Drawer 738

Telephone Number: (512) 293-6321 **Fax:** (512) 293-3318

Completed by: Calvin Cook

Title: Director of Public Works

Signature: ______________ **Date:** ______________

I. CUSTOMER DATA

A. Population and Service Area Data

1. Description of service area. If the applicant has received a Certificate of Convenience and Necessity (CCN) from the Texas Natural Resource Conservation Commission, please include a copy of the CCN and a map.

   Attached

2. Service area (square miles): 4.5

3. Current population of service area: 6,095 (est. GCRPC)

4. Current population served by utility: a. water 6,095

   b. wastewater 6,095

5. Population served by water utility for previous five years:

Year	Population
1990	5,611
1991	5,960
1992	5,934
1993	6,006
1994	6,083

6. Projected population for service area:

Year	Population
1995	6,095
2000	6,430
2005	
2010	6,730
2020	7,043

Indicate source(s), dates, and/or method for the calculation of current and projected population:

1990 - Census

1991 - 1993 - T.A & M State Data Center

1994 - GCRPC

1995 - 2020 - T.W.D.B.

B. Active Connections

1. Current number of active water meter connections by user type. Check whether multi-family service with a single meter is counted as Residential X or Commercial ____.

Treated water users:	Metered	Not metered	Total	
Residential	2,129	0	2,129	
Commercial	387	0	387	
Industrial	12	0	12	
Public	26	1 *	27	* (Golf Course)
Other				

2. Net number of new connections per year for previous five years:

Type	19 90	19 91	19 92	19 93	19 94
Residential	1	1	1	2	3
Commercial	1	0	2	2	7
Industrial	0	0	0	2	2
Public	0	0	1	1	0
Other					

II. WATER USE DATA FOR SERVICE AREA

A. Water Production and Sales

1. Total amount of water diverted and/or pumped for previous five years from all sources (in 1000 gallons):

	19 90	19 91	19 92	19 93	19 94
January	23,547	24,232	21,647	21,747	21,715
February	20,835	20,406	19,214	19,182	21,761
March	23,514	24,379	21,901	22,036	22,332
April	25,863	22,556	20,901	22,483	23,674
May	31,390	24,840	21,694	23,584	23,399
June	48,418	30,144	26,261	24,038	28,586
July	39,202	30,171	34,200	37,344	50,280
August	45,351	33,183	34,311	43,384	32,765
September	30,552	23,333	33,161	34,955	29,825
October	32,225	29,041	33,760	28,999	25,522
November	25,442	22,518	23,348	22,553	22,186
December	29,930	22,333	21,392	21,597	21,102
Total	376,269	307,136	311,826	321,902	323,152

2. Please indicate how the above figures were determined (for example, from a master meter located at the point of diversion from a stream or located at a point(s) where raw water enters the plant, or from water use sales).

From master meters at plant discharge into distribution system.

3. Amount of water delivered and/or sold as recorded by individual meter sales records (in 1000 gallons).[1] Again, check whether multi-family service with a single meter is counted as Residential __X__ or Commercial ____.

Year	Total	Residential	Commercial	Industrial	Public	Other
1990	357,364	218,933	69,830		25,988	42,613
1991	285,697	180,954	53,784		17,175	33,784
1992	298,442	187,284	54,520		22,338	34,300
1993	293,037	184,031	49,813		23,784	35,409
1994	300,168	182,072	57,781		24,769	35,546

B. High Volume Customers: Give two-year average annual use.

1. Give two year average annual use for your ten highest volume retail customers in your service area that you serve directly.

	Customer	(1,000) gals/year	Type of Customer
(1)	Eddy Packing Co.	5,245	Industrial
(2)	Yoakum Packing Co.	3,597	Industrial
(3)	Stevens Nursing Home	3,339	Nursing Home (Commercial)
(4)	Village Oaks Apt.	2,729	Residential
(5)	Tex. Dept. Public Hwy/Trans	2,696	Commercial
(6)	La Mancha Inn	1,998	Commercial
(7)	Oak Meadows Apt.	1,684	Commercial/Res.
(8)	Ykm. Com. Hospital	1,600	Hospital
(9)	Roadrunner Trailer Park	1,328	Residential
(10)	Y.I.S.D. Stadium	1,060	School

2. Attach a list of your wholesale customers and indicate whether water sales are included in II.A.1. above.
NONE

C. Water Accounting Data

1. Unaccounted-for Water[2]:

Year	Unaccounted-for Percent
1990	5
1991	7
1992	4
1993	9
1994	7.1

2. Peak daily use to average daily use ratio[3]:

Year	Average Daily Annual Use (MGD)	Peak Day (MGD)	Date Peak Occurred	Ratio
1990	1.03	2.09	6/25	2:1
1991	.841	1.77	8/13	2.1:1
1992	.854	1.63	7/14	1.9:1
1993	.882	1.77	8/3	2:1
1994	.885	2.04	7/27	2.3:1

3. Per capita water use for previous five years (in gallons per capita per day, or gpcd).[4]

Year	Population	Residential Use (1,000 gallons)	Residential gpcd	Total Municipal Use (1,000 gallons)	Municipal gpcd
90	5,611	218,933	106.9	376,269	183.7
91	5,960	180,954	83.2	307,136	141.1
92	5,934	187,284	86.5	311,826	143.9
93	6,006	184,031	83.9	321,902	146.8
94	6,083	182,072	82	323,152	145.5
5-year average	5,919	190,654	88.2	328,057	151.8

4. Seasonal water use:[1]

Year	Average Daily Winter Use (Dec. - Feb. in MGD)	Average Daily Summer Use (Jun - Aug. in MGD)	Average Daily Annual Use (12 months in MGD)	For Office Use
90	.825	1.445	1.03	
91	.744	1.016	.841	
92	.692	1.030	.854	
93	.694	1.138	.881	
94	.717	1.213	.885	

5. Monthly Water Sales by User Category for the Last Full Calendar Year, based on customer meters (in 1,000 gallons)

	Residential	Commercial-Institutional	Industrial	Public	Total
January	13,411	4,092	329	19,449	37,281
February	11,089	4,524	267	14,493	30,373
March	11,425	3,619	172	15,637	30,853
April	14,747	4,321	301	23,281	42,650
May	12,687	3,721	276	18,469	35,153
June	13,239	3,831	318	22,081	39,469
July	18,933	4,388	388	26,460	50,169
August	22,074	6,595	473	23,270	52,412
September	20,914	5,884	351	24,233	51,382
October	16,829	5,438	322	22,542	45,131
November	13,460	3,457	294	17,541	34,752
December	13,261	4,100	319	20,230	37,910

D. **Projected Water Demands:** Provide estimates for total water demands for the planning horizon of the utility. Indicate sources of data and how projected water demands were determined. Attach additional sheet if needed.

III. WATER SUPPLY SYSTEM

A. Water Supply Sources: Identify all current water supply sources and the amount available.

	Source	Amount Available
Surface water:	NA	
Groundwater:	4 wells (950+850+825+600)	4,644,000 GPD
Contracts:	None	
Other:	NA	

B. Treatment and Distribution System

1. Design capacity of system: 4.6 MGD

2. If surface water, do you recycle filter backwash to the head of the plant? Yes_______ No_______

3. Please describe your water system. Include the number of treatment plants, wells and storage tanks. If possible, include a sketch of the system layout. 4 water wells, 2 pump plants
3 ground storage - 975,000 gals. (includes standpipe)
2 elevated storage - 550,000 gals.

IV. WASTEWATER UTILITY SYSTEM

A. Wastewater System Data

1. Design capacity of wastewater treatment plant(s): .950 MGD

2. Is treated effluent used for irrigation on-site NO, off-site NO, plant washdown NO, or chlorination/dechlorination NO?

3. Briefly describe the wastewater system(s) of the area serviced by the water utility. Describe how treated wastewater is disposed. Where relevant, identify treatment plant(s) with the TNRCC name and number, the operator, owner, and, if wastewater is discharged, the receiving stream. Please provide a sketch or map which locates the plant(s) and discharge points or disposal sites. (See Attached.)

B. Wastewater Data for Service Area

1. Percent of water service area served by wastewater utility system: 100 %

2. Monthly volume treated for previous five years (in 1,000 gallons):

	19 90	19 91	19 92	19 93	19 94
January	19,396	21,661	28,289	20,815	20,344
February	16,804	17,676	26,271	17,171	18,085
March	18,813	15,817	18,633	24,990	21,484
April	17,429	22,726	19,473	23,667	18,951
May	19,326	19,842	20,377	21,957	20,994
June	19,574	19,043	19,831	21,078	16,250

July	22,401	20,865	19,321	20,481	17,754
August	21,184	19,564	18,385	21,581	21,109
September	19,200	20,189	18,020	21,338	22,760
October	17,633	16,830	18,938	22,074	24,233
November	16,277	17,180	20,090	20,371	18,236
December	18,696	25,167	17,450	19,773	22,710
Total	229,733	236,510	246,078	255,296	242,910

V. UTILITY OPERATING DATA

A. **Water and Wastewater Rates and Rate Structure** (Indicate if there are different rate structures for industrial users). (See Attached.)

B. **Other Relevant Data:** Please indicate other data or information which are relevant to both the applicant's water management operations and design of a water conservation plan.

VI. CONSERVATION GOALS

PLEASE USE THE WATER CONSERVATION PLANNING DATA YOU HAVE PROVIDED IN THIS SURVEY TO ESTABLISH CONSERVATION GOALS.

A. Water Conservation goals for municipal utilities are generally established to maintain or reduce consumption as measured in:

1) gallons per capita per day use,
2) unaccounted-for water losses,
3) the peak day to average day ratio, and/or
4) an increase in reuse or recycling of water.

B. *Conservation review* staff assess the reasonableness of water conservation goals based on whether the applicant addresses the following steps:

1) identification of a water or wastewater problem,
2) performance of a system audit (completion of a planning data form),
3) selection of goals based on the potential to save water as identified in the audit, and
4) performance of a benefit-cost analysis of conservation strategies.

If at least the first three steps in the water conservation plan have been completed and are summarized, then staff can conclude that there is a substantiated basis for the goals and that the water conservation plan is integrated into water management. Therefore the established conservation goals are reasonable. Please contact Board for most current version of this form before submission.

ATTACHMENT NO. 3 - FOR PARAGRAPH NO. 10
DESCRIPTION OF WATER SERVICE AREA
CITY OF YOAKUM WATER DEPARTMENT - YOAKUM, DE WITT COUNTY, TEXAS

Beginning at a point on the DeWitt Lavaca County Line said point being in the centerline of Roundhouse Creek said beginning point being also 1300 feet West of U. S. Highway Alt. No. 77 in the City of Yoakum DeWitt and Lavaca County, Texas:

Thence, in a southerly direction with the meanders of the centerline of Roundhouse Creek to its intersection with Big Brushy Creek, and southeasterly, with the centerline of Big Brushy Creek, crossing the Southern Pacific Railroad and continuing down stream with the centerline of Big Brushy Creek to the centerline of a County Road which is down stream 4000 feet more or less from the Southern Pacific Railroad for a corner of this boundary;

Thence, in a northeasterly direction with the centerline of the foresaid County Road 3700 feet more or less to its intersection with Farm Market Road No. 682 for an angle point in this boundary;

Thence, in a northeasterly direction crossing Lakeside Drive and continuing and in all 2700 feet to a point on the Lavaca DeWitt County Line and on the centerline of Wilson-Wagoner Road for an angle point;

Thence, in a northwesterly direction with the foresaid County Line a distance of 12,300 feet more or less crossing the City of Yoakum to the place of beginning.

ATTACHMENT NO. 4 - FOR PARAGRAPH NO. 10
DESCRIPTION OF WATER SERVICE AREA
CITY OF YOAKUM WATER DEPARTMENT - YOAKUM, LAVACA COUNTY, TEXAS

Beginning at a point on the DeWitt Lavaca County Line said point being in the centerline of Roundhouse Creek 1300 feet more or less west of U.S. Highway Alt. No. 77 in the City of Yoakum DeWitt and Lavaca Counties, Texas:

Thence, up stream with the centerline of Roundhouse Creek with its meanders to the centerline of Yoakum Street for a corner of this boundary;

Thence, in a southeasterly direction with the centerline of Yoakum Street to a point on the East Right of Way of U.S. Highway Alt. No. 77 for an angle point;

Thence, in a northeasterly direction along the East Right of Way of U.S. Highway Alt. No. 77 a distance of 7400 feet to the North Property Line of Yoakum Municipal Airport for a corner of this boundary;

Thence, in a southeasterly direction with the North Property Line of Yoakum Municipal Airport, and the extension thereof to the centerline of Lavaca Street for an angle point;

Thence, in a southwesterly direction with the centerline of Lavaca Street to the centerline of Supplejack Creek;

Thence, in a southeasterly direction down Supplejack Creek with its meanders to the centerline of Farm Market Road No. 318 for an angle point;

Thence, in a southwesterly direction, with the centerline of Farm Market Road No. 318 to a point on the centerline of Maple Street for an angle point;

Thence, in a southeasterly direction with the centerline of Maple Street a distance of 2750 feet more or less to the point of intersection of the centerlines of said street at an angle point therein for a corner of this boundary;

Thence, in a southwesterly direction perpendicular to the foresaid Maple Street a distance of 1250 feet more or less to the centerline of State Highway No. 111 for an angle point;

Thence, in a southwesterly direction a distance of 1300 feet more or less to a point on the DeWitt Lavaca County Line and on the centerline of Wilson-Wagner Road for an angle point;

Thence, in a northwesterly direction with the foresaid DeWitt Lavaca County Line a distance of 12,300 feet more or less to the place of beginning.

ATTACHMENT NO. 5 - FOR PARAGRAPH NO. 10
DESCRIPTION OF SEWER SERVICE AREA
CITY OF YOAKUM SEWER DEPARTMENT-YOAKUM DE WITT COUNTY TEXAS

Beginning at a point on the DeWitt Lavaca County Line said point being in the centerline of Roundhouse Creek said beginning point being also 1300 feet West of U. S. Highway Alt. No. 77 in the City of Yoakum DeWitt and Lavaca County, Texas:

Thence, in a southerly direction with the meanders of the centerline of Roundhouse Creek to its intersection with Big Brushy Creek, and southeasterly, with the centerline of Big Brushy Creek, crossing the Southern Pacific Railroad and continuing down stream with the centerline of Big Brushy Creek to the centerline of a County Road which is down stream 4000 feet more or less from the Southern Pacific Railroad for a corner of this boundary;

Thence, in a northeasterly direction with the centerline of the foresaid County Road 3700 feet more or less to its intersection with Farm Market Road No. 682 for an angle point in this boundary;

Thence, in a northeasterly direction crossing Lakeside Drive and continuing and in all 2700 feet to a point on the Lavaca DeWitt County Line and on the centerline of Wilson-Wagoner Road for an angle point;

Thence, in a northwesterly direction with the foresaid County Line a distance of 12,300 feet more or less crossing the City of Yoakum to the place of beginning.

ATTACHMENT NO. 6 - FOR PARAGRAPH NO. 10

DESCRIPTION OF SEWER SERVICE AREA

CITY OF YOAKUM SEWER DEPARTMENT-YOAKUM LAVACA COUNTY TEXAS

Beginning at a point on the Lavaca DeWitt County Line at its intersection with the centerline of Roundhouse Creek for the place of beginning of this boundary in the City of Yoakum Lavaca County Texas;

Thence, in a northerly direction with the centerline of Roundhouse Creek to the centerline of the Southern Pacific Railroad for an angle point in this boundary;

Thence, in a southeasterly direction with the centerline of the Southern Pacific Railroad to a point on the centerline projection of Bingham Street for an angle point;

Thence, in a northerly direction with the centerline of Bingham Street and its projections south and north to the North Property Line of Yoakum Municipal Airport for an angle point;

Thence, in a southeasterly direction with the North Property Line of Yoakum Municipal Airport, and the extension thereof to the centerline of Lavaca Street for an angle point;

Thence, in a southwesterly direction with the centerline of Lavaca Street to the centerline of Supplejack Creek;

Thence, in a southeasterly direction down Supplejack Creek with its meanders to the centerline of Farm Market Road No. 318 for an angle point;

Thence, in a southwesterly direction, with the centerline of Farm Market Road No. 318 to a point on the centerline of Maple Street for an angle point;

Thence, in a southeasterly direction with the centerline of Maple Street a distance of 2,750 feet more or less to the point of intersection of the centerlines of said street at an angle point thereof for a corner of this boundary;

Thence, in a southwesterly direction perpendicular to the foresaid Maple Street a distance of 1,250 feet more or less to the centerline of State Highway No. 111 for an angle point;

Thence, in a southwesterly direction a distance of 1,300 feet more or less to a point on the DeWitt Lavaca County Line and on the centerline of Wilson-Wagner Road for an angle point;

Thence, in a northwesterly direction with the foresaid DeWitt Lavaca County Line a distance of 11,100 feet more or less to the place of beginning.

PUBLIC INVOLVEMENT

Public At Large

The City Manager of Yoakum reports to the Council each month at regular Council meetings on water plant operating expenses and any unusual developments or operating problems. These meetings are open to the public and anyone is free to speak to the Mayor or Council. At these meetings, they hear the concerns of the public, and this input contributes to the decision-making process.

WATER CONSERVATION PLAN

I. EDUCATION AND INFORMATION

The City of Yoakum will inform the public in order to promote water conservation among its users. Plans are to inform both residential and commercial customers with the following type of information to encourage water conservation:

- Distribution of educational materials to all customers will be made two times during the first year of the program and once per year thereafter.
- Articles will be published in the local paper at times corresponding to the distribution mentioned above and more often if conditions warrant.
- New customers will receive general conservation information when applying for service.

The first mailout in the first year to current customers of the City's water system will include information promoting the Water Conservation Plan and the Drought Contingency Plan (see appendix for sample mailout). The mailout will seek to explain the need for this plan and encourage customers to start conserving water.

The second mailout in the first year will include a brochure promoting indoor water conservation.

During the first year of the plan another method used to reach the public and the City's water customers will be in the form of a newspaper article referring to conserving water through the use of water saving fixtures both indoors and outdoors.

The fourth method used to inform the public during the first year will be a newspaper article promoting outdoor water conservation.

During subsequent years the City will distribute written water conservation information by customer mailouts or articles in the local newspaper.

Information as presented in Appendix A and as listed in Appendix B will be the basis for public education as well as pre-printed brochures available from:

CONSERVATION
Texas Water Development Board
P.O. Box 13231, Capitol Station
Austin, Texas 78711-3231

II. PLUMBING CODES

The City of Yoakum's plumbing code requires the use of water saving fixtures for all new construction and for replacement of plumbing in existing structures. The standards for residential and commercial fixtures are:

Maximum Allowable

Water Usage for Plumbing Fixtures

Water closets, flushometer tank or close-coupled 2-piece gravity-flush type	1.6 gal/flush
Water closets, one-piece	1.6 gal/flush
Water closets, nonresidential application	3.5 gal/flush
Urinals	1.0 gal/flush
Residential sink and lavatory faucets	2.2 gal/minute
Public lavatory faucets, matering type	0.25 gal/cycle
Public lavatory faucets, where metering type is not required	0.5 gal/minute
Showerheads	2.5 gal/minute

III. RETROFIT PROGRAM

Customers in existing buildings which do not have water saving devices should be encouraged to replace their old plumbing fixtures. The advertising program will help inform them of the advantages of installing water saving devices.

City water customers will be informed of where to obtain water saving kits to aid in their water conservation efforts. The City will also encourage local plumbing and hardware stores to stock water conserving fixtures and retrofit devices.

IV. WATER RATE STRUCTURES

A water rate structure which encourages water conservation was adopted on October 12, 1993. The City's water and sewer rates are conservative rates to discourage the use of large quantities of water. When a customer applies for service, information about the rates will be discussed and consumers will be given literature on how to conserve water. The current water rates are shown in Appendix C.

V. METERING

The City currently meters 100% of the water used, both residential and commercial. The City has a policy of removing all meters which appear to have abnormally high or low water usage. Incorporated into the Water Conservation Plan, the City will continue checking the meters in order to replace those that do not operate properly.

The City will also establish a regular schedule to test its meters. The schedule of testing when implemented will be as follows:

Production (Master) meters - Test annually

Meters two inch and larger - Test annually

Meters smaller than two inch - Test every ten years

The City uses a computer to handle all billings. This computer identifies any high or low rate users, and keeps track of all water use, as well as estimating consumption.

VI. WATER CONSERVATION LANDSCAPING

The City has not established regulations which would require developers to plant only low water using plants and grasses. However, our advertising program will include suggestions on landscaping and irrigation procedures which will save water usage and money. In addition, the City will encourage local plant nurseries, commercial landscapers and others in the landscaping industry to promote water conserving landscaping practices.

VII. LEAK DETECTION AND REPAIR

The City currently has a leak detection program which will be maintained. The program includes:

1. Monthly water use accounting by the billing computer.
2. Frequent monitoring of elevated and ground storage tanks to detect watermain breaks.
3. Visual inspection by meter readers and employees who keep a watch out for abnormal conditions including leaks and conditions which could lead up to leaks.
4. An adequate maintenance staff which is available to repair any leaks.
5. If several major leaks are detected in an area, the City will consider conducting a leak detection survey of the suspected area and possibly use the Texas Water Development Board personnel to assist the City in setting up a leak detection survey program.

VIII. IMPLEMENTATION AND ENFORCEMENT

The Water Conservation Plan will be enforced by the following methods:

1. Builders will be encouraged to use water-saving plumbing fixtures in proposed new buildings.

2. The water rate structure will be enforced; customers who do not pay their water bill will have their water disconnected.

3. Building Inspector will not certify new construction unless it meets adopted plumbing codes.

IX. CONSERVATION PLAN ANNUAL REPORT

A member of the City staff will file an Annual Report which addresses the progress and effectiveness of the Water Conservation Plan. The report will include:

1. Public information which has been issued
2. Implementation progress and status of the City's water conservation program
3. Effectiveness of water conservation plan in reducing water use by providing consumption data
4. Public response

X. CONTRACTS WITH OTHER POLITICAL SUBDIVISIONS OR WATER SUPPLY CORPORATIONS

If the City of Yoakum contracts to sell water to any other subdivisions or water supply corporations, the contract agreement will require that the purchaser adopt the City of Yoakum's water conservation and drought contingence plan or develop and adopt a plan of their own that is acceptable to the Texas Water Development Board.

DROUGHT CONTINGENCY PLAN

Drought or other uncontrollable circumstances can disrupt the normal availability of utility water supplies. Even though a City may have an adequate water supply, the supply could become contaminated, or a disaster could destroy the supply. During drought periods, consumer demand is often significantly higher than normal. System treatment, storage or distribution failures can also present a utility with an emergency situation.

The following guidelines pertain to the preparation of drought contingency plans. It is important to distinguish drought contingency planning from water conservation planning. While water conservation involves implementing permanent water use efficiency practices, drought contingency plans establish temporary methods or techniques designed to be used only as long as an emergency exists.

I. TRIGGER CONDITIONS

The City will establish trigger conditions that will indicate when drought contingency measures need to be implemented. This will include guidelines for normal operating procedures and drought conditions.

Trigger conditions are as follows:

A. <u>Mild Drought Trigger</u>

Mild drought conditions and contingency measures will be effective based on the following criteria:

1. When the daily water usage equals or exceeds 3.9 mgd (85% of treatment capacity) for seven (7) consecutive days.

B. <u>Moderate Drought Trigger</u>

Moderate drought conditions and contingency measures will be effective based on the following criteria:

1. When the daily water usage equals or exceeds 4.2 mgd (92% of treatment capacity) for seven (7) consecutive days, and
2. Reservoir levels continually recede on a daily basis and remain below 1,100,000 gallons (75% of storage capacity) for forty-eight (48) consecutive hours.

C. <u>Severe Drought Trigger</u>

Severe drought conditions and contingency measures will be effective based on the following criteria:

1. When the daily water usage equals or exceeds 4.6 mgd (100% of treatment capacity) for three (3) consecutive days, and
2. Reservoir levels continually recede on a daily basis and remain below 760,000 gallons (50% of storage capacity) for twenty-four (24) consecutive hours.

Severe drought or system limitations conditions will be in effect upon the failure of any system component which limits the treatment, storage, or distribution capabilities of the system and the Mayor determines that such conditions are a hazard to public health and safety.

II. DROUGHT CONTINGENCY MEASURES

The following measures will be taken during various phases of drought conditions:

A. <u>Step 1.</u> - The Mayor may restrict the use of water for outdoor sprinkling, watering of lawns and shrubs, and washing of driveways and automobiles to certain areas of the service area by days and to certain hours. Said restrictions will remain in effect until the Mayor lifts the restrictions. More specifically stated shall be:

1. Inform the public through the news media and cable TV company that a mild, moderate or severe drought condition has been reached, and that they should look for ways to voluntarily reduce water use. One way is to only water outdoors in the early morning or late evening or implement odd/even outdoor watering based on the last digit of the street address.
2. Encourage the public not to waste water, such as:
    a. Allowing water from vehicle washing or landscape irrigation to run excessively onto streets and sidewalks
    b. Washing foundations, sidewalks and paved areas
    c. Recreational use of sprinklers, hoses or hydrants
    d. Obviously wasteful and non-essential uses
3. Notify major commercial water users of the situation and request voluntary use reductions.
4. City will monitor raw water availability daily.

B. <u>Step 2.</u> - Curtailment, the Mayor bans the use of water totally for outdoor sprinkling, watering of lawns and shrubs, and washing of driveways and automobiles. Said restriction will remain in effect until the Mayor lifts the ban. More specifically stated as follows:

1. Continue implementation of all relevant actions in preceding phase.

2. The following public water uses, not essential for public health or safety, are prohibited:

   a. Washing of pavements, windows, automobiles

   b. Water hydrant flushing

   c. Filling pools

3. Exceptions to the mandatory water use restrictions will be given for health or safety uses as well as variances given to businesses that use outdoor water as a primary activity. Examples of and not limited to are:

   a. Washing of sanitation vehicles

   b. Nurseries

   c. Commercial car washes

C. The curtailment will be effective upon the Mayor's giving notice of curtailment by posting of a notice of curtailment and notifying the news media of curtailment.

D. The curtailments will be terminated upon the Mayor giving notice of termination as he does for the institution of the curtailment.

E. The Mayor can amend, add or delete any of these Rules and Regulations and shall notify the City Council at its regular meeting of said amendments, additions or deletions.

F. Any violation of the rules and regulations contained within this plan shall be subject to a penalty and fine of not less than $10.00 per day nor more than $200.00 per day for each day of noncompliance and/or subject to disconnection or discontinuance of water services to users by the City.

G. The City proposes to enact the following Drought Contingency measures:

1. Mild Drought Contingency Measures

   a. Inform public by giving notice of a mild drought to residents and businesses by the posting of notices and notifying news media of the mild drought.

   b. Included in the information to the public will be the recommendation that water users look for ways to conserve water.

   c. Public will be advised of the drought condition daily by newspaper notices.

2. Moderate Drought Contingency Measures

   a. Residents and businesses will be informed as mentioned above.

   b. The Step 1 curtailment will be enacted.

   c. Residents will be advised of the drought conditions daily by posting notices on bulletin boards.

3. Severe Drought Contingency Measures

   a. Residents and businesses will be informed as mentioned above.

   b. The Step 2 curtailment will be enacted.

III. INFORMATION AND EDUCATION

Once trigger conditions and emergency measures have been approached, the residents, businesses and public will be informed of the conditions and measures to be taken. The process for notification includes:

A. Posting the Notice of Drought conditions at City Hall

B. General circulation to newspapers

C. Notifying all other media sources

D. Distributing information concerning the City's drought contingency plan and explaining the need for such a plan.

IV. TERMINATION NOTIFICATION

Termination of the drought measures will take place when the trigger conditions which initiated the drought measures have subsided, and an emergency situation no longer exists. Residents and businesses will be informed of the termination or of the downgrading to a lower condition of the drought measures in the same manner that they were informed of the initiation of the drought measures.

V. IMPLEMENTATION

This water conservation and drought contingency plan, upon approval of the Texas Water Development Board, will be adopted by the Yoakum City Council by Resolution. A copy of the approved Resolution will be forwarded to the TWDB.

APPENDIX A - LISTING OF WATER CONSERVATION LITERATURE

TEXAS WATER DEVELOPMENT BOARD

WATER CONSERVATION LITERATURE

Single copies of all of the following publications and materials can be obtained at no charge. The "*" indicates those publications that are available free to political subdivisions in small quantities. To make a request, write: CONSERVATION, Texas Water Development Board, Capitol Station, P.O. Box 13213, Austin, Texas 78711-3231.

Agricultural Conservation Literature

Title	Publisher	Description	Length
Agricultural Water Conservation in Texas*	TWDB	Pamphlet	8 pages
Have Your Irrigation System Evaluated Free*	TWDB	Pamphlet	4 pages
LEPA Irrigation*	TWDB	Pamphlet	6 pages
Drip Irrigation*	TWDB WC-8	Pamphlet	6 pages
Conserving Water in Irrigated Agriculture*	TWDB	Booklet	12 pages
Furrow Dikes*	HPUWCD #1	Pamphlet	4 pages
Soil Moisture Monitoring*	HPUWCD #1	Pamphlet	4 pages
Center Pivot Irrigation*	TAEX L-2219	Pamphlet	4 pages
Surge Flow Irrigation*	TAEX L-2220	Pamphlet	4 pages
Surge Irrigation*	SCS	Pamphlet	6 pages

MUNICIPAL CONSERVATION MATERIALS AVAILABLE FOR USE IN EDUCATION AND INFORMATION PROGRAMS

Title	Publisher	Description	Length
Water....Half-A-Hundred Ways to Save It*	TWDB WC-1	Pamphlet	8 pages
Municipal and Commercial Water Conservation Services*	TWDB WC-2	Pamphlet	4 pages
A Homeowner's Guide to Water Use and Water Conservation*	TWDB WC-3	Booklet	22 pages
How to Save Water Inside the Home*	TWDB WC-4	Pamphlet	8 pages
Water Saving Ideas for Business and Industry*	TWDB WC-5	Pamphlet	8 pages
How to Save Water Outside the Home*	TWDB WC-6	Pamphlet	8 pages
Texas Sesquicentennial Native Plant Landscape (Located in Austin)*	TDA TWDB WC-7	Pamphlet	8 pages
Drip Irrigation*	TWDB WC-8	Pamphlet	6 pages
Coloring Poster for Children*	TWDB WC-9	Poster	1 page
Water Conservation Coloring Book*	TWDB WC-10	Booklet	8 pages
Lawn Watering Guide*	TWDB WC-12	Card 3.5" x 5"	1 page
A Directory of Water Saving Plants and Trees for Texas*	TWDB WC-13	Booklet	26 pages
Xeriscape-Principles, Benefits*	TWDB WC-14A	Pamphlet	4 pages
Toilet Tank Leak Detector Tablets*			

GUIDEBOOKS AND CONSERVATION PLANNING LITERATURE (1)

Title	Publisher	Description	Length
The Authority of Cities, Water Utilities, and Water Districts to Regulate and Enforce Water Conservation Measures*	TWDB GB-1	Guidebook	5 pages
A Guidebook for Reducing Unaccounted for Water*	TWDB GB-2	Guidebook	34 pages
Guidelines for Municipal Water Conservation and Emergency Water Demand Management*	TWDB GB-3	Guidebook	54 pages
Guidelines for Water Reuse EPA600/8-80-036*	EPA	Guidebook	105 pages
Example Water Conservation Plans and Adoptions Ordinances For Cities*	TWDB GB-5	Guidebook	100 pages
Sources of Water Saving Devices*	TWDB GB-6	Guidebook	20 pages
Example Water Conservation Plans and Adoption Resolutions for Water Utilities and Water Districts*	TWDB GB-7	Guidebook	38 pages
Example Xeriscape Incentives and Landscape Watering Ordinances*	TWDB GB-9	Guidebook	58 pages
The Texas Water Education Network Directory*	TWDB GB-10	Guidebook	32 pages
Texas Water Development Board (Funding Programs)*	TWDB	Pamphlet	16 pages
Water for Texas....Today and Tomorrow (The Texas Water Plan)*	TWDB	Book	185 pages
Texas Water Facts*	TWDB	Booklet	30 pages

(1) These publications designed for Utility or individual planning purposes and not large scale distribution.

APPENDIX B - PUBLIC INFORMATION SUGGESTIONS

PUBLIC INFORMATION SUGGESTIONS

Suggested ways to save water:

1. Bathroom

A. Take a shower instead of a bath. Showers usually use less water than tub baths.

B. Install a low-flow shower head which restricts the quantity of flow at 60 psi to no more than 3 gallons per minute.

C. Take short showers and turn the water off while soaping and back on again only to rinse.

D. Do not use hot water when cold will do. Water and energy can be saved by washing hands with soap and cold water; hot water should only be added when hands are especially dirty.

E. Reduce the level of the water being used in a bath tub by one or two inches if a shower is not available.

F. Turn water off when brushing teeth until it is time to rinse.

G. Do not let water run when washing hands. Instead, hands should be wet, and water would be turned off while soaping and scrubbing and turned on again to rinse.

H. Shampoo hair in the shower. Shampooing in the shower takes only a little more water than is used to shampoo hair during a bath and much less than shampooing and bathing separately.

I. Hold water in the basin when shaving instead of letting the faucet continue to run.

J. Test toilets for leaks. To test a leak, a few drops of food coloring can be added to the water in the tank. The toilet should not be flushed. Then watch to see if the coloring appears in the bowl within a few minutes. If it does, the fixture needs adjustment or repair.

K. Use a toilet tank displacement device. A one-gallon plastic milk bottle can be filled with stones or with water, recapped, and placed in the toilet tank. This will reduce the amount of water in the tank but still provide enough for flushing. Displacement devices should never be used with new low-volume flush toilets.

L. Install faucet aerators to reduce water consumption.

M. Never use the toilet to dispose of cleansing tissues, cigarette butts or other trash. This can waste a great deal of water and also places an unnecessary load on the sewage treatment plant or septic tank.

N. Install a new low-volume flush toilet that uses 1.6 gallons or less per flush when building a new home or remodeling a bathroom.

2. Kitchen

A. Use a pan of water (or place a stopper in the sink) for rinsing pots and pans and cooking implements when cooking rather than turning on the water faucet each time a rinse in needed.

B. Never run the dishwasher without a full load. In addition to saving water, expensive detergent will last longer and a significant energy savings will appear on the utility bill.

C. Use the sink sparingly, and never use it for just a few scraps.

D. Keep a container of drinking water in the refrigerator. Running water from the tap until it is cool is wasteful.

E. Use a small pan of cold water when cleaning vegetables rather than letting the faucet run.

F. Use only a little water in the pot and put a lid on it for cooking most food. Not only does this method save water, but food is more nutritious since vitamins and minerals are not poured down the drain with the extra cooking water.

G. Use a pan of water for rinsing when hand washing dishes rather than running faucet.

H. Always keep water conservation in mind, and think of other ways to save water.

3. Laundry

A. Wash only a full load when using an automatic washing machine (32 to 59 gallons are required per load).

B. Use the lowest water level setting on the washing machine for light loads whenever possible.

C. Use cold water as often as possible to save energy and to conserve the hot water for uses which cold water cannot serve. (This is also better for clothing made of today's synthetic fabrics.)

4. <u>Appliances and Plumbing</u>

A. Check water requirements of various models and brands when considering purchasing any new appliance that uses water. Some use less water than others.

B. Check all water line connections and faucets for leaks.

5. <u>Out-of-Door Use</u>

A. Water lawns early in the morning during the hotter summer months. Much of the water used on the lawn can simply evaporate between the sprinkler and the grass.

B. Use a sprinkler that produces large drops of water, rather than a fine mist, to avoid evaporation.

C. Turn soaker hoses so the holes are on the bottom to avoid evaporation.

D. Water slowly for better absorption, and never water in high winds.

E. Forget about watering the streets, walks or driveways. They will never grow a thing.

F. Condition the soil with compost before planting grass or flower beds so that water will soak in rather than run off.

G. Fertilize lawns at least twice a year for root stimulation. Grass with a good root system makes better use of less water.

H. Learn to know when grass needs watering. If it has turned a dull grey-green or if footprints remain visible, it is time to water.

I. Do not water too frequently. Too much water can overload the soil so that air cannot get to the roots and can encourage plant diseases.

J. Do not over-water. Soil can absorb only so much moisture and the rest simply runs off. A timer will help, using either a kitchen timer or an alarm clock. An inch and one-half of water applied once a week will keep most Texas grasses alive and healthy.

K. Operate automatic sprinkler systems only when the demand on the town's water supply is lowest. Set the system to operate between four and six a.m.

L. Do not scalp lawns when mowing during hot weather. Taller grass holds moisture better. Rather, grass should be cut fairly often, so that only 1/4 inch is trimmed off. A better looking lawn will result.

M. Use a watering can or hand water with the hose in small areas of the lawn that need more frequent watering (those near walks or driveways or in especially hot, sunny spots).

N. Learn what types of grass, shrubbery and plants do best in the area and in which parts of the lawn, and then plant accordingly. In especially dry sections of the state, attractive arrangements of plants that are adapted to arid or semi-arid climates should be chosen.

O. Consider decorating areas of the lawn with rocks, gravel, wood chips, or other materials available that require no water at all.

P. Do not "sweep" walks and driveways with the hose. Use a broom or rake instead.

Q. Use a bucket of soapy water and use the hose only for rinsing when washing the car.

Contents

List of Appendices

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Chapter 7 – Long Term Protection of the State's Water Resources, Agricultural Resources, and Natural Resources

LRWPG balanced meeting water needs with good stewardship of the water, agricultural, and natural resources within the region. However, LRWPG recognized the importance of recommending water management strategies that were of a realistic cost to irrigation, the major water user in the region, and the category expected to experience all potential water shortages. The resulting strategies were found to be both beneficial from a cost-benefit perspective and helpful for maintaining in-stream flows during dry periods of the year.

Conjunctive use of groundwater along with surface water supplies was found to meet the needs of rice growers whose business is sensitive to the cost of irrigation water. The increased drawdown that will be experienced will increase the cost of producing rice in the area, but this effect will only be temporary. The additional groundwater that is estimated to be pumped will only occur if the DOR climate conditions occur during a cycle when maximum demand for rice is expected. In addition, the farmers who have a choice will use surface water when it is available in nearly all instances, since the cost of pumping surface water is less than the cost of pumping groundwater. Once DOR conditions end, interruptible surface water will be more readily available and surface water will then be used in place of groundwater wherever possible. This strategy would allow the groundwater levels in LRWPA to return to normal when the area is no longer experiencing DOR conditions. It is further noted that pumpage for agricultural irrigation during DOR will be all groundwater. No flow will be diverted from surface streams for irrigation during the drought conditions, and any return flows from irrigated agriculture would be a net benefit for in-stream flows that would, otherwise, be dry.

7.1 Water Resources Within the Lavaca Regional Water Planning Area

Water resources available by basin within LRWPA are discussed in further detail below. Note that the surface water basins listed below do not necessarily coincide with groundwater divides but are used for accounting purposes in the RWP. *Appendix 7A* includes a listing of current water right holders within the region. Although most of these rights are not firm under DOR conditions, they provide an important source for irrigation water without the need for high amounts of lift that are required for pumping groundwater.

7.1.1 Colorado River Basin

The Colorado River Basin contains a portion of the Gulf Coast aquifer that is shared with Region K. The amount of water available from this source is sufficient to meet the municipal demands of a portion of El Campo located in this basin.

7.1.2 Colorado-Lavaca Coastal River Basin

The sustainable yield of the portion of the Gulf Coast aquifer located in the Colorado-Lavaca River Basins of southern Jackson and Wharton Counties was found to be insufficient to meet the demands of irrigators under DOR conditions. Conjunctive use of groundwater and surface water supplies was recommended as a water management strategy to avoid shortages in irrigation categories in this region. During drought conditions, the irrigation return flows from groundwater irrigation will provide an important resource for stream habitat. During average conditions, the reduced usage of groundwater would allow aquifer conditions to recover to normal levels.

The only contract surface water supply used within LRWPA is a 1,832 ac-ft/yr manufacturing contract within the Colorado-Lavaca River Basin. This water is supplied from Lake Texana and represents the only water supply allocated within this basin and the entire region that does not originate from the Gulf Coast aquifer.

7.1.3 Lavaca River Basin

As in the Colorado-Lavaca River Basin, groundwater resources were found to be inadequate to meet the demands of irrigation WUGs. Conjunctive use of groundwater and surface water supplies was recommended to relieve these shortages. This use of groundwater in excess of the sustainable yield would not be continued for an extended period of time.

Lake Texana has a firm yield of 79,000 ac-ft/yr. Approximately 42,000 ac-ft of this volume continues to be an important supply for the City of Corpus Christi in the Coastal Bend Region. Contracts to manufacturing users make up an additional 32,500 ac-ft/yr. The manufacturing contract listed above in the Colorado-Lavaca River Basin is one of these contracts. The remaining water supply is reserved for use in maintaining bay and estuary flows.

7.1.4 Lavaca-Guadalupe Coastal Basin

The Lavaca-Guadalupe Coastal Basin has sufficient water supplies in the Gulf Coast aquifer to meet the municipal, agricultural, and industrial demands of the basin.

7.1.5 Guadalupe River Basin

A small portion of the Guadalupe River Basin is present within Lavaca County. The minor domestic and agricultural demands in this basin are met with groundwater supplies from the Gulf Coast aquifer.

7.2 Agricultural Resources Within the Lavaca Regional Water Planning Area

LRWPA currently has nearly 97,000 acres of irrigated agricultural land that require a projected 217,846 ac-ft/yr of water for irrigation under DOR conditions. This demand is expected to remain approximately constant through 2060. The majority of this water is used for growing rice and represents, by far, the greatest water demand in the area. Because of the strong dependency of rice production on water supplies, irrigation demand will be the most significant driver of water demands for the region over the next 60 years.

Due to the strong dependency of rice production on water supplies and the sensitivity of agriculture to increased costs in water, LRWPG focused on economical and practical strategies for meeting water demands under DOR conditions. The least costly management strategy reviewed by the group, and the only strategy that would be economically feasible for agricultural usage, was temporary pumpage of groundwater in excess of reliable supplies to meet demands during drought conditions.

This temporary pumpage is vital for sustaining the rice industry in times of droughts. As discussed in *Chapter 5*, the specifics of rice farming make it difficult to convert land used for the growth of rice to the production of alternative crops that require less water. In many cases, where the conversion to other crops is feasible, this change has already taken place. Also, any reduction in rice growth brought about by limited water resources could have a significant impact on the infrastructure required by the industry and, in turn, the cost of producing the rice acreage that remains.

7.3 Natural Resources Within the Lavaca Regional Water Planning Area

The water management strategy recommended for LRWPA in this plan is intended to be a realistic option for meeting the projected water needs of the region while still responsibly protecting natural resources. Temporary overpumping of groundwater does not involve the issues regarding the interbasin transfer of water nor the inundation of land required for reservoir storage.

This strategy may hold some positive environmental benefit during moderately dry periods. This was examined in *Chapter 4* by estimating the return flows from rice fields during the months of June and July. Streamflows are typically low during this period. The majority of irrigation is currently from groundwater sources, so irrigation return flows play an important role in maintaining streamflows during dry periods. While observations of streamflow during the ongoing drought indicate that irrigation returns and streamflow are both minimal under exceptional drought conditions, it is likely that for moderately dry conditions the increased amount of groundwater entering a stream through irrigation return flows would help to sustain habitat that would otherwise be water-stressed. However, during extreme drought irrigation return flows would be insufficient to maintain habitat. Additionally, LRWPA previously received irrigation return flows from the Garwood irrigation right; however, these return flows have not contributed inflow to LRWPA subsequent to 2007.

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Appendix 7A

Current Water Rights in the Lavaca Regional Water Planning Area

Lavaca Regional Water Planning Area
TCEQ Active Water Rights - Sept 29, 2009

WR Number	Type	Permit #	WR Issue Date	Amendment	Owner Name	Owner Type	Amount (ac-ft/yr)	Use	Priority Date	Expiration	Acreage	Reservoir Name	Reservoir Capacity (ac-ft)	Site Name	Basin Number	River Order	Stream Name	Other Stream	County
1947	9		12/14/1993		CITY OF CORPUS CHRISTI TEXAS	2	41840	1		12/14/2035		LAKE TEXANA			16	0500000000	NAVIDAD RIVER		Jackson
2077	6		7/3/1981		MATT J BOZKA	1	61	3	2/28/1949		61		10		16	3600000000	NAVIDAD RIVER		Lavaca
2077	6		7/3/1981		MATT J BOZKA	1	4	3	12/31/1956		16				16	3600000000	NAVIDAD RIVER		Lavaca
2078	6		7/3/1981		M T SIMONS JR ET AL	4	1138	3	9/30/1903		300				16	3200000000	NAVIDAD RIVER		Jackson
2078	6		7/3/1981		M T SIMONS JR ET AL	4	450	3	12/10/1938		300				16	3200000000	NAVIDAD RIVER		Jackson
2082	6		7/3/1981		EL RANCHO DE LOS PATOS INC	2	932	3	3/31/1929		233				16	2300000000	PINOAK CRK		Wharton
2083	6		7/3/1981		NORRIS RAUN	1	623.2	3	5/10/1948		312				16	2200000000	SANDY CRK		Wharton
2083	6		7/3/1981		NORRIS RAUN	1	2400	3	10/27/1969		1200				16	2200000000	SANDY CRK		Wharton
2084	6		7/3/1981		E T ROSE ESTATE	5	400	3	11/10/1950		200				16	2000000000	SUTHERLAND BR		Jackson
2090	6		7/3/1981		WILLIAM J NAISER ET AL	4	527	3	3/31/1956		174				16	1410000000	W MUSTANG CRK		Wharton
2091	6		7/3/1981	B	JACK BIRKNER ET UX	3	290	3	3/31/1953		240.794				16	1400000000	W MUSTANG CRK		Wharton
2092	6		7/3/1981		MARK & CHARLOTTE DEFRIEND	1	990	3	3/30/1945		277				16	1390000000	PORTER'S CRK		Wharton
2093	6		7/3/1981		EVA REIGH TUCKER	1	1750	3	7/31/1964		350				16	1389700000	W MUSTANG CRK		Wharton
2094	6		7/3/1981		J K ALLEN ESTATE & GRADY ALLEN	5	640	3	4/30/1952		320				16	1350000000	STAGE STAND CRK		Wharton
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	42518	1	5/15/1972			LAKE TEXANA	170300	STAGE 1, NAVIDAD RIVER	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	4000	1	5/24/1982			LAKE TEXANA		STAGE 1, NAVIDAD RIVER	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	32482	2	5/15/1972			LAKE TEXANA		STAGE 1, NAVIDAD RIVER	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2		7	5/15/1972			LAKE TEXANA		STAGE 1, NAVIDAD RIVER	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	D	LAVACA-NAVIDAD RIVER AUTH	2	7500	1	7/1/2002			LAKE TEXANA			16	0500000000	NAVIDAD RIVER		Jackson
2095	6		7/3/1981	D	LAVACA-NAVIDAD RIVER AUTH	2		2	7/1/2002			LAKE TEXANA			16	0500000000	NAVIDAD RIVER		Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	7150	1	5/15/1972				93340	STAGE 2	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	22850	2	5/15/1972					STAGE 2	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2		7	5/15/1972					STAGE 2	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2095	6		7/3/1981	C	LAVACA-NAVIDAD RIVER AUTH	2	18122	8	10/6/1993					STAGE 2	16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson
2096	6		7/3/1981		VLASTA MRAZ	1	33	3	2/28/1961		22	ROCKY CREEK	12		16	9500000000	ROCKY CRK		Lavaca
2096	6		7/3/1981		VLASTA MRAZ	1		13	2/28/1961			ROCKY CREEK	12		16	9500000000	ROCKY CRK		Lavaca
2097	6		7/3/1981		GEBRUEDER VIEHOF FARMS OHG	2	95	3	11/17/1939		47.5				16	6400020000	LAVACA RIVER		Jackson
2098	6		7/3/1981	A	HARRISON STAFFORD II ET AL	4	452.5	3	11/17/1939		226.25				16	6400010000	LAVACA RIVER		Jackson
2098	6		7/3/1981	A	HARRISON STAFFORD II ET AL	4	747.5	3	11/22/1982		173.75				16	6400010000	LAVACA RIVER		Jackson
2099	6		7/3/1981		HARRISON STAFFORD ET AL	4	226.25	3	11/17/1939						16	6400000000	LAVACA RIVER		Jackson
2100	6		7/3/1981		HARRISON STAFFORD II ET AL	4	226.25	3	11/17/1939						16	6400030000	LAVACA RIVER		Jackson
2101	6		7/3/1981		FRANCIS KOOP	1	1000	3	11/28/1939		500				16	5600000000	LAVACA RIVER		Jackson
2102	6		7/3/1981		JOHNNIE E KOTLAR	1	10	3	6/30/1967		47				17	5919000000	ARENOSA CRK		Jackson
3665	1	3958	4/23/1979	A	JACK BIRKNER ET UX	3	211	3	1/29/1979		100				16	1395000000	W MUSTANG CRK		Wharton
3725	1	4019	4/22/1980		CARL B BAIN	1	420	3	1/21/1980		107				16	1389850000	PORTERS CRK		Wharton
3727	1	4021	4/23/1980		GREGORY PAUL SCHMIDT ET AL	4	913	3	1/21/1980		234				16	1360000000	E MUSTANG CRK		Wharton
3827	1	4123	8/3/1981		ALBERT W & CLAUDIA SWENSON	1	100	3	5/11/1981		100				15	5590000000	LUNIS CRK		Jackson
3836	1	4132	10/23/1981		HARRY E VITERA	1	550	3	5/26/1981		140				16	1389730000	PORTERS CRK		Wharton
3876	1	4129	6/4/1982	A	ALAN WAYNE MEEK	1	47.12	3	5/18/1981		12.04				16	1389800000	PORTERS CRK		Wharton
3876	1	4129	6/4/1982	A	BRIAN NELSON MEEK	1	208.05	3	5/18/1981		53.18				16	1389800000	PORTERS CRK		Wharton
3876	1	4129	6/4/1982	A	DALE CHARLES MEEK	1	208.05	3	5/18/1981		53.18				16	1389800000	PORTERS CRK		Wharton
3876	1	4129	6/4/1982	A	GARY KENNETH MEEK	1	160.93	3	5/18/1981		41.13				16	1389800000	PORTERS CRK		Wharton
3876	1	4129	6/4/1982	A	ALAN WAYNE MEEK ET AL	4	1.85	3	5/18/1981		0.47				16	1389800000	PORTERS CRK		Wharton
3884	1	4192	6/18/1982	B	FORMOSA PLASTICS CORP	2	9000	3	3/1/1982		5900		1120		15	5580000000	W CARANCAHUA CRK		Jackson
3903	1	4158	10/14/1982		MUSTANG EXPLORATION CO INC	2	800	3	11/16/1981		200				16	1320000000	E MUSTANG CRK		Wharton
3905	1	4161	10/14/1982	A	EL RANCHO DE LOS PATOS INC	2	1332	3	11/16/1981						16	2300010000	PINOAK CRK		Wharton
3907	1	4163	10/14/1982		J K ALLEN ESTATE	5	640	3	11/16/1981		375		1		16	1350010000	E MUSTANG CRK	STAGE STAND CRK	Wharton
3907	1	4163	10/14/1982		J K ALLEN ESTATE	5	520	3	11/16/1981				1		16	1350010000	E MUSTANG CRK	STAGE STAND CRK	Wharton
3909	1	4165	10/14/1982		KATHLEEN HALAMICEK	1	350	3	11/16/1981		120		45		16	1370000000	E MUSTANG CRK		Wharton
3910	1	4166	10/14/1982		EDMUND A WEINHEIMER III ET AL	4	1000	3	11/16/1981		290		63		16	2350000000	PINOAK CRK		Wharton
3911	1	4174	10/14/1982		GAYNARD & ELAINE WIGGINTON	1	400	3	12/7/1981		580		2		16	1389750000	PORTERS CRK		Wharton
3912	1	4185	10/14/1982	A	JOHN E LEAVESLEY ET AL	4	340	3	2/8/1982		460		100		16	3400020000	NAVIDAD RIVER		Lavaca
3978	1	4296	5/19/1983		PNL RANCH LP	2	1200	3	1/3/1983		266.67		480		16	8500000000	LAVACA RIVER		Jackson
3978	1	4296	5/19/1983		RICHARD W MANN JR ET AL	2	600	3	1/3/1983		133.33				16	8500000000	LAVACA RIVER		Jackson
4085	1	4353	3/14/1984	B	JOHN B LAY ET AL	4	500	3	4/18/1983		350				16	2050000000	GOLDENROD CRK		Jackson

Lavaca Regional Water Planning Area
TCEQ Active Water Rights - Sept 29, 2009

WR Number	Type	Permit #	WR Issue Date	Amendment	Owner Name	Owner Type	Amount (ac-ft/yr)	Use	Priority Date	Expiration	Acreage	Reservoir Name	Reservoir Capacity (ac-ft)	Site Name	Basin Number	River Order	Stream Name	Other Stream	County
4102	1	4327	4/19/1984	A	T-BAR-D LLC	2	57	3	2/22/1983		18				16	3380000000	NAVIDAD RIVER		Lavaca
4241	1	4560	8/1/1985	B	EDMUND A WEINHEIMER JR	1	272.63	3	4/30/1985		184.5		25.2		16	1407000000	W MUSTANG CRK		Wharton
4252	1	4559	10/3/1985	A	TRAVIS NORRIS RAUN ET AL	4	5500	3	4/16/1985		2250		4.9		16	2200010000	WOLF RUN BRANCH	MOTT BRANCH AND SANDY CRK	Wharton
4791	6		1/20/1987		FORMOSA PLASTICS CORP	2	11035	3	12/20/1976		4874		900		15	5755000000	KELLER		Jackson
5120	1	5120	6/10/1987		T J BABB HEIRS REVOCABLE TRUST	5	2500	3	2/19/1987		500				17	5900000000	DRY CRK		Jackson
5120	1	5120	6/10/1987		ROBERT MARTIN ET AL	4		3	2/19/1987						17	5900000000	DRY CRK		Jackson
5130	1	5130	7/15/1987	A	CITY OF MOULTON	2		7	4/24/1987				6.08		16	9900000000	W PRONG LAVACA RIVER		Lavaca
5168	1	5168	6/17/1988	A	JOHN L & SUSAN H RICHARDS ET AL	4	1092	3	2/2/1988		398				16	2250000000	PINOAK CRK		Wharton
5168	1	5168	6/17/1988	A	JOHN L & SUSAN H RICHARDS ET AL	4	651	7	2/2/1988				336		16	2250000000	PINOAK CRK		Wharton
5263	1	5263	3/8/1990	A	EDMUND A WEINHEIMER JR	1	90	3	11/21/1989		187				16	1361000000	E MUSTANG CRK		Wharton
5370	1	5370	10/15/1991	A	EVA RUTH HANCOCK ET AL	4	900	3	7/1/1991		500		356		16	2150000000	GOLDENROD CRK		Lavaca
5487	1	5487	8/8/1994		BRIAN M SWENSON ET AL	4	35	3	5/20/1994		35	OFF-CHANNEL RESERVOIR	8		15	5585000000	W CARANCAHUA CRK		Jackson
5579	1	5579	3/18/2003		WILLIAM R SEIFMAN ET UX	3	200	3	3/7/1997		336				16	1389745000	PORTERS CRK		Wharton
5584	1	5584	10/27/1997		JACKSON COUNTY	2	1.52	2	4/24/1997						16	0400000000	DRY CRK		Jackson
5584	1	5584	10/27/1997		JACKSON COUNTY	2		2	4/24/1997						17	5910000000	DRY CRK		Jackson
5595	1	5595	9/27/2000		E G GOFF ET AL	4	1550	3	9/27/2000		769				16	2100000000	GOLDENROD CRK		Wharton
5678	1	5678	11/14/2000		PIN OAK FARMS 2	2	120	3	7/27/2000	LEASE & ONGOI	80				16	1389910000	PORTER'S CRK		Wharton
5706	1	5706	3/27/2002		ANTON BRANDL JR ET UX	3	104.4	3	10/1/2000						16	1406000000	W MUSTANG CRK		Wharton
2345	9		12/14/2001		CITY OF CORPUS CHRISTI	2	4500	1		12/14/2043		LAKE TEXANA			16	0500000000	NAVIDAD RIVER	LAVACA RIVER	Jackson

Contents

List of Appendices

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Chapter 8 – Unique Stream Segments, Reservoir Sites, and Legislative Recommendations

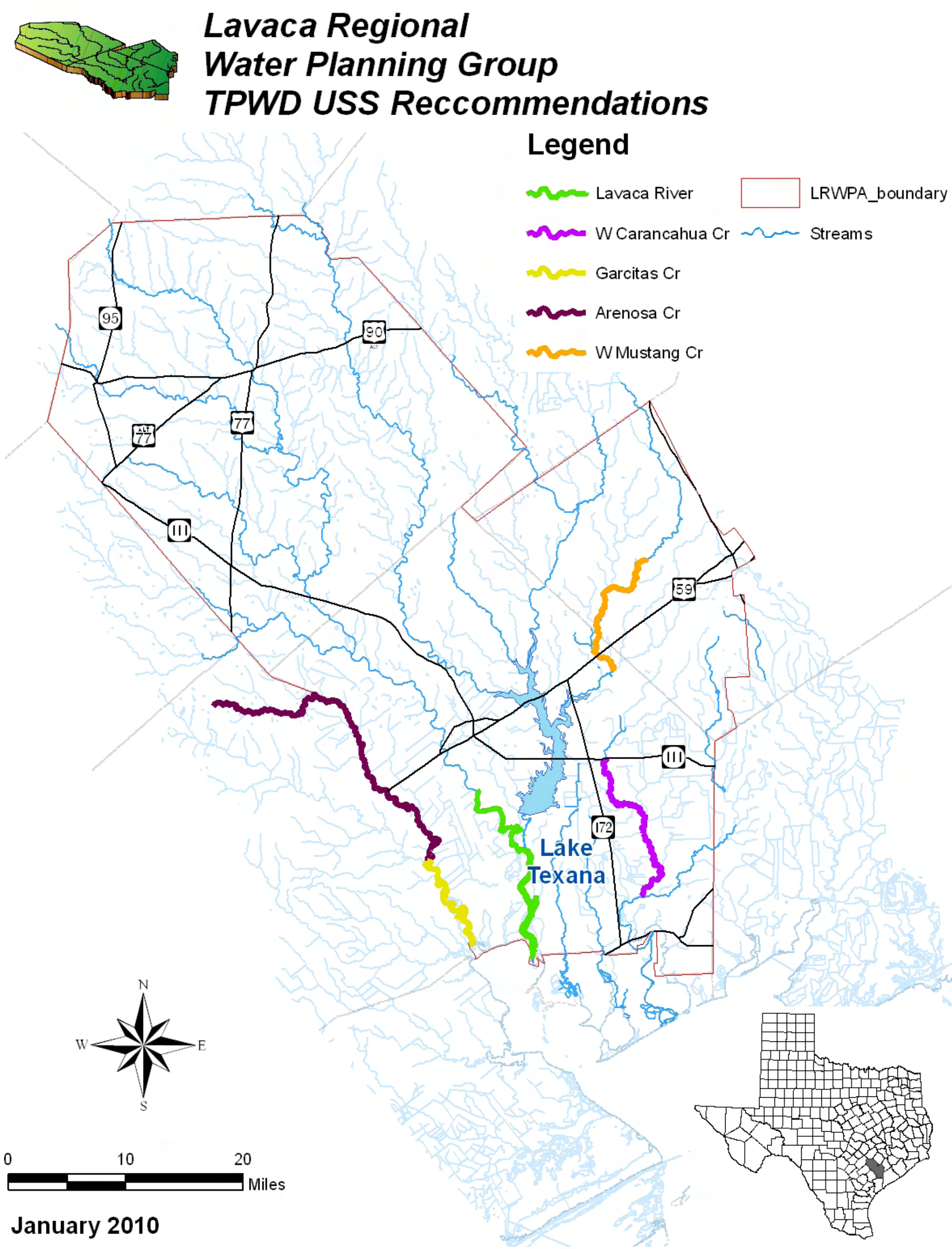
LRWPG has made the following recommendations regarding unique ecological stream segments (USS) and URSs. Additionally, the group has considered the creation of regulatory entities in accordance with legislative and regional water policy issues.

8.1 Unique Stream Segments and Reservoir Sites

As noted in *Chapter 3*, the proposed Palmetto Bend Stage II Reservoir has been designated as a unique reservoir site (URS). It is one of 19 sites (17 major and 2 minor) recommended by the 2007 SWP and designated by the 80th Texas Legislature as sites of unique value. Since the original design and permitting of the reservoir, a number of changes have been made to the proposed Stage II project. The most significant of these changes is the relocation of the reservoir from its originally-proposed location to a point 1.4 miles upstream along the Lavaca River. Subsequent studies indicated that separation of the storage pools and moving Stage II upstream would be more cost effective. Due to this change and a resultant alteration of yield, the Certificate of Adjudication for Stage II would need to be revised if the reservoir is to be constructed.

For the 2006 RWP, no designation of USSs was made as LRWPG desired to have additional information on the potential impacts of such designation. Designation of USS for the current planning round were considered by the LRWPG at the October 5, 2009 Group meeting. *Appendix 8A* includes information from TPWD concerning potential USSs within LRWPA from the 2006 RWP. TPWD-recommended segments are illustrated in *Figure 8-1*. Note that subsequent to the publication of TPWD recommendations, conditions along stream segments in LRWPA may have changed. Since the TPWD study, much of West Carancahua Creek has been channelized for drainage improvement. The LRWPG elected not to recommend any USS for the current round of regional water planning.

Figure 8-1
Major Surface Water Sources



8.2 Proposed Regulatory Changes or Resolutions

The primary concern of LRWPG has been the protection of existing groundwater sources to maintain agricultural production because of its direct economic impact to the area. As a result of the planning process, LRWPG considered and approved eight policy resolutions as presented in the 2006 RWP. These policy recommendations and rationales for the proposals are detailed below. No additional policy recommendations have been made for the current planning round.

8.2.1 Environmental Issues

LRWPG has developed a water plan to address projected water demands within LRWPA. The construction of the Palmetto Bend Stage II reservoir was considered as a potential management strategy to meet shortages in the 2001 and 2006 RWPs for LRWPA and is considered in the form of either an on-channel or off-channel impoundment for the current planning round. LRWPG understands that any water development strategy can have potentially threatening environmental consequences and fully supports efforts to identify and mitigate environmental impacts to the extent feasible.

8.2.2 Ongoing Regional Water Planning Activities

LRWPG recommends that the Texas Legislature establish funding through TWDB for the continued existence of the regional planning groups. Duties would include the monitoring of ongoing research needed for planning, environmental flows issues, processing of any amendments to the plan, and monitoring the implementation of new crop varieties and other improvements to the area's primary water user. Provision of funding to pursue the above activities will allow LRWPG to continue to perform a vital role as a focal point for communications with the various user groups concerning development of and amendments to the Plan.

8.2.3 Inter-Regional Coordination

LRWPG recognizes the importance of inter-regional coordination efforts in order to maintain consistency among regional plans in situations where activities in one region may impact water availability or project needs in other regions. As population growth and other development activities increase over time for much of the state, multi-regional issues and the ability of regions to cooperatively use resources will be of increasing importance. The Group recommends that the State recognize the importance of these multi-regional issues and support a greater role for inter-regional coordination in future planning rounds.

8.2.4 Conservation Policy

LRWPG supports existing and continued efforts of agricultural producers to practice good stewardship of surface and groundwater resources of the state of Texas. The group recognizes the economic impact that a voluntary conservation effort has on the viability of agricultural operations on the area. The group also supports state and federally funded programs administered by NRCS, State Soil and Water Conservation Board, and local soil and water conservation districts. These programs provide technical and financial assistance to agricultural producers to install, manage, and maintain structural and vegetative measures for increased irrigation efficiency and overall water conservation. They are important in successfully implementing the regional water plan.

8.2.5 Sustainable Yield of the Gulf Coast Aquifer

LRWPG supports the use of the sustainable yield of the Gulf Coast aquifer as the amount of water that should be included in the State Water Plan for areas using the Gulf Coast aquifer. While the Gulf

Coast aquifer has significant amounts of water in storage, the aquifer levels impact regional agricultural, municipal, and manufacturing users directly. Mining of significant quantities of water over and above the sustainable annual yield will result in increasing pumping costs for all users. Increased pumping costs will have the most detrimental effect on agricultural production in the area. It is noted that the Lavaca Regional Plan does allow short-term overpumping for temporary periods during drought conditions, but on a long-term basis, the aquifer will not be pumped beyond the sustainable yield. Coastal Bend Groundwater Conservation District and GMA 15 are in the process of determining the desired future conditions (DFCs) and managed available groundwater (MAG) for the portion of the Gulf Coast aquifer underlying LRWPA.

8.2.6 Support of the Rule of Capture

LRWPG supports the Rule of Capture as the means of allocating groundwater in the state of Texas. The group also supports TWDB in its monitoring activities with regard to well static-water levels and groundwater pumpage in the state.

8.2.7 Groundwater Conservation Districts

LRWPG supports the control of groundwater resources through local control by GCDs. The group supported the creation of the Coastal Bend GCD in Wharton County and the Texana GCD in Jackson County. The Texana GCD is currently not active. The primary focus of the districts is to preserve and protect groundwater supplies in their respective counties for future generations. The management plans for the Coastal Bend and Texana districts were certified by TWDB on September 28, 2004. The group supports the further efforts of these districts as a tool in protecting water resources in the Lavaca Regional Water Planning Area.

8.2.8 Establishment of Fees for Groundwater Export

LRWPG supports the use of the sustainable yield of the Gulf Coast aquifer as the limit for water development and the use of groundwater conservation and management districts as the appropriate method of retaining local control of groundwater. LRWPG understands large-scale groundwater mining of the Gulf Coast aquifer is in direct opposition to the concept of sustainable yield for aquifer management. While local entities are encouraged to conserve groundwater for the use of local citizens with attendant impacts on the local economy, the citizens of large municipalities at great distances from the Lavaca area are relatively insulated from the impacts of increasing depth to the water table for the Lavaca area. Use of an export fee may help offset the negative impacts of transferring water out of the basin to other areas of the state. The transfer of water by export would be permitted provided the transfer would not present the possibility of unreasonable interference with the production of water from exempt, existing, or previously permitted wells. This could potentially be administered by the local GCDs through their regulations.

8.2.9 Limits for Groundwater Conservation Districts

LRWPG recommends that the sustainable yield of the aquifer be used for all GCDs in the region as the upper limit of groundwater available for all uses. For this region, there is no overall surplus of groundwater and any use of groundwater contemplated outside the region must be subject to the same rules for protection of the basin of origin as interbasin transfers of surface water.

Appendix 8A

TPWD Ecologically Significant Stream Segments

Area Study: Jackson, Lavaca, and Wharton Counties

Evaluation of Natural Resources in Lavaca Water Planning Area (Region P)

Wetlands in Lake Texana State Park (D.W. Moulton)

TEXAS PARKS & WILDLIFE

RESOURCE PROTECTION DIVISION:
WATER RESOURCES TEAM

Evaluation of Natural Resources in Lavaca Water Planning Area (Region P)

By: Albert El-Hage
Peter D. Sorensen
Daniel W. Moulton

October 1999

TABLE OF CONTENTS

Pages

TABLES

Pages

FIGURES

Acknowledgments

The authors wish to thank those individuals who cooperated in providing information on the selected natural resources in the study area. Additional thanks are given to those individuals whose comments and proofreading allowed us to produce this report. We appreciate and acknowledge the help and expertise of Gordon Linam, Cindy Loeffler, and David Bradsby.

EXECUTIVE SUMMARY

The study area is located in the mid-coastal region of Texas and includes Jackson and Lavaca counties, and part of Wharton County. It is located within the Lavaca, Colorado-Lavaca, Guadalupe, and Lavaca-Guadalupe river basins.

Drainage of the study area is by the Lavaca and Navidad rivers and their tributaries. Elevations range from sea level in Jackson County to about 503 feet in Lavaca County. The study area is entirely within the Upland Prairie and Woods natural subregion. The land surface of the area is generally rolling to prairie.

The economy of the area consists primarily of petroleum production and operations, agribusiness and tourism. Agricultural production is varied. It consists of cattle, poultry, corn, cotton, and rice with rice being the principal crop for Wharton County. The market value for the agriculture in the study area is around $192.4 million. Outdoor recreational facilities also contribute to the area's economy. The Lavaca-Navidad estuary, the estuarine wetlands along the east side of Garcitas Creek and Lake Texana provide opportunities for bird watching, fishing, waterfowl hunting, boating, and other water sports. All these areas are located in Jackson County.

The natural regions of Texas were delineated largely on the basis of soil types and major vegetation types. Soils in the study area vary from alluvial, sandy soils with loamy surface to black waxy soils with loamy or sandy surface. Most of the region is on the Beaumont and Lissie Geological Formations.

There are seven major vegetation types found in the study area (Figure 4). The main vegetation types are Crops, and Post Oak Woods/Forest, followed closely by Post Oak Woods, Forest and Grassland Mosaic. The Pecan-Elm Forest, Other Native or Introduced Grasses, Bluestem Grassland, and Marsh/Barrier Island types are also found with decreasing distributions, respectively, in the study area.

Region P has a variety of valuable aquatic, wetland, riparian, and estuarine habitats. The estuary of the Lavaca and Navidad Rivers, in Jackson County, provides habitats for economically important marine and estuarine animals as well as for freshwater and terrestrial animals.

The region has 5 rivers or stream segments that satisfy one or more of the criteria defined in Senate Bill 1 for ecologically unique river and stream segments. These are in Jackson and Wharton Counties.

INTRODUCTION

Location and Extent

The study area is located in the mid-coastal region of Texas and includes Jackson and Lavaca counties, and part of Wharton County (Figure 1). It is located within the Lavaca, Colorado-Lavaca, Guadalupe, and Lavaca-Guadalupe river basins (Figure 2).

Geography and Ecology

Drainage of the study area is by the Lavaca and Navidad rivers and their tributaries. Elevations range from about sea level in Jackson County to about 503 feet in Lavaca County (Dallas Morning News 1997). The study area includes the Uplands Prairie and Woods natural subregion (Lyndon B. Johnson School of Public Affairs 1978). The land surface of the area is generally rolling to prairie (Dallas Morning News 1997).

Long, hot summers and short, mild winters characterize the study area's climate. The average daily minimum temperature for January is about 41.5?F and the average daily maximum temperature for July is about 93.7?F. The average annual precipitation is 40 inches (Dallas Morning News 1997).

Population

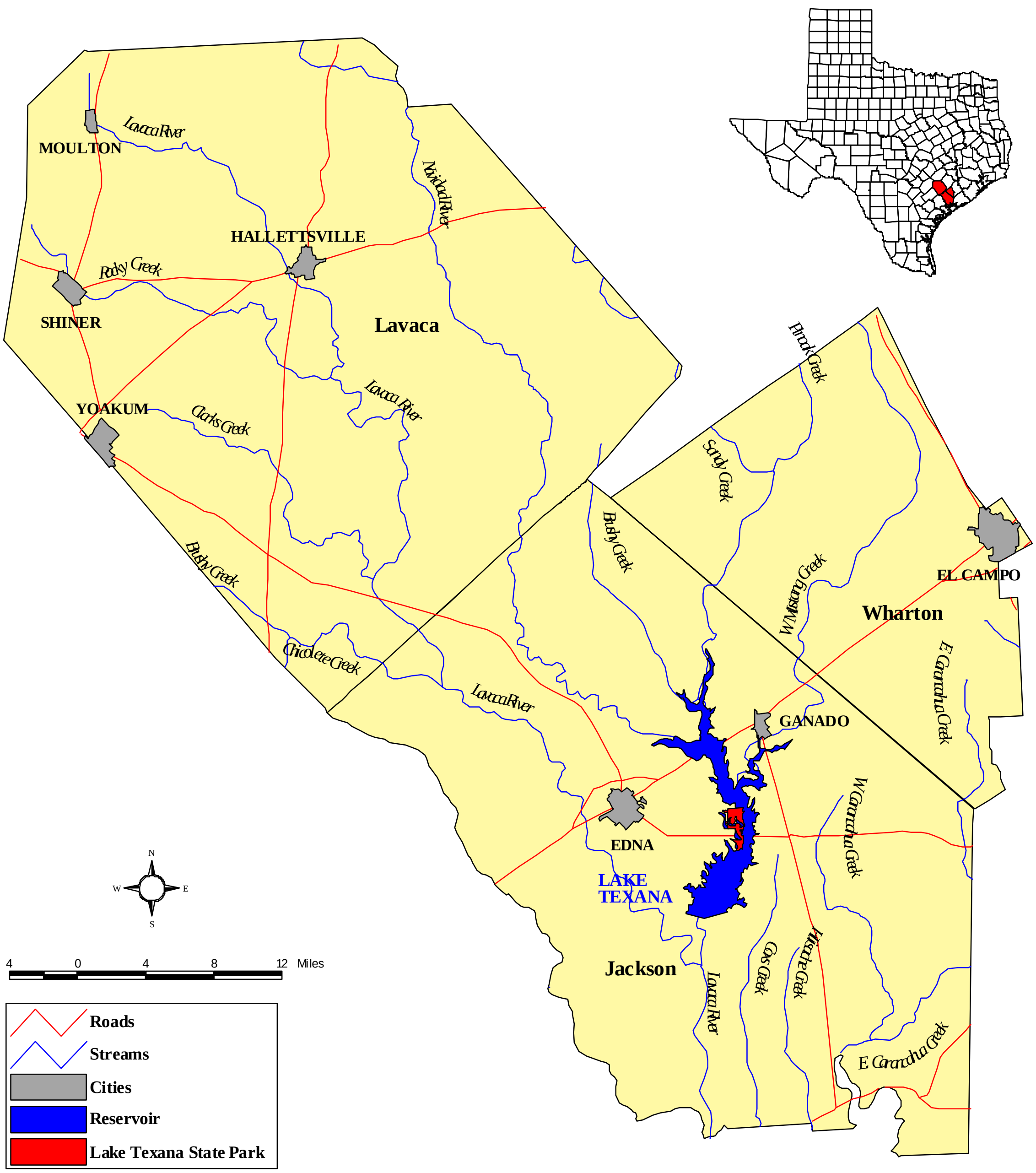
The 1990 census estimated the population of the study area to be 45,039 (Table 1, TWDB 1998). TWDB (1998) predicted a 2050 population of 58,958. Moderate increase in population is projected for all three counties, Jackson, Lavaca, and Wharton.

Table 1. Projections for Population Growth in the Study Area (TWDB 1998)

County ?	Year ? City ?	1990	2000	2010	2020	2030	2040	2050
Jackson		13,039	14,748	14,984	15,040	15,058	15,076	15,085
Jackson	Edna	5,343	6,193	6,324	6,355	6,365	6,375	6,385
Jackson	Ganado	1,701	1,892	1,922	1,928	1,930	1,932	1,934
Jackson	County-other	5,995	6,663	6,738	6,757	6,763	6,769	6,766
Lavaca		18,690	20,764	21,507	22,193	23,264	24,398	25,648
Lavaca	Hallettsville	2,718	3,052	3,257	3,413	3,626	3,828	4,041
Lavaca	Moulton	923	936	950	963	977	991	1,005
Lavaca	Shiner	2,074	2,348	2,432	2,510	2,631	2,759	2,901
Lavaca	Yoakum (P)	3,457	3,919	4,059	4,188	4,390	4,604	4,840
Lavaca	County-other	9,518	10,509	10,809	11,119	11,640	12,216	12,861
Wharton	(P)	13,310	13,830	14,615	15,501	16,325	17,241	18,225
Wharton	El Campo	10,511	10,851	11,355	11,961	12,486	13,100	13,744
Wharton	County-other	2,799	2,979	3,260	3,540	3,839	4,141	4,481
	Total	45,039	49,342	51,106	52,734	54,647	56,715	58,958

**P- partial*

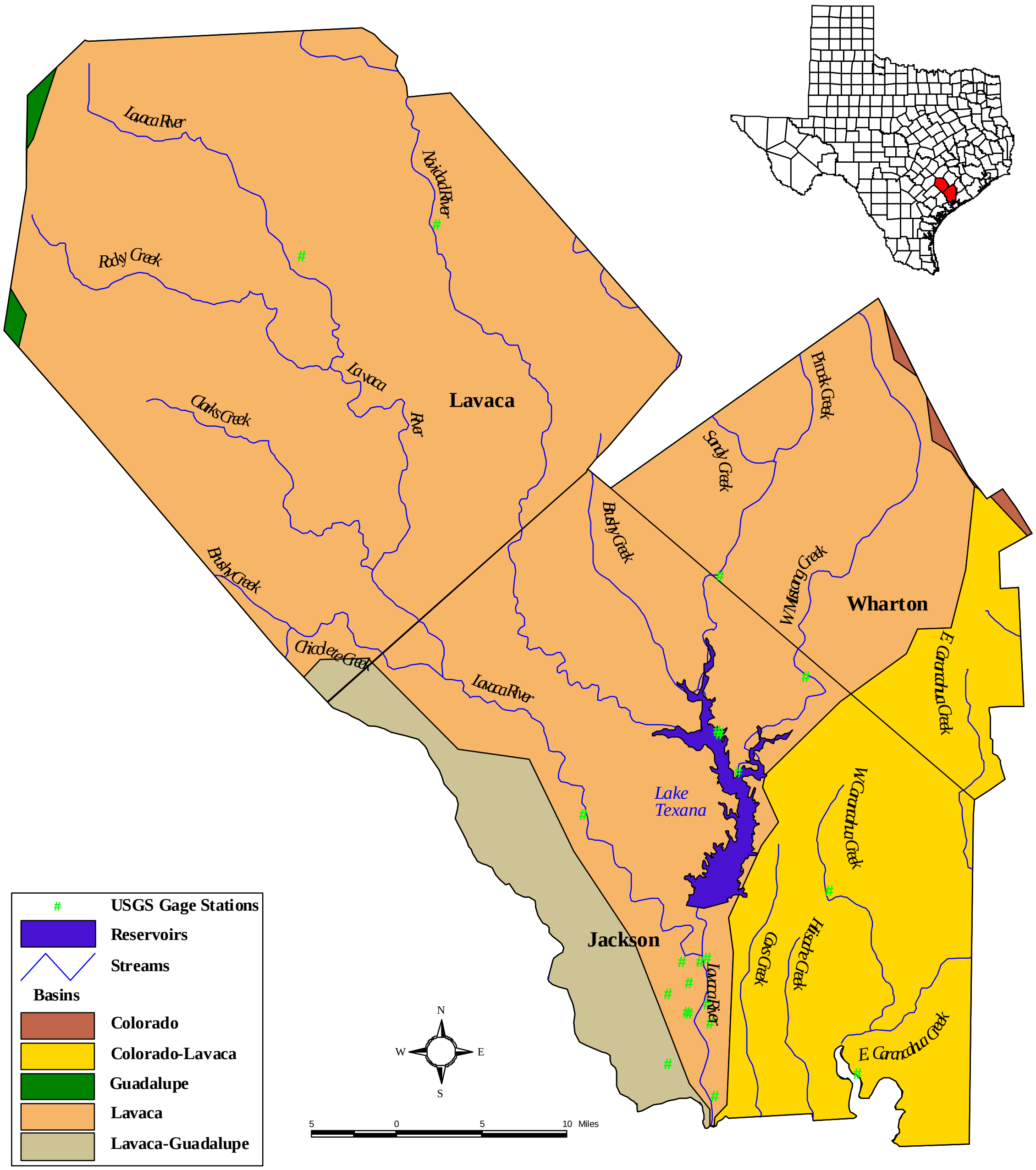
Figure 1. Location of the Study Area



Produced by the TPWD Water Resources Team, June 1999. No claims are made to the accuracy of the data or the suitability of the data for a particular use.

Sources:
TPWD GIS lab archives 1998.
Texas Water Development Board
Texas Natural Resources Information System
Projection:
Texas Statewide Projection

Figure 2. Water Resources of the Study Area



Produced by the TPWD Water Resources Team, June 1999. No claims are made to the accuracy of the data or the suitability of the data for a particular use.

Sources:
TPWD GIS Lab archives data 1998.
Texas Water Development Board
EPA-823-C-98-008
Projection:
Texas Statewide Projection

Economy and Land Use

The economy of the area consists primarily of petroleum production and operation, agribusiness and tourism. Agricultural production is varied. It consists of cattle, poultry, corn, cotton, and rice, with rice being the principal crop for Wharton County. The market value for the agriculture in the study area is around $192.4 million (Dallas Morning News 1997).

Outdoor recreational facilities also contribute to the area's economy. Lake Texana, the estuarine areas of the Lavaca River, and Garcitas Creek provide opportunities for bird watching, fishing, waterfowl hunting, boating, and other water sports. All these areas are located in Jackson County.

The Texana Loop of the Great Texas Coastal Birding Trail (Central Texas Coast) includes 9 sites (Sites 17-25), all in Jackson County, on Lake Texana, the Lavaca/Navidad estuary, and on Arenosa/Garcitas Creek. Lake Texana SP alone contributes $ 5-6 million per year to the local economy in Jackson County (see Appendix B).

SELECTED NATURAL RESOURCES

Soils

The natural regions of Texas were delineated largely on the basis of soil types and major vegetation types. Soils in the study area vary from alluvial, sandy soils with loamy surface to black waxy soils with loamy or sandy surface (Godfrey et al. 1973). Soil associations found in the area are described as follows:

1. Level soils of the coast Prairie and Marsh

    (a) Somewhat poorly to moderatly well drained cracking clayey soils; and mostly poorly drained soils with loamy surface layers and cracking clayey subsoils: Vertisols.
    (b) Cracking clayey soil and friable loamy soils of the Brazos and Colorado River flood plains: Mollisols.
    (c) Soils with loamy surface layers and mottled clayey or mottled to gray loamy subsoils: Alfisols.

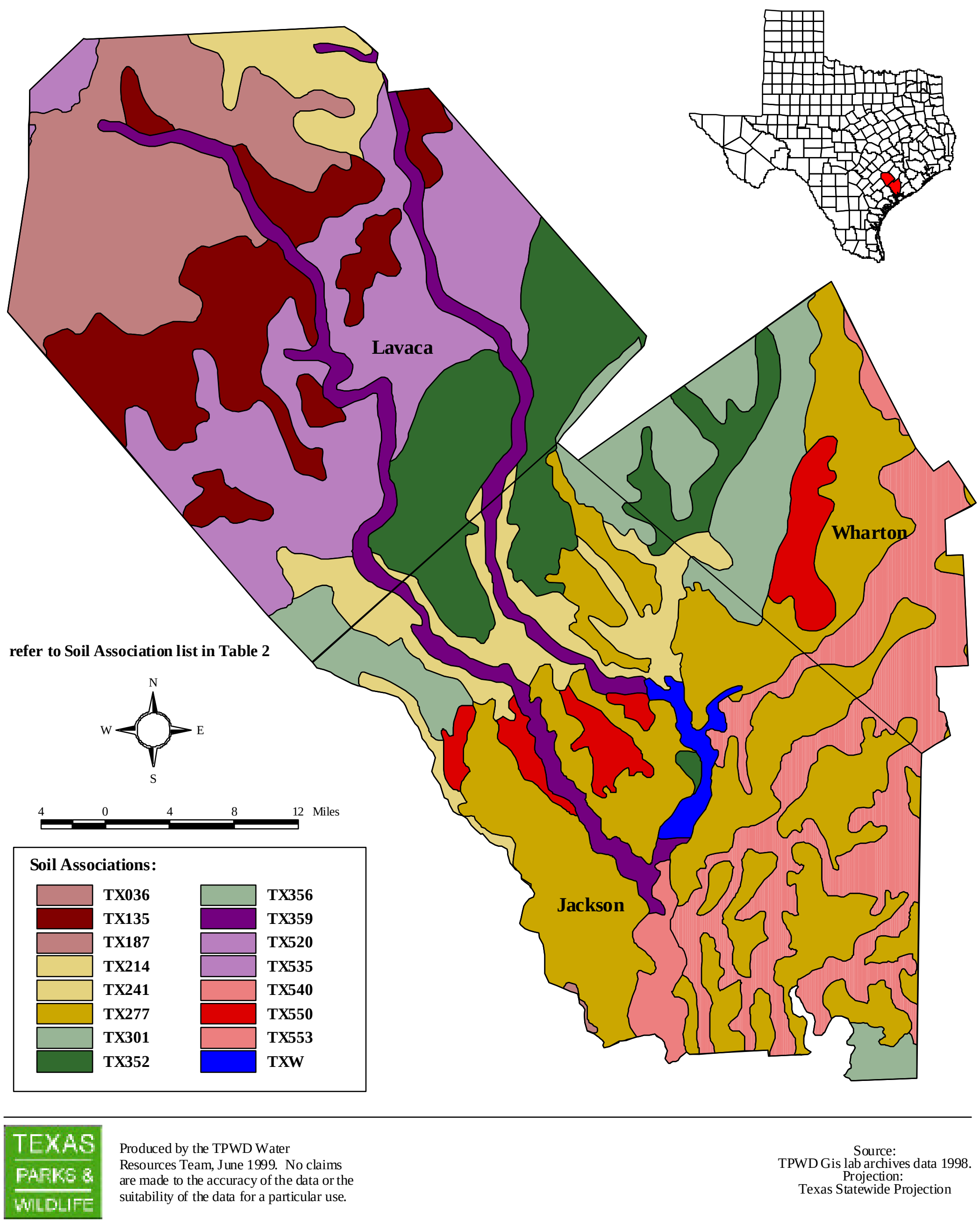
2. Undulating alkaline to slightly acid soils of the Blackland Prairie

    (a) Slightly acid soils with loamy surface layers and cracking clayey subsoils; and noncalcareous cracking clayey soils: Alfisols
    (b) Noncalcareous and calcareous cracking clayey soils; and slightly acid soils with loamy surface layers: Vertisols.
    (c) Soils with loamy surface layers and mottled gray and red or yellow cracking clayey subsoils: Alfisols.

Table 2. Soil Associations of the study area

Soil Association	Soil Name
TX036	Austwell-Aransas-Placedo
TX135	Denhawken-Elmendorf-Hallettsville
TX187	Frelsburg-Carbengle-Hallettsville
TX214	Hallettsville-Dubina-Straber
TX241	Inez-Milby-Kuy
TX277	Lake Charles-Dacosta-Contee
TX301	Livia-Palacios-Francitas
TX352	Morales-Cieno-Inez
TX356	Nada-Telferner-Cieno
TX359	Lavaca-Navidad-Ganado
TX520	Singleton-Burlewash-Shiro
TX535	Straber-Tremona-Catilla
TX540	Swan-Aransas-Placedo
TX550	Telferner-Edna-Cieno
TX553	Texana-Edna-Cieno
TXW	Water

Figure 3. Soil Types of the Study Area



Vegetation

As stated in the introduction, the study area includes parts of the following natural subregions: Blackland Prairie, and the Upland Prairies and Woods subregions (Lyndon B. Johnson School of Public Affairs 1978).

There are seven major vegetation types found in the study area (Figure 4). The main vegetation types are Crops, and Post Oak Woods/Forest, followed closely by Post Oak Woods, Forest and Grassland Mosaic, Pecan-Elm Forest, Other Native or Introduced Grasses, Bluestem Grassland, and Marsh/Barrier Island are also found with decreasing distributions, respectively, in the study area. The scientific names for the plants mentioned below can be found in Appendix A (McMahan et al. 1984).

Commonly associated plants of the Crops type are: cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals. This type also includes grassland associated with crop rotation.

Commonly associated plants of the Post Oak Woods/Forest, and Post Oak Woods, Forest, and Grassland Mosaic vegetation types are: Post oak, blackjack oak, eastern redcedar, mesquite, black hickory, live oak, sandjack oak, cedar elm, hackberry, yaupon, poison oak, American beautyberry, hawthorn, supplejack, trumpet creeper, dewberry, coral-berry, little bluestem, silver bluestem, sand lovegrass, beaked panicum, three-awn, sprangle-grass, and tickclover. These vegetation types are most apparent on the sandy soils of the Post Oak Savannah.

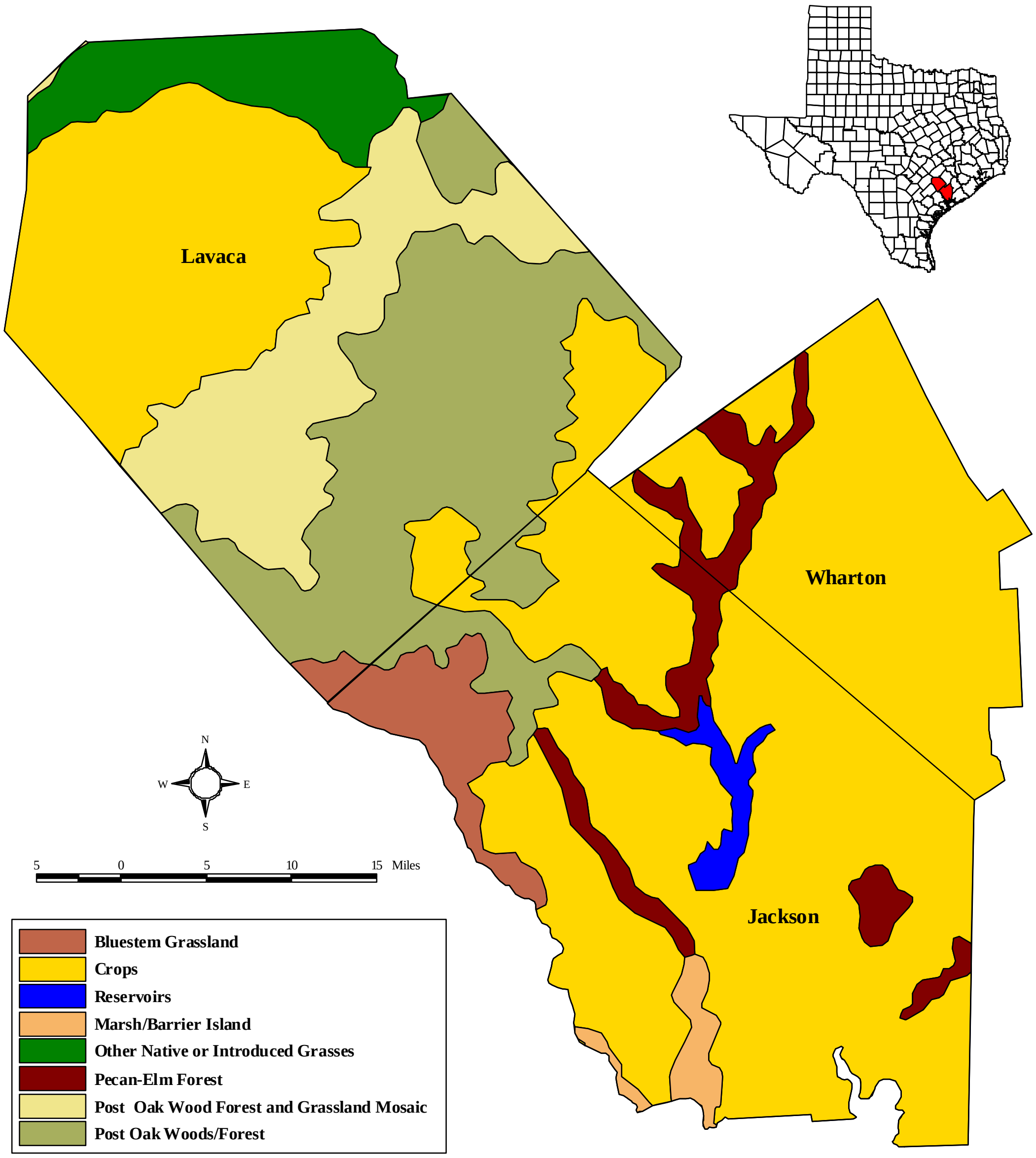
Pecan-Elm Forest includes: Pecan, American elm, cedar elm, cottonwood, sycamore, black willow, live oak, green ash, bald cypress, water oak, hackberry, virgin's bower, yaupon, greenbrair, mustang grape, poison oak, Johnsongrass, Virginia wildrye, Canada wildrye, rescuegrass, frostweed, and western ragweed.

Other Native or Introduced Grasses include: mixed native or introduced grasses and forbs on grassland sites or mixed herbaceous communities resulting from the clearing of woody vegetation. This type is associated with the clearing of forests and may portray early stages of Young Forest.

Bluestem Grassland includes: bushy bluestem, slender bluestem, little bluestem, silver bluestem, three-awn, buffalograss, bermudagrass, brownseed paspalum, single-spike paspalum, smutgrass, Gulf cordgrass, windmillgrass, southern dewberry, live oak, mesquite, huisache, baccharis, and Macartney rose.

Marsh/Barrier Island includes: marshhay cordgrass, Olney's bulrush, saltmarsh bulrush, widgeongrass, California bulrush, seashore paspalum, Gulf cordgrass, and common reed.

Figure 4. Vegetation Types of the Study Area



Produced by the TPWD Water Resources Team, June 1999. No claims are made to the accuracy of the data or the suitability of the data for a particular use.

Source: TPWD GIS lab archives. The vegetation represents a general summary of previously produced larger scale maps. Delineation of the vegetation occurs only where the actuall vegetation exhibit adequate resolution for delineation.
Projection:
Texas Statewide Projection

Rivers and Reservoirs

The study area includes four river basins: Lavaca, Colorado-Lavaca, Guadalupe, and Lavaca-Guadalupe river basins (Figure 2). Two major rivers run through the study area (Figure 1): the Lavaca River, in the northwest portion of the study area, and the Navidad River, in the northeast portion of the study area. The Navidad River flows into Lake Texana, the only lake in the study area. Lake Texana covers 11,000 surface acres, with approximately 125 miles of shoreline.

Texas Parks and Wildlife Department drafted a list (See Appendix C for Region P List) of Texas streams and rivers (Figure 2) satisfying at least one of the criteria (See Appendix D) for ecologically unique river and stream segments. Four (Table 3); streams met the high water quality/exceptional aquatic life/high aesthetic value criteria, while the threatened or endangered species/unique communities criteria was met by 2 streams (Table 4). Two stream segments, the Lavaca River and Garcitas Creek, were found to meet the biological function criteria (Appendix C).

Table 3. Streams that meet the high water quality/exceptional aquatic life/high aesthetic value criteria (31 TAC §357.8 (b) (4)); (Bayer et al. 1992; Davis, J.R. 1998) Refer to Appendix C.

River or Stream Segment	County	Criteria
Arenosa Creek	Jackson	Ecoregion Stream; Benthic macroinvertebrates
Garcitas Creek	Jackson	Ecoregion Stream, Dissolved oxygen; Benthic macroinvertebrates
West Carancahua Creek	Jackson	Ecoregion Stream, Dissolved oxygen; Benthic macroinvertebrates
West Mustang Creek	Jackson	Ecoregion Stream; Benthic macroinvertebrates
West Mustang Creek	Wharton	Ecoregion Stream; Benthic macroinvertebrates

Table 4. Streams that meet the threatened or endangered species/unique community criteria (31 TAC §357.8 (b) (5); (Ortego, B. 1999))

River or Stream Segment	County	Threatened/endangered species
Garcitas Creek	Jackson	Texas palmetto; Diamondback terrapin
Lavaca River	Jackson	Diamondback terrapin

Wetlands

The study area has significant wetland resources. There are extensive forested wetlands (pecan-elm bottomland forests) occurring along the Lower Lavaca River in Jackson County (Figure 4); north of Lake Texana along Sandy Creek and its tributaries in Jackson and western Wharton counties, along the Navidad River west of Lake Texana; and along West and East Carancahua Creeks in southeastern Jackson County.

Rather extensive estuarine wetlands occur in southwestern Jackson County (Figures 4 & 5). The Lavaca/Navidad estuary wetlands extend from the juncture of the two rivers at FM 616 about 10 miles downstream to Lavaca Bay. The lakes, marshes, and flats of this area (Figure 5) provide habitat for estuarine fish and shellfish, freshwater river fishes, birds, mammals, reptiles, and amphibians. The same is true for the estuarine wetlands along Garcitas Creek, which forms part of the western Jackson County line.

Lake Texana supports fringing freshwater wetlands including emergent marshes, pecan-elm bottomlands, and beds of floating aquatic plants. Lake Texana State Park (575 acres), located on the west-central shore of the lake, has all these wetland types (See cover photo).

There are nine sites on the Great Texas Coastal Birding Trail (the Texana Loop) in Jackson County. Six of these are associated with forested riparian habitats fringing Lake Texana as well as the Lake itself. The other three are associated with the estuarine and riparian habitats of the Lavaca/Navidad estuary and Garcitas/Arenosa Creeks.

Figure 5. Lavaca-Navidad Estuary

Springs

The distribution and size, as of 1980, of springs and seeps in the area are given by county, in Table 5 (Brune 1981). Brune conducted most of the fieldwork, which produced the following information, during the period of February 11-17, 1977. Information on Lavaca County springs was not available at the time.

Jackson and Wharton Counties springs are not numerous or large due to the relatively flat topography of the Counties. Spring waters in the county are generally of the sodium bicarbonate type, hard, and alkaline (Brune 1981).

Table 5. Distribution and Estimated Size (in 1980) of Springs and Seeps in the Study Area (Brune 1981)

County	Large	Moderately large	Medium	Small	Very small	Seep	Former
Jackson	0	0	0	1	0	0	5
Lavaca	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wharton	0	0	0	0	0	1	3

The numbers above are a reflection of either a spring or a group of springs.
Codes:
Large = 280 to 2,800 cfs
Moderately large = 28 to 280 cfs
Medium = 2.8 to 28 cfs
Former = no flow or inundated
Small = 0.28 to 2.8 cfs
Very Small = 0.028 to 0.28 cfs
Seep = less than 0.028 cfs

Gulf Coast Aquifer

The Gulf Coast Aquifer forms an irregular shaped belt along the Gulf of Mexico from Florida to Mexico. In Texas, the aquifer provides water to all or parts of 54 counties and extends from the Rio Grande northeastward to the Louisiana-Texas border. Total pumpage was approximately 1.1 million acre-feet in 1994. Municipal pumpage accounted for 51 percent of the total, irrigation accounted for 36 percent, and industrial accounted for 12 percent. The Greater Houston Metropolitan Area is the largest user (Texas Water Development Board 1997).

Water quality is generally good in the shallower portion of the aquifer. Groundwater containing less than 500 mg/l dissolved solids is usually encountered to a maximum depth of 3,200 feet in the aquifer from San Antonio River Basin northeastward to Louisiana. From the San Antonio River Basin southward to Mexico, quality deterioration is evident in the form of increased chloride concentration and salt-water encroachment along the coast (Texas Water Development Board 1997).

Freshwater Mussels

Freshwater mussels (Family Unionidae) are sensitive biological indicators of environmental quality and are often the first organisms to decline when environmental quality of aquatic ecosystems begins to degrade (Howells et al. 1996). Consequently, freshwater mussels have become important elements of environmental impact considerations. Surveys of mussels in Texas show many of the 52 species recognized in the state have declined greatly in recent years. These population declines probably reflect poor land and water management practices and subsequent loss of mussel habitat (Howells et al. 1997). Over-grazing, the clearing of native vegetation, the design and construction of highways and bridges, and general land clearing and development have contributed to the increase of runoff and scouring floods. Scouring in upstream reaches often results in excessive deposits of soft silt or deep shifting sand on downstream substrates, eliminating mussel habitat. Mussels with reported occurrence in the study area are shown in Table 6.

Table 6. Freshwater Mussels (Howells et al. 1996)

Scientific Name	Common Name
Amblema plicata	Threeridge
Anodonta grandis	Giant floater
Anodonta imbecillis	Paper pondshell
Arcidens confragosus	Rock-pocket book
Cyrtonais tampicoensis	Tampico pearlymussel
Glebula rotundata	Round pearlshell
Lampsilis bracteata	Texas fatmucket
Lampsilis teres	Yellow sandshell
Leptodea fragilis	Fragile papershell
Ligumaia subrostrata	Pond mussel
Potamilus ohiensis	Pink papershell
Potamilus purpuratus	Bleufer
Quadrula apiculata	Southern Mapleleaf
Quadrula houstonensis	Smooth pimpleback
Toxolasma texasensis	Texas lilliput
Truncilla macrodon	Texas fawnsfoot
Uniomerus declivis	Tapered pondhorn
Uniomerus tetralasmus	Pondhorn

Fish

Most Texas estuaries that receive freshwater inflow from rivers provide habitats for over 200 species of fish and shellfish. Many of these are important to the commercial and recreational fishing industries. Species such as brown, white and pink shrimp, oysters, blue crab, redfish, sea trout, and flounder are very important to the economy of the Texas coast. The estuarine habitats of Jackson County contribute to this economy.

One of the species of fish reported in the area (Table 7) is included on the Special Species List (Table 8) produced by the Texas Parks and Wildlife Department (1998a). This species is Guadalupe bass, it is the official state fish of Texas (Hubbs et. al 1991). The Guadalupe bass is endemic to the streams of the northern and eastern Edwards Plateau including portions of the Brazos, Colorado, Guadalupe, and San Antonio basins.

Table 7. Fish Species Reported in the Study Area
(Lee et al. 1980; Hubbs et al. 1991)

Species	Common Name
Ameiurus melas	Black bullhead
Ameiurus natalis	Yellow bullhead
Anguilla rostrata	American eel
Aplodinotus grunniens	Freshwater drum
Astyanax mexicanus	Mexican tetra
Campostoma anomalum	Central stoneroller
Carassius auratus	Goldfish
Carpiodes carpio	River carpsucker
Cycleptus elongatus	Blue sucker
Cyprinella lutrensis	Red shiner
Cyprinella venusta	Blacktail shiner
Cyprinodon variegatus	Sheepshead minnow
Cyprinus carpio	Common carp
Dorosoma cepedianum	Gizzard shad
Dorosoma petenense	Threadfin shad
Etheostoma gracile	Slough darter
Fundulus chrysotus	Golden topminnow
Fundulus grandis	Gulf killifish
Fundulus notatus	Blackstripe topminnow
Fundulus pulvereus	Bayou killifish
Gambusia affinis	Western mosquitofish
Ictalurus furcatus	Blue catfish
Ictalurus punctatus	Channel catfish
Ictiobus bubalus	Smallmouth buffalo
Lepisosteus oculatus	Spotted gar

Table 7 cont'd.

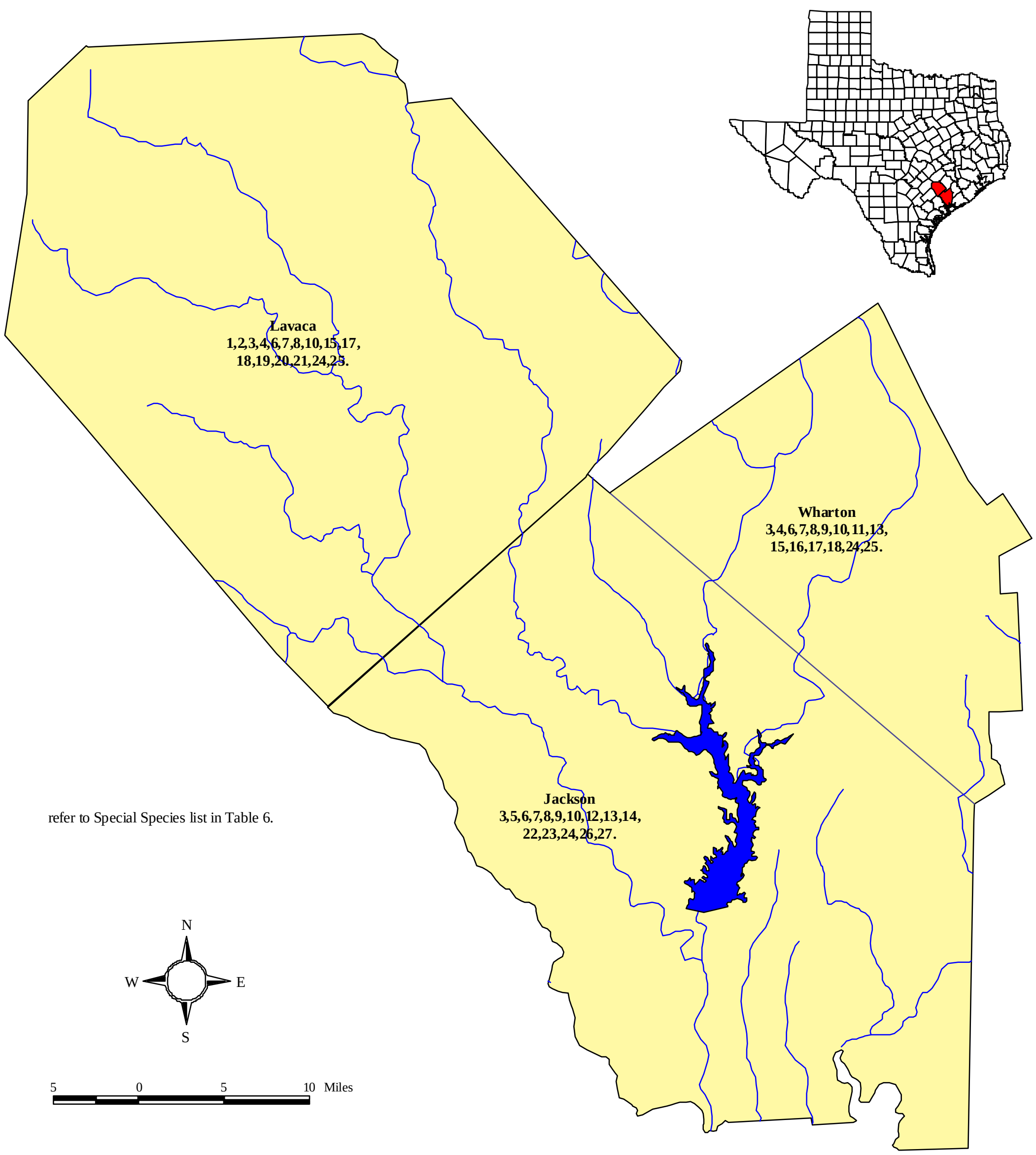
Lepisosteus osseus	Longnose gar
Lepisosteus spatula	Alligator gar
Lepomis auritus	Redbreast sunfish
Lepomis cyanellus	Green sunfish
Lepomis gulosus	Warmouth
Lepomis humilis	Orangespotted sunfish
Lepomis macrochirus	Bluegill
Lepomis megalotis	Longear sunfish
Lepomis microlophus	Redear sunfish
Lepomis punctatus	Spotted sunfish
Lythrurus fumeus	Ribbon shiner
Macrhybopsis aestivalis	Speckled chub
Menidia beryllina	Inland silverside
Micropterus treculi	Guadalupe bass
Micropterus salmoides	Largemouth bass
Morone chrysops	White bass
Mugil cephalus	Stiped mullet
Notemigonus crysoleucas	Golden shiner
Notropis amnis	Pallid shiner
Notropis buchanani	Ghost shiner
Notropis shumardi	Silverband shiner
Notropis texanus	Weed shiner
Notropis volucellus	Mimic shiner
Noturus gyrinus	Tadpole madtom
Opsopoeodus emiliae	Pugnose minnow
Percina macrolepida	Bigscale logperch
Pimephales promelas	Fathead minnow
Pimephales vigilax	Bullhead minnow
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
Pylodictis olivaris	Flathead catfish
Syngnathus scovelli	Gulf pipefish

Table 8. Species of Special Concern in the Study Area (Texas Parks and Wildlife Department 1998a)

Map code*	Scientific name	Common name	Fed. Status	State Status
	AMPHIBIANS			
1	*Bufo houstonensis*	Houston toad	LE	E
	BIRDS			
2	*Ammodramus henslowii*	Henslow's sparrow		
3	*Buteo albicaudatus*	White-tailed hawk		T
4	*Charadrius montanus*	Mountain plover	PT	
5	*Egretta rufescens*	Reddish egret		T
6	*Falco peregrinus anatum*	American peregrine falcon	LE	E
7	*Falco peregrinus tundrius*	Arctic peregrine falcon	E/SA	T
8	*Grus americana*	Whooping crane	LE	E
9	*Haliaeetus leucocephalus*	Bald eagle	LT	T
10	*Mycteria americana*	Wood stork		T
11	*Numenius borealis*	Eskimo curlew	LE	E
12	*Pelecanus occidentalis*	Brown pelican	LE	E
13	*Plegadis chihi*	White-faced ibis		T
14	*Sterna antillarum athalassos*	Interior least tern	LE	E
15	*Tympanuchus cupido attwateri*	Attwater's greater prairie-chicken	LE	E
	FISHES			
16	*Micropterus treculi*	Guadalupe bass		
	MAMMALS			
17	*Spilogale putorius interrupta*	Plains spotted skunk		
	REPTILES			
18	*Crotalus horridus*	Timber/Canebrake rattlesnake		T
19	*Gopherus berlandieri*	Texas tortoise		T
20	*Graptemys caglei*	Cagle's map turtle	C1	
21	*Liochlorophis vernalis*	Smooth green snake		T
22	*Malaclemys terrapin littoralis*	Texas diamondback terrapin		
23	*Nerodia clarkii*	Gulf saltmarsh snake		
24	*Phrynosoma cornutum*	Texas horned lizard		T
25	*Thamnophis sirtalis annectens*	Texas garter snake		
	VASCULAR PLANTS			
26	*Psilactis heterocarpa*	Welder machaeranthera		
27	*Thurovia triflora*	Threeflower broomweed		

* Lookup code for map of Figure 6.
Status Code: LE, LT – Federally Listed Endangered/Threatened; E/SA – Federally Endangered by Similarity of Appearance; E, T – State Endangered/Threatened; PT – Federally Proposed Threatened;
C1 – Federal Candidate, Category 1, information supports proposing to list as endangered/threatened.

Figure 5. Special Species by County



Produced by the TPWD Water Resources Team, June 1999. No claims are made to the accuracy of the data or the suitability of the data for a particular use.

Sources:
TPWD Gis lab archives data 1998.
Projections:
Texas Statewide Projection

Birds and Waterfowl

Many species of neotropical songbirds, wintering shorebirds, and a large number of waterfowl stop-over in the study area to feed and rest along the river banks and creek bottoms. The Special Species List (Texas Parks and Wildlife Department 1998a) for the study area includes 14 birds (Table 8), some of which are riparian and/or wetland dependent. Several of the birds occur in the study area only as migrants (i.g. peregrine falcon, whooping crane). Migrating peregrine falcons utilize wetlands as they prey mostly on ducks and shorebirds. Migrating whooping cranes use wetlands for feeding and roosting. An extensive list of birds observed in Lake Texana State Park can be obtained at the park headquarters (also see http:www.tpwd.state.tx.us/park/laketexa/laketexa.htm).

Mammals, Amphibians, and Reptiles

There are 1,100 vertebrate species in Texas, 60 of which are endemic to the state (Texas Audubon Society 1997). There are at least 87 species of mammals (Table 9), amphibians (Table 10), and reptiles (Table 11), listed in the Texas Parks and Wildlife Biological Conservation Database (BCD), present in the study area.

The plains spotted skunk is the only mammal in Table 9 that is listed in the Special Species List. Table 10 includes one amphibian that is listed in the Special Species List, the Houston toad. Table 11 includes eight reptiles that are listed in the Special Species List (Table 8), the timber rattlesnake, Texas horned lizard, Texas garter snake, Texas tortoise, Cagle's map turtle, smooth green snake, Texas diamondback terrapin, and the Gulf saltmarsh snake. Figure 6 shows the county distribution of those species listed on the Special Species List.

The Houston Toad, a federally and state listed endangered species is found only in a small pocket of southeastern Texas, including Austin, Bastrop, Burleson, Colorado, Lavaca, Leon, Milam, and Robertson Counties. It is found in pine forests and prairies with sandy ridges (Texas Parks and Wildlife 1999).

The Houston Toad is endangered because many small natural breeding ponds have been drained. Clearing natural vegetation and planting pasture grasses such as bermudagrass also eliminates habitat. Also, fire ants may kill young toads as they leave the pond (Texas Parks and Wildlife 1999).

The Texas garter snake is found in wet or moist microhabitats, but not necessarily restricted to them. It hibernates underground or under surface cover. The Timber/Canebrake rattlesnake occurs in swamps, floodplains, upland pine, deciduous woodlands, riparian zones, and abandoned farms.

The Cagle's map turtle is endemic to the Guadalupe River System. It occurs in short stretches of shallow water with swift to moderate flow and gravel or cobble bottom, connected to deeper pools with a slower flow rate and a silt or mud bottom. It nests on gently sloping sand banks within 30 feet of the water.

Table 9. Mammals of the Study Area (Davis and Schmidly 1994; Texas Parks and Wildlife Department 1998a)

Scientific Name	Common Name
Baiomys taylori	Northern pygmy mouse
Canis rufus	Red wolf (extirpated)
Chaetodipus hispidus	Hispid pocket mouse
Didelphis virginiana	Virginia opossum
Geomys attwateri	Attwater's pocket gopher
Lasiurus borealis	Eastern red bat
Lepus californicus	Black-tailed jack rabbit
Mephitis mephitis	Striped skunk
Neotoma floridana	Eastern woodrat
Oryzomys palustris	Marsh rice rat
Peromyscus leucopus	White-footed mouse
Peromyscus maniculatus	Deer mouse
Reithrodontomys fulvescens	Fulvous harvest mouse
Sciurus niger	Eastern fox squirrel
Sigmodon hispidus	Hispid cotton rat
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel
Spilogale putorius interrupta	Plains spotted skunk
Sylvilagus floridanus	Eastern cottontail
Urocyon cinereoargenteus	Gray fox

Table 10. Amphibians of the Study Area (Texas Parks and Wildlife Department 1998a)

Scientific Name	Common Name
Acris crepitans	Northern cricket frog
Ambystoma texanum	Smallmouth salamander
Bufo houstonensis	Houston toad
Bufo speciosus	Texas toad
Bufo valliceps	Gulf coast toad
Bufo woodhousii	Woodhouse's toad
Gastrophryne carolinensis	Eastern narrowmouth toad
Gastrophryne olivacea	Great plains narrowmouth toad
Hyla chrysoscelis	Cope's gray treefrog
Hyla cinerea	Green treefrog
Hyla versicolor	Northern gray treefrog
Notophthalmus viridescens	Eastern newt
Pseudacris clarkii	Spotted chorus frog
Pseudacris streckeri	Strecker's chorus frog
Pseudacris triseriata	Striped chorus frog
Rana catesbeiana	Bullfrog
Rana sphenocephala	Southern leopard frog
Scaphiopus holbrookii	Eastern spadefoot
Siren intermedia	Lesser siren

Table 11. Reptiles of the Study Area (Texas Parks and Wildlife Department 1998a)

Scientific Name	Common Name
Agkistrodon contortrix	Copperhead
Agkistrodon piscivorus	Cottonmouth
Alligator mississippiensis	American alligator
Anolis carolinensis	Green anole
Chelydra serpentina	Snapping turtle
Cnemidophorus gularis	Texas spotted whiptail
Cnemidophorus sexlineatus	Six-lined racerunner
Coluber constrictor	Racer
Crotalus atrox	Western diamondback rattlesnake
Crotalus horridus	Timber (canebrake) rattlesnake
Deirochelys reticularia	Chicken turtle
Elaphe obsoleta	Black rat snake
Eumeces fasciatus	Five-lined skink
Eumeces laticeps	Broadhead skink
Eumeces septentrionalis	Prairie skink
Farancia abacura	Mud snake
Gopherus berlandieri	Texas tortoise
Graptemys caglei	Cagle's map turtle
Hemidactylus turcicus	Mediterranean gecko
Heterodon platirhinos	Eastern hognose snake
Kinosternon flavescens	Yellow mud turtle
Kinosternon subrubrum	Eastern mud turtle
Lampropeltis calligaster	Prairie kingsnake
Lampropeltis getula	Common kingsnake
Liochlorophis aestivus	Rough green snake
Malaclemys terrapin littoralis	Texas diamondback terrapin
Masticophis flagellum	Coachwhip
Micrurus fulvius	Eastern coral snake
Nerodia cyclopion	Green water snake
Nerodia erythrogaster	Plainbelly water snake
Nerodia fasciata	Southern water snake
Nerodia rhombifer	Diamondback water snake
Ophisaurus attenuatus	Slender glass lizard
Phrynosoma cornutum	Texas horned lizard
Pseudemys texana	Texas river cooter
Regina grahamii	Graham's crayfish snake
Sceloporus undulatus	Eastern fence lizard
Scincella lateralis	Ground skink
Sistrurus miliarius	Pigmy rattlesnake
Storeria dekayi	Brown snake
Tantilla gracilis	Flathead snake
Terrapene carolina	Eastern box turtle

Table 11 cont'd.

Terrapene ornata	Western box turtle
Thamnophis marcianus	Checkered garter snake
Thamnophis proximus	Western ribbon snake
Trionyx muticus	Smooth softshell
Trionyx spiniferus	Spiny softshell
Virginia striatula	Rough earth snake

Conclusions

Region P has a variety of valuable aquatic, wetland, riparian, and estuarine habitats. The estuary of the Lavaca and Navidad Rivers provides habitats for economically important and ecologically characteristic marine and estuarine animals as well as for freshwater and terrestrial animals. This is true also for the smaller estuarine reach of Garcitas Creek from Lavaca Bay upstream to the Arenosa Creek confluence. The estuarine habitats are in southern Jackson County.

Extensive pecan-elm type bottomland hardwood forests occur along several rivers and streams in Jackson and Wharton Counties. The Lavaca River, Garcitas Creek, Arenosa Creek, West Carancahua Creek, and West Mustang Creek all satisfy at least one of the criteria for ecologically unique river and stream segments. These include: the Lavaca River from the Navidad river confluence upstream about 20 miles; the Navidad River west of Lake Texana; Sandy Creek and its tributaries north of Lake Texana in Jackson County and Wharton Counties; and West and East Carancahua Creeks in southeastern Jackson County. Arenosa Creek on the Western border of Jackson County and West Mustang Creek in Jackson and Wharton Counties have also been identified as ecologically significant stream segments (see Appendix C & D).

Lake Texana, in Jackson County, also supports fringing wetland and bottomland habitats as well as several recreational areas, including Lake Texana State Park, that are economic assets to the region.

The above habitats include 9 sites on the Texana loop of the Great Texana Coastal Birding Trail, all in Jackson County. These are also of high economic value to the region.

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APPENDIX A

Scientific Names of Plants Mentioned
(from McMahan et al. 1984)

APPENDIX A

Scientific Names of Plants Mentioned

American beautyberry	*Callicarpa americana*
Ash, green	*Fraxinus pennsylvanica*
Baccharis	*Baccharis spp.*
Bermudagrass	*Cynodon dactylon*
Bluestem, bushy	*Andropogon glomeratus*
_______, little	*Schizachyrium scoparium var. frequens*
_______, silver	*Bothriochloa saccharoides*
_______, slender	*Schizachyrium tenerum*
Buffalograss	*Buchloe dactyloides*
Bulrush, California	*Scirpus californicus*
______, Olney's	*S. americanus*
______, saltmarsh	*S. maritimus*
Coral-berry	*Symphoricarpos orbiculatus*
Cordgrass, Gulf	*Spartina spartinae*
________, marshhay	*S. patens*
Cottonwood	*Populus deltoides*
Cypress, bald	*Taxodium distichum*
Dewberry	*Rubus spp.*
Elm, American	*Ulmus americana*
___, cedar	*U. crassifolia*
Frostweed	*Verbesina virginica*
Grape, mustang	*Vitis mustangensis*
Greenbriar	*Smilax spp.*
Hackberry	*Celtis spp.*
Hawthorn	*Crataegus spp.*
Hickory, black	*Carya texana*
Huisache	*Acacia farnesiana*
Johnsongrass	*Sorghum halepense*
Lovegrass, sand	*Eragrostis trichodes*
Mesquite	*Prosopis glandulosa*

Oak, blackjack	*Quercus marilandica*
___, live	*Q. virginiana*
___, post	*Q. stellata*
___, sandjack	*Q. incana*
___, water	*Q. nigra*
Panicum, beaked	*Panicum anceps*
Paspalum , brownseed	*Paspalum plicatulum*
________, seashore	*P. vaginatum*
________, single-spike	*P. monostachyum*
Pecan	*Carya illinoinensis*
Poison oak	*Rhus toxicodendron*
Ragweed, western	*Ambrosia psilostachya*
Reed, common	*Phragmites australis*
Redcedar, eastern	*Juniperus virginiana*
Rescuegrass	*Bromus unioloides*
Rose, Macartney	*Rosa bracteata*
Smutgrass	*Sporobolus indicus*
Sprangle-grass	*Chasmanthium sessiliflorum*
Supplejack	*Berchemia scandens*
Sycamore	*Platanus occidentalis*
Three-awn	*Aristida spp.*
Tickclover	*Desmondium spp.*
Trumpet creeper	*Campsis radicans*
Virgin’s bower	*Clematis virginiana*
Widgeon grass	*Ruppia maritima*
Wildrye, Canada	*Elymus canadensis*
______, Virginia	*E. virginicus*
Willow, black	*Salix nigra*
Windmillgrass	*Chloris spp.*
Yaupon	*Ilex vomitoria*

APPENDIX B

Estimated Economic Importance of Selected TPWD Facilities
(from Crompton et al. 1998)

LAKE TEXANA STATE RECREATION AREA

JACKSON COUNTY

AVERAGE PARTY SIZE:
Day Visitors = 3.62
Overnight Visitors = 3.41

AVERAGE DISTANCE TRAVELED TO SITE:
Day Visitors = 72.6 Miles
Overnight Visitors = 100.6 Miles

ACTUAL 1997 VISITATION (Fiscal Year):
Day Visitors = 556,092
Overnight Visitors = 58,659

PERCENT OF OUT-OF-COUNTY VISITORS:
Day Visitors = 80.95
Overnight Visitors = 94.43

PER PERSON PER DAY EXPENDITURES

Sector		**Day Visitors***			**Overnight Visitors**		**Visitor**
	Adjacent	Enroute	Total	Adjacent	Enroute	Total	**Average**
Transportation	$1.68	$1.88	$3.56	$1.68	$0.45	$2.12	**$2.84**
Food	2.69	1.47	4.17	4.21	0.65	4.86	**4.51**
Lodging	0.31	0.15	0.46	0.04	0.00	0.04	**0.25**
Other	1.01	0.15	1.16	1.07	0.00	1.07	**1.12**
Total	**5.70**	**3.65**	**9.35**	**6.99**	**1.10**	**8.09**	**8.72**

ESTIMATED ANNUAL ECONOMIC IMPACT ON SALES

Sector		**Day Visitors***			**Overnight Visitors**		**Visitor**
	Expenditures	Direct Impact	Total Impact	Expenditures	Direct Impact	Total Impact	**Total**
Transportation	$755,125	$755,125	$1,049,171	$92,918	$92,918	$129,100	**$1,178,271**
Food	1,211,854	1,211,854	2,164,249	233,044	233,044	416,194	**2,580,443**
Lodging	140,063	140,063	237,170	2,248	2,248	3,807	**240,976**
Other	456,729	456,729	882,400	59,198	59,198	114,370	**996,770**
Total	**2,563,771**	**2,563,771**	**4,332,989**	**387,408**	**387,408**	**663,471**	**4,996,460**

ESTIMATED ANNUAL ECONOMIC IMPACT ON PERSONAL INCOME

Sector		**Day Visitors***			**Overnight Visitors**		**Visitor**
	Expenditures	Direct Impact	Total Impact	Expenditures	Direct Impact	Total Impact	**Total**
Transportation	$755,125	$330,292	$401,047	$92,918	$40,642	$49,349	**$450,396**
Food	1,211,854	354,588	572,601	233,044	68,189	110,113	**682,714**
Lodging	140,063	38,952	62,090	2,248	625	997	**63,087**
Other	456,729	152,410	253,621	59,198	19,754	32,873	**286,494**
Total	**2,563,771**	**876,242**	**1,289,359**	**387,408**	**129,211**	**193,331**	**1,482,691**

ESTIMATED ANNUAL ECONOMIC IMPACT ON EMPLOYMENT

Sector		**Day Visitors***			**Overnight Visitors**		**Visitor**
	Expenditures	Direct Impact	Total Impact	Expenditures	Direct Impact	Total Impact	**Total**
Transportation	$755,125	10.62	15.43	$92,918	1.31	1.90	**17.33**
Food	1,211,854	39.56	55.22	233,044	7.61	10.62	**65.84**
Lodging	140,063	3.27	4.88	2,248	0.05	0.08	**4.96**
Other	456,729	20.11	27.36	59,198	2.61	3.55	**30.90**
Total	**2,563,771**	**73.56**	**102.88**	**387,408**	**11.57**	**16.14**	**119.03**

* Average PPPD expenditure data for Texas State Recreation Areas were used.

LAKE TEXANA STATE RECREATION AREA
JACKSON COUNTY

AVERAGE PARTY SIZE:
Day Visitors = 3.62
Overnight Visitors = 3.41

AVERAGE DISTANCE TRAVELED TO SITE:
Day Visitors = 72.6 miles
Overnight Visitors = 100.6 miles

ACTUAL 1997 VISITATION (Fiscal Year):
Day Visitors = 556,092
Overnight Visitors = 58,659

PERCENT OF OUT-OF-COUNTY VISITORS:
Day Visitors = 80.95
Overnight Visitors = 94.43

PER PERSON PER DAY EXPENDITURES

Sector	Day Visitors* Adjacent	Day Visitors* Enroute	Day Visitors* Total	Overnight Visitors Adjacent	Overnight Visitors Enroute	Overnight Visitors Total	Visitor Average
Transportation	$1.68	$1.88	$3.56	$1.68	$0.45	$2.12	**$2.84**
Food	2.69	1.47	4.17	4.21	0.65	4.86	**4.51**
Lodging	0.31	0.15	0.46	0.04	0.00	0.04	**0.25**
Other	1.01	0.15	1.16	1.07	0.00	1.07	**1.12**
Total	**5.70**	**3.65**	**9.35**	**6.99**	**1.10**	**8.09**	**8.72**

ESTIMATED ANNUAL ECONOMIC SURGE ON SALES (Including Local Visitors)

Sector	Day Visitors* Expenditures	Day Visitors* Direct Impact	Day Visitors* Total Impact	Overnight Visitors Expenditures	Overnight Visitors Direct Impact	Overnight Visitors Total Impact	Visitor Total
Transportation	$932,829	$932,829	$1,296,072	$98,399	$98,399	$136,715	**$1,432,788**
Food	1,497,040	1,497,040	2,673,563	246,791	246,791	440,743	**3,114,307**
Lodging	173,025	173,025	292,983	2,381	2,381	4,031	**297,014**
Other	564,211	564,211	1,090,056	62,690	62,690	121,116	**1,211,172**
Total	**3,167,104**	**3,167,104**	**5,352,674**	**410,260**	**410,260**	**702,606**	**6,055,280**

ESTIMATED ANNUAL ECONOMIC SURGE ON PERSONAL INCOME (Including Local Visitors)

Sector	Day Visitors* Expenditures	Day Visitors* Direct Impact	Day Visitors* Total Impact	Overnight Visitors Expenditures	Overnight Visitors Direct Impact	Overnight Visitors Total Impact	Visitor Total
Transportation	$932,829	$408,019	$495,425	$98,399	$43,040	$52,260	**$547,685**
Food	1,497,040	438,034	707,351	246,791	72,211	116,609	**823,960**
Lodging	173,025	48,118	76,702	2,381	662	1,055	**77,757**
Other	564,211	188,277	313,306	62,690	20,920	34,812	**348,118**
Total	**3,167,104**	**1,082,448**	**1,592,785**	**410,260**	**136,832**	**204,735**	**1,797,520**

ESTIMATED ANNUAL ECONOMIC SURGE ON EMPLOYMENT (Including Local Visitors)

Sector	Day Visitors* Expenditures	Day Visitors* Direct Impact	Day Visitors* Total Impact	Overnight Visitors Expenditures	Overnight Visitors Direct Impact	Overnight Visitors Total Impact	Visitor Total
Transportation	$932,829	13.12	19.06	$98,399	1.38	2.01	**21.07**
Food	1,497,040	48.87	68.22	246,791	8.06	11.25	**79.46**
Lodging	173,025	4.04	6.03	2,381	0.06	0.08	**6.11**
Other	564,211	24.84	33.80	62,690	2.76	3.76	**37.55**
Total	**3,167,104**	**90.87**	**127.10**	**410,260**	**12.26**	**17.09**	**144.19**

* Average PPPD expenditure data for Texas State Recreation Areas were used.

APPENDIX C

TPWD Information Supporting River and Stream Segment Designations

Texas Parks and Wildlife Department Draft List of Texas streams and rivers satisfying at least one of the criteria defined in Senate Bill 1 for ecologically unique river and stream segments.

<u>REGION P (LAVACA)</u>

Arenosa Creek - From the confluence with Garcitas Creek in Jackson/Victoria County upstream to its headwaters along the northern boundary of Victoria County

Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]

Garcitas Creek - From the confluence with Lavaca Bay in Jackson/Victoria/Calhoun County upstream to the Arenosa Creek confluence in Jackson/Victoria County

Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]

End/Threat: One of only a few locales in Texas where Texas palmetto occurs naturally[32]; Diamondback terrapin[32]

Biol. Function: Extensive estuarine wetland habitat

Lavaca River - From the confluence with Lavaca Bay in Calhoun/Jackson County to a point 5.3 miles downstream of US 59 in Jackson County (TNRCC stream segment 1601)

Biol. Function: Extensive freshwater and estuarine wetland habitat[14]

End/Threat: Diamondback terrapin[32]

Hydrologic Function: Forested riparian habitats perform all hydrologic functions

West Carancahua Creek - From the confluence with Carancahua Creek in Jackson County upstream to the FM 111 crossing east of Edna in Jackson County

Aq. Life: Ecoregion Stream, Dissolved oxygen[1]; Benthic macroinvertebrates[1,2]

Hydrologic Function: Forested riparian habitats perform all hydrologic functions

West Mustang Creek - From the point where East Mustang Creek and West Mustang Creek join to form Mustang Creek in Jackson County upstream to FM 1160 in Wharton County

Aq. Life: Ecoregion Stream[1]; Benthic macroinvertebrates[1,2]

<u>REFERENCES</u>

[1] Bayer, C.W., J.R. Davis, S.R. Twidwell, R. Kleinsasser, G. Linam, K. Mayes, and E. Hornig. 1992. Texas aquatic ecoregion project: an assessment of least disturbed streams (draft). Texas Water Commission, Austin, Texas.

[2] Davis, J.R. 1998. Personal communication. Texas Natural Resource Conservation Commission, Austin, Texas.

[14] Bauer J., R. Frye, and B. Spain. 1991. A Natural Resource Survey for Proposed Reservoir Sites and Selected Stream Segments in Texas. Texas Parks and Wildlife Dept., PWD-BK-0300-06 7/91, Austin, Texas

[32] Ortego, B. 1999. Personal communication. Texas Parks and Wildlife Department, Victoria, Texas.

Appendix D

§357.8 Ecologically Unique River and Stream Segments

Title 31. NATURAL RESOURCES AND CONSERVATION

Part X. TEXAS WATER DEVELOPMENT BOARD

Chapter 357. REGIONAL WATER PLANNING GUIDELINES

§ 357.8 Ecologically Unique River and Stream Segments

(a) Regional water planning groups may include in adopted regional water plans recommendations for all or parts of river and stream segments of unique ecological value located within the regional water planning area by preparing a recommendation package consisting of a physical description giving the location of the stream segment, maps, and photographs of the stream segment and a site characterization of the stream segment documented by supporting literature and data. The recommendation package shall address each of the criteria for designation of river and stream segments of ecological value found in subsection (b) of this section. The regional water planning group shall forward the recommendation package to the Texas Parks and Wildlife Department and allow the Texas Parks and Wildlife Department 30 days for its written evaluation of the recommendation. The adopted regional water plan shall include, if available, Texas Parks and Wildlife Department's written evaluation of each river and stream segment recommended as a river or stream segment of unique ecological value.

(b) A regional water planning group may recommend a river or stream segment as being of unique ecological value based upon the following criteria:

(1) biological function--stream segments which display significant overall habitat value including both quantity and quality considering the degree of biodiversity, age, and uniqueness observed and including terrestrial, wetland, aquatic, or estuarine habitats;

(2) hydrologic function--stream segments which are fringed by habitats that perform valuable hydrologic functions relating to water quality, flood attenuation, flow stabilization, or groundwater recharge and discharge;

(3) riparian conservation areas--stream segments which are fringed by significant areas in public ownership including state and federal refuges, wildlife management areas, preserves, parks, mitigation areas, or other areas held by governmental organizations for conservation purposes, or stream segments which are fringed by other areas managed for conservation purposes under a governmentally approved conservation plan;

(4) high water quality/exceptional aquatic life/high aesthetic value--stream segments and spring resources that are significant due to unique or critical habitats and exceptional aquatic life uses dependent on or associated with high water quality; or

(5) threatened or endangered species/unique communities--sites along streams where water development projects would have significant detrimental effects on state or federally listed

threatened and endangered species, and sites along streams significant due to the presence of unique, exemplary, or unusually extensive natural communities.

Source: The provisions of this § 357.8 adopted to be effective March 11, 1998, 23 TexReg 2338.

Contents

List of Tables

List of Appendices

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Chapter 9 – Water Infrastructure Financing Recommendations

9.1 Introduction

In SB 2 of the 77th Texas Legislature, the preparation of an infrastructure financing report (IFR) was added to the regional planning process and this step is carried into the 2011 Planning Round. The purpose of the report is to identify the funding needed to implement the water management strategies recommended in RWPs. The primary objectives of this chapter/report are:

- Determine the number of political subdivisions with identified needs that will be unable to finance their water infrastructure needs
- Determine the impacts upon the economy and social aspects of the region if these demands are not met by management strategies
- Determine the amount of infrastructure costs in the RWPs that cannot be financed by the local political subdivisions
- Determine funding options, such as state funding, that are proposed by the political subdivisions to finance water infrastructure costs that cannot be financed locally
- Determine additional roles the RWPG propose for the state in financing the recommended water supply projects

LRWPA is somewhat unique in that there are no shortages for either the municipal or manufacturing user groups. The only user groups with shortages were irrigation users in Jackson and Wharton Counties. The socioeconomic impacts associated with a failure to meet the water demands of irrigated agriculture in Jackson County were estimated in the report, *Socioeconomic Impacts of Projected Water Shortages for the Lavaca Regional Water Planning Area*, which is summarized below in *Section 9.2* and found in its entirety in *Appendix 9A.* It should be noted here that the impacts presented in this report are based on a shortage of just under 68,000 acre-feet annually of irrigation water. This amount of water represents approximately 32 percent of the total demand for these user groups in Jackson and Wharton Counties.

Irrigated agriculture has experienced a moderate decline from the high usage periods of the 1970s and early 1980s. Demand for irrigation water was higher during those times and many irrigation wells were deepened to accommodate the lowering water table and increased lift needed to bring water to the surface. The projected average additional pumping lifts anticipated as a result of increased groundwater pumpage during DOR are still within the pumping levels that were experienced during those times of greater usage. As a result, it is anticipated that capital costs have already been incurred and would not be incurred again.

Currently, there are no entities within the Lavaca Region that are engaged in developing capital projects to generate supplies for the Region. As such, there was no need to complete the Infrastructure Finance Report Survey for the Lavaca Region.

9.2 Socioeconomic Impacts of Unmet Water Needs

For the 2011 RWP, TWDB prepared the report *Socioeconomic Impacts of Projected Water Shortages for the Lavaca Regional Water Planning Area*, along with corresponding reports for each of the other 15 regional water planning areas. The socioeconomic impacts within Jackson, Lavaca, and Wharton Counties were summarized in this report for LRWPA.

The socioeconomic impact reports for all 16 planning regions were divided into two components. The first of these is the economic impact module which addressed the potential impacts of unmet water demands on losses to regional economies resulting from reduced economic output caused by agricultural, industrial, or commercial water shortages. For LRWPA, this portion of the report predicts what would occur if, in any given year, DOR recurs and the water demands anticipated in *Chapter 2* of this Plan cannot be met by the firm supplies shown in *Chapter 3*. Economic baseline data used in the analysis was generated from available year 2000 data using IMPLAN PRO™ distributed by the IMPLAN Group.

Additionally, methodology for socioeconomic impact analyses for the 2011 Regional Water Plans was provided by the TWDB as the second component of this analysis. The IMPLAN model estimates direct and indirect impacts to business, industry and agriculture, using output elasticities which were chosen to correlate the magnitude of the shortage as a percentage of the total demand to the resulting economic impact. Elasticities measure the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, shortages of 0 to 5 percent of the total demand were not expected to cause any reduction in output. Water shortages of between 5 and 30 percent were expected to result in a 0.50 percent reduction in output for every 1 percent of unmet need. For shortages of between 30 and 50 percent and shortages greater than 50 percent, output elasticities were selected to show a 0.75 percent and a 1.0 percent reduction in output for each 1 percent increase in the WUG shortage, respectively.

The socioeconomic impacts analysis examined multiple potential impacts of unmet water needs, including repercussions to tax revenues, income, employment, population, and school enrollment. The results of the study indicate income losses of $16.3 million for irrigated agriculture and tax revenue losses of $1.89 million if needs are not met during a 1-year drought period. Unmet needs would result in the loss of an estimated 215 agricultural jobs, a population reduction of 258 people, and a decline in school enrollment of 73 students.

9.3 Potential Agricultural Conservation Improvements

Because agricultural water use is the greatest water demand in LRWPA, consideration was also given to the potential cost of on-farm improvements to enhance water conservation. The cost of implementing such practices was recognized as a substantial amount that would likely require farmers to seek assistance to defray the cost of improvements.

The 2008 Farm Bill includes changes in a number of provisions as compared to the previous 2002 Farm Bill. One of the most significant changes in the 2008 bill is a reduction in the income cap for direct payments. Under the 2008 Farm Bill, funding for the Environmental Quality Incentives Program (EQIP) is expanded by $3.39 billion while maintaining the existing 60/40 split in favor of livestock operations. The 2002 Farm Bill's "Ground and Surface Water Program" is also replaced and modified by the Agricultural Water Enhancement Program (AWEP) under EQIP. The 2008 Farm Bill also extends the Conservation Stewardship Program (CSP, formerly the Conservation Security Program) with $1.1 billion in new funding to enroll approximately 13 million acres per year. While the EQIP program is being increased, farmers are not always able to afford the typically 50% matching share of the cost. The lack of benefit from EQIP is especially significant in LRWPA since much of the region's agriculture is operated by tenant farmers with year-to-year land contracts. Thus, there is little incentive for these tenant farmers to incur capital costs since they may not benefit from improvements beyond the year of implementation. Conservation measures may be further discouraged by increasing production costs. Reduction of the adjusted gross income (AGI) limit is also expected to adversely impact typical farm operations in the region and could significantly reduce the number of farms qualifying for benefits programs. For these reasons, it is important to further consider the cost of agricultural conservation practices as related to the development of future financial assistance programs to assist agriculturally dominated regions such as LRWPA.

The anticipated costs of potential agricultural conservation improvements within the LRWPA were estimated using a variety of data sources: 1) the 2000-2005 planted rice acreage as reported by the National Agricultural Statistics Service (NASS); 2) several assumptions guided by past experience; 3) the report *Potential Rice Irrigation Conservation Measures* prepared by James W. Stansel for the Region H Water Planning Group; and 4) input from L. G. Raun, Jr., a rice farmer and member of LRWPG. *Table 9.3* shows the estimated cost of all potential agricultural conservation measures for the entire region. The average 2000-2005 planted rice acreage for LRWPA is approximately 50,249 acres as presented in the *Agricultural Water Demands Analysis.* It was assumed that this planted acreage was approximately one-third of the total rice acreage in the region since crops are generally grown on a 3-year rotation. As noted in the *Agricultural Water Demands Analysis* and in *Chapter 4*, approximately 15 percent of rice acreage for the 2005-2006 period was identified as improved acreage; a maximum of 85 percent of total rice acreage was assumed to be improvable. Costs were taken from the report by Stansel and adjusted to September 2008 with the cost-indices provided by the *Engineering News Record* (ENR). Costs for the replacement of irrigation ditches with pipeline were compiled assuming 20 feet of pipeline would be required per acre of rice. The total potential cost for all agricultural improvements in LRWPA is estimated to total over $69 million.

Table 9.1 Estimated Cost of Agricultural Conservation Improvements for LRWPA

Improvement	Total Remaining Improvable Rice Acreage	Improvement Cost per Acre	Total Improvement Cost
Land Leveling	106,035	$400	$42,414,000
Multiple Inlets	106,035	$75	$7,952,625
Reduced Levee Interval	106,035	$0.71	$75,285
Irrigation Pipeline	106,035	$179	$18,980,265
		Total Cost	**$69,422,175**

9.4 Policy Recommendations

The RWPG is directed by the TWDB to propose roles for the State to take in financing the recommended water supply projects. In the *2006 Region P RWP*, two recommendations were made regarding policies and programs that directly or indirectly funded water projects and water infrastructure.

9.4.1 Summary

LRWPG reviewed the existing state and federal programs for funding water supply and infrastructure for their applicability to the Lavaca RWP. Generally, recommendations were classified into two categories: those addressing direct assistance programs (loans and grants) and those addressing indirect actions that impact water infrastructure financing. LRWPG recommendations are summarized below and detailed discussions of each program or policy are provided in the following sections.

LRWPG recommends the state develop programs to provide matching funds to farmers for implementing water conservation measures. This would include costs for precision leveling and the conversion of irrigation canals to pipelines. These funds would provide a mechanism to leverage federal grant programs by providing the local matching share.

LRWPG recommends increased funding of the Agricultural Water Conservation Loan Program, and adding a one-time grant or subsidy program to stimulate early adoption of conservation practices by individual irrigators.

LRWPG recommends increased funding of the State Revolving Fund (SRF) Programs in future decades. This program will remain important to assist some systems in upgrading their infrastructure to meet future demands and minimum water quality standards. As infrastructure ages and water quality standards increase, the demand for this assistance will grow. The State Loan Program for political subdivisions and water supply corporations offers loans at a cost advantage over many commercial and many public funding options.

The LRWPG supports the continued and increased funding of the USDA's Rural Utilities Service program at the federal level as well as the state Rural Water Assistance Fund at the state level. These programs offer water and waste disposal loans and grants to rural areas and towns of up to 10,000 people. Certain communities within Texas are specifically targeted for these grants.

LRWPG supports the placement of a five-cent state tax on the sale of all bottled water to be used for the funding of water-related projects by TWDB. These would include municipal and agricultural conservation programs.

LRWPG has and continues to support desalination as a supply alternative to neighboring regions that will develop shortages in the near future. However, desalination is not yet cost-competitive with more traditional water supply projects. It is recommended that the state continue to fund programs to promote desalination research and implementation.

The LRWPG supports provision of increased research grants to study and better develop efficient irrigation practices and to develop varieties of crops that require less water to grow and provide increased first-crop yields. Irrigators cannot generally afford the increased cost of water when new supplies are developed. By reducing demand in a cost-efficient manner, small irrigators may be able to continue farming.

9.4.2 Recommendations Relating to Direct Financial Assistance Programs

Program/Policy Item: Agricultural Water Conservation Programs

Discussion: The Agricultural Water Conservation Loan Program provides loans to soil and water conservation districts, underground water conservation districts, and districts authorized to supply water for irrigation. These districts may further lend the funds to private individuals for equipment and materials, labor, preparation, and installation costs to improve water-use efficiency related to irrigation of their private lands. There is also a grant program for equipment purchases by eligible districts for the measurement and evaluation of irrigation systems and agricultural water conservation practices and for efficient irrigation and conservation demonstration projects, among others. However, these grants are not available directly to individual irrigators. The program also includes a linked deposit loan program allowing individuals to access TWDB funding through participant farm credit institutions and local state depository banks.

EQIP, available through USDA, provides some limited funding to natural resources issues, including water quantity and availability. In 2008, Texas was allocated over $103 million in EQIP funds for projects including irrigation supply, brush control, water and air quality from livestock operations, wildlife, and invasive species. This amount has increased from nearly $89 million in 2007. These funds are typically provided at a 50 percent cost-share rate. Jackson, Lavaca, and Wharton Counties were designated within the primary area of concern for irrigation water quantity issues. The implementation of a similar program at the state level would allow additional opportunities for irrigators to receive assistance in implementing conservation practices.

Eligible districts will need to act as conservation brokers, identifying those irrigators with the potential to reduce water demand through equipment improvements, and matching them with available loans. To assist with the immediate adoption of these improved conservation practices, a one-time grant or subsidy program for water-efficient equipment purchases may help by reducing the loan amount required by each irrigator. If the requirements of an existing federal loan or grant program could be met, the state could provide all or part of the local matching share. Since the methods used by irrigators vary across the state, such a program would need to be flexible, with local oversight provided by those districts currently eligible for the Agricultural Water Conservation Loan Program. Consistency with the applicable RWP may be included as a prerequisite for this program, as it is for other state grants and loans.

<u>Policy Recommendation</u>: Provide a mechanism to leverage federal grant programs by providing the local matching share. Increase funding of this loan program, and consider adding a one-time grant or subsidy component to stimulate early adoption of conservation practices by individual irrigators.

Program/Policy Item: Drinking Water State Revolving Fund Program

<u>Discussion</u>: This program provides loans at subsidized interest rates for the construction of water treatment and distribution systems and for source water protection. As the loans are paid off, the TWDB uses the funds to make new loans (thus the name revolving fund). State funds for the program receive a federal match through the U.S. Environmental Protection Agency. These loans are intended for projects to bring existing systems into compliance with rules and regulations and are available to political subdivisions, water supply corporations, and privately-owned water systems. Applications are collected at the beginning of each year, given a priority ranking, and funded to the extent possible. Projects not funded in a given year may be carried forward into the next year's ranking.

These programs are important in that they assist sub-standard water systems in attaining the minimum water quality mandated by federal and state regulations, but they are not intended to fund system expansions due to projected growth. However, the SRF Fund may provide assistance to water providers with aging infrastructure.

<u>Policy Recommendation</u>: Increase the funding of this program in future decades.

Program/Policy Item: State Loan Program

<u>Discussion</u>: The State Loan Program provides loans to political subdivisions and water supply corporations for water, wastewater, flood control, and municipal solid waste projects. The interest rates for this program are not subsidized as they are in the Drinking Water SRF Program. The loan can be used for a number of water system improvements including the improvement or construction of wells, treatment facilities, and transmission and distribution systems. Loans are made on a first come, first served basis. This program will be helpful to regions that are seeking funding alternatives for adding groundwater supply infrastructure.

<u>Policy Recommendation</u>: Increase funding of this program to meet near-term infrastructure cost projections.

Program/Policy Item: Water and Waste Disposal Loans and Grants from the USDA's Rural Utilities Service

Discussion: This federal program provides loans and grants in rural areas and communities of up to 10,000 people for water, wastewater, storm water, and municipal solid waste projects. The program is intended for communities that cannot obtain commercial loans at reasonable rates. Loans are made at or below market rates, depending upon the eligibility of the recipient. Grants can cover up to 75 percent of project costs when required to reduce user costs to a reasonable level. A separate program of Emergency Community Water Assistance Grants (up to $500,000 per project) is also available to communities experiencing rapid declines in water quality or quantity.

This program is similar to the state loan and revolving fund programs. It offers another option to small communities and rural areas unable to finance required infrastructure without assistance. However, this is a nationwide program, and the competition for available funds is correspondingly greater. Colonias and border areas are specifically identified as target areas for the grant portion of this program, and it is therefore in the state's interest to support its continued funding.

At the state level, the Rural Water Assistance Fund provides low-interest loans to municipalities, water districts, and non-profit water supply corporations. LRWPG also promotes the funding of this program in an effort to assist small rural utilities in providing safe, reliable water supplies.

Policy Recommendation: Support continued and increased funding of this program at the federal level, and fund the state Rural Water Assistance Fund.

9.4.3 Policy Recommendations Which Indirectly Impact Financing for Water Infrastructure

Program/Policy Item: TWDB Funding Through Taxation of Bottled Water Sales

Discussion: In order to finance programs relating to water-related issues, the state should develop a dedicated means of acquiring funds for these projects. A tax on bottled water would generate revenue that could then be applied to conservation of water for municipal, agricultural, and industrial uses.

Policy Recommendation: Use funds generated from sales tax on the sale of bottle water to fund water-related projects, namely municipal and agricultural infrastructure projects.

Program/Policy Item: Desalination Research and Demonstration Projects

Discussion: House Bill 1370 of the 78th Texas Legislature directed TWDB to "undertake or participate in research, feasibility and facility planning studies, investigations and surveys as it considers necessary to further the development of cost-effective water supplies from seawater desalination in the state." Funding was appropriated under the 79th Texas Legislature to continue and expand the State's efforts in desalination research. Subsequently, TWDB has participated in two seawater desalination pilot projects and several brackish water desalination demonstration projects

The Lavaca Region anticipates meeting future shortages through other methods; LRWPG recognizes the growing demands of surrounding regions. By supporting programs to promote the research and implementation of desalination, LRWPG wishes to promote desalinated water as a strategy to allow regions to meet their future needs without increasing the pressure to transfer supplies from rural areas in other regions.

Policy Recommendation: Provide research grants for the study of current and upcoming desalination technologies available to wholesale and retail water suppliers. Continue to fund appropriate demonstration facilities and subsidize the use of these facilities to develop a customer base.

Program/Policy Item: Water Research Program – Agriculture

Discussion: The TWDB offers research grants to individuals or political subdivisions for water research on topics published in the TWDB's Request for Proposals. Eligible topics include product and process development.

One recommendation to the Legislature is to establish funding for agricultural research in the areas of efficient irrigation practices and the development of new crop varieties that provide more yield with less water. Generally, irrigators cannot afford the increased cost of water when new supplies are developed in today's market. By reducing demand in a cost-efficient manner, small irrigators may be able to continue farming. This is another potential topic for the Water Research Program.

Policy Recommendation: Provide increased research grants to study and better develop efficient irrigation practices.

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Appendix 9A

Socioeconomic Impacts of Projected Water Shortages

Socioeconomic Impacts of Projected Water Shortages for the Lavaca (Region P) Regional Water Planning Area

Prepared in Support of the Lavaca (Region P) Regional Water Plan

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Table of Contents

Tables

Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Region P Regional Water Planning Group.

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200 acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands, and people would experience a shortage of 100 acre-feet assuming drought of record conditions.

Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted as "output" in an IO model. Thus, total sales double-count or overstate the true economic value of goods

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

[2] Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;

- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;

- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and

- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$D_{i,t} = Q_{i,t} *_{,} S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

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the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). As shown in Table 2, the overwhelming majority of irrigation in Region P is for rice. Table 3 displays average (2003-2007) gross revenues per acre for rice production applied in the analysis.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors	
IMPLAN category	**TWDB category**
Oilseeds	Soybeans and “other oil crops”
Grains	Grain sorghum, corn, wheat and “other grain crops”
Vegetable and melons	“Vegetables” and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All “other” crops	“Forage crops”, peanuts, alfalfa, hay and pasture, rice and “all other crops”

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Lavaca Regional Water Planning Area (average 2003-2007)

Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Oilseeds	<1	<1%	1	<1%
Grains	5	6%	7	3%
Vegetable and melons	<1	<1%	<1	<1%
Tree nuts	<1	<1%	<1	<1%
Cotton	1	2%	1	<1%
Rice	73	91%	217	97%
Total	**160**	**100%**	**226**	**100%**

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB’s annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as “failed acres,” “golf course” or “waste water.”

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Region P Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
All Other Crops	$460	Based on five-year (2003-2007) average weighted by acreage for “rice.”
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

3. *Reduce sales revenues for forward processers in proportion to lost rice production*. As discussed in Section 1.1, input output models capture indirect losses to suppliers and other businesses that depend upon rice farming, but only those providing inputs to rice production. Multipliers do not capture potential impacts to forward processors, in this case rice mills, which add considerable value to the product and hence income and jobs to the state. For example, Texas rice farming directly generates about $60 to $80 in gross state product. Once the rice harvested it is sold to rice mills that process and resell the crop. This added value generates an additional $60 to $80 million in direct gross state product. Impacts measured in the study capture this additional value added.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of “other” is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill

stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk manufacturers) would likely have little to process. This is not an unreasonable premise. Since the 1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[5] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[6]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[7] For example,

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[5] Ferreira, W.N. "*Analysis of the Meat Processing Industry in the United States*." Clemson University Extension Economics Report ER211, January 2003.

[6] Ward, C.E. "*Summary of Results from USDA's Meatpacking Concentration Study*." Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[7] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of

if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as "county-other." Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

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the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: "*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*," Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, "*Evaluation of Water Conservation for Municipal and Industrial Water Supply*." U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[8] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[9]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions
(average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total Monthly Cost	Avg. Monthly Use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[10] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the

[8] Bell, D.R. and Griffin, R.C. "*Community Water Demand in Texas as a Century is Turned*." Research contract report prepared for the Texas Water Development Board. May 2006.

[9] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[10] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[11] Earlier findings of the U.S. Water Resources Council showed a national average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[12] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[13] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[14] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[15]

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[11] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

[12] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[13] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[14] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[15] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people				
Water shortages as a percentage of total monthly household demands	**No. of gallons remaining per household per day**	**No of gallons remaining per person per day**	**Economic loss (per acre-foot)**	**Economic loss (per gallon)**
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use.

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[16] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[17]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

[16] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[17] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.

2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[18] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

[18] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[19] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[20]

[19] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[20] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2. Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economics impacts of water shortages for water user groups with reported deficits. According to the 2011 *Lavaca Regional Water Plan*, during severe drought irrigation water user groups would experience water shortages without new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Lavaca planning region generates about $860 million in gross state product for Texas ($800 million in income and $70 million in state and local business taxes) and supports nearly 16,240 jobs (Table 8). Generating nearly $411 million in gross state product irrigation, mining and manufacturing (particularly plastics packing materials) are the primary base economic sectors for the Lavaca region.[21] Municipal sectors also generate substantial amounts of activity, and are major employers; however, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing or farming. In other words, without base industries many municipal jobs would not exist.

[21] Base industries are those that supply markets outside of a region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Lavaca (Region P) Economy by Water User Group ($millions)[a]						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation[b]	$37.25	$32.01	$5.23	427	$18.02	$0.72
Livestock	$194.02	$105.70	$88.32	2,683	$18.56	$2.55
Manufacturing	$752.12	$230.34	$521.78	3,810	$226.99	$9.47
Mining	$193.68	$144.81	$48.87	380	$124.65	$11.03
Steam-electric	$17.36	$4.88	$12.48	50	$12.05	$2.06
Municipal	$690.89	$165.03	$525.86	8,891	$401.29	$43.89
Regional total	$1,885.32	$682.77	$1,202.54	16,241	$801.56	$69.72

[a] Appendix 1 displays data for individual IMPLAN sectors that make up each water use category.
[b] Irrigation includes activity for both rice farms and rice mills.
Source: Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Irrigation Water Shortages

According to the 2011 *Lavaca Regional Water Plan*, during severe drought in Jackson and Lavaca counties would experiences shortages of irrigation water without new management strategies. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by an estimated $18 million in each decade over the planning horizon (Table 9). Please note that these figures include impacts to the rice milling sector.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	Lost income from reduced rice production and rice milling [a]	Lost state and local tax revenues from rice production and rice milling	Lost jobs from rice production and rice milling
		Jackson County	
2010	$2.26	$0.26	30
2020	$2.26	$0.26	30
2030	$2.26	$0.26	30
2040	$2.26	$0.26	30
2050	$2.26	$0.26	30
2060	$2.26	$0.26	30
		Wharton County	
2010	$14.03	$1.62	185
2020	$14.03	$1.62	185
2030	$14.03	$1.62	185
2040	$14.03	$1.62	185
2050	$14.03	$1.62	185
2060	$14.03	$1.62	185
		Regional Totals	
2010	$16.30	$1.89	215
2020	$16.30	$1.89	215
2030	$16.30	$1.89	215
2040	$16.30	$1.89	215
2050	$16.30	$1.89	215
2060	$16.30	$1.89	215

[a] Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level.

2.4 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment. In each decade, estimated population losses total 258 with corresponding reductions in school enrollment of 73 students (Table 10).

Table 10: Social Impacts of Water Shortages (2010-2060)		
Year	Population Losses	Declines in School Enrollment
2010	258	73
2020	259	73
2030	259	73
2040	259	73
2050	259	73
2060	259	73

2.5 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 11 displays the results.

Table 11: Distribution of Impacts by Major River Basin (2010-2060)

Water Use	2010	2020	2030	2040	2050	2060
Irrigation						
Lavaca	7%	7%	7%	7%	7%	7%
Colorado-Lavaca	93%	93%	93%	93%	93%	93%

Appendix: Economic Data for Individual IMPLAN Sectors for Lavaca Regional Water Planning Area

Economic Data for Agricultural Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Irrigation	Rice	10	$34.14	$31.90	$2.24	358	$16.55	$0.66
Irrigation	Grain Farming	2	$2.01	$0.10	$1.91	55	$0.92	$0.04
Irrigation	Cotton Farming	8	$0.56	$0.01	$0.55	6	$0.21	$0.01
Irrigation	Vegetable and Melon Farming	3	$0.27	$0	$0.26	3	$0.19	$0.00
Irrigation	Oilseed Farming	1	$0.23	$0	$0.23	4	$0.12	$0.01
Irrigation	Tree Nut Farming	4	$0.04	$0	$0.04	1	$0.03	$0.00
	Total irrigation		$37.25	$32.01	$5.23	427	$18.02	$0.72
Livestock	Cattle ranching and farming	11	$102.33	$70.95	$31.37	2,236	$8.09	$2.15
Livestock	Meat processed from carcasses	68	$76.37	$22.53	$53.84	181	$6.10	$0.31
Livestock	Poultry and egg production	12	$12.06	$9.45	$2.61	82	$4.06	$0.04
Livestock	Animal production- except cattle and poultry	13	$3.27	$2.77	$0.50	184	$0.32	$0.05
Livestock	Fluid milk processing	62	$0.00	$0.00	$0.00	0	$0.00	$0.00
Livestock	Cheese manufacturing	64	$0.00	$0.00	$0.00	0	$0.00	$0.00
	Total livestock		$194.02	$105.70	$88.32	2,683	$18.56	$2.55
	Total agriculture		$231.27	$137.71	$93.55	3,110	$36.58	$3.28

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Mining and Steam-electric Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Mining	Oil and gas extraction	19	$149.59	$138.92	$10.67	122	$85.90	$9.21
Mining	Support activities for oil and gas operations	28	$42.32	$5.88	$36.44	255	$38.34	$1.77
Mining	Drilling oil and gas wells	27	$1.77	$0.01	$1.76	3	$0.41	$0.05
Total Mining	**NA**		$193.68	$144.81	$48.87	380	$124.65	$11.03
Steam-electric	**Power generation and supply**	30	$17.36	$4.88	$12.48	50	$12.05	$2.06

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Plastics packaging materials- film and sheet	172	$318.32	$172.36	$145.97	998	$90.62	$2.46
Manufacturing	Accessories and other apparel manufacturing	108	$47.98	$3.35	$44.63	461	$12.03	$0.19
Manufacturing	New residential 1-unit structures- all	33	$47.04	$0.00	$47.04	325	$14.96	$0.24
Manufacturing	Motor vehicle parts manufacturing	350	$42.69	$3.43	$39.26	125	$8.13	$0.13
Manufacturing	Machine shops	243	$41.62	$10.04	$31.58	358	$16.10	$0.26
Manufacturing	Fabricated structural metal manufacturing	233	$39.87	$2.06	$37.80	170	$12.30	$0.20
Manufacturing	Breweries	86	$37.54	$1.55	$35.99	49	$8.62	$4.99
Manufacturing	Soft drink and ice manufacturing	85	$28.69	$1.60	$27.08	48	$3.15	$0.14
Manufacturing	Commercial and institutional buildings	38	$26.05	$0.00	$26.05	283	$12.83	$0.16
Manufacturing	Electroplating- anodizing- and coloring metal	247	$25.45	$8.97	$16.48	187	$10.08	$0.12
Manufacturing	Plastics plumbing fixtures and all other plastic	177	$24.52	$17.76	$6.76	143	$7.61	$0.13
Manufacturing	Other new construction	41	$11.33	$0.00	$11.33	129	$5.95	$0.05
Manufacturing	New residential additions and alterations-all	35	$6.65	$0.00	$6.65	38	$2.37	$0.03
Manufacturing	Switchgear and switchboard apparatus	335	$6.64	$1.65	$4.99	27	$2.91	$0.05
Manufacturing	Other leather product manufacturing	111	$5.68	$0.89	$4.79	46	$2.03	$0.04
Manufacturing	Highway- street- bridge- and tunnel construct	39	$5.60	$0.00	$5.60	55	$2.75	$0.04
Manufacturing	New multifamily housing structures- all	34	$5.06	$0.00	$5.06	47	$2.31	$0.01
Manufacturing	Agriculture and forestry support activities	18	$4.89	$2.78	$2.11	146	$3.55	$0.04
Manufacturing	Bread and bakery product- except frozen	73	$4.18	$0.93	$3.25	32	$1.49	$0.02
Manufacturing	Travel trailer and camper manufacturing	349	$4.12	$0.22	$3.90	21	$0.96	$0.01
Manufacturing	Water- sewer- and pipeline construction	40	$4.10	$0.00	$4.10	36	$1.76	$0.03
Manufacturing	Other oilseed processing	53	$3.61	$0.12	$3.49	2	$0.17	$0.02
Manufacturing	Wood kitchen cabinet and countertops	362	$2.58	$2.01	$0.57	22	$1.07	$0.02
Manufacturing	Manufacturing and industrial buildings	37	$2.06	$0.00	$2.06	24	$1.07	$0.01
Manufacturing	Other concrete product manufacturing	195	$1.07	$0.01	$1.06	4	$0.60	$0.01
Manufacturing	Hunting and trapping	17	$0.84	$0.07	$0.77	7	$0.13	$0.04
Manufacturing	All other manufacturing	Various	$3.12	$0.48	$2.64	21	$1.16	$0.02
Manufacturing	**Total manufacturing**	**NA**	$752.12	$230.34	$521.78	3,810	$226.99	$9.47

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Municipal	Owner-occupied dwellings	509	$90.01	$0.00	$90.01	0	$69.73	$10.64
Municipal	Wholesale trade	390	$66.04	$31.62	$34.42	595	$34.78	$9.75
Municipal	State & Local Education	503	$36.78	$0.00	$36.78	1,059	$36.78	$0.00
Municipal	State & Local Non-Education	504	$31.24	$0.00	$31.24	729	$31.24	$0.00
Municipal	Monetary authorities and depository credit institutions	430	$30.75	$10.13	$20.62	171	$21.59	$0.39
Municipal	Gasoline stations	407	$27.27	$4.14	$23.13	337	$14.68	$3.98
Municipal	Pipeline transportation	396	$24.78	$10.83	$13.94	19	$9.99	$2.14
Municipal	Food services and drinking places	481	$23.67	$3.02	$20.65	553	$8.74	$1.02
Municipal	Nursing and residential care facilities	468	$23.23	$0.00	$23.23	573	$13.42	$0.32
Municipal	Other State and local government enterprises	499	$22.66	$7.38	$15.28	123	$6.88	$0.00
Municipal	Offices of physicians- dentists- and other he	465	$22.61	$0.00	$22.61	291	$15.29	$0.14
Municipal	Telecommunications	422	$22.40	$7.69	$14.71	66	$9.11	$1.51
Municipal	Truck transportation	394	$22.15	$12.00	$10.16	136	$11.69	$0.27
Municipal	Motor vehicle and parts dealers	401	$17.06	$1.85	$15.20	196	$8.64	$2.45
Municipal	Food and beverage stores	405	$16.81	$2.25	$14.56	349	$8.18	$1.79
Municipal	Civic- social- professional and similar organ	493	$16.78	$5.89	$10.88	685	$4.97	$0.03
Municipal	General merchandise stores	410	$12.26	$1.29	$10.97	230	$5.47	$1.74
Municipal	Hospitals	467	$12.04	$0.00	$12.04	116	$6.00	$0.08
Municipal	Architectural and engineering services	439	$10.69	$6.74	$3.95	100	$5.25	$0.05
Municipal	Real estate	431	$9.44	$3.74	$5.70	58	$5.47	$1.16
Municipal	Automotive repair and maintenance- except car	483	$8.53	$2.03	$6.50	128	$2.84	$0.58
Municipal	Maintenance and repair of nonresidential buildings	43	$8.42	$5.58	$2.84	72	$3.16	$0.06
Municipal	Legal services	437	$8.33	$5.28	$3.04	95	$4.91	$0.16
Municipal	Building material and garden supply stores	404	$7.16	$1.11	$6.05	103	$3.21	$0.98
Municipal	Miscellaneous store retailers	411	$6.98	$0.87	$6.11	182	$4.21	$1.03
	All other municipal sectors	NA	$107.33	$40.11	$67.22	$1,907.00	$52.52	$3.62
	Total municipal	**NA**	$690.89	$165.03	$525.86	8,891	$401.29	$43.89

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Contents

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Chapter 10 – Public Participation

10.1 Introduction

LRWPG's approach to public involvement has been to secure early participation of interested parties so that concerns could be addressed as the Plan is being developed. From its initial deliberations, LRWPG has made a commitment to an open planning process and has actively solicited public input and involvement in developing the elements of RWP. This has been accomplished by pursuing several avenues to gain public involvement.

The first line of public involvement occurs through the membership of LRWPG. As a result of the small geographic area and the relatively small population, the LRWPG members are highly visible and well-known representatives of the interests of water users in LRWPA. The individual group members provide a liaison with identified associations, such as the soil and water conservation districts, the farm service agencies in the counties, the Texas Farm Bureau, and similar organizations. In addition, individual group members, staff members of LNRA, and members of the consultant team have made themselves available to other regional planning groups and to civic organizations such as the Lion's Clubs, Kiwanis Clubs, Rotary Clubs, and Chambers of Commerce throughout the regional planning area and in neighboring regional planning areas where LNRA customers were located. Meetings were held with interested agricultural representatives to develop revisions to the irrigation demands. All planning group meetings are open to members of the public in order to welcome public participation in the planning process. In addition, three of these meetings, corresponding with the development of the scope of work, population and water demands, and the Initially Prepared Plan public hearing were more widely advertised to the public. Presentation materials tailored to the particular interest groups were prepared for each of the events noted above.

Following the development of the 2011 Draft Regional Water Plan for LRWPA, two public meetings and a public hearing were held to present the draft plan to the public and receive comments. Written public comments received after these meetings are included in Appendix 10B. Formal responses to public comments are included in Appendix 10C.

Members of LRWPG and personnel from LNRA attended various other regional planning meetings and meetings of community and civic organizations to present findings and decisions made by the group.

10.2 Public Meetings

LRWPG held the first meeting for the 2011 Planning Cycle in the summer of 2006. All of these meetings welcomed public participation as elements of RWP were addressed. The following is a summary of the minutes of those meetings. The complete minutes can be found in *Appendix 10A*.

10.2.1 June 15, 2006, Meeting

The LRWPG elected decided to re-elect the current list of officers and to re-elect the current Executive Committee. Calvin Bonzer was appointed as a new member of the LRWPG, representing small business. It was requested that LRWPG prioritized the tasks for the 2011 planning cycle, and the professional services of AECOM were approved for the 2006-2011 regional water planning cycle.

10.2.2 August 28, 2006, Meeting

The LRWPG by-laws were amended regarding terms of office. LRWPG moved to approve the Scope of Work. The group decided to approve the Scope with a minor revision.

10.2.3 February 27, 2007, Meeting

The LRWPG accepted the resignations of Judge Ronald Leck and Paul Markovsky. LRWPG moved to accept the appointment of David Wagner as a member of the group.

10.2.4 September 10, 2007, Meeting

The LRWPG approved a resolution honoring the service of Wayne E. Popp, deceased LRWPG member. The LRWPG moved to develop a committee to review specific work as necessary. At this meeting it was agreed that the committee with meet to discuss the response to the TWDB questionnaire.

10.2.5 February 25, 2008, Meeting

The LRWPG moved to reelect the existing officers and appointed a new member, Tommy Brandenberger. AECOM was authorized to participate with the approved scoping committee in preparing a Scope of Work for completion of a regional water plan for the LRWPG. A report from the agriculture committee was presented as well as the recommended methodology for revising agricultural water demands.

10.2.6 May 19, 2008, Meeting

The LRWPG approved the final scope of work for the 2011 RWP as presented. The authority for final review and approval of the application document was delegated to the Scoping Committee.

10.2.7 November 3, 2008, Meeting

The LRWPG moved to enter into a contract with the TWDB for the completion of a Regional Water Plan. The Group also moved to submit the Irrigation Water Demands Study to the TWDB.

10.2.8 April 20, 2009 Meeting

The LRWPG received the resignation of Bob Weiss, moved to elect LG Raun as vice-chair, and re-elect Judge Harris Stafford II and Patrick Brzozowski as chair and secretary, respectively. The LRWPG receive a presentation on the agricultural demands analysis and submit the final report to TWDB. The LRWPG reviewed the draft Chapter 1 of the 2011 RWP and moved to approve a methodology for the selection of water management strategies (WMS). Finally, the LRWPG received a report from the inter-regional coordination meeting held on April 8th.

10.2.9 June 22, 2009 Meeting

The LRWPG moved to approve Chapter 1 of the 2011 RWP on a draft basis. The LRWPG also reviewed Chapters 2, 3 of the plan.

10.2.10 August 4, 2009 Meeting

The LRWPG moved to accept the appointment of Edward Putska and Lester Little to the group, Draft Chapters 2 and 3 of the 2011 RWP were approved and the LRWPG received presentations on the draft Chapters 4, 5, and 6 of the plan.

10.2.11 October 5, 2009 Meeting

The LRWPG received a presentation from the City of Corpus Christi regarding the Garwood Pipeline Project. The LRWPG proceeded to approve the draft Chapters 4, 5, and 6 for the 2011 RWP and received presentations regarding the draft Chapters 7, 8, and 9. The LRWPG accepted the resignation of Patricia Hertz.

10.2.12 January 11, 2010 Meeting

The LRWPG moved to request the TWDB to perform the socioeconomic impact analysis of not meeting water needs identified in the 2011 Plan. The Group also moved to accept the Draft Initially Prepared Plan (IPP) contingent upon approval of final edits by the Executive Committee. The Group set the dates for the public meetings and hearing for the IPP as April 27, 28, and 29, 2010.

10.2.13 April 27, 2010 Public Meeting

A Public Meeting to present the Initially Prepared Plan was held in Hallettsville at the Lavaca County Courthouse Annex. There were no comments from the public regarding the IPP.

10.2.14 April 28, 2010 Public Hearing

A Public Hearing to present the Initially Prepared Plan was held in Edna at the Lavaca-Navidad River Authority Main Office Meeting Room. Eight public comments were taken from the audience.

10.2.15 April 29, 2010 Public Meeting

A Public Meeting to present the Initially Prepared Plan was held in El Campo at the El Campo Chamber of Commerce. Three public comments were taken from the audience.

10.2.16 July 19, 2010 Meeting

The group moved to appoint Michael Skalicky as a voting member of the LRWPG. The Group re-elected Harrison Stafford II, Chairman, LG Raun, Vice-Chairman, and Patrick Brzozowski, Secretary of the Lavaca Regional Water Planning Group. LRWPG moved to send a letter to the TWDB requesting that no modification be made to the boundaries of Region P.

10.2.17 August 16, 2010 Meeting

The LRWPG moved to adopt the 2011 Regional Water Plan for the Lavaca Region, including IFR survey results and the Socioeconomic Impacts study, and authorized the Consultant to transmit the adopted documents to the TWDB.

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Appendix 10A

Meeting Minutes

Minutes of Lavaca Regional Water Planning Group
June 15, 2006
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Thursday, June 15, 2006 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Patrick Brzozowski, John Butschek, Gerald Clark, Judge Ronald Leck, Paul Morkovsky, Richard Ottis, L. G. Raun, Robert Shoemate, and Bob Weiss.

Absent Voting Group Members were: Griffin, Hertz, Maloney, Miller, Popp, Schmidt, Waits, and Weinheimer.

Also present were: Bill Roberts, Texas Water Development Board, Mark Lowry, Turner Collie & Braden, John Seifert of LBG-Guyton Associates, Mike Fields, AEP, B. J. Jimenez, LNRA Board member, Karen Gregory, LNRA staff, Calvin Bonzer, Better Beverages, Lois Weiss, and Anne R. Rowbotham.

Chairman Stafford called the meeting to order.

Group Member Weiss introduced his guests, Lois Weiss and Anne R. Rowbotham.

Public Comments

There were no public comments.

Minutes

The minutes of the November 17, 2005 meeting were reviewed. Ottis moved the minutes be approved as presented. Raun seconded the motion. Motion passed.

Election of Officers

Ottis moved to re-elect the current slate of officers for the Lavaca Regional Water Planning Group. Clark seconded the motion. Motion passed.

Raun moved to re-elect the current Executive Committee members for the Lavaca Regional Water Planning Group. Butschek seconded the motion. Motion passed.

Appointment of New Voting Member

Brzozowski introduced Calvin Bonzer as a prospective LRWPG Small Business voting member. Judge Leck moved to elect Calvin Bonzer to the Lavaca Regional Water Planning Group as a voting member. Otis seconded the motion. Motion passed.

LRWPG By-laws

The Group was given a copy of LRWPG By-laws for review. Brzozowski asked for comments and/or recommendations for revisions regarding the By-laws.

The Group agreed that revisions to Section 2, Terms of Office should be considered. It was agreed that proposed revisions to Section 2 would be presented to the Group for their consideration at the next scheduled meeting.

Texas Water Development Board Briefing

Roberts and Lowry discussed the Texas Water Development Board's letter in reference to the next round of regional water planning (2006-2011). The Group was presented a copy of the letter outlining TWDB's proposed plan for future regional water planning.

Lowry asked the Group to prioritize topics for the 2011 water planning cycle and send to him for an overall ranking of the priorities. These priorities will be reviewed by the Scoping Committee (Raun, Brzozowski, Morkovosky).

Professional Services

Clark moved to approve Turner Collie Braden for professional services for the 2006-2011 regional water planning. Morkovosky seconded the motion. Motion passed.

The Group discussed the requirement of notice of public meeting to receive comments on the proposed scope of work for the updated regional water plan.

The Group scheduled the next regular meeting for August 28, 2006. The public meeting to receive comments is scheduled prior to the regular meeting.

The meeting adjourned at 2:55 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
August 28, 2006
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, August 28, 2006 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Calvin Bonzer, Patrick Brzozowski, John Butschek, Gerald Clark, Roy Griffin, Pat Hertz, Jack Maloney, Richard Ottis, Dean Schmidt, Robert Shoemate, Larry Waits, Ed Weinheimer, and Bob Weiss.

Absent Voting Group Members were: Judge Ronald Leck, Phillip Miller, Paul Morkovsky, Wayne Popp, and L. G. Raun.

Also present were: David Meesey, Texas Water Development Board, Mark Lowry and Jason Afinowicz, Turner Collie & Braden, John Nelson of LBG-Guyton Associates, Mike Fields, AEP, B. J. Jimenez and Ronald Kubecka, LNRA Board members, and Karen Gregory, Sylvia Balentine, and Chad Kinsfather, LNRA staff.

Chairman Stafford called the meeting to order.

Minutes

The minutes of the June 15, 2006 meeting were reviewed. Weiss recommended correcting the spelling of Ottis in the minutes. Hertz moved the minutes be approved as presented with correction recommended. Brzozowski seconded the motion. Motion passed.

LRWPG By-laws

The Group discussed and reviewed the LRWPG By-laws. Weiss moved to amend the LRWGP By-laws, Article V. Voting Membership, Section 2, Terms of Office, 1st sentence, to read:

> *"Following the initial two year term of membership ending on September 30, 2001, members may commit to serve additional terms."*

Butschek seconded the motion. Motion passed.

Path Forward Review

Lowry discussed with the Group the anticipated process that is necessary to produce the scope of work and grant application by the September 14, 2006 deadline. The Group was presented a summary of the process.

Weiss moved to recess the LRWPG meeting and convene into Public Meeting to receive comments on the draft scope and funding application. Clark seconded the motion. Motion passed.

Chairman Stafford declared at 1:45 p.m. that the LRWPG would convene into a Public Meeting.

Chairman Stafford asked for public comments. There were no public comments.

Public Meeting ended and Stafford declared the LRWPG to be in Open Session at 1:46 p.m.

<u>Potential Changes on Scope of Work</u>

The Group discussed the draft scope of work. The Group was presented a copy of the draft scope of work with an amended Scope Item Number 1 – Groundwater Availability Determinations.

Ottis moved to approve the Scope of Work with an amended Scope Item No. 1 as discussed by the group which is to include a combination of the items from Revised Scope Item No. 1 that was handed out at the meeting, and Scope Item No. 3 from the handouts. This combined scope item would also include some of the GIS from the original Scope Item No. 1 that was sent out to the Group members. Weiss seconded the motion. Motion passed.

<u>Delegating Authority for Final Review</u>

Hertz moved to delegate authority to the Executive Committee for final review and approval of application document. Ottis seconded the motion. Motion passed.

The meeting adjourned at 2:30 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
February 27, 2007
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Tuesday, February 27, 2007 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Calvin Bonzer, Patrick Brzozowski, Gerald Clark, Pat Hertz, Jack Maloney, Dean Schmidt, Robert Shoemate, and Bob Weiss.

Absent Voting Group Members were: John Butschek, Roy Griffin, Phillip Miller, Richard Ottis, L. G. Raun, Larry Waits, Ed Weinheimer.

Also present were: Bill Roberts, Texas Water Development Board, Mark Lowry, Turner Collie & Braden, Philip Benavides, Texas Department of Agriculture, Darlene Tise, Jackson County Herald Tribune, and Karen Gregory and Doug Anders, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

Weiss introduced members of the Lavaca County Groundwater Conservation District as follows: Larry Svetlik, August "Boyce" Etlinger, A.J. Cerny, J.C. Hermes Jr., and David Myers.

Minutes

The minutes of the August 28, 2006 meeting were reviewed. Clark moved the minutes be approved as presented. Weiss seconded the motion. Motion passed.

Accept Resignations

Brzozowski informed the Board that resignations had been received from Judge Ronald Leck and Paul Morkovsky. He also informed the Board of Wayne Popp's death. The Board will consider replacement members.

Hertz moved to accept the resignations as presented. Bonzer seconded the motion. Motion passed.

Election of Officers

Hertz moved to re-elect Stafford, Chairman and Brzozowski, Secretary and elect Weiss as Vice-Chairman of the Lavaca Regional Water Planning Group. Clark seconded the motion. Motion passed.

Appointment of New Voting Member

Brzozowski introduced David E. Wagner, Lavaca County Commissioner as a prospective LRWPG County voting member to replace Judge Leck. Brzozowski moved to elect David E. Wagner to the Lavaca Regional Water Planning Group as a voting member. Clark seconded the motion. Motion passed.

Discussion of Region P Water Plan

Lowry presented the Group the Task Budget and the Scope of Work for the Lavaca Regional Water Planning Group (LRWPG) as part of the grant application process and to be included in the public deliberation process.

Negotiating Committee

Brzozowski moved to name the following members to the Negotiating Committee to review any subsequent scopes of work developed with the TWDB as part of the negotiation process for the contract for the next round of planning: Ed Weinheimer, Gerald Clark, L.G. Raun, Dean Schmidt, and Bob Shoemate. This committee was given the authority to approve any scope changes for inclusion in the contract between the TWDB and the LNRA. Weiss seconded the motion. Motion passed.

The meeting adjourned at 2:26 p.m.

Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
September 10, 2007
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, September 10, 2007 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Calvin Bonzer, Patrick Brzozowski, Gerald Clark, Roy Griffin, Pat Hertz, Jack Maloney, Dean Schmidt, David E. Wagner, Larry Waits, and Ed Weinheimer.

Absent Voting Group Members were: John Butschek, Phillip Miller, Richard Ottis, L.G. Raun, Robert Shoemate, and Bob Weiss.

Also present were: David Meesey, Texas Water Development Board, Mark Lowry, Turner Collie & Braden, David Myers, Lavaca County Groundwater Conservation District, and Karen Gregory, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the February 27, 2007 meeting were reviewed. Brzozowski moved the minutes be approved as presented. Weinheimer seconded the motion. Motion passed.

Resolution for Lavaca Regional Water Planning Group Member

Brzozowski presented the Board with a draft Resolution to pay tribute to Wayne E. Popp, deceased LRWPG Board member. The Resolution will be presented to Popp's family.

Griffin moved to approve the Resolution as presented. Clark seconded the motion. Motion passed.

Review Scope Items

Lowry informed the Board that Texas Water Development Board has approved Scope Item No. 2- Review and Update Demand Information for Rice Irrigation and Scope Item No. 5- Public Outreach/Administration.

Development of Committee

Waits moved to name the following members to the standing Committee to review specific work items as necessary: Patrick Brzozowski, L.G. Raun, Dean Schmidt, Bob Shoemate, and Ed Weinheimer. Schmidt seconded the motion. Motion passed.

Texas Water Development Board Questionnaire

The standing Committee as appointed will meet and discuss the response to the Texas Water Development Board (TWDB) questionnaire. Lowry will send a draft response to the Committee and the Committee is asked to respond by October 8, 2007. A meeting will be held the 15th or 22nd to finalize the response. The final response is due to TWDB on November 1, 2007.

LRWPG Meetings

The group agreed that future meetings will be held on an as needed basis through 2009.

The meeting adjourned at 2:25 p.m.

Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
February 25, 2008
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, February 25, 2008 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Calvin Bonzer, Patrick Brzozowski, John Butschek, Jack Maloney, Richard Ottis, L. G. Raun, Dean Schmidt, Robert Shoemate, David E. Wagner, Larry Waits, Ed Weinheimer, and Bob Weiss.

Absent Voting Group Members were: Gerald Clark, Roy Griffin, Pat Hertz, and Philip Miller.

Also present were: David Meesey, Texas Water Development Board, Mark Lowry and Jason Afinowicz of Turner Collie & Braden, David Myers, Lavaca County Groundwater Conservation District, Neil Hudgins of Coastal Bend/Coastal Plains Groundwater Conversation District, Max Castaneda and Rene Marroquin of the City of Corpus Christi, Larry Svetlik, Josh Harper, Gary Skalicky, Lynn Cox, Ronald Kubecka, LNRA Board President, and Karen Gregory, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the September 10, 2007 meeting were reviewed. Weinheimer moved the minutes be approved as presented. Brzozowski seconded the motion. Motion passed.

Election of Officers

Raun moved to re-elect Stafford, Chairman, Weiss, Vice-Chairman, and Brzozowski, Secretary of the Lavaca Regional Water Planning Group. Ottis seconded the motion. Motion passed.

Appointment of New Voting Member

Wagner introduced Tommy Brandenberger of Hallettsville as a prospective LRWPG voting member to replace Morkovsky. Wagner moved to elect Tommy Brandenberger to the Lavaca Regional Water Planning Group as a voting member. Raun seconded the motion. Motion passed.

Committee Assignments

Brzozowski moved to approve Committees as follows:

Agriculture Committee: Shoemate, Schmidt, Raun, Weinheimer, Brzozowski
Scoping Committee: Brzozowski, Raun, Maloney, Weiss.

Raun seconded the motion. Motion passed.

Agriculture Committee Report

Lowry presented the planned methodology for the agricultural demands task. The calculations for projected water usage will be composed of 1) planted crop acreage data from the Farm Service Agency (FSA), Coastal Bend Groundwater Conservation District (GCD), the Garwood Irrigation Company (Garwood), and local input, 2) source water information from Coastal Bend GCD, Garwood, and the South Texas Watermaster, 3) irrigation rate information from Coastal Bend GCD and Garwood, and 4) policy considerations from the proposed Farm Bill if available as well as other events that affect the rice market.

Methodology for Revising Water Demands

Raun moved to approve methodology for revising water demands for rice irrigation and authorize presentation of approved methodology to Texas Water Development Board for approval. Waits seconded the motion. Motion passed.

RFP from the Texas Water Development Board

Brzozowski moved to authorize TCB to participate with the approved scoping committee in preparing a Scope of Work for completion of a Regional Water Plan for the Lavaca Regional Water Planning Group. This scope will be made available for consideration and approval at the May 19, 2008 meeting. Butschek seconded the motion. Motion passed.

Authorize Scoping Committee

Weinheimer moved to authorize the Scoping Committee to work with Turner Collie Braden to develop draft scope for presentation to the Lavaca Regional Water Planning Group. Ottis seconded the motion. Motion passed.

The meeting was recessed at 2:40 p.m.

The meeting was reconvened at 2:50 p.m. to discuss agriculture water demands.

The meeting adjourned at 2:50 p.m.

Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
May 19, 2008
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, May 19, 2008 at 1:30 p.m.

Voting Group Members present were: Chairman Judge Harrison Stafford II, Patrick Brzozowski, John Butschek, Gerald Clark, Pat Hertz, Jack Maloney, Philip Miller, Richard Ottis, L. G. Raun, Robert Shoemate, David E. Wagner, Ed Weinheimer, and Bob Weiss.

Absent Voting Group Members were: Calvin Bonzer, Tommy Brandenberger, Roy Griffin, Dean Schmidt, and Larry Waits.

Also present were: David Meesey, Texas Water Development Board and Jason Afinowicz of Turner Collie & Braden, David Myers, Lavaca County Groundwater Conservation District, Rene Marroquin, Jr. of the City of Corpus Christi, Josh Harper, Philip Benavides, J. F. Minter, B. J. Nolen, Marie Day, Ronald Kubecka, LNRA Board President, and Karen Gregory, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the February 25, 2008 meeting were reviewed. Raun moved the minutes be approved as presented. Wagner seconded the motion. Motion passed.

Review of Path Forward

Afinowicz reviewed with the Group the path forward in developing the final application document.

Brzozowski moved to recess the LRWPG meeting and convene into Public Meeting to receive comments on the draft scope and funding application. Raun seconded the motion. Motion passed.

Chairman Stafford declared at 2:35 p.m. that the LRWPG would convene into a Public Meeting.

Chairman Stafford asked for public comments. B. J. Nolen and Marie Day, Lavaca County residents both addressed the Group with concerns regarding water use and availability.

Public Meeting ended and Stafford declared the LRWPG to be in Open Session at 2:45 p.m.

Raun and Weiss addressed the public comments.

Final Scope of Work

Clark moved to approve the final scope of work as presented. Raun seconded the motion. Motion passed.

Review and Approval of Application

Weinheimer moved to approve delegating authority for final review and approval of application document to the Scoping Committee. Clark seconded the motion. Motion passed.

The meeting adjourned at 2:50 p.m.

Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
November 3, 2008
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, November 3, 2008 at 1:30 p.m.

Voting Group Members present were: Calvin Bonzer, Tommy Brandenberger, John Butschek, Patrick Brzozowski, Gerald Clark, Pat Hertz, Jack Maloney, Richard Ottis, David Wagner, and Ed Weinheimer.

Absent Voting Group Members were: Roy Griffin, Philip Miller, L.G. Raun, Dean Schmidt, Robert Shoemate, Harrison Stafford II, Larry Waits, and Bob Weiss.

Also present were: David Meesey, Texas Water Development Board, Mark Lowry and Jason Afinowicz of AECOM, Josh Harper of Texas Parks and Wildlife, Ronald Kubecka, LNRA Board President, and Karen Gregory, LNRA staff.

Brzozowski called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the May 19, 2008 meeting were reviewed. Ottis moved the minutes be approved as presented. Hertz seconded the motion. Motion passed.

Review Scope 2011 Planning Round

Lowry reviewed with the Group the approved scope items for the second phase of the 2011 Planning Round. The group also discussed the path forward for finalizing contract and finalizing the agriculture demand reports.

Contract with TWDB

Lowry briefed the Group on the proposed contract with the Texas Water Development Board for the completion of a Regional Water Plan.

Weinheimer moved to approve Lavaca-Navidad River Authority to enter into contract with the Texas Water Development Board for the completion of a Regional Water Plan. Butschek seconded the motion. Motion passed.

Draft Results of Irrigation Water Demands Study

Afinowicz briefed the Group on the draft results of the Irrigation Water Demands Study conducted in the first biennium.

There were no public comments.

Submission of Irrigation Water Demands Study

Afinowicz requested approval from the Group to submit the Draft Final Ag Demands Report by December 31, 2008.

Wagner moved to approve AECOM to submit the Irrigation Water Demands Study to the Texas Water Development Board. Weinheimer seconded the motion. Motion passed.

Report on Palmetto Bend Stage II

Brzozowski briefed the Group on the Lavaca-Navidad River Authority's customers need for future water development. LNRA is assessing the need of their customers and water development strategies.

The meeting adjourned at 3:15 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
April 20, 2009
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, April 20, 2009 at 1:30 p.m.

Voting Group Members present were: Patrick Brzozowski, Gerald Clark, Roy Griffin, Jack Maloney, Richard Ottis, L.G. Raun, Robert Shoemate, Harrison Stafford II, David Wagner, Ed Weinheimer, and Bob Weiss.

Absent Voting Group Members were: Calvin Bonzer, Tommy Brandenberger, John Butschek, Pat Hertz, Philip Miller, Dean Schmidt, and Larry Waits.

Also present were: David Meesey and Angela Kennedy, Texas Water Development Board, Jason Afinowicz and Philip Taucer, AECOM, Josh Harper, Texas Parks and Wildlife, Melissa Barton, Texas Department of Agriculture, Haskell Simon, Region K, and Karen Gregory, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the November 3, 2008 meeting were reviewed. Weiss moved the minutes be approved as presented. Weinheimer seconded the motion. Motion passed.

Election of Officers

Raun moved to re-elect Stafford, Chairman, Weiss, Vice-Chairman, and Brzozowski, Secretary of the Lavaca Regional Water Planning Group. Ottis seconded the motion. Vice-Chairman Weiss announced his resignation from the Planning Group effective with the adjournment of this meeting. Weiss moved to elect Raun as Vice-Chairman and re-elect Stafford, Chairman, and Brzozowski, Secretary. Brandenberger seconded the motion. Motion passed.

Agricultural Water Demands Analysis

Afinowicz briefed the Group on the Texas Water Development Board recommendations to the Agricultural Water Demands Analysis. Stafford moved for the Executive Committee and David Wagner to review the final recommendations. Weis seconded the motion. Motion passed.

Public Comments

There were no public comments.

Final Agricultural Water Demands Analysis

Raun moved to approve the consultant to submit the final Agricultural Water Demands Analysis to TWDB. Brzozowski seconded the motion. Motion passed.

Report on 2011 Round of Regional Planning

Afinowicz briefed the Group on the proposed population and water demands to be used for the 2011 Round of Regional Planning.

Public Comments

There were no public comments.

Submit Population and Water Demand Projections

Raun moved to approve the consultant to submit the presented population and water demand projections to TWDB for consideration and approval. Weiss seconded the motion. Motion passed.

Review Draft Chapter I

The Group was presented a copy of Draft Chapter 1 – Description of Region, for their review.

Process for Management Strategies.

Afinowicz recommended the adoption of the same process for Water Management Strategies (WMS) based on an acceptable cost to irrigators.

Brzozowski moved that different costs be considered for agriculture and municipal uses. Wagner seconded the motion. Motion passed.

Interregional Coordination Meeting Report

The Group was presented the agenda indicating the topics discussed at the Interregional Water Planning Group Meeting with Regions N, L, and P held on April 8, 2009. Brzozowski and Afinowicz briefed the Group on this effort to improve interregional coordination/cooperation in relation to the identification and development of available water resources for use within Planning Regions N, L, and P.

Presentation on Development of the 2011 Regional Water Plan

Afinowicz presented a Power Point on the development of the 2011 Regional Water Plan.

Schedule for Completion of 2011 Regional Water Plan

A tentative schedule was presented indicating meeting dates and tasks to be completed.

Public Comments

There were no public comments.

The meeting adjourned at 3:20 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
June 22, 2009
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, June 22, 2009 at 1:30 p.m.

Voting Group Members present were: Calvin Bonzer, Tommy Brandenberger, John Butschek, Patrick Brzozowski, Gerald Clark, Roy Griffin, Patrick Brzozowski, Pat Hertz, Jack Maloney, Dean Schmidt, Robert Shoemate, Harrison Stafford II, David Wagner, and Ed Weinheimer.

Absent Voting Group Members were: Philip Miller, Richard Ottis, L. G. Raun, and Larry Waits.

Also present were: Angela Kennedy, Texas Water Development Board, Jason Afinowicz and Philip Taucer, AECOM, Ron Gertson of Region K Planning Group, and Karen Gregory, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the April 20, 2009 meeting were reviewed. Brzozowski moved the minutes be approved as presented. Wagner seconded the motion. Motion passed.

Appointments of New Voting Members

Brzozowski informed the Group that there are currently two voting member positions vacant. The Group will consider nominations for the two voting members at the next meeting.

Review of Draft Chapter 1

Afinowicz briefed the Group on the Draft Chapter 1 – Description of Region. The Group was presented a copy for their review and comments at the April 20 meeting. After discussion from the Group, Clark moved to approve the draft document as presented. Hertz seconded the motion. Motion passed.

Review of Draft Chapter 2

Afinowicz briefed the Group on the Draft Chapter 2 – Presentation of Population and Water Demand Projections. The Group was presented a copy for their review and comments. The Group will be asked for approval of the document at the next meeting.

Review of Draft Chapter 3

Afinowicz briefed the Group on the results of Task 3 – Analysis of Current Water Supplies. A presentation was given on the results of Groundwater Availability Model runs conducted as part of the task and the Group was asked for their guidance on options for defining groundwater availability. Mr. Ronald Gertson explained the perspective of the Coastal Bend GCD and urged the Planning Group to retain the 2006 projections for this round of planning until such a time GMA 15 developed a MAG. Brzozowski moved to utilize the 2006 water demand data. Hertz seconded the motion. Motion passed.

Afinowicz indicated that copies of the Draft Chapter 3 would be provided to the Group prior to the next meeting.

Development of 2011 Regional Water Plan

Afinowicz briefed the Group and presented a Power Point on the development of the 2011 Regional Water Plan. A tentative schedule was presented indicating meeting dates and tasks to be completed.

Resignation Tendered

Schmidt respectively tendered his resignation as a voting member of the Lavaca Regional Water Planning Group. He agreed to remain a voting member until a replacement member is appointed.

Public Comments

There were no public comments.

The meeting adjourned at 2:15: p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
August 4, 2009
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Tuesday, August 4, 2009 at 9:00 a.m.

Voting Group Members present were: Calvin Bonzer, John Butschek, Patrick Brzozowski, Gerald Clark, Pat Hertz, Jack Maloney, Phillip Miller, Richard Ottis, L. G. Raun, Robert Shoemate, Harrison Stafford II, David Wagner, and Ed Weinheimer.

Absent Voting Group Members were: Tommy Brandenberger, Roy Griffin, Dean Schmidt, and Larry Waits.

Also present were: Angela Kennedy, Texas Water Development Board, Jason Afinowicz and Philip Taucer, and David Pardrill of AECOM, Olivia Jarratt, LNRA Board member, and Karen Gregory and Doug Anders, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the June 22, 2009 meeting were reviewed. Clark moved the minutes be approved as presented. Weinheimer seconded the motion. Motion passed.

Appointment of New Voting Members

Wagner briefed the Group on two (2) prospective voting members of the Lavaca Regional Water Planning Group. Edward Pustka and Lester Little, both from Hallettsville, submitted bios outlining their interests. Pustka and Little will replace Bob Weiss and Dean Schmidt, respectively.

Raun moved to approve Edward Pustka and Lester Little as voting members of the Lavaca Regional Water Planning Group. Ottis seconded the motion. Motion passed.

City of El Campo Water Conservation/Contingency Plan

Brzozowski briefed the Board on the City of El Campo Water Conservation/Contingency Plan as submitted from the City of El Campo.

Miller moved to accept the City of El Campo Plan as presented. Weinheimer seconded the motion. Motion passed.

Review of Draft Chapter 2

Afinowicz briefed the Group on the Draft Chapter 2 – Presentation of Population and Water Demand Projections. The Group was presented a copy for their review and comments at the June 22, 2009 meeting.

Butschek moved to approve Chapter 2 as presented. Brzozowski seconded the motion. Motion passed.

Review of Draft Chapter 3

Afinowicz briefed the Group on the Draft Chapter 3 – Analysis of Current Water Supplies. The Group was presented a copy for their review and comments at the June 22, 2009 meeting. Raun made several recommendations for edits to the Draft Chapter 3.

Raun moved to approve Chapter 3 as presented to include discussed recommendations. Clark seconded the motion. Motion passed.

Review of Draft Chapter 4

Afinowicz briefed the Group on the Draft Chapter 4 – Identification, Evaluation, and Selection of Water Management Strategies Based on Needs. The Group was presented a copy for their review and comments. Recommendations were discussed for Chapter 4. The Group will be asked to consider approval of Chapter 4 at the next scheduled meeting.

Review of Draft Chapter 5

Afinowicz briefed the Group on the Draft Chapter 5– Impacts of Selected Water Management Strategies on Key Parameters of Water Quality and Impacts of Moving Water from Agricultural Areas. The Group was presented a copy for their review and comments. Recommendations were discussed for Chapter 5. The Group will be asked to consider approval of Chapter 5 at the next scheduled meeting.

Review of Draft Chapter 6

Afinowicz briefed the Group on the Draft Chapter 6 – Water Conservation and Drought Management Recommendations. The Group was presented a copy for their review and comments. Recommendations were discussed for Chapter 6. The Group will be asked to consider approval of Chapter 6 at the next scheduled meeting.

Development of 2011 Regional Water Plan

Afinowicz briefed the Group and presented a Power Point on the development of the 2011 Regional Water Plan. A tentative schedule was presented indicating meeting dates and tasks to be completed. The next LRWPG meeting is scheduled for Monday, October 5, 2009 at 1:30 p.m.

Public Comments

There were no public comments.

The meeting adjourned at 10:55 a.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
October 5, 2009
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, October 5, 2009 at 1:30 p.m.

Voting Group Members present were: Calvin Bonzer, Tommy Brandenberger, Patrick Brzozowski, Gerald Clark, Roy Griffin, Jack Maloney, Richard Ottis, Edward Pustka, L. G. Raun, Robert Shoemate, Harrison Stafford II, Larry Waits, and Ed Weinheimer.

Absent Voting Group Members were: John Butschek, Pat Hertz, Lester Little, Philip Miller, Dean Schmidt, and David Wagner.

Also present were: Angela Kennedy, Texas Water Development Board, Jason Afinowicz and Philip Taucer of AECOM, Mark Lowry, Josh Harper and Leslie Hartman of Texas Parks and Wildlife, Paul Littlefield, Nils Mauritz, and Olivia Jarratt, LNRA Board members, and Karen Gregory and Doug Anders, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Chairman Stafford introduced new voting member, Edward Pustka.

Minutes

The minutes of the August 4, 2009 meeting were reviewed. Ottis moved the minutes be approved as presented. Clark seconded the motion. Motion passed.

Presentation from City of Corpus Christi

Gustavo Gonzales and Rudy Garza from the City of Corpus Christi briefed the Group on the Garwood Pipeline Project. The Group was presented with handouts outlining project information, history and background of the project, and frequently asked questions.

Review of Draft Chapter 4

Brzozowski briefed the Group on the potential management strategies for meeting shortages. He presented the Group with information indicating a strategy of construction of Lavaca River Off-Channel Reservoir Diversion Project.

Braden moved to include the alternative strategy in Chapter 4, Potential Water Management Strategies as Brzozowski presented. Ottis seconded the motion. Motion passed.

Raun moved to approve the Draft Chapter 4 as presented. Brzozowski seconded the motion. Motion passed.

Review of Draft Chapter 5

Afinowicz briefed the Group on the Draft Chapter 5 – Impacts of Selected Water Management Strategies on Key Parameters of Water Quality and Impacts of Moving Water from Rural and Agricultural Areas. The Group was presented a copy for their review and comments.

Clark moved to approve Draft Chapter 5 as presented. Waits seconded the motion. Motion passed.

Review of Draft Chapter 6

Afinowicz briefed the Group on the Draft Chapter 6 – Water Conservation and Drought Management Plans. The Group was presented a copy for their review and comments.

Ottis moved to approve Draft Chapter 6 as presented. Clark seconded the motion. Motion passed.

Review of Draft Chapter 7

Afinowicz briefed the Group on the Draft Chapter 7– Long Term Protection of the State's Water Resources, Agricultural Resources and Natural Resources. The Group was presented a copy for their review and comments. The Group will be asked to consider approval of Chapter 7 at the next scheduled meeting.

Review of Draft Chapter 8

Afinowicz briefed the Group on the Draft Chapter 8– Unique Stream Segments, Reservoir Sites and Legislative Recommendations. The Group was presented a copy for their review and comments. Recommendations were discussed for Chapter 8. The Group will be asked to consider approval of Chapter 8 at the next scheduled meeting.

Review of Draft Chapter 9

Afinowicz briefed the Group on the Draft Chapter 9 – Water Infrastructure Financing Recommendations. The Group was presented a copy for their review and comments. Recommendations were discussed for Chapter 9. The Group will be asked to consider approval of Chapter 9 at the next scheduled meeting.

Development of 2011 Regional Water Plan

Afinowicz briefed the Group and presented a Power Point on the development of the 2011 Regional Water Plan. A tentative schedule was presented indicating meeting dates and tasks to be completed. The next LRWPG meeting is scheduled for Monday, January 11, 2009 at 1:30 p.m.

Resignation of Voting Member

Chairman Stafford informed the Group that a resignation letter had been submitted by Patricia Hertz due to health conditions.

Griffin moved to accept the resignation by Hertz. Ottis seconded the motion. Motion passed.

Public Comments

There were no public comments.

The meeting adjourned at 3:35 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
January 11, 2010
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, January 11, 2010 at 1:30 p.m.

Voting Group Members present were: Calvin Bonzer, Patrick Brzozowski, John Butschek, Gerald Clark, David Wagner, Roy Griffin, Lester Little, Jack Maloney, Richard Ottis, Edward Pustka, L. G. Raun, Robert Shoemate, Harrison Stafford II, David Wagner Larry Waits, and Ed Weinheimer.

Absent Voting Group Members were: Tommy Brandenberger and Philip Miller.

Also present was: Matt Nelson of Texas Water Development Board, Jason Afinowicz of AECOM, LNRA Board President Paul Littlefield, and Jennifer Martin, LNRA staff.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the October 5, 2009 meeting were reviewed. Ottis moved the minutes be approved as presented. Clark seconded the motion. Motion passed.

Draft Initially Prepared 2011 Regional Water Plan

Afinowicz reviewed the draft Initially Prepared 2011 Regional Water Plan (IPP).

Clark moved for the Group to request the Texas Water Development Board (TWDB) to perform the socioeconomic impact analysis of not meeting water needs identified in the 2011 Plan. Weinheimer seconded the motion. Motion passed.

Review Comments to 2011 Initially Prepared Plan

The Group discussed the comments to the 2011 Plan. L.G. Raun moved to accept the draft IPP as presented contingent upon approval of final edits by the Executive Committee. Brzozowski seconded the motion. Motion passed.

Schedule for Public Meetings/Hearing

Afinowicz briefed the Group on the schedule and timeline necessary for public meetings and public hearing to coincide with IPP submittal.

Ottis moved to approve April 27, 28, 29, 2010 for the public meetings and public hearing to be held in Jackson County, Lavaca County, and Wharton County with appropriate notices posted. Griffin seconded the motion. Motion passed.

Public Comments

There were no public comments.

The meeting adjourned at 3:10 p.m.

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Harrison Stafford II
Chairman

Lavaca Regional Water Planning Group Public Meeting
Hallettsville, Lavaca County, Texas
April 27, 2010

A Public Meeting of the Lavaca Regional Water Planning Group was held at the Lavaca County Courthouse Annex, County Judge Meeting Room, 412 N. Texana, Hallettsville, Texas on Tuesday, April 27, 2010 at 7:00 p.m. to discuss and receive a brief summary of the Lavaca Regional Water Planning Group, Region P, draft Regional Water Plan and to receive comments from the public on the draft Plan. Approximately 15 people were present. A sign-in sheet is attached to the minutes.

Voting Group Members present were: Secretary Patrick Brzozowski, Jack Maloney, Tommy Brandenberger, and David Wagner.

Absent Voting Group Members were: Bonzer, Butschek, Clark, Griffin, Little, Miller, Ottis, Pustka, Vice Chairman Raun, Shoemate, Chairman Stafford, Waits, and Weinheimer.

Also present were: Lann Bookout and Matt Nelson of the Texas Water Development Board, Jason Afinowicz and Philip Taucer of AECOM, and Doug Anders and Karen Gregory of Lavaca-Navidad River Authority.

Secretary Brzozowski called the meeting to order and welcomed everyone.

Afinowicz presented the group with a power point presentation giving a general overview of the State's Regional Water Planning Process and the Region P Initially Prepared Regional Water Plan. He informed them of the public meeting to be held in El Campo, Wharton County on April 29 and the public hearing to be held in Edna, Jackson County on April 28 to receive public input regarding the IPP. A copy of Afinowicz's presentation to the group is attached to the minutes.

There were no comments from the audience regarding the draft Plan**.**

With no comments, the comment period was closed.

The meeting adjourned at 7:35p.m.

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Harrison Stafford
Chairman

Lavaca Regional Water Planning Group Public Hearing
Edna, Jackson County, Texas
April 28, 2010

A Public Hearing of the Lavaca Regional Water Planning Group was held at the Lavaca-Navidad River Authority Main Office Meeting Room, 4631 FM 3131, Edna, Jackson County, Texas on Wednesday, April 28, 2010 at 7:00 p.m. to discuss and receive a brief summary of the Lavaca Regional Water Planning Group, Region P, draft Regional Water Plan and to receive comments from the public on the draft Plan. Approximately 100 people were present. A sign-in sheet is attached to the minutes.

Voting Group Members present were: Chairman Harrison Stafford II, Secretary Patrick Brzozowski, Gerald Clark, and Larry Waits.

Absent Voting Group Members were: Bonzer, Bradenberger, Butschek, Griffin, Little, Maloney, Miller, Ottis, Pustka, Vice Chairman Raun, Shoemate, Wagner, and Weinheimer.

Also present were: Lann Bookout of the Texas Water Development Board, Jason Afinowicz and Philip Taucer of AECOM, and Charles A. Reckaway, Doug Anders, Karen Gregory and Sylvia Balentine of Lavaca-Navidad River Authority.

Chairman Stafford called the meeting to order and welcomed everyone.

Afinowicz presented the group with a power point presentation giving a general overview of the State's Regional Water Planning Process and the Region P Initially Prepared Regional Water Plan. He informed them of the public meeting held in Lavaca County on April 27, 2010 and the public meeting to be held in El Campo, Wharton County on April 29 to receive public input regarding the IPP. A copy of Afinowicz's presentation to the group is attached to the minutes.

Chairman Stafford opened the public comment period.

Public comments were received from Mary Prihoda, Warren Evans, Lindsey Lee Bradford, Timmy Jacobs, Mac Lee, Alan Berryhill, Milam T. Simons, and Kenneth Koop.

Chairman Stafford closed the public comment period and opened for a question and answer period.

An audio of the public comments and the questions and answers are attached to the minutes.

The meeting adjourned at 8:58.m.

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Harrison Stafford
Chairman

Lavaca Regional Water Planning Group
Public Meeting
El Campo, Wharton County
April 29, 2010

A Public Meeting of the Lavaca Regional Water Planning Group was held at the El Campo Chamber of Commerce, 201 East Jackson Street, El Campo, Wharton County, Texas on Thursday, April 29, 2010 at 7:00 p.m. to discuss and receive a brief summary of the Lavaca Regional Water Planning Group, Region P, draft Regional Water Plan and to receive comments from the public on the draft Plan. Approximately 15 people were present. A sign-in sheet is attached to the minutes.

Voting Group Members present were: Chairman Harrison Stafford II, Vice-Chairman L.G. Raun, and Dick Ottis.

Absent Voting Group Members were: Bonzer, Brandenberger, Brzozowski, Butschek, Clark, Griffin, Little, Maloney, Miller, Pustka, Shoemate, Wagner, Waits, and Weinheimer.

Also present were: Lann Bookout of the Texas Water Development Board, Jason Afinowicz and Philip Taucer of AECOM, and Doug Anders and Karen Gregory of Lavaca-Navidad River Authority.

Chairman Stafford called the meeting to order and welcomed everyone.

Afinowicz presented the group with a power point presentation giving a general overview of the State's Regional Water Planning Process and the Region P Initially Prepared Regional Water Plan. A copy of Afinowicz's presentation to the group is attached to the minutes.

Chairman Stafford opened the public comment period.

Public comments were received from Warren Evans, Lindsey Lee Bradford, and Mac Lee.

Chairman closed the public comment period and opened for a question and answer period.

An audio of the public comments and the questions and answers are attached to the minutes.

The meeting adjourned at 8:32 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
July 19, 2010
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, July 19, 2010 at 9:00 a.m.

Voting Group Members present were: Patrick Brzozowski, Gerald Clark, Jack Maloney, Philip Miller, David Wagner, L. G. Raun, Robert Shoemate, Harrison Stafford II, Larry Waits, and Ed Weinheimer.

Absent Voting Group Members were: Tommy Brandenberger, John Butschek, Roy Griffin, Lester Little, Richard Ottis, and Edward Pustka.

Also present was: Lann Bookout of Texas Water Development Board, Jason Afinowicz and Phillip Taucer of AECOM, Melissa Barton of the Texas Department of Agriculture, Josh Harper, Texas Parks and Wildlife Department, and Doug Anders and Karen Gregory, LNRA staff. A sign in sheet is attached as part of the minutes indicating citizen attendance.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the January 11, 2010 meeting were reviewed. Waits moved the minutes be approved as presented. Raun seconded the motion. Motion passed.

Appointments for New Voting Members

Brzozowski informed the Group that new voting members were needed to replace Calvin Bonzer, Small Business and Patricia Hertz, Water Districts. He nominated Texana Groundwater District Chairman. Raun moved to appoint the Chairman of the Texana Groundwater District as a voting member of Lavaca Regional Water Planning Group. Brzozowski seconded the motion. Motion passed.

Election of Officers

Clark moved to re-elect Stafford, Chairman, Raun, Vice-Chairman, and Brzozowski, Secretary of the Lavaca Regional Water Planning Group. Waits seconded the motion. Motion passed.

Presentation on Comments and Draft Responses to 2011 Initially Prepared Plan

Afinowicz presented the Group with a power point which included comments to the Initially Prepared Plan. The Group discussed the comments.

Progress Since IPP Submittal

Afinowicz presented the Group with information on the progress since submittal of the Initially Prepared Plan, including the socioeconomic impact study completed by the Texas Water Development Board.

Request to Change the Regional Water Planning Boundaries

The Group discussed the request to realign eastern Calhoun County in Region P. Miller moved to send a letter to the Texas Water Development requesting that no modification be made to Planning Region P. Weinheimer seconded the motion. Motion passed.

Timeline for IPP Submittal

Afinowicz informed the Group of the IPP submittal deadline of September 1, 2010. He recommended meeting in August to review the final markup and to adopt the final Regional Water Plan. The Group agreed to meet on Monday, August 16, 2010 at 9:00 a.m.

Public Comments

There were no public comments.

The meeting adjourned at 3:05 p.m.

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Harrison Stafford II
Chairman

Minutes of Lavaca Regional Water Planning Group
August 16, 2010
Edna, Texas

A meeting of the Lavaca Regional Water Planning Group was held in the Meeting Room of the Lavaca-Navidad River Authority Office Complex, 4631 FM 3131, located approximately seven (7) miles east of Edna, Jackson County, Texas off FM 3131 on Monday, August 16, 2010 at 9:00 a.m.

Voting Group Members present were: Patrick Brzozowski, Gerald Clark, Roy Griffin Jack Maloney, Richard Ottis, L. G. Raun, Robert Shoemate, Michael Skalicky, Harrison Stafford II, David Wagner, Larry Waits, and Ed Weinheimer.

Absent Voting Group Members were: Tommy Brandenberger, John Butschek, Lester Little, Philip Miller, and Edward Pustka.

Also present was: Lann Bookout of Texas Water Development Board, Jason Afinowicz, David Pardrill, and Phillip Taucer of AECOM, Josh Harper, Texas Parks and Wildlife Department, and Doug Anders and Karen Gregory, LNRA staff. A sign in sheet is attached as part of the minutes.

Chairman Stafford called the meeting to order.

Public Comments

There were no public comments.

Minutes

The minutes of the July 19, 2010 meeting were reviewed. Wagner indicated that his attendance was listed twice in the minutes. Clark moved the minutes be approved as presented with correction on attendance. Waits seconded the motion. Motion passed.

Appointments for New Voting Members

Brzozowski informed the Group that a new voting member is needed to replace Calvin Bonzer, Small Business, Lavaca County, Small Business. He indicated that Wagner would assist in finding a replacement.

Ottis informed the Group that the Leave Our Lavaca Alone (LOLA) group had indicated interest in serving on the Lavaca Regional Water Planning Group.

Appointment of Committee

Afinowicz recommended the Group consider the appointment of a committee to develop a list of focused study items for the development of the 2016 study round.

Brzozowski, Raun, Maloney, Wagner, Waits, and Weinheimer volunteered to serve on the Committee. Brzozowski will contact the committee members for a meeting date and time.

The Group discussed several topics for potential future study which included rice demands and how the GMA will affect the Group.

Changes to the Initially Prepared Plan

Afinowicz informed the Group of proposed changes to the Initially Prepared Plan to include TWDB comment responses, online planning database (DB12), and Socioeconomic Impact Study to Chapter 4.

Adoption of the 2011 Regional Water Plan

The Group discussed the proposed plan. Raun recommended several clarifications in the plan language including “conjunctive use”. Afinowicz indicated that the clarifications would be made to the Plan. Brzozowski moved to adopt the 2011 Regional Water Plan for the Lavaca Region including Chapter 4 and Chapter 9 and authorize the consultant to transmit the adopted documents to the Texas Water Development Board. Waits seconded the motion. Motion passed.

Public Comments

There were no public comments.

The meeting adjourned at 10:21 a.m.

____

Harrison Stafford II
Chairman

Appendix 10B

Written Public and Agency Comments

June 28, 2010

The Honorable Harrison Stafford, II
Jackson County Judge
Chairman, Lavaca Regional Water Planning Group
c/o Jackson County
115 West Main
Edna, Texas 77957

Mr. Patrick Brzozowski
General Manager, Lavaca-Navidad
River Authority
4631 FM 3131
P.O. Box 429
Edna, Texas 77957

Re: Texas Water Development Board Comments for the Lavaca Regional Water Planning Group (Region P) Initially Prepared Plan, Contract No. 0904830875

Dear Judge Stafford and Mr. Brzozowski:

Texas Water Development Board (TWDB) Staff completed a review of the Initially Prepared Plan (IPP) submitted by March 1, 2010 on behalf of the Region P Regional Water Planning Group. The attached comments (Attachments A and B) follow this format:

- Level 1: Comments, questions, and online planning database revisions that must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements; and
- Level 2: Comments and suggestions for consideration that may improve the readability and overall understanding of the regional plan.

The TWDB's statutory requirement for review of potential interregional conflicts under Title 31, Texas Administrative Code (TAC) §357.14 will not be completed until submittal and review of adopted regional water plans.

Title 31, TAC §357.11(b) requires the regional water planning group to consider timely agency and public comment. Section 357.10(a)(3) of the TAC requires the final adopted plan include summaries of all timely written and oral comments received, along with a response explaining any resulting revisions or why changes are not warranted.

Copies of TWDB's Level 1 and 2 written comments and the region's responses must be included in the final, adopted regional water plan.

If you have any questions, please do not hesitate to contact Lann Bookout at (512) 936-9439.

Sincerely,

Carolyn L. Brittin
Deputy Executive Administrator
Water Resources Planning and Information

Attachments (2)

c w/att: Mr. Jason Afinowicz, AECOM

ATTACHMENT A

TWDB Comments on Initially Prepared 2011 Region P Regional Water Plan

LEVEL 1. Comments and questions must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

General Comment

1. Please include a table listing alternative strategies, if alternative water management strategies were included. *[Contract Exhibit "C" Sections 4.3, 11.1]*

2. Table of Contents, List of Tables: Summary tables listed (e.g. ES.3, ES.4, and ES.5) for Lavaca, Jackson and Wharton Counties were not found in the plan. Please revise as appropriate.

Executive Summary

3. Executive Summary, Page 1, Table ES-1; Chapter 2, Pages 2-12 and 2-17: The water demand projections for Lavaca County-Other in the Guadalupe River basin appear to not be included in Table ES-1. Please revise as appropriate.

Chapter 1

4. Please describe the plan's impact to navigation. *[Title 31 Texas Administrative Code (TAC) §357.5(e)(8)]*

5. Please identify the threats to agricultural or natural resources due to water quality problems in the region. *[31 TAC §357.7(a)(1)(L)]*

6. Page 1-4, sixth paragraph: The plan does not refer to the most recent groundwater management plan for the Coastal Bend Groundwater Conservation District which was approved by TWDB on November 4, 2009. Please revise if appropriate.

Chapter 2

7. Please include a summary of information regarding water loss audits specific to Region P. *[31 TAC § 357.7 (a)(1)(M)]*

Chapter 3

8. Page 3-16, second paragraph: Please clarify the source of the 12,000 acft/yr of interruptible water supply.

Chapter 4

9. Please describe how the plan considered regional water supply facilities and providing regional management of regional resources. *[31 TAC §357.5(e)(6)]*

10. Please explain how the region considered emergency transfers of non-municipal use surface water without causing unreasonable damage to the property of the non-municipal water rights holder pursuant to Texas Water Code §11.139. *[31 TAC §357.5(i)]*

11. Page 4-3, second paragraph, last sentence: Plan indicates that water management strategy costs have not been updated. Please revise plan to ensure that all costs of projects presented are in September 2008 dollars as required. *[Contract Exhibit "C" Section 4.1.2]*

Appendix 4B

12. Appendix 4B: Please describe how plan considered environmental water needs of bay and estuary inflows, including freshwater inflows to Matagorda and Lavaca Bays. *[31 TAC §357.5(l)]*

13. Appendix 4B: Please provide a quantitative reporting of environmental factors for each potentially feasible water management strategy evaluated. *[31 TAC §357.7(a)(8)(A)(ii)]*

14. *(Attachment B)* Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

Chapter 4

1. Please consider revising the fourth line of the last paragraph of Appendix 4D where it states "..and likely make it longer economically viable…" to read: "…and likely make it *no* longer economically viable…".

2. Appendix 4B: The plan states that "a schedule for freshwater releases will be established during permitting of the [Construction of Lavaca River Off-Channel Reservoir Diversion] project." Please consider mentioning that the natural unappropriated flows would be subject to environmental conditions for the proposed reservoir.

Appendix 3A

1. Appendix 3A, Table 3A-1: The last entry for the Gulf Coast Aquifer has "K" listed in the "RWPG" column. Please revise, if appropriate, to "P".

REGION P

[redacted]

		IPP document reference:		Non-matching numbers													
				IPP document number							Online Planning Database (DB12) number						
P	Lake Texana DOR Supply	ES-2		79,000								74,500	74,500	74,500	74,500	74,500	74,500
P	Shortages in ac-ft/yr, Jackson Co. Irrigation	ES-2	ES-2					-5,054							-5,053		
P	Population, CRU, Lavaca County-Other	2-11	2-1		9,698	9,675	9,051	7,949	6,671	5,207		44	44	43	41	38	35
P	Supplies,WUG 2962, Lavaca County-Other	3A-2	3A-2		1,140	1,140	1,140	1,140	1,140	1,140		1,145	1,145	1,145	1,145	1,145	1,145
P	Total Lavaca County-Other supply	na	3A-2		1,145	1,145	1,145	1,145	1,145	1,145		1,150	1,150	1,150	1,150	1,150	1,150
P	Total Region supply	na	3A-3		164,148	164,148	164,148	164,148	164,148	164,148		164,153	164,153	164,153	164,153	164,153	164,153
P	Jackson Co. Irrigation and County Total shortage	Appendix 4A	4A.1					5,054							5,053		
P	Regional Shortage Total	Appendix 4A	4A.1					67,740							67,739		
P	Alternate - Off-Channel Stage II	4C.2	Table 4C.2	na							na						
P	Construction of Lavaca River Off-Channel	4C.2	Table 4C.2	na	na	na	na	na	na	na	85,429,083	0	26,242	26,242	26,242	26,242	26,242
P	Palmetto Bend Stage II - firm yield	14-Apr	na		22,964							26,242					
P	Lake Texana DOR Supply	7-2		79,000								74,500	74,500	74,500	74,500	74,500	74,500
P	Regional irrigation demand	7-2		220,000							217,846						

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June 28, 2010

Mr. Patrick Brzozowski
Region P Water Planning Group
c/o Lavaca-Navidad River Authority
4631 FM 3131
Edna, Texas 77957

Re: 2010 Region P Initially Prepared Regional Water Plan

Dear Mr. Brzozowski:

Thank you for seeking review and comment from the Texas Parks and Wildlife Department (TPWD) on the 2010 Initially Prepared Regional Water Plan for Region P (IPP).

As you may know, the Texas Parks and Wildlife Commission recently issued a new and updated Land and Water Resources Conservation and Recreation Plan. One of the cornerstones of the Land and Water Plan calls for TPWD to promote and protect healthy aquatic ecosystems including the establishment of cooperative strategies to incorporate long-term plant, fish and wildlife needs in all statewide, regional and local watershed planning, management and permitting processes.

TPWD understands that regional water planning groups are required by TAC §357.7(a)(8)(A) to perform quantitative reporting of environmental factors including effects on environmental water needs, wildlife habitat, cultural resources, and effects of upstream development on bays, estuaries and arms of the Gulf of Mexico when evaluating water management strategies. TPWD believes this quantification is a critical step in the process of attempting to plan for future water needs yet at the same time, protecting environmental resources, including fresh water inflows to current reservoirs and the Gulf of Mexico. Accordingly, TPWD staff reviewed the IPP with a focus on the following questions:

- Does the IPP include a quantitative reporting of environmental factors including the effects on environmental water needs and habitat?
- Does the IPP include a description of natural resources and threats to natural resources due to water quantity or quality problems?
- Does the IPP discuss how these threats will be addressed?
- Does the IPP describe how it is consistent with long-term protection of natural resources?
- Does the IPP include water conservation as a water management strategy? Reuse?
- Does the IPP recommend any stream segments be nominated as ecologically unique?

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

- If the IPP includes strategies identified in the 2006 regional water plan, does it address concerns raised by TPW in connection with the 2006 Water Plan?

A brief description of natural resources is included in Chapter 1.7. The delta of the Lavaca-Navidad River Basin is important nursery habitat for estuarine and marine vertebrates and invertebrates. These habitats require freshwater inflows to maintain salinities adequate to support these species which include several important recreational and commercial fisheries. Under Recreational and Natural Resources (§1.7.2), freshwater inflows are addressed, but without any specifics. The IPP mentions that LNRA has an agreement with TPWD concerning release of freshwater to the bay, but no specifics of this agreement are mentioned. It would be helpful to include details of the agreement in the IPP and/or add a copy of the agreement as an appendix. Table 1-7 lists threatened, rare and endangered species within Region P. This table should be expanded to include recently listed state-threatened mussel species. Information regarding Texas threatened and endangered species can be found at: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

In general, the Lavaca Region P IPP includes more of a narrative rather than quantitative reporting of the impacts of the proposed water supply strategies. This is in large part due to the nature of the proposed strategies which include conjunctive use of groundwater and reuse of municipal effluent. Palmetto Bend Reservoir Stage II, which has been designated as a Unique Reservoir Site, is discussed as a water management strategy to supply Regions N and L. Lavaca River diversion to an off-channel reservoir is also discussed as a water management strategy. Both of these options pose potentially significant environmental impacts to the riparian habitats of the Lavaca River and to the estuarine habitats of Lavaca Bay. Careful consideration of the effects to natural resources should be considered before recommending either option, especially as Region P predicts no significant water shortages in the next 50 years.

Water conservation and wastewater reuse are discussed in the IPP. Chapter 4.3 states that increasing conservation in agricultural use of water would be detrimental to wildlife habitat. Though groundwater from agricultural sources does supplement instream flows during dry parts of the year, the possible deleterious effects of groundwater pumping on naturally occurring springs and other fish and wildlife resources should be examined.

The Region P IPP does not recommend nomination of any stream segments as ecologically unique but does include as an appendix a 2006 TPWD report that documents stream segments in the region that meet at least one of the criteria for classification as ecologically unique. The IPP recognizes that changed conditions (e.g. channelization of streams for drainage improvement) since 2006 may merit reconsideration of some stream segments as ecologically significant.

TPWD hopes Region P will consider these comments before finalizing the IPP. While we value and appreciate the need to meet future water supply demands, we must do so in a thoughtful and sound manner that ensures the ecological health of our state's aquatic and natural resources. We look forward to hearing from you. If you have any questions, please feel to contact Cindy Loeffler at 512-389-8715.

Sincerely,

Ross Melinchuk
Deputy Executive Director, Natural Resources

RM:CL:ch

Comments for Region P Water Planning Committee
May 1, 2010

My name is Warren Evans and I am a land owner on the Lavaca River. Thank you for giving me the opportunity to express some concerns about the Region P Water Plan. Everyone recognizes that water is a precious commodity and its value increases everyday. It is a very precious commodity in Jackson County and you have an important task to develop the Region P Water Plan.

In developing the water plan for Region P, I ask that you consider all the options and parts of the plan very carefully. I request that you place all the pros and cons on the table for each issue, gather as much information as possible, and make an informed decision based on facts that is best for Region P.

There are two major sources of water and I will not address the surface water situation. Others can do that.

It is time for Jackson County to protect our underground water by getting our Ground Water Conservation District functional. A group of us are working to get that accomplished. We are currently getting names of qualified people to serve on the Board. These names are coming from a variety of sources. In a few days, we will request a meeting with Board members who were elected to see if we can move forward. Preliminary discussions indicate this is possible.

The consequences of not getting the Texana Ground Water Conservation District functional can be devastating for our groundwater. Our groundwater has already been the target of one attempt and will continue to be a prime target for some entity – public or private – to drill a series of wells and sell the water to groups outside of Jackson County. This is easier and cheaper to do that many of our residents understand. The wells can be close to a stream that flows into Lake Texana and then the water moved via existing pipelines to places like Corpus Christi and others.

These types of wells without regulation can easily lower the groundwater level in our aquifers and cause irreparable damage. Farmers using irrigation will have to drill deeper wells and pay more energy costs to obtain the irrigation water they need. This could also affect the municipal wells for the cities of Edna and Ganado. If they have to drill deeper wells to provide water for their residents, it will be at a considerable cost. Rural home water wells will encounter similar problems. Salt water may move into the aquifers that are being pumped.

I encourage your Planning Board to explore the feasibility of desalination of brackish water that is present in some of our aquifers comprising the Gulf Coast Aquifer. I have been advised these smaller desalination plants for brackish water with 1,100 to 1,600 mg per liter from depths of about 3,500 feet are probably economically feasible. These plants may produce about 6,000 acre feet per year. We must get data over time that characterizes our aquifer and how it behaves under a variety of climatic and withdrawal conditions.

I also ask that you consider the method of Aquifer Storage and Recovery with land owner participation. Also, consider the development of an off channel reservoir with land owner participation. Land owner participation is critical. These two methods could be combined to increase efficiency and economics.

I am opposed to placing a dam on the Lavaca River for a number of reasons beyond any emotional considerations. I feel there are other ways of getting water to serve our needs if it is indeed needed. Some of these methods are given above. I feel the dam would have too much damage on the ecology of the basin. Also, we can not afford to send this water out of Jackson County and lose the opportunity to use it within the county sometime in the future. Without it, we would lose our ability to attract industry to our county and improve its economic status and tax revenues.

Thank you for your attention and consideration.

James Warren Evans
3200 FM 822
Edna, Texas 77957
979-218-5020

RECEIVED

JUN 28 2010

TWDB

June 20, 2010

Lavaca Regional Water Planning Group
c/o J. Kevin Ward
P.O. Box 13231
Austin, TX 78711-3231

Dear Members of the Lavaca Regional Water Planning Group:

I was born and raised in Edna, Texas. After graduating from Texas A&M University, I decided to move to San Antonio to pursue my teaching career. When my husband and I got married and started thinking about a family, we agreed that the only place for us to raise our family was Jackson County so we moved home. I appreciate the extensive amount of work you have done to compile our region's IPP. I do, however, have some concerns about the water management strategies selected.

Over the next 50 years, the only water shortage projected for our region is in agriculture. I agree it is most logical to recommend conjunctive use as our management strategy since it is the only option that is feasible for irrigating farmers. I also agree with the statement in Chapter 7—7.3 that reads, "*Temporary overpumping of groundwater does not involve the issues regarding the interbasin transfer of water nor the inundation of land required for reservoir storage.*"

The development of a water supply on the Lavaca River by on-channel impoundment or off-channel reservoir should not be a potential water management strategy for our region. Region P has no need for additional surface water. Agricultural needs are the only projected demands and the Palmetto Bend Stage II reservoir is not a feasible management strategy for agriculture. In Chapter 3.4.2 the following is stated: "*Water demand projections show that communities and entities within LRWPA do not need additional surface water supplies. However, there are communities and entities outside of the Lavaca Region that are experiencing supply needs that potentially can be satisfied by the development of the Palmetto Bend Reservoir. To that end, LRWPG has designated the Palmetto Bend Stage II reservoir site as a unique reservoir site.*" Once again, the plan states that the reservoir is not a viable water management strategy for the agricultural users or other users. I do not believe that the Palmetto Bend Stage II reservoir should be designated as a unique reservoir. According to Texas Administrative Code, Chapter 357, Rule 357.9, to recommend a site as a unique reservoir, a water planning group must have a beneficiary of the water supply to be developed at the site. There is no beneficiary in our region nor is one stated in this chapter. Has Formosa or any other beneficiary come before the Region P board and made a formal request for water?

Chapter 8.1 of the IPP states, "*For the 2006 RWP, no desgination of USSs was made as LRWPG desired to have additional information on the potential impacts of such designation.*" It is disappointing that the potential impacts of the designation are not included in this paragraph as support for deciding not to designate a USS. According to the TPWD study included in this chapter, Arenosa Creek, Garcitas Creek, West

Carancahua Creek, Mustang Creek as well as the Lavaca River all have at least one, some as many as three, of the five criteria defined in Senate Bill 1 for ecologically unique river and steam segments. "*Note that subsequent to the publication of TPWD recommendations, conditions along stream segments in LRWPA may have changed. Since the TPWD study, much of West Carancahua Creek has been channelized for drainage improvement."(Chapter 8.1 IPP)* It is again disappointing that the board chose not to have TPWD update their study so that an informed decision could be made based on the current conditions.

If inter-regional coordination must occur in the Initially Prepared Plans, then Region P should look at other management strategies besides the on-channel impoundment. *Title 31 Part 10 rule 357.7 of the Texas Administrative Code states [357.7(a)(7)(E)]*
(a) Regional Water Plan development shall include the following:
(7) evaluation of all water management strategies the regional water planning group determines to be potentially feasible, including:
(E) new supply development including construction and improvement of surface water and groundwater resources, brush control, precipitation enhancement, desalination, water supply that could be made available by cancellation of water rights based on data provided by the Texas Commission on Environmental Quality, aquifer storage and recovery. Aquifer Storage and Recovery should be one management strategy evaluated by the region. Aquifer Storage and Recovery (ASR) involves injecting water into an aquifer through wells or by surface spreading and infiltration and then pumping it out when needed. The aquifer essentially functions as a water bank. Deposits are made in times of surplus, typically during the rainy season, and withdrawals occur when available water falls short of demand. ASR would have less of a negative sociological and ecological impact on Jackson County and the Lavaca Bay. According to the South Florida Management District, ASR facilities have been used in Florida for about 30 years. Another management strategy that the region should consider is desalinization. Region P, as well as LNRA, should consider furthering and updating the research previously compiled on desalinization. A brackish water desalinization plant owned and operated by Formosa on Formosa's property should also be considered. I realize that this would not be a management strategy for Region P but it should be considered by all involved in the water planning process.

Thank you for your consideration of these comments.

Sincerely,

Shelley Srp

Shelley Srp
shelleyalee@yahoo.com
407 Dennis St.
Edna, TX 77957
361-782-5949

cc: Patrick Brzozowski

JOHNNY E. BELICEK
Commissioner – Pct. 3 – Jackson County

4389 FM 1822
Edna, Texas 77957

361-782-2033
Fax 361-782-3707

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JUN 21 2010
TWDB

June 15, 2010

Mr. J. Kevin Ward
Executive Administrator
Lavaca Regional Water Planning Group
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711-3231

Re: Against Stage 2

Dear Mr. Ward:

I am very aware of how important water is for the State of Texas. Jackson County has done its part by allowing the Stage 1 Dam to be built. As it turns out, the only entity profiting from this water is Lavaca-Navidad River Authority.

Since the citizens of Jackson County are very much against the damming of the Lavaca River, our last free-flowing river, I am asking you NOT to support another dam being built here just to profit LNRA.

Sincerely,

Johnny E. Belicek

JOHNNY E. BELICEK
JACKSON COUNTY COMMISSIONER
PRECINCT 3

RECEIVED

JUN 30 2010

TWDB

Dear Region P Water board members,

I live in Jackson county and am also on the LNRA board. I am very opposed to damming up the Lavaca river for numerous reasons. There is no benefit to Jackson county to do this, only negative things can occur. Here is a list of reasons.

1. Jackson county cannot lose any more tax base, I know firsthand because I own a business here and the taxes are extreme for the fact that we have low population. Lnra's original position was that whoever purchases the water will make up the taxes but it is not clear if that can be done.
2. There will have to be Bonds issued to build the dam, you cannot issue municipal bonds without taxing the people, does not matter if you are a taxing entity. Bond issuers will not issue a A+ bond without taxing the people, they want them on the hook not LNRA. We cannot afford that, we are losing businesses everywhere as it is. It could well be the final blow to some businesses.
3. This water will be used for private enterprise to make money at the expense of Jackson county, land will have to be condemned which is going to lead to massive lawsuits since it is illegal in Texas to condemn land for a commodity. LNRA does not need this.
4. The orginal dam took 17,000 acres off of the taxrolls as well as the people paid $81,000,000 in taxes and that only goes back to 1980, there were no records previous to that. None of the water now benefits Jackson County at all, they have a trailer park and the people in the county donated most of the money to build the Brackenridge center, either in kind services or monetarily. We cannot afford that, we need to attract businesses to come here and you cannot do that with the taxing structure we will have.
5. This has already caused all kinds of problems within the county, I cannot imagine if it were to happen. People will leave this county if in fact they dam up the last free flowing river in Texas.
6. Our Bay and Estuaries cannot stand it either, it relies on the free flow of the Lavaca, damming the Navidad hurt it enough.
7. The damming of the river will be an huge eyesore on what was once beautiful pristine bottom land that is irreplaceable. There will be massive Dykes all around it which will prevent homes on the lake, all of this due to new regulations on new lakes. These regulations are to do with the maximum permissible flood, which will be the maximum amount rain that could occur in a period of time. Existing structures have to pass by holding 75% of the volume while any new structure will have to be 100% of the PMF. This will mean that the Dykes are going to be massive earthen structures that will be very unsightly.
8. There are many alternatives to the damming of this river, underground aquifers, desalinization, off channel storage, etc. Lnra has not even looked into these and that is what it needs to happen to keep Jackson county fiscally responsible. If the cost of the water is more for the alternative plans than private industry can certainly deal with it, that is a fact in business. None of these industries are located in Jackson county and pay 0 taxes here.

I appreciate your time at looking at this project as the people here feel they are being run over by big government and in fact they may be in this case. This is the reason for writing you and pleading for your help in the matter. I fully understand the value of water and how it will be a commodity at some point in time but I think the alternatives to a lake our much better for Jackson county. If you would like to call me and discuss or meet I would be more than happy.

Thank you,

Jon Bradford

361-782-1783

RECEIVED

JUN 30 2010

TWDB

June 28, 2010

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Dear Mr. Ward:

I am presenting you a petition signed by over 781 concerned Jackson County residents protesting the possibility of the construction of Palmetto Bend Dam Phase II. These citizens, like myself, are concerned with the broad and devastating impact that damming up the Lavaca River could cause on the environment, the ecology, and livelihoods of people who live in the area. This petition was presented to the Lavaca Navidad River Authority at their meeting last month and was received with no response. We feel it is important that our elected representatives and the public servants who are deciding what are the best uses of our water should take seriously how the people who will be impacted the most feel.

Sincerely,

Lindsey Lee Bradford

Lindsey Lee Bradford
Member
Leave Our Lavaca Alone (LOLA)

Please sign this petition to try to Save the Lavaca River. We need to protect the last free flowing river in Texas!

Por Favor, hagan el favor de firmar esta petision para salvar el Rio de Lavaca. Es el ultimo en Texas!

Name	Address
Julia Schoellmann	PO Box 142 Lolita TX 77971
Sharina Grasch	P.O. Box 731 Edna, Tx 77957
[illegible]	409 OAK TERRACE, TX. 77957
Beckie & Patrick Woods	202 Robinson, Edna, TX 77957
Sue Quinn [illegible]	1079 Co. Rd. 401 Edna
Becky Quinn	8583 State Hwy 111 N Edna
Brenda Koop	514 Wilson Edna
Georgia Miller	2601 Myatt Lane El Campo TX
[illegible] Miller	2601 Myatt Lane El Campo TX
Teresa Olivas	2447 Loop 521 Edna TX
Anabel Mejia	1410 N Wells.
Josue Martinez	405 W Ash
Steven Cox	P.O Box 570 Ganado Tx 77962
[illegible]	8798 FM 3131 Lolita TX 77971
[illegible] Martin	8798 FM 3131 Lolita TX. 77971
Sheri Martin	8798 FM 3131 Lolita TX. 77971
Dennis [illegible]	909 CR 110 Edna Tx 77957
[illegible]	1569 CR 110 El Toro Tx 77957
Dianne Jeroske	909 CR 110 Edna, TX 77957
DJ Bell	299 County Road 110 Edna, Tx 77957
Debra Stewart	130 CR 307 Edna Tx
[illegible]	130 CR 307 Edna TX 77957
Andy Bell	299 CR 110 El Toro, TX 77957
[illegible] Cobb Jr	13708 FM 530 Edna, Tx 77957
Eric Calder [illegible]	" "
[illegible] Molina.	114 E main Edna Tx. 77957
Brenda Molina	205 W. Blackwood Edna, Tx 77957
[illegible]	P.O. Box 715 Schulenburg Tx.
Judy ~~[illegible]~~ Ortolon	P.O. Box 460 Edna
Roy Ortolon	P.O. Box 460 Edna
[illegible]	4795 FM 234 S. EDNA
Diane Matocha	1390 FM 1683 Ganado
John L. [illegible]	P.O Box 845 Edna

D'Anna Long	P.O. Box 423	Edna Tx 77957
Becky Hudson		Edna Tx 77957
Rickey Williams	506 Jackson	Edna Tx 77957
Jerry Delgado	512 Buffalo St	Edna Tx 77957
Mike Parson	215 Ft Intake	Vict TX 77905
Kenny Whittley	1425 CR 123	Edna TX 77957
Leslie Williams	P.O. Box 919	Ganado, TX 77962
[illegible]	PO Box 151	Edna Tx 77957
Tammy J. Terry	PO Bx 151	Edna Tx 77957
Brandy [illegible]	111 Ridge View	Victoria, TX. 77904
[illegible] F. Robles	702 Ed. Rinn	Edna, Tx 77957
Elizabeth Novak	1008 Hackberry	Ganado, Tx 77962
Juliana Blevins	1003 Fredrick	Edna
Ruth Delgado	512 buffalo St	Edna TX
Todd Poole	500 Jackson	Edna TX 77957
Gary Armstrong	PO Box 155	Laward TX 77970
Shelly Eppinett	1900 N. Wells St.	Edna Tx 77957
Bertha Andrews	506 Frank White	Edna Tx 77957
Raymond V. Carter	601 W. Goodwin	Victoria Tx 77901
[illegible]	210 C R. 307	Edna TX 77957
Melinda Pierce	1247 Best Oaks Dr	Inez, Tx 77968
[illegible]	1247 Best Oak	Inez TX 77968
Brandy Vacicavich	1202 Dewberry lane	Edna, TX 77957
Rhenlea Haferrich		
KRISTEN CARTER		
Teri Morgan	306 Mary Rose St	Ganado Tx 77962
Molly Chumo	346 CR 304	Edna TY 77957
Judy Mace	209 W. TROTWOOD	Edna TX 77957
Sharon Jones	2303 County Road	Edna Tx 77957
Kimberly Blackmon	1630 C. 237	Ganado TX 77962
Kimberly Martin	3959 FM 446	Victoria Tx 77905
Mark C. [illegible]	208 P.R. 4044	EDNA, TX 77957
Deborah Casey	707 Miriam St	Edna, TX 77957
Gail Lawrence	973 CR 239	Ganado, TY 77962
Cynthia Doyle	3012 Benbow Rd.	Inez, TX 77968
Robert J. Schumann	4890 old Hwy Rd.	Inez, TX 77968
Jackie Knezek-Schumann	4890 Old Hwy Rd.	Inez TX 77968
Terry Russell	803 S Allen	Edna TX 77957
Tonia Russell	803 S. Allen	Edna TX 77957
Sandy Bell	299 CoRd 110	Edna TX 77957

Jim Nickel 299 CoRd 110 Edna
Bryan Hurt Ganado
Krystal Diaz Inez
Amanda Martin Inez
Rachel Guidry Edna
Blake Hilgart Edna
Leticia Ramirez PO Box 1693 Edna, TX
Michael Vickey Edna, TX
Betty Willis Edna, Tx
Billie Batterton Edna, Tex.
Luanne Kucera Edna, TX
Chriscelle Willis EDNA TX
Heath Bednar EDNA TX
Will Pope La Salle Tx.
[illegible] Edna Tx
[illegible] [illegible] Tex
[illegible] 308 [illegible], Edna, TX
[illegible] Glaser Ganado, Tx.
Erin Beattie P O Box 134 - Ganado, TX
Michelle M. Sample P.O. Box 866 - Edna, Tx 77957
[illegible] Inez TX
[illegible] Hicks Edna, TX
Leah Hicks Edna, TX
Timiron Williams EDNA, TX
Carol Janssen Box 256 Ganado Tx 77962
[illegible] 403 W. Brackenridge Edna, TX
Gloria Margadez 310 N. Colorado, Edna, Tx
Donated 4/19/10 $20.00 Jason McCarrell 209 Sunset Dr Edna
Patricia K. McElroy 985 Co. Rd. 312 Edna, Tx 77957
J. Bryce Dugger 114 Gentle Breeze Victoria, Tx 77905
Hope Wood 2124 Cr 303 Edna, Tx 77957
Milam [illegible] Simons 1206 Dewberry Ln Edna, Tx 77957

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Por Favor, hagan el favor de firmar esta petision para salvar el Rio de Lavaca. Es el ultimo en Texas!

Name	Address	Email
Deborah L. Norris	1400 N Wells #1201	
Randy Waters	P.O. Box 572 Lolita, TX. 77971	
Rebecca Manzanales	P.O. Box 688 Edna, Tx 77957	
Gilbert L. Dery	PO BOX 1187 Edna, Tx. 77957	
Violet Lewis	1400 N Wells #1103 Edna	
Tina Vibrock	1400 N Wells 1605 Edna	
[illegible]	421 PR 3065 Edna	
Charlotte Cooksey	700 W. Elm, #46, Edna	
Larry Vibrock	700 W. Elm # 48 Edna	
[illegible]	130 CR 301 Edna TX	
[illegible] Salinas	602 W. Division Edna TX.	
Kevin Turner	810 First Street Edna Tx 77957	
Kathy Roddy	PO Box 268 Edna, TX 77957	
[illegible] Marlow	Box 84 La Salle, TX.	
Kathy Gray	375 CR. 132 Hallettsville, TX 77964	
L.J. Korenek	602 Brodie St. Apt 1 Edna 77957	
Amber Weddle	305 Sample St. Edna TX 77957	
Jade Dement	303 Sample St. Edna TX 77957	
Dusty Weddle	305 Sample St. Edna, TX. 77957	
[illegible] Chew	710 HEATHERTON HILL LN HOUSTON TX, 7704	
[illegible]	803 W. Cedar St Edna Tx	
[illegible] Conley	803 W Cedar St Edna TX	
Leonard Johnson	1007 W main St Edna	
Emelia Johnson	Same	
[illegible]	241 Len Bar Ln Leander, TX	
[illegible]	322 BROOK FOREST TRAIL SUGARLAND TX	

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Flood It!

Name	Address	Email
Enrique Townley		rickperez65@yahoo.com
Doris Sanguhun	313 W. Gayle	
Zachary D. Wittelbert	806 CR 306	
Jill Keith	1403 Albers Colmen	

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Name	Address	Email
SILVIA RODRIGUEZ	1400 N WELLS APT 3706 EDNA TX 77957	
CHRIS		
George Gregory	903 Fulton Edna, Tex	

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Name	Address
W. J. Vincik	3531 CR 324 EDNA 77957
Jon Malek Wood	56 County Rd 248 Ganado 77962
Willard Franklin	1200 County Rd 416 Edna, 77957
John Rogers (361-308-0326)	806 Liveoak Edna Tx 77957
D K Russell (Russell)	11288 FM 822 Edna 781-0384
Ernest New	921 Co Rd 17 Hallettsville 77964
Shirley New	921 Co. Rd 17 Hallettsville, Tx 77964
Kathy [illegible]	382 FM 3131 EDNA TX 77957 361-781-2130
Henry Rolf	14145 ST. HWY 111 E. GANADO TX. 77962
361 782-7238 282-7238 W. H. & Mary M. Johnson	173 Private Rd. 3122 Edna, TX 77957
[illegible] Sr.	2903 Willow Creek El Campo, TX 77437
David A Motal	14553 FM 530 EDNA, TX. 77957
[illegible]	2030 CR 303 Edna Texas 77957
Ronnie [illegible]	2955 Hwy 111 N Edna

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Name	Address
Matthew Goldman	421 CR 284
Jim CARROll	282 CR 122
[illegible]	6778-FM 1822 EDNA, TX 77957
Jacob DeBord	4479 FM 822 Edna TX 77957
HARLAN J. SPECHT	230 CR 1301 EDNA, TX 77957
AdAN GARZA	9155 St. Hwy 111 N.
Chris Willis	303 S Pumphrey
Robert Volkmer	1798 FM
Josh Frankel	301 S Pumphrey
Kathy Dusser	303 FM EDNA
[illegible]	7370 FM 234 N.
Katherine Newman	1099 FM 1157 Ganado
Jeremy Gaubatz	PO Box 113 Francitas TX
NORVELL BUTLER	503 ERIC EDNA, TEX
Alex Cox	10893 CR 234 EDNA Tx
Chris Zuber Jr.	2183 cr. 130 Edna TX
Joshua Gaubatz	285 CR 230 Ganado
Bill Tipton	5224 FM 234 N EDNA, TX
Clinton [illegible]	509 Suzanne St. Edna
Glenda Specht	230 C.R. 1301, Edna, TX
[illegible]	5653 CR 288 EDNA
Betty [illegible]	782-3433 FM 234
Claxton Butler-Norman	6556 St Hwy 111 N
Lane Tipton	5001 Fm 822
Michael Marthiljohni	2646 FM 822
Sonny Strelec	470 C.R. 3011
DANIEL KLIMITCHEK	P.O. Box 436 LOLITA, TX. 77971
[illegible] Johnson	6714 FM 1822 Edna TX
[illegible]	497 CR 429 Lolita, Tx 77971

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Name	Address
Brian Hicks	PO Box 149 Ganado, Tx
Bryan Miska	202 W Main Edna
David Parker	P.O. Box 138 Ganado Tx
Edward Covarrubias	1308 Green St
Russell Gary	414 Peabody St
Al Miska	3647 FM 234 South
J. Bradley	210 Sample Edna
Denise Owen	PO Box 725 Edna Tx
Vernon Houdek	203 Edna Edna Tx
Fred Westhoff	PO Box 314 Edna, Tx

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Name	Address
Teresa Durham	PO Box 697 Edna TX 77957
Norman Hunt	152 CR 253 Ganado 77962
DAVID PATEK	606 midway RDS Inez TX 77968
Joleen Jackson	132 KOALI, BASTROP, TX 78602
CAROL Ann Lee	118 N. WELLS EDNA TX 77957
Michael Farris	213 W. Gayle, EDNA, Tx 77957
[illegible] Blue	407 Robinson St. Edna, Tx 77957
Chad Burkorsky	606 midway Rd South Inez TX 77968
[illegible]	107 Charleston Dr., Victoria, TX 77904
[illegible]	27927 Wild Bloom SAN ANTONIO, Texas 78260
Claudia Braun	27927 Wild Bloom S.A. TX 78260
Linda Teague	4897 FM 2616 Hallettsville TX 77964
O M Teague	4897 FM 2616 Hallettsville TX 77964
Justin Robbs	1400 n Wells Edna Tx 77957
Ryan Blue	407 Robinson Street, Edna Tx 7795
Mary Beth LaPlue	PO Box 69 EDNA, TX 77957
[illegible] Carter	PO BOX 709 Ganado 77962
Susan Carter	PO Box 709 Ganado, TX 77962
Mae Lee	118 N Wells, Edna, Tx 77957

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Please sign this petition to try to Save the Lavaca River. We need to protect the last free flowing river in Texas!

Name	Address
[illegible] Tapia	490 CO RD 120 Edna Tx.
Genoveva G. Almeda	108 E. Cypress Edna 77957.
Christina Almeda	409 S Second Ganado Tx 77962
Victoria Govea	407 N 3rd St Ganado Tx 77962
[illegible]	803 S. Second Ganado Tx 77962
Maria Almeda	211 Spalek Ganado Tx 77962
Minerva Tapia	490 CR 120 Edna Tx 779
Angie Tapia	305 Buffalo St. Edna Tx 77957
Sergio Tapia	305 Buffalo st Edna Tx 77957
Teresa Trinidad	600 N Wells St Apt 7 Edna Tx 77957
Angela Garcia	601 N Wells St Edna TX 77957
Claudia Olivares	557 CR 126 Edna Tx 77957
Armando Olivares	557 CR 126 Edna Tx 77957
Maria Olivares	612 CR 126 Edna Tx 7795
Efain Arvizu	612 CR 126 Edna Tx 77957
Maria Vargas	557 CR 126 Edna Tx 7795
Edelmira Vargas	557 CR 126 Edna Tx 7795
Maria Garcia	1134 CR 126 " " "
Jose Garcia	" " " " " "
Melissa [illegible]	612 CR 126 Edna Tx 77957
Aliz G. Olivares	612 CR 126 Edna, Tx 77957
Erain Tapia	490 CR 120 Edna, Tx 77957
Audelia M Vidal	1021 W Hickory Edna Tx 7795
Julio C Vidal	1021 W Hickory Edna Tx "
Yolanda Govea	306 S. Bryan st. Edna, Tx. 77957
Everardo Govea	306 S. Bryan st. Edna Tx 77957
Lisa Ochoa	408 S. Bryan St. Edna, Tx 77957
Petra Ochoa	408 S. Bryan St. Edna T 77957
Anna Rodriguez	303 S Bryan St Edna Tx 77957
Jessica Segundo Castillo	202 Guadalupe Edna Tx. 77957
Benito DeLeon [illegible]	199 FM 822 Edna Tx 77957
Jennifer Ramos	1413 W. Main Edna Tx 77957
Derrick Ramos	1413 W. Main Edna Tx 77957
Jacinto P. De Leon	665 Fm 822 Edna, Tx 77957
Nora De Leon	" " " Edna, Tx 77957
Marcelino DeLeon	899 Fm 822 Edna Tx 77957
[illegible]	756 FM 822 Edna Tx 77957

ALONZO P. CRUZ 118 ROSA EDNA TX. 77957
John Kalles 1077 ST. HWY 111 N. Edna tx. 77957
Ernesto Baez 610 W CHURCH ST EDNA T-77957
John Gonzales 1303 N East EDNA TX 77957
John Gonzales Jr. 1303 N. East Edna Tx 77957
Luis Negrete 1305 N E[illegible] Edna TX, 77957
[illegible] 413 YUBA DAM ST, EDNA TX 77957
Johnny A. Gonzales 411 Yuba DAM EDNA TX 77957
Antonio Gonzales ~~[illegible]~~ 827 Co Rd 411
Bonnie Gonzales 3411 Yuba Dam Edna TX 77957

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Name	Address
Lindsey Lee Bradford	101 E Main St. Edna
Anna Plotini	409 Maxine Edna
Laura Miller	1007 Suzanne Edna
Suze Smith	709 CR 356 El Campo TX 77437
[illegible]	502 Fannin St. Edna, TX 77957
[illegible]	105 Cherry St. Edna, TX. 77957
[illegible]	436 CR 417 EDNA TX 77957
[illegible]	711. 4th St. Edna TX. 77957
[illegible]	504 Carver St Edna TX 77957
Kayla Kallus	910 CR 284
Lisa Kallus	910 CR 284
Annabelle Villa	507 N. Kleas Edna, TX
Vicki Hessong	7727 St Hwy 111 N Edna TX 77957
Bill Hessong	7727 St Hwy 111 N Edna TX 77957
Gina Cherry	PO Box 557 Ganado TX
Amber Martinez	PO Box 656 Ganado TX
[illegible]	405 Sunset Drive, Edna, Tx. 7795
[illegible]	P.O. Box 421, Edna, Tx 77957
[illegible]	
[illegible]	118 N. Wells, Edna, Tx 77957
Butch Olsovsky	1246 Co. RD. 423 LoLita Tx 77971
Lanatl Olsovsky	1246 Co. RD. 423 LoLita Tx 77971
Ryan Ballin	405 Sunset Drive, Edna, Tx 77957
LEONARDO PLOTINI	409 MAXINE ST. EDNA, TX 77957
Brenna Dixon	109 E. Main St. Edna TX 77957
[illegible] Kubacka	P.O. Box 573 Edna Tx 77957
Russell A. Hahn	3503 Hilltop LN Plano, TX 75023
[illegible] Reed	P.O. Box 549 GANADO, Tx 77962
Joe P. Rodriguez	2003 DuBarry Ln Houston, TX 77018
[illegible]	507 N. Kleas St.
[illegible] Duarte	2382 CR 302 Edna TX 77957
[illegible]	1465 CR 401 EDNA TX 77957
Laurie Padron	1008 Fulton St. Edna, TX 77957
[illegible]	1406 W. MAIN EDNA, TX 77957
[illegible]	1400 N. Wells Apt. 2607 Edna, TX 77957
Cheryl Nelson	1400 N. Wells Apt. 2607 Edna, TX 77957

Sign on next page -

Erica A. Andrade 214 S. Allen Edna Tx.
Tonia Prukop 601 N Wells Edna, TX
Lane Hadley
Connie Marthiljohni P.O. Box 105 Edna, Texas
Coy Rooks 1400 N W Apt 2505 EDNA TX 77957
Justin Rooks 1400 N W Apt 2505 EDNA Tx 77957
John Muschalek 950 Buffalo St Edna 77957
Kim Courville PO Box 409 Louise TX 77455
Mindy Currie 146 CR 122 Edna TX 77957
[illegible] 1209 St Hwy
Mary Ellen Holmes 416 Pear St
Julie Holmes 416 Pear St
Lisa Jones 1400 N. Wells Apt. 4313
BRENDA JACOBS 4341 FM 1822 EDNA
Cortney Hardaway 105 E. Cypress Street Edna, TX
Denice Callis Edna, TX 208 W. Elm
Kelvin Turner 208 W. Elm St.
[illegible] 1145 Fm 234 South
Debra Balizan 1480 Fm 1593 Ganado, TX 77962
Allison Infante 1479 CR 303 Edna, TX 77957
Clayton Butler

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Name	Address	Email
Renee Johnson	11643 US Hwy 59 South Edna	
Crystal Merechka	2315 Cty Rd. 19a Hallettsville	
[illegible] Close	105 E. Main Edna	lowercaseletters@yahoo.c
Esperanza Sanchez	CR 323 LaSalle, Tx 77969	
Melinda Manzanarez	801 Progress St apt #3 Edna	
Ryann [illegible]	~~[illegible]~~	
Vanessa Beltran		
Haylee Brown		
Tammie Ramsey		
Linda Parr		
Brandon [illegible]		
Eric Ramsey		
Steve Parr		
Floa Lee Moore		
Peggy Williams		
Megan Cloviss		
Tyler [illegible]		
[illegible]		
Stephanie Meeschalk		
Cynthia Muschalik		
Bonnie Muschalik		
Brandon Muschalik		
Marbella Moreland	2143 CR 302 Edna, Tx 77957	
Bruce Merechka	2300 CR 19 Hallettsville 77964	
Rudolf Merechka	CR 19	
Frank Merecka	CR 19	
Jerry Soto	F.M. 234 N. Edna Tx.	
James Simons	607 Gilbert Burn TX	
Scott Ortolon		
Lisa Vinet	3443 CR 331 Edna TX	
Jon [illegible]		
[illegible]	210 CR 253 Ganado	

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Name	Address	Email
JAIME BEDNARZ	1513 N. EAST ST. EDNA TX 77957	Jliepe@yahoo.com
Shae mabry	PO BOX 112 Edna, TX	shae-shae_18@hotmail.com
Duane Curlee	904 Pin Oak Edna Tx ~~77957~~	duane.curlee@yahoo.com
Darvis Jones	205 Hanover st Edna TX 77957	
ERNO SATTLER	7828 FM 1822 EDNA TX 77957	e.sattler@hotmail.com
Lupana Resendez	505 W. Cypress St. Edna, Tx 77957	mslupana@yahoo.com
[illegible]	407 Dennis Edna, TX 77957	[illegible]@yahoo.com
James E. Glover Jr.	501 Mead Rd Victoria Texas 77904	jameseglover jr@[illegible]
Jan Bone	1510 CR 103 Edna	jan-bone at sbcglobal.net
Patti Bone	1510 CR 103 Edna	jan-bone@sbcglobal.net
DEWITT PEASE	7653 FM 2718 YORKTOWN	
Sean Cunningham	1267 CR 123	ears-lee@yahoo.com

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Name	Address
Marbella Arbellan	914 W. main st
Artemia Hernandez	
Joe Garza	
Jessica Hernandez	
Natalia Ruiz	
Armando Hernandez	
Olivia Rodriguez	
Maria Rodriguez	
Cindy Hernandez	
Kristy Salazar	
Joshua Thompson	
Shawn Dodds	
Leslie Hernandez	
Wesley Ramirez	417 E Division
Abel Rodriguez	
[redacted]	I also felt pressured I misunderstood what it was all about and did not feel I could support this at this time
Nicole Flournoy	106 E. Cypress
Sharon Head	411 S Progress
Brandi Williams	
Stephen Dodd	1400 N Wells
Enloe David O'Bannon Jr	103 E. Tiptwood
Carol Vickery	686 Co Rd 426 Lolita
Davis Farquhar	707 W. Gayle St Edna, Tx
Dora Farquhar	313 W Gayle St. " "
Corbett King	606 VALE St.
Linda King	606 Vale St.
Melissa Meador	
Miguel Ranera	Beeville, TX
Elisha James	Edna, TX
Jesse James	Edna TX
Skylar James	Edna TX
Jayden James	Edna TX

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Name	Address	Email
[illegible]	612 Davis Street	nuts-in-a-rut@hotmai
[illegible] Koop	859 CR 312 EDNA Tx	[illegible]
[illegible] Koop	622 Fulton Edna	
[illegible]	804 Harris St. Edna, TX 77957	dsilver44@hotmai
Kim Bradley	8062 CR 283 Edna Tx 77957	kbradley[illegible]@yahoo.com
Michael Malek	208 Southeast St EDNA TX	
Charnicka Bradshaw	302 S. Colorado Edna TX	Charnicka[illegible]@yahoo.com
Ayreona Turner	302 S. Colorado EDNA TX	
[illegible] Sanchez	612 Fannin Edna	
[illegible] Robinson	606 E Cedar Edna TX	
Gary Nuff	609 Jackson ST EDNA TX	
Wayne Mendez	802 W Cypress EDNA TX	
[illegible]	1341 C.R. 116 Edna TX	
[illegible]	205 Young St Edna TX	
Ramon [illegible] Jr	P.O. Box 772 [illegible]	
Gray → Billy McCormack	816 Buttercup	CR 438A
Joel Frankel		
Jessenia Silver	806 Harris St.	jesseniasilver@yahoo.com
Douglas Kelley	205 S Colorado St Edna	dugkelley@sbcglobal.n
Robert D. Bell	P.O. Bx 213	
Danny Zapata		
[illegible]	103 S Pumphrey	
[illegible]	432 Co. Rd 416	
[illegible]	P.O. Box 188 Edna TX	
Hugo Rene Sanchez		
Wesley Koop	514 Wilson EDNA	
Tyler Koop	514 Wilson EDNA TX	
Wendell Hamilton	620 [illegible] Edna TX	
Benito Hernandez	313 Marvin Edna Tx	
[illegible]	312 Dennis St. Edna, TX.	
Curtis Elledge		
[illegible]	1612 South 3rd Ganado TX	
[illegible]	Jackson Co.	

[illegible] Victoria, Tex 77905

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Name	Address
Rachel Tinsley	306 S. Colorado A4 Edna, Tx. 77957
(Cera Sears)	14 Live Oak Lolita Tx 77971
Vanessa Tristan	P.O. Box 990 Ganado, TX 77962
Andrew Townsend	3802 Run of the Oaks. Austin, TX 78704
[illegible]	316 East Calhoun El Campo 77437
Oswald & Rosalie Henze	1913 FM 2345, Edna, Tex 77957
[illegible]	1040 CR 319 Edna Tx
Janet Floyd	1024 S. Wells Edna Tx 77957
Lord Beard	9019 FM 822 Edna Tx
Michael Dambrosky	1560 HWY South Edna, TX 77957
Anna Dambrosky	1560 Hwy South Edna, Tx 77957
Malinda Allen Rowlett	1617 CR 110 Edna TX 77957
Stephanie Nesloney	1825 CR 429 Lolita TX 77971
Carolyn Nesloney	704 W. Division #8 Edna Tx. 77957
[illegible]	612 Ella Marie Edna, Tx 77957
Amanda Nesloney	710 Hanover St. Edna Tx 77957
Raymond & Margaret Friedel	5201 City of Harbin Rd [illegible] 77957
W. E. Stark	608 apollo Dr. Edna Tx 77957
Shelley & Bryan Hurt	P.O. Box 242 Ganado 77962
Dana Miller	601 W. Division - Edna TX 77957
William Miller	601 W - Division - Edna TX 77957
Alexis Rios	710 Courtney - Edna TX 77957
Lauren Anderson	PO Box 328 - Louise TX 77455
Amanda Sample	711 S. Progress, Edna, TX 77957
Suzanne Matak	300 S. Guadalupe Edna
Willie R Matak	300 S Guadalupe Edna
Brenda Rose	301 S. Colorado Edna
[illegible] Whitley	11248 FM 822 Edna, Tx 77957
[illegible]	170 Roden Inez Tx 77968
Sandra L Meadows	795 CR 312 Edna, TX 77957
Jarrod Jennings	6876 CR 283 Edna TX 77957
Jason Jennings	6876 CR 283 Edna TX 77957
Jamie Jennings	6878 CR 283 Edna TX 77957

Kristenthurmond	6878 CR 283 Edna TX 77957
Lupe Lovely	113 Brown St EDNA, TX 77957
Norman Glaze	113 Brown St EDNA, TX 77957
Chelsea Kerley	555 County Rd 406 Edna, TX 77957
Ricky Johnson	705 W. Ash Edna, Tx 77957
Rusty Johnson	705 W. Ash Edna, Tx 77957
Donald Johnson	211 6th St Louise, TX 77455
Sara Koop	622 Fulton Edna, TX 77957
Clyde Martin	18466 FM 1300 Louise, TX 77455
Dorothy Martin	18466 FM 1300 Rd, Louise, TX 77455
Sylvia Butler	P.O. Box 97 421 PR 3065
Jennifer Butler	421 PR 3065 &
Craig Malory	421 PR 3065 Edna TX 77957
[illegible] Hunt	P.O. Box 36, LaWard TX 77970
[illegible] Hunt	P O Box 36, LaWard, TX 77970

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Name	Address	Email
April McLennan		precisionservices@
Kenny McLennan		Rocketmail.com
Glenn Edwards		
Kevin Davis	112 W. Main	
W.A. Davis	909 SAiDEN	Edna
Sandra Robinson	306 S. Colorado	
Samuel Rucker	816 E. Cedar	
Cunice Rucker	816 E. Cedar	

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Luis Martinez	El Campo TX
Saw Lay	Port Lavaca TX
Maria Figueroa	Port Lavaca TX
Emma Amaro	Palacios tx
Oscar Perez	Port Lavaca
Esperanza Rodriguez	Port Lavaca TX
Janice Davis	Lolita, TX
Jose Perez	Port Lavaca Tx.
René Rodriguez	Port Lavaca Tx.
[illegible]	Victoria Tx.
David Journet	Victoria, Tx
Ismael Morales	Victoria, Tx
Santiago Castro	El Campo, tx
Alberto Sanchez	Lolita TX
[illegible]	Victoria, Tx.
Raul Martinez	~~[illegible]~~ EDNA TX.
Chris Cortes	Edna TX
Martin Sanchez	Edna Tx
Nicholas Cant[illegible]	Victoria Tx
Addie Peña	Victoria Tx
Will Turner	Edna Tx
Tracey Moore-Sweeney	1043 Co. Rd. 312, Edna, TX 77957
[illegible]	Blessing Tx 77419 Tx
Marty Goedrich	Victoria TX 77904
[illegible]	Victoria Tx 77901
[illegible]	Victoria Tx 77904
John M[illegible]	Victoria TX 77901
William W. Vickery Jr.	Lolita, TX 77971
[illegible]	Port Lavaca TX 77979
[illegible]	Bloomington TX 77951
[illegible]	Victoria, TX 77905
Nina Cruz	PL TX
[illegible] Morales	Victoria TX
[illegible]	Victoria TX
JOHN SWEENEY	1043 CO. RD. 312 EDNA TX

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Por Favor, hagan el favor de firmar esta petision para salvar el Rio de Lavaca. Es el ultimo en Texas!

Name	Address
PATSY GABRYSCH	P.O. BOX EDNA, TX
MICHAEL COBOS	PORT LAVACA, TX
LINDA TISLOW	PALACIOS, TX
Jeff Terry	Huston Tx
Ter Wai Lin	Houston TX
Kelly Fikes	EDNA Tx
Delores Longu	Edna, TX
Jose Gonzalez	Ganado, Tx
AARON ESPINOSA	EDNA, TX
Brian Flores	Victoria Tx
Miguel Hernandez	Lolita Tx
Jessica Frazier	Lolita, TX
James Soetje	Lolita TX
JAMES HAUBERT	VICTORIA
TERRY DORNAK	El Campo
Norma Smith	Victoria, TX
Carl Weeks	Ganado TX
Craig Kramne	Ganado TX
mike LAW	VICTORIA, TX
Matthew Espinosa	Victoria, TX
DEAN HARLEY	PORT LAVAC, TX
Dale SPARKMAN	Lolita TX
Victor H. Leos	Victoria, TX
LONNIE BUERGER	VICTORIA, TX
SHANE BARKER	El Campo, Tx
ROGELIO SALAS	POINT COMFORT, TX
Debra Hernandez	Port Lavaca TX
Ramiro Velazquez	El Campo TX
Angelina Segovia	Port Lavaca. T.X.
Stephanie Escamilla	Bay City TX
[illegible]	Victoria TX
Luis R. Mahone	Port Lavaca TX
Doris Rosas	Victoria, TX.

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Name	Address
[illegible]	6201 old [illegible] Rd [illegible] TX 77968
[illegible]	9301 St Hwy 288 Port Lavaca TX 77979
[illegible]	P.O. Box 151 LaWard, Tx. 77970
[illegible]	5708 FM 1822 Edna, Tx. 77957
Lauren Hayovsky	501 Barbara Ganado, TX 77962
Isaya Nunez	P.O. Box 127 Vanderbilt, TX 77991
Jason Hessong	215 private road 303[illegible]
[illegible] Hessong	406 W Brackenridge Edna Tx 77957
[illegible]	N/A Ganado Tx
Tammy Leal	439 FM 2982 Ganado TX
David E [illegible] Johnson	907 Buttercup, Edna
Dorothy Johnson	907 Buttercup Edna
Barry Selcer	P.O. Box 37 Vanderbilt, TX 77991
[illegible]	764 Suzanne St Edna Tx 77957
[illegible]	" " " " "
[illegible]	505 Elizabeth, Edna, TX 77957
Doris DeBruhl	1000 CR 312 Edna
Kat Woodring	744 Co. Rd. 3091, Edna
[illegible]	744 Cr 3091 Edna.
Hadley Young	5530 Ranch Rd 1 Stonewall, TX 78671
Terry Young	5530 Ranch Rd 1 Stonewall, TX 78671
S [illegible]	325 [illegible] 430 Lolita Tx 77971
Adam Anderson	Richmond Tx
Cindy Anders[illegible]	
Josh Nels[illegible]	710 Hackberry Ganado Tx
[illegible] Dunn	710 Hackberry Ganado Tx
[illegible]	El Campo, Tx
Megan Gresham	Ganado, TX
B E Taylor	Yoakum, Tex.
Caralyn Taylor	Yoakum, Tx.
Sam [illegible]	Edna TX
Feliz Navidad	" "
Kelli Miller	"

Tate [illegible]	Edna, Tx
Ryan Tomas	~~[illegible]~~ Low Water, County Road 301
[illegible]	Low Water, TX
Dennis Barton	Edna, Tx
Mary Tomas	2456 Co Rd 306 Edna
Debra Tomas	2456 CR 306 Edna
Keith L. Orsak	901 Gilbert St Edna
Michele Orsak	901 Gilbert st.
Kayla Darilek	2266 CR 414 Ganado
[illegible] Barton	Edna, Tx
[illegible]	Edna Tx. "Low Water TX"
[illegible] Olsovsky	Lolita TX
J C Towers	64 Warsaw Landing Port Alto 77979
[illegible]	64 Warsaw Landing, Port Alto 77979
Kristen Carter	
Miranda Malek	2531 CR 311 Edna, TX
Patti Cook	8813 Hwy 111 N. Edna
Robert [illegible]	1730 Cty. Rd. 110 Edna
Billie Marshall	1730 Cty. Rd. 110 Edna
[illegible]	Hwy 172 S Ganado TX
[illegible]	Hwy 172 S Ganado TX
[illegible]	P.O. Box 148 Ganado TX 77962
Kyle Hermanzicky	P.O. Box 731 Edna, TX 77957
Rebecca Haney	625 Hanover Edna
Phyllis Janke	305 Hudson Edna

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Name	Address	Email
Sara Fiew	P.O. Box 161 Edna, 77957	saratiffany86@hotmail.c
Pamela Fiew	POB 281 Edna	rodeomama@hotmail.com
Valerie Callaway	2229 Fm 822 Edna	valerie@ykewb.com
Doris Farquhar	313 W. Gayle Edna	
Brenda Coulter	1943 St. Hwy 111 S Edna	rocking1943@sbcglobal.net
Dodie Stuart	311 Live Oak Inez, TX	dodiestuart@yah...
Pat Stuart	311 Live Oak Inez, Texas	
Skye Smith	107 CR 356 El Campo TX 77437	
Courtney Beard	9019 FM 822	clbeard24@sbcglobal.net
Levi Duarte	9019 FM 822	levibailey24@aol.com
Jeff Sublett	P.O Box 863 Ganado TX 77962	
Cory Jacobs	6341 F.M. 1822	
Clarence Joines	Po Box 114 Lolita Tx 77971	
Angie Joines	PO Box 114 Lolita, TX 77971	
Trish Mercer	1818 CR 267 Ganado TX 77962	
→ Kendall Doyle! ←	325 C.R. 306 Edna, Tx 77957	
Jana Kolbe	2283 C.R. 418 Ganado TX 77962	
Patricia Revel	P.O. Box 177 Ganado TX 77962	
[illegible]	PO. Box 608 Edna TX.	
[illegible]	1206 Cobb St. Edna, TX 77957	
Margaret Perez	305 Duggan Edna, TX 77957	
Homer Perez	305 Duggan Edna, Tx 77957	
[illegible]	P.O. Box 302 Danevang Tx. 77432	
John Critchfield	P.O. Box 1273 El Campo Tx. 77437	
Jane Putnam	1999 St Hwy 111 N Edna 77957	
Kristi Doyle	325 County Rd 306 Edna TX 77957	
[illegible]	513 New / Simons Edna Tx 77957	
Donna Dunham	109 W. Ash St. Edna Tx 77957	
Charlene Olcola	1834 CR 121 Edna TX 77957	
[illegible]	424 Ocelot Inez, Tx 77968	
Johnny A Boyle	411 Yuba Dam Edna Texas 77957	
Bonnie Boyle	411 Yuba Dam Edna Tx 77957	
Patrick [illegible]	PO Box 161 Edna, TX 77957	

Joy Meador 795 Co.Rd. 312, Edna melody.joymeador@yahoo.com
Becky & Patrick
Barbara Blevins 311 Buffalo, Edna, TX
Clint Whittley 1195 CR 401

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Name	Address
Robert E. Lee	106 Prof. Park Dr. Victoria, TX 77904
Tracy L. McNeley	106 Prof. Park Dr. Victoria, TX 77904
Jardie Petru	106 Prof Park Dr Victoria, TX 77904
Kinta Cameron	106 Prof Park Dr. Victoria, TX 77904
James Mark [illegible]	208 W. Main Edna TX 77957
[illegible]	43 Louisiana AVE Victoria, TX 77905
Jeremy Woldert	6107 Country Club Drive Victoria TX 7790[illegible]
Graham Woldert	1006 Jeffrey Dr. Tyler, TX 75701
Jerra Lee	6107 Country Club, Victoria, TX 77904

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Name	Address	Email
Paige Simmons	2594 FM 1822	
Ola Whitley		
Dinda McDonald	207 Duggan	
Melissa Sappington	310 W. Cypress	
Haize Clowers	2594 Fm 1822 Edna	
Charles Rivera	179 3035 Edna Tx	
Shane Clowers	2594 Fm 1822 Edna	
TRAVIS SIMONS	PO Box 1186 Edna Tx	
Patti Sappington	310 W. Cypress	

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Name	Address	Email
Lois Drushel	110 W Main	Security@TKC.com
Carol Arcrer	P.O. Box 598 Edna TX	
Henry Drushel	607 N Wells Edna TX	

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Name	Address
Linda Snow	POB 434, EDNA Tx 77957
Irea Laird	2285 Fm 822 Edna Tx 77957
Felicia Laird	2385 - Fm 822 Edna Tx 77957
[illegible] Moten	P.O. Box 622 Ganado Tx 77962
Amanda Hampton	214 E. Gayle St. Edna TX 77957
Doug Goble	619 CR 126 Edna Tx 77957
[illegible] Sorensen	
Bill Dickens	207 Hanover Edna Tx 77957
Keith Gr[illegible]	614 E Main Edna TX
Andrea Laws	701 Ed Linn Edna Tx
Jenni Lima	712 Frank White Edna tx 77957

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Name	Address
Shelley Ayo	407 Dennis, Edna, Tx 77957
Julie A Garza	305 Dennis, Edna TX 77957
Carol Chalek	1005 S. Third, Ganado, Tx 77962
Leah Latimer	1505 N. East Edna, TX 77957
Jeretta Novak	305 Elm St., Ganado TX 77962
Samantha Gerdes	1643 CR 303 Edna TX 77957
Jessica [illegible]	89 CR 125 Edna TX 77957
Courtney Garretson	2358 Loop 521 Edna, TX 77957
[illegible]	910 Vanderbilt Rd TX 77957
Christine Rodriguez	203 S. Colorado St, Edna, TX 77957
[illegible]	245 CR 117 N Edna TX 77957
Shelley Miller	611 Washington Edna TX 77957
Heather Bolton	801 Celestial Ln Edna TX 77957
[illegible]	1265C FM 822 Edna
[illegible] Duggan	1918 County RD 303 Edna
[illegible]	1422 CR 110 Edna, 77957
Billy Atzenhoffer	109 E. Brackenridge Edna 77957
Rodney [illegible]	3043 FM 234 South, Edna, Tx
[illegible]	2291 FM 234 South, Edna, Tx 77957
[illegible]	2358 Loop 521 Edna TX 77957
[illegible] Johnston	P.O. Box 703 Edna TX 77957
Robin [illegible]	2358 Loop 521 Edna TX 77957
Theresa Whitehead	406 Dennis St. Edna, Tx 77957
Donald L Bolton	801 Celestial Ln. Edna, TX. 77957
Maxine Gates	402 Dennis, Edna 77957
Darward Gates	402 DENNIS, EDNA - 77957
Jesse Whitehead	406 Dennis Edna - 77957

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Name	Address
Bobby Gendke Jr.	P.O. Box 7 Vanderbilt, Tx 77991
Tammy Gendke	PO Box 7 Vanderbilt, TX 77991
Karen Matak	107 Norwich Glen Victoria, TX 77904
Amanda Gendke	15700 Lexington Blvd Apt 1021 Sugarland, TX 77478
Lisafaye Motley	732 CR 115 Edna, Tx 77957
John E Motley	732 CR 115 Edna Tx 77957
Suzi Gendke	P.O. Box 487 Vanderbilt, Tx 77991
Robert Gendke	P.O. Box 487 Vanderbilt Tx 77991
[illegible]	446 CR 429
Walt Venglar	CR 238 La Salle, Tx 77969
Dena Spain	446 CR 429 Lolita 77971
Jacqlyn Curlee	PO Box 519 Lolita Tx 77971
Linda Lugo	PO Box 132 Vanderbilt Tx 77991
Martin Lugo Sr	PO Box 132 Vanderbilt TX 77991
Celia Segura	P.O Box 172 Vanderbilt Tx 77991
Martin Bri[illegible]	P.O. Box 132 Vanderbilt Tx 77991
James Yarborough	PO Box 484 Vanderbilt Tx 77991
Alan Schoby	PO Box 262 Lolita, TX 77971
Wm [illegible] L. Loy	PO Box 33 La Salle Tx 77969
Mina Loy	PO Box 33 La Salle Tx 77969
Mike Garza	3342 FM 1822 Edna Tx 77957
Marra Malone	PO Box 5874 Vanderbilt, TX 77991
Kathy Malone	P.O. Box 5874 Vanderbilt Tx 77991
[illegible]	P.O. Box 114 La Salle, Tx 77969
Linda Harrison	PoBox 632, Lolita 77971
J.W. Carmody	Box 527 Lolita
Georgia Abel[illegible]	Box 394 Inez 77968
Barbara Thedford	Box 162 Lolita, Tx. 77971
Rosita B. Lopez	Box 12 Vanderbilt Tx 77991
R [illegible]	1502 Seguin Ave. Victoria, TX 77901
Ronnell [illegible]	PO Box 132 Vanderbilt Tx 77991
Willie M. Boston D.	Pot 179 - Ganado, Tex
Maranda Parker	11313 FM 1593 - Lolita Tx
Bernice Fikes	1749 CR 429 Lolita TX
Mary Yarborough	Box 484 Vanderbilt, Tx 77991
John Rockaway	11342 US 59 N Ganado Tx 77962

Harry Sandel Jr	P.O. Box 361 Vanderbilt TX 77991
[illegible]	[illegible]
[illegible]	[illegible]
Matthew [illegible]	P.O. Box [illegible]
[illegible]	[illegible]
[illegible]	P.O. Box [illegible]
[illegible]	P.O. Box 157 [illegible] 77971
John Ehuik	P.O. Box 115 LaSalle TX 77969
David Simek	P.O. Box 115 LaSalle TX 77969
Ethan Pittman	P.O Box 14 Vanderbilt, TX 77991
D. Pittman	P.O. Box 14 Vanderbilt, TX 77991
Hutson family	PO Box 332 Vanderbilt TX 77991
Tina Landis	PO Box 591 Victoria 77903
Jessie Kelley	PO Box 96 Vanderbilt 77991
Shawn Egg	1460 CR Edna TX 77957
Wayne Gabrysch	2838 CR 324 Edna 77957
Agnes Gabrysch	2838 CR 324 Edna 77957
Tracy Thedford	P.O. Box 637 Lolita 77971
Chema Longoria	P.O BOX 293 Vanderbilt 77991

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Name	Address
[illegible]	208 Asbeck Ln Edna Tx 77957
Brian Bradley	951 CR407 Edna TX
[illegible]	411 Bois D'Arc Edna, TX
Charlotte Decker	393 Co. Rd. 131 Edna, TX. 77957
Kendra D. Bures	1509 S. Third St Ganado TX 77962
LARRY Koop	383 CR 311 Edna TX 77957
[illegible]	1203 Cobb Edna TX 77957
Ashley [illegible]	PO Box 171 Ganado TX 77962
Brandi [illegible]	~~PO BOX~~ 1103 S. Progress St. Edna
Scarlett Hicks	Edna TX 77957
[illegible]	1201 N. East, Edna, TX 77957
[illegible]	208 W. Elm Edna TX 77957
[illegible]	PO BOX 992, 210 W Bard Ganado TX 77962

Sylvia Butler	P.O Box 197, Edna, Tx 77957
Sandra Collins	405 4TH Street
Sandi Harper	9882 FM 822 Edna, Tx 77957
Billy Harper	9882 FM 822 Edna, Tx 77957
Vanda Hefer	9882 FM 822 Edna, Tx 77951
Odilia Garza	706 N Pumphrey Edna, Tx 77957
Reyes Cantu	706 N pumphrey
Anastacia Garza	707 N Flournoy
Joe Peterson	2740 Loop 521 - EdNA, Tx 77957
John Pina	202 Cora St Edna Tx
Richard Cooper	3245 FM 1234S Edna Tx 77957
Deborah J Davis	1400 N Wells #1201 Edna 77957 Tx

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JUL 01 2010

TWDB

Lavaca Regional Water Planning Group
J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Dear Region P Water Board,

I am writing to express my concerns about Stage 2 of the Palmetto Dam bend being included in our regions water plan. I was raised in Edna, TX and returned home after attending The University of Texas and after living many other places around 5 years ago. My husband owns Bradford Motor Cars and I own Fireflies so we know the importance of growth and progress for our community and our county. I also understand the importance of meeting the water needs of the State of Texas. I strongly disagree with the damming of the Lavaca River as the option to try to solve these issues.

The citizens of Jackson County are up in arms about Stage 2 being on our regions water plan. The Lavaca River is a part of our life and our livelihoods. There are families that will stand to lose land that has been in their families for over 5 generations. There are those who have never lived in a house besides the house they were raised in and several of those houses will be bulldozed and covered with water. There are others who have worked all their lives to buy river bottom land or worked to keep it in their families and now they are being threatened with it being taken away. Others have either just built or are planning to build houses on their land but now that may be covered with water. We are living in complete fear and for what? So, a private corporation will have more water and continue to get richer? If you could only hear and see how this is affecting us. Even those who do not stand to lose any land are 100% against the damming of the Lavaca River. We have seen what Lake Texana has done for this community and it does not outweigh losing the last free flowing river in Texas. The Lavaca River is part of life in Jackson County and we would not be Jackson County without it.

Along with how it will affect us locally, the harmful environmental impact a dam would cause on the bay and estuary system. With the unfortunate environmental disaster caused by British Petroleum in Louisiana, the Texas Gulf Coast is even now more precious and should be protected at all costs. Daily, we hear the ill effects on the bay system and the estuary system caused by the oil spill in Louisiana and Florida. Not only is the BP oil spill the largest environmental disaster, look what it is doing to the poor people of Louisiana and now Florida. Due to events beyond their control, the shrimp industry and oyster industry are now threatened and it will be years if not longer before the Louisiana and Florida Gulf Coast has recovered. This makes our bays and our portion of the Gulf even more of a commodity and opens the door for Texas to be the largest producer of shrimp and oysters. This could add millions if not billions to the Texas economy.

I hope you listen to the citizens of Jackson County. Again, I strongly oppose the damming of the Lavaca River and Stage 2. Please help us protect the future of Jackson County.

Sincerely,

Lindsey Lee Bradford

Lindsey Lee Bradford

Security Insurance Agency
• 110 W. Main • Edna • TX • 77957 •
• Phone (361) 782-3300 • Fax (361) 782-0541 • Security@YKC.com •

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JUN 09 2010
TWDB

06/07/2010

Lavaca Regional Water Planning Group
J Kevin Ward
Executive Administrator
PO Box 13231
Austin, TX 78711-3231

Dear Mr. Ward,

I am writing to you today to voice my opposition to the damming of the Lavaca River. In addition I am against the use of eminent domain as a means to acquire land for State II.

In addition, after attending the meeting for Region P, I found that Region P is in Region L's water plan which would encourage the damming of the Lavaca River. I also oppose this and want them to take our region out of their plan.

Also, I am against Formosa Plastics Corporations request to the Calhoun County commissioners to help Formosa get the east side of Calhoun County switched to the Lavaca Navidad River Authority from the Guadalupe Blanco River Authority jurisdiction.

Thank you for your time.

Sincerely,

Lois A Drushel

Lois A Drushel

From: Lois Kruschwitz eco@earthnet.net
Second Home Edna Address: 107 W. Gayle St 77957
Date: Sat, 26 Jun 2010 10:47:10 -0700
To: Lavaca Regional Water Planning Groups

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JUN 30 2010
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DAMMING THE LAVACA RIVER

First, let me introduce myself. My family has lived in Jackson County since the 1830s. At that time, several family members fought in the Texas Revolution and, there is reason to believe, were given land in Jackson County for their service in lieu of pay. We have been ranchers and farmers and have cared for our land as a family treasure. Our land along the Lavaca includes bottomland and primary forest, scarred only by pipelines such as the Corpus water line, which insisted on clearing a very wide right-of-way. Previously, part of our land was taken for the I-59 right-of-way and for Lake Texana.

For 38 years, I have taught biology, ecology and environmental science. Currently, I am a professor emeritus and teach primarily environmental science. The inspiration for my career came from my roots in Jackson County. I wandered along the Lavaca and had science fair projects that dealt with subjects such as "Native Woods of Jackson County."

My thoughts and ideas on the Lavaca River project are below. They reflect my interests.

The Lavaca is the last free flowing river on the Texas coast and for many, many reasons should not be dammed or diverted. There are better choices, such as industrial recycling of water, commonly used all over the world. Industries along the Gulf coast already use significant amounts of fresh water, including water from Lake Texana. In an effort to "sell" such projects, the public has been misinformed and misled about the advantages of reservoirs. Reservoirs may seem economically desirable, but such projects are costly environmentally and economically over time. An analogy might be that when forests are cut down, there may be substantial economic gain, but over time the many economic and environmental services and benefits that an intact forest provides are missing. Forested areas provide protection from hurricanes. Rivers not only provide for forests and wildlife, they sustain estuaries and provide fish and shrimp with freshwater and nutrients. We take for granted many of their ecological services. For example, wetlands and bottomlands act like sponges, absorbing and releasing water as needed. They are carbon sinks. They provide maximum storage for carbon in plants and animals, preventing global warming. Equally important, they produce oxygen. And, of course, forests, wetlands, rivers and natural areas are important economically as meccas for birdwatchers, fisherman, hunters and outdoor activists that bring revenue to the county.

The Lavaca is a silt laden river. It will drop its load of suspended materials, including toxic pesticides, pollutants, and pathogens and fill in as little as 100 years. In comparison, free flowing streams cleanse themselves and can be enjoyed for their scenic beauty.

Dams and water transfer projects upset the natural balances of streams and ecosystems. Not only do they completely destroy the habitats that they inundate, but they allow for the introduction of invasive organisms such as water hyacinths, nutria, mussels and many others. (For example, introduced water hyacinths clog waterways and are a problem for recreational and other interests in eutrophic Lake Texana and are rare in free-flowing streams, such as the Lavaca.)

Invasive species displace native organisms and are major threats to biodiversity. The rate of species disappearance has increased dramatically in the last 150 years and more extinctions and ecosystem crashes are expected. Organisms are interconnected and depend on one another for survival. The elimination of key species leads to disruption and ecosystem collapse. Not only are habitats destroyed by inundation and invasive species, but estuaries downstream are effected by the reduction in freshwater and nutrients from Texas rivers. Populations of shrimp, crab and fish are in decline.

The diverse subtropical region of the Texas coast has lost top predators and many less obvious organisms and has much more to lose from continued environmental disruptions. Today, most residents and visitors to Jackson County enjoy hunting, fishing, and exploring the pristine forested areas of the county. However, there are growing concerns about toxic marine seafood and respiratory and other health problems emanating from polluting industries along the Gulf. The bases of these concerns are well documented.

The question arises whether the people of Jackson County should be forced to service and subsidize major international polluting industries along the coast. Our artesian wells dried up years ago and as wells for farming are redrilled deeper, there will be no future access to surface water for local use.

Jackson County has preserved some of its wild lands and natural areas and is interested in continuing to do so in the future. It supports remnants of the most southwestern extension of the eastern deciduous forest. Pecan trees, ancient oaks, buckeye and hawthorn intermingle with huisache and knock-away from drier areas further southwest. In LNRA's recent proposal (March 2010) environmental issues are discussed and inventories of endangered and threatened species are presented. The lists are very incomplete and seem to be based of very old surveys of the Texas Biotic Province. The reference from Frank Blair is 60 years old and is very general. An inventory and survey need to be done for the Lavaca River watershed. This is the last free flowing river in the region. It needs to be preserved for comparative purposes, so that we know what has been lost in other Texas watersheds. Please keep in mind that it is the less obvious "little creatures that run the world."

Water is "our most valuable and least appreciated resource." Protecting rivers and watersheds is far more economically important than the short term benefits from polluting industries. For a variety of reasons, such as loss of wildlife, loss of a free flowing river, loss of primary forest, and displacement of people and their livelihoods, the people of Jackson County are vehemently opposed to turning the remaining river into a reservoir to supply water for an international polluting industry. In the United States, Florida and California have the most highly developed water management systems and are in the process of reversing decisions and embarking on restoration projects. Let us not make their mistakes. Water has been called the "New Oil." It is even more precious. Please help us to use and manage it wisely.

Lois Kruschwitz

RECEIVED
JUN 07 2010
TWDB

6/4/10

Dear Mr. Ward,

As a citizen & land owner in Jackson Co., I express the wishes of the majority of our County.

PLEASE DO NOT DAM THE LAVACA RIVER.

Thank you,
Carol Ann Lee

McHenry Lee, D.D.S.

118 N. Wells
Edna, TX 77957
Tel. (361) 782-7191
Fax (361) 782-5438

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JUN 28 2010
TWDB

Lavaca Regional Water Planning Group
J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O Box 13231
Austin, Tx 78711-3231

RE: Region P Water Board IPP

Dear Mr. Ward,

My comments are based on the spirit of SB 1 being a "bottoms up" piece of legislation. My great-great grandfather moved to Texas in 1832 and received a league and labor of land from the Mexican Government. The land was on the Lavaca River and our family has been on that river ever since. I am also a third generation dentist in Edna. A Lee dentist has been serving this community for over 100 years. By default, I represent LOLA, which stands for Leave Our Lavaca Alone. It is a grass roots movement, with a huge following of Jackson and surrounding counties citizens. I appreciate the opportunity to share my thoughts and feelings as an informed local citizen:

1. Region P's plan, 1.9.1, states that Palmetto Stage II was designated a Unique Reservoir Site and was evaluated for agriculture purposes. Texas Administrative Code 357.9 states in order to designate a URS there must be an expected beneficiary. Since there is no beneficiary for water from Stage II (it cannot be used for agriculture because of the expense), it should not be a part of the 2011 Regional P Water Plan. I suggest that Stage II be removed until there is a beneficiary within the region.

2. The Plan also states that the Unique Stream Segment classification was discussed but not voted on for lack of information. I feel strongly that attitude shows total disregard for a river that took thousands of years to make. It is a crime to dam up the last free flowing river in Texas.

3. According to an email from Patrick Brzozowski, General Manager of LNRA, Formosa has not made a formal, written request for additional water. This fact should negate the April 8th, 2009 interregional meeting between Regions P, L, and N in which Formosa's supposed request and Stage II was discussed and therefore placed on all three water plans. I suggest that Stage II be removed from all three water plans.

4. The environment is one of 9 proposed policies in Region P's IPP, but yet is not even mentioned in regards to Stage II. In addition, SB 3 was put into effect to protect our estuary systems. This critical information is at least a year from being completed and is not even referenced in the IPP. Putting Stage II on the books prior to the study is putting the cart before the horse. I am requesting that there be an environmental impact concerning Stage II. I am also requesting that there at least be contingency plans that will cover the outcome of the SB 3 results added to Region P's IPP.

5. Region P's IPP does not mention the negative impact that Palmetto Stage II reservoir would have on the vast majority of citizens in Jackson County. Stage II would destroy a way of life, a historical culture, livelihoods, etc. It would reopen old wounds created by

the Stage I reservoir. There are people and lives attached to the decisions made by Region P's board that need to be discussed and appreciated.

6. Region P's IPP does not mention that eminent domain will be necessary to take the required land for Stage II. As a life long resident and as one with personal experience in losing land to Stage I, I can assure you that condemnation will be required. Texas is a state that frowns on eminent domain being used for a commodity, and in this case water is nothing but a commodity.

Summary:

I applaud the legislature for making SB 1 a "ground up" piece of legislation. By doing so, the state can get a true feeling of what is happening at a local level. My personal feeling, from living my life here and being actively involved in this issue is that Stage II found its way to Region P, L and N's Water Plans because of Patrick Brzozowski, General Manager of the LNRA via the April 8th, 2009 inter-regional meeting held at the LNRA headquarters for those three water boards. The notes of the meeting are included in this letter. It is at this meeting that Mr. Brzozowski told the group that Formosa Plastics was asking for 10,000 additional acre feet of water. To my knowledge, there was never a formal request from Formosa.

It is also disturbing that of the 14 people attending the meeting, all but three were associated with a Wholesale Water Supplier, or a consultant or engineer for the WWS. Placing Stage II on each Region's Plan afforded each WWS the potential to grow their own infrastructure and power base at the expense of the people of Jackson County. It would only be fair if the meeting took place again and was overseen by Water Board Members that were not associated with River Authorities and their consultants and engineers.

It is my understanding that if Stage II is NOT placed in Region P's 2011 IPP, it would jeopardize its Unique Reservoir Status making it subject to the 2015 deadline. If this is true, it would explain why the LNRA Board, in January 2010, had a continuous, emergency vote for feasibility studies for Stage II and the OCR after the studies were voted down twice before in November and December of 2009. Any GM of any River Authority would not want to lose the ability to have more water resources so it is understandable why Mr. Brzozowski pushed the concept at the April 8th, 2009 meeting and pushed the feasibility studies at LNRA. Just because it makes business sense to the LNRA doesn't mean it is right, legal or ethical.

For all of the above reasons, it only makes sense to remove Palmetto Stage II and the Off Channel Reservoir from the Region P IPP.

Dr. McHenry "Mac" Lee

Ms. Shaw summarized projected water demands for Region N. Based on the 2006 Region N Plan, the total water demand was about 206,000 acft/yr in 2000 and estimated to increase to 309,000 acft (an increase of 103,000 acft/yr, or 50%) by 2060. About 50% of the Region N water demand in 2000 was used for municipal purposes. This trend continues to Year 2060, with municipal water demand representing about 50% of the total water demand for the region. According to the 2006 Plan, the City of Corpus Christi would need to bring on an additional project between 2020 and 2030 to meet projected customer needs.

For Region N's 2011 Plan, the population and water demand projections are not anticipated to change from the 2006 Plan projections prepared by the TWDB except for Bee County and San Patricio County irrigation water demands. The preliminary, recommended RWPG updates for Bee and San Patricio County irrigation water demands are expected to be higher than 2006 Plan projections. Most of the irrigators in Region N are on groundwater supplies, so this change will not impact surface water supplies or contracts. Mr. West asked whether the Farm Bill allocation was considered in Region N irrigation water demand estimates. Mr. Bledsoe commented that most of the irrigation in Region N is for corn, grain, and sorghum production with continued irrigation water needs.

Mr. Vaugh summarized projected water demands for Region L. In the 2006 Plan, two counties showed unmet irrigation water needs. An overall population growth of about 40% is expected from 2000 to 2060 according to TWDB projections used for the 2006 Plan. Currently, municipal use accounts for about 50% of the overall, total water demand for the region. Although a formal request for population or water demand revisions is not requested for the 2011 Plan, it appears that the population and water demand projections provided by the TWDB along the IH 35 corridor are significantly underestimating growth in the area. The IH 35 corridor area actually shows higher population and water demands than the TWDB projections, although projections for the City of San Antonio appear to be reasonably accurate. The 2011 Plan will show increases in steam/electric water demands associated with a proposed Exelon project. Mr. West mentioned a recent land conference in San Antonio and stressed the importance of considering land planner information during regional water planning.

Mr. Choffel discussed water supply opportunities for the City of Corpus Christi. With the Mary Rhodes Pipeline capacity of 112,000 acft/yr (with pumping upgrades), the remaining pipeline capacity available for new supplies is 23,000 acft/yr after considering existing permitted water supplies from Lake Texana (up to roughly 54,000 acft/yr) and Garwood project supplies (35,000 acft/yr). According to a recent study prepared for the City with three water demand scenarios, the earliest that the Garwood supplies would be needed is 2018. Most likely, though, the supplies would not be needed until 2020-2030 timeframe.

2. Identified Projects for Meeting Projected Demands

Mr. Brzozowski mentioned LNRA's interest in discussing possible joint participation with the City of Corpus Christi in a pipeline and an off-channel reservoir near the Garwood Project proposed diversion near Bay City. He has had preliminary discussions with the City identifying the possibility of the City firming up the daily diversion of the Garwood supply through use of an off-channel resevoir. LNRA is considering purchasing available surface water rights from an irrigation district, which is estimated to provide 10,000 – 12,000 acft/yr for LNRA that would be used to meet Formosa's request for additional supply. If LNRA is unable to develop this water supply, then Stage II of Lake Texana would be the most likely option. Mr. Choffel mentioned that an analysis of peak and uniform delivery has been performed for the Garwood Project. At the maximum diversion rate of 150 cfs (per contract), it would only take about 1/3 of a year to divert 35,000 acft/yr. Water availability is affected by the inclusion of City of Austin's return flows. Water quality issues associated with adding the Garwood Project water supplies to existing raw water supplies is an important consideration for Corpus Christi.

Mr. Brzozowski then discussed Stage II of Lake Texana and local interest in keeping water supplies in the Coastal Area, for future Coastal Area water needs. Stage II of Lake Texana is likely to require more mitigation than Lake Texana (Stage I) and negotiations would need to consider a "minimum fee for mitigation" in return for construction of the reservoir. Locally, the residents in Jackson County do not perceive the benefits of Lake Texana since the inundated land was removed from the tax rolls and access to the reservoir is limited by Federal land restrictions. A similar approach to Stage II would not be locally popular and so land owners on the shoreline of this project would likely have access to the reservoir. Contingent on Board approval, the LNRA will consider moving forward with an evaluation of a more specific location, define impoundment area, and evaluate alternatives to impoundment.

Mr. Brzozowski asked if the City of Corpus Christi is considering ASR. Mr. Choffel commented that one of the biggest challenges to ASR is treating the water prior to storage, and then needing to treat the water a second time if subsequently mixed with raw water as would be the case with ASR along the Mary Rhodes pipeline. This increases the costs significantly. Mr. Vaugh mentioned that identifying a suitable site near the Coast becomes more challenging due to water quality and aquifer storage limitations.

Ms. Shaw discussed recommended projects included for Region N in the 2006 Coastal Bend Regional Water Plan. The region recommended conservation, the Garwood Project, potential USACE Nueces Feasibility Projects (including the Nueces Off-Channel Reservoir and Ocean Desalination), groundwater supplies in Bee/San Patricio Counties, and Stage II of Lake Texana. Since the 2006 Plan, there is less interest in groundwater supplies and ocean desalination.

Mr. Raabe provided a summary of the SAWS 2009 Water Management Plan and impacts to water planning for Region L. A study of the Edwards Aquifer was conducted to determine water supplies for 2014, 2034, and 2060 with drought of record conditions. The study results indicated that ASR would be fully depleted. The water supply needs are estimated to be 31,000 acft/yr in 2014; 81,000 acft/yr in 2034; and 141,000 acft/yr in 2060. SAWS is actively considering additional Edwards Aquifer supplies, conservation, brackish groundwater desalination, recharge enhancement, regional Carrizo, and other supply strategies to meet future water needs. SAWS is still considering the LCRA/SAWS project in their Long Range Program. SAWS has two RFPs in the process of being issued: (1) Ocean desalination with possible partnership with the City of Corpus Christi, and (2) groundwater supplies (from Milam/Lee Counties, Kinney County, and others). Ocean desalination is in the current Region L plan and will likely be in the Region L 2011 and 2016 Plans.

Mr. West mentioned that Exelon is requesting 75,000 acft/yr (67 MGD) for steam-electric water use. He also noted the possibility of co-location of a seawater desalination water treatment plant with the proposed Exelon nuclear power plant in Victoria County. The Exelon plant could provide power for both treatment and pumping to deliver potable water to users.

3. <u>Coordination between Groundwater Conservation Districts/ Groundwater Management Areas and Planning Regions regarding Designation of Desired Future Conditions and Managed Available Groundwater</u>

Mr. Brzozowski mentioned that GMA 15 (predominantly Region L and P) is getting closer to developing desired future conditions. Scotty mentioned that GMA 16 (predominantly located within Region N) has made progress, and is awaiting GAM results from the TWDB prior to developing desired future conditions. GMA 16 has had some challenges regarding establishing desired future conditions, since there are a few counties located in the overlap area between the Central Gulf Coast GAM and Southern Gulf Coast GAM. The models do not produce the same results in the overlap area, making it difficult to develop desired future conditions. Overall, there is a concern about desired future conditions and resulting managed available groundwater amounts being used to establish permits by the groundwater districts. The groundwater districts are required to issue permits up to the managed available groundwater supplies, however, if the criteria is later revised, then it may be difficult to implement changes.

4. <u>Governor's Interests in Accelerating the Acquisition and Construction of 16 Reservoir Sites Across the State and Affect on the Timeliness of Stage II Palmetto Bend</u>

Mr. Brzozowski mentioned the TWCA keynote address which prioritized the 16 reservoir sites across Texas based on the TWDB Reservoir Site Acquisition Study (2007). Two of the 16 reservoir sites are relevant to Region's N, L, or P: Stage II of Lake Texana (Palmetto Bend) and the Nueces Off-Channel. The USACE is currently studying the Nueces Off-Channel Reservoir, as is the Coastal Bend Region (Region N).

5. <u>Timeliness and Potential Impacts of Diverting the City of Corpus Christi Garwood Supply Through or Around Lake Texana</u>

The City of Corpus Christi is considering diverting the Garwood Project water supplies to West Mustang Creek for withdrawal at Lake Texana. According to Mr. Brzozowski, the City's report indicates an estimated 15-20% channel loss in delivery of Garwood supplies through West Mustang Creek. Mr Brzozowski, however, anticipates the amount of water loss would actually be higher, primarily due to increased irrigation withdrawals on West Mustang Creek with Garwood Project delivery. He further discussed that the West Mustang Creek delivery method may be subject to the following constraints: (1) no ~~excess~~ storage in Lake Texana; (2) a portion of the water may need to be released to the Bay and Estuary depending on local conditions; (3) LNRA may impose a conveyance charge for water supplies delivered through Lake Texana; and (4) it would be difficult to monitor rice farming withdrawals from West Mustang Creek and Lake Texana that have water rights tied to streamflows and water levels. In addition to these constraints, there may be regulatory issues associated with TPWD and TCEQ requirements for conveyance of Garwood Project supplies (outside of a pipeline) through West Mustang Creek. LNRA's program for Bay and Estuary releases is based on inflow, and therefore Garwood Project delivery through West Mustang Creek could increase Bay and Estuary releases.

6. <u>Other discussion items</u>

LCRA has issued their report on environmental flows to the Matagorda Bay system. According to Mr. Brzozowski the environmental flows for the LCRA report were 580,000 acft/yr, which are about 60% higher than the previous Bay and Estuary inflow requirements of 365,000 acft/yr. Mr. Brzozowski also noted that the LNRA already releases 386,000 acft/yr from Lake Texana, without including inflows from the Lavaca River. The environmental flow updates from the LCRA study have not been adopted. As early as this summer, an instream flow team will be developed to consider environmental flows to Matagorda Bay. Environmental flows will have a large impact on available yield from Stage II of Lake Texana, whose operation is subject to environmental flow provisions.

Action/Notes:

The next regional water planning group meetings are scheduled as follows:

Region P- April 20, 2009 at 1:30 pm.
Region L- May 7, 2009 at 10:00 am
Region N- June 11, 2009 at 1:30 pm

The three regions (Regions P, L, N) will coordinate during development of their 2011 Plans regarding projects with interregional interest.

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Meeting Notes

Subject: Interregional Coordination Meeting (Regions N, L, and P)			
Project: Region Coordination-P		Project No: 100662 Act 001	
Meeting Date: April 8, 2009		Meeting Location: Harry Hafernick Recreation Center (Edna)	
Notes by: Kristi Shaw			

Attendees:

✓Mr. Jason Afinowicz, AECOM (Consultant for Region P)
Mr. Scott Bledsoe, Co-Chair of Region N
✓Mr. Pat Brzozowski, General Manager Lavaca-Navidad River Authority (LNRA) and Region P Planning Group member
✓Mr. Ken Choffel, HDR Engineering (Consultant for the City of Corpus Christi)
✓Ms. Rocky Freund, Deputy Executive Administrator of the Nueces River Authority (Administrative Agency for Region N)
✓Ms. Karen Gregory, Assistant to General Manager Lavaca-Navidad River Authority
✓Mr. Con Mims, Chair of Region L and Executive Director of the Nueces River Authority
✓Mr. Steve Raabe, Director of Technical Services of San Antonio River Authority (Administrative Agency for Region L)
Ms. Carola Serrato, Co-Chair of Region N
✓Ms. Kristi Shaw, HDR Engineering (Consultant for Region N)
✓Mr. Philip Taucer, AECOM (Consultant for Region P)
✓Mr. Sam Vaugh, HDR Engineering (Consultant for Region L)
Mr. Bob Weiss, Vice Chair of Region P
✓Mr. Bill West, General Manager of the Guadalupe-Blanco River Authority

Mr. Gus Gonzalez, Water Director for the City of Corpus Christi, was invited to the meeting but was unable to attend.

Topics Discussed:

Mr. Brzozowski welcomed the group. LNRA is getting ready for their grand opening of the Brackenridge Recreation Complex Main Event Center on May 2, 2009. Lake Texana's water level (on April 8, 2009) was 36.4 ft-msl, or 7.6 ft below conservation pool elevation of 44 ft-msl.

1. <u>Projected Water Demands in Regions N, L, and P.</u>

LNRA currently has a water sales agreement with Formosa Plastics (located in Calhoun County) for a water supply of 30,000 acft/yr. Formosa has approached LNRA about needing an additional 10,000 acft/yr (40,000 acft/yr total) within the next four years. Mr. Brzozowski requested inclusion of these new demands in the Region L 2011 Plan, noting, however, that LNRA will supply the water to meet Formosa's needs. Similarly, he advised that LNRA will continue to meet projected needs for Point Comfort.

Mr. Afinowicz summarized water demands for Region P. The overall population projection for the region is fairly stable from 2000 through 2060, with a 3% increase by 2060. Total projected demands are anticipated to decrease by about 25,000 acft/yr by 2060, which is primarily attributable to reductions in irrigation water demands. Over 90% of the total current water demand for Region P is associated with irrigation. For the 2011 Plan, there are proposed shifts in agricultural uses amongst counties within Region P however the overall numbers are not anticipated to change significantly.

June 12, 2010.

Dear Mr. J. Kevin Ward,

I ~~live in~~ own property in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

These are the issues I am deeply concerned about:

- I don't want or need another dam like the one we already have.
- We were taxed before on Stage I and will be taxed again on Stage II.
- We need more tax relief not more taxes.
- Where the water goes, the job goes. The water needs to stay in Jackson County and let the industries come to us.
- Damming the last remaining free river in Texas is simply the wrong thing to do when there are other choices.
- I do not believe in taking people's land just to help some private or public company in another county have more water to increase their own tax base.
- If the Lavaca River is dammed, eminent domain will be used to take the land. LNRA has already taken 17,000 acres and doesn't need more.
- As it stands, only LNRA will benefit from having a second dam. They will be able to hire more people and pay more to upper level management while Jackson County will continue to be one of the highest tax paying counties in the state.
- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note Please see letter included.

Signed: Mary Gayle Pihoda and Joe D. Pihoda

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Mr. J. Kevin Ward,

PLEASE DON'T DESTROY THE LAVACA RIVER BY DAMMING IT! You hold in your hands the ability to let the Lavaca River basin live! You and we all have been given a sacred trust. Once the chainsaws and bulldozers come, we will never have a second chance to leave our precious river in the same condition for the next generation. The pristine forests will be bull dozed and burned, and the wildlife will die or be squeezed into a smaller and smaller habitat. THIS IS YOUR CHOICE!

I would like to voice my objections to adding yet another dam to the only river left in the county.
I grew up, like many others, exploring the woods of this river bottom. Generations before have been good stewards of this land, and it's up to us to continue that heritage for future generations. Friends' homes and livelihoods will be destroyed, and for what???? For a lake that in the grand scheme of things will silt in after 50 to 75 years?????? Jackson County already has one of those lakes that has dramatically changed to a waist land in the last few years. Look North of Highway 59 on Lake Texana to what a beautiful river bottom with a clear stream has turned into!

The residents of Jackson County have enjoyed, as long as I can remember , a wonderful small town and country life, and they would like to be able to pass that legacy on to their children and grandchildren. We have all long enjoyed hunting, fishing, and exploring the pristine forested areas in the county. The amount of these wildlife areas is shrinking more and more, and the dam will destroy much of this legacy. Jackson County is the most southwestern extension of the eastern forests. Pecan trees, great oaks, buckeyes, hawthorns and a variety of wildlife can be found along the Lavaca River. Wildlife we have observed include whitetail deer, turkeys, raccoons, opossums, foxes, grey wolves, coyotes, bobcats, squirrels, the American and Mexican Eagle, armadillos, jack rabbits, many ducks, Sand Hill Cranes, Blue Herons, egrets, and owls to name just a few.

In addition to destroying the habitat of numerous species of wildlife, the formation of the lake would also destroy virgin forested areas that provide protection from hurricanes. Rivers not only provide for forests, and wildlife, they sustain our estuaries. They provide fish and shrimp with fresh water and nutrients needed for their life cycle. Wetlands, bottom lands and forests provide maximum storage for carbon in plants and animals needed to prevent global warming and rising of sea levels. They are also carbon sinks, and they produce oxygen for our planet.

In addition to the loss of wildlife, loss of primary (uncut) forests, and displacement of people and their livelihoods, many of us are vehemently opposed to turning remaining rivers into reservoirs and dams to provide inexpensive, subsidized water to industries. Newer methods of using water for industries bordering the Gulf should be used such as desalinization plants which could convert salt water into usable water. We should have the choice of how our land is to be used. In the United States, Florida, and California have the most highly developed water management systems and are in the process of reversing decisions and embarking on restoration projects. Let us not make their mistakes. Once the bulldozers and the chain saws have come in and destroyed, we can never bring these areas back to their former glory. They are gone forever! And what will Jackson County get in return except yet another lake with valuable land, mineral, and wildlife resources taken off the tax rolls to subsidize a company not even located in the county.

Sincerely, Mary Gayle Prihoda

Mary Gayle Prihoda and Joe D. Prihoda

RECEIVED

JUN 29 2010

TWDB

June 25, 2010

Lavaca Regional Water Planning Group
J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, TX 78711-3231

Lavaca Regional Water Planning Group,

I am sending this letter to express my concern over Region P's decision to include the Palmetto Bend Dam ("Stage II") as part of our region's water plan. While I firmly believe that we must confront our state's current and future water problems I do not believe that building new dams is always the best solution.

My concern with the "Stage II" dam is due to its possible effects on the Lavaca and Matagorda Bays. In 1980, the Navidad River was dammed several miles upriver from the Lavaca Bay, creating Lake Texana. Although enough water is released from Lake Texana to maintain the natural flow of fresh water into the Bay, I fear that the sediment and nutrients, which are vital to sustaining the ecosystems of the bays and estuaries, are being trapped by the dam and deposited in Lake Texana. This concern was reinforced during last year's drought which caused the water level in Lake Texana to drop, exposing that the Lake is now very shallow in places that were once deep. If "Stage II" is implemented, the Lavaca and Matagorda Bays will be deprived of one of their only remaining free flowing tributaries, thereby further depleting the bays and estuaries of these important resources.

Given the recent environmental disaster caused by the British Petroleum oil spill, it is even more important that the Lavaca and Matagorda Bays and their estuaries, remain healthy and productive. Presently, some 33% of the Gulf of Mexico is under a fishing ban. This includes most of the eastern Gulf of Mexico, from Louisiana to Florida. Before the spill, the areas now contaminated with oil accounted for large amounts of our country's seafood supply. Unfortunately, today most of the shrimp, oysters, and fish from these areas are considered "off limits" and "not safe" to eat. There is little reason to doubt that the demand for seafood and coastal recreation will simply disappear as a result of the spill. Most likely, the unaffected areas of the Gulf Coast, including the Lavaca and Matagorda Bays, will be responsible for contributing significantly larger amounts of seafood to satisfy this demand. In anticipation of this, we must act to protect our bays and estuaries so that they are capable of producing more. I would recommend, that the first step to protecting our bays and estuaries is to remove "stage II" as an option in our region's water plan.

In the future, as a result of what has occurred in the Gulf, it is likely that our state's seafood industry as well as coastal recreation and tourism will see an increase in revenues which could possibly provide millions, if not billions more to our economy. I realize that water is necessary to sustain the growth and development of other parts our economy; however, I ask you to consider the alternatives to "stage II" which are capable of satisfying the demand for water, while allowing you to simultaneously protect our coast and those parts of our economy that are dependent upon it. Such alternatives include: aquifer storage and recovery, the off channel reservoir, and perhaps desalinization. While I understand that these alternatives are most likely more expensive than the "stage II" dam, I ask that you take into consideration the detrimental effects the dam would have on our economy when determining its true cost.

Texas is one of only a hand full of states that have developed such an extensive water planning process. It is important for us to supplement our leadership in this area with creativity and ingenuity when it comes to addressing this issue. I strongly encourage you to consider the alternatives to the "stage II" dam.

Thank you,

Jake Srp

RECEIVED

MAY 28 2010

TWDB

Marcus & Sharon Tomas
2303 CR 306
Edna, TX 77957

Lavaca Regional Water Planning Group (Region P)
J. Kevin Ward, Executive Administrator
Texas Water Development Board
P. O. Box 13231
Austin TX 78711-3231

May 26, 2010

I hear a lot ot talk as to why we need State II of the Palmetto Dam and the benefits will it bring to Jackson County. Unfortunately, most of what I hear is the same rethoric that was ballyhooed many years ago before Stage I of Palmetto Dam was built. Some of the claims were a huge rise in population, burgeoning retail business growth, a broader tax base resulting in lower taxes per capita, lots of new jobs, a beautiful recreational area for both residents and tourists and developement of a large industrial/manufacturing center.

Most of these pie-in-the-sky promises weren't true then and they still aren't true now. Our population barely grew, the jobs situation is still pretty stagnant, we have less retail businesses open now that before, taxes haven't been reduced, Formosa, etc. is actually located in Calhoun County and Lake Texana should have been named "Mud Lake."

The real question is: do we, the citizens of Jackson County want Stage II to happen? My opinion and the opinion of the majority of landowners/taxpayers is a resounding NO!!!

The Lavaca River is the last free-flowing river in Texas. The Navidad River was obiliterated years ago by the same people who are pushing Stage II of Palmetto Dam now. They didn't care all those years ago about perserving the rich history, the wild beauty of the river and its surrounding fertile river bottom and they don't care about destroying the Lavaca now.

Jackson County doesn't need Stage II. We have enough water for our use now and in the forseeable future. Stage II is about stealing our land, our livelihoods and our history in order to high-jack our water resources for use in other cities and counties. There must be other options available to develop water resources nearer these places that are looking to us for their water.

The citizens and taxpayers of Jackson County are concerned about losing the last free-flowing river in Texas, their homes, farms and ranches, and the destruction of family histories and the loss of many local historicial sites. They worry about losing their livelihoods and the freedom to continue to live their lives where and in the manner they and their forebearers chose many, many years ago.

We speak out now against Stage II of Palmetto Dam and the loss and destruction that it will bring to Jackson County. We speak out against Stage II of Palmetto Dam because it is our right, our duty and our priviledge to be involved in and protect the future of Jackson County. We speak out against Stage II of Palmetto Dam now because in less than four months the results of the feasibility study will be revealed and then it may be too late to speak out.

We hope that you will listen to us, take up our cause and speak out with us to "Save Our Lavaca" before it is too late for anything but regrets.

Thank you for your time.

Sincerely,

Marcus Tomas

Sharon Tomas

Marcus & Sharon Hamman Tomas

We Are Two Third-Generation Jackson County Residents.
We Live On the Banks of the Lavaca River.
We Appreciate It As It Was, As It Is and
As We Hope It Will Remain -
Wild, Open and Free!

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JUN 21 2010

TWDB

Dear SENATOR HEGAR,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

These are the issues I am deeply concerned about:

- ✓ I don't want or need another dam like the one we already have.
- ✓ We were taxed before on Stage I and will be taxed again on Stage II.
- ✓ We need more tax relief not more taxes.
- ✓ Where the water goes, the job goes. The water needs to stay in Jackson County and let the industries come to us.
- ✓ Damming the last remaining free river in Texas is simply the wrong thing to do when there are other choices.
- ✓ I do not believe in taking people's land just to help some private or public company in another county have more water to increase their own tax base.
- ✓ If the Lavaca River is dammed, eminent domain will be used to take the land. LNRA has already taken 17,000 acres and doesn't need more.
- ✓ As it stands, only LNRA will benefit from having a second dam. They will be able to hire more people and pay more to upper level management while Jackson County will continue to be one of the highest tax paying counties in the state.
- ✓ The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note

we do Not Need Another Damm. period

Signed: [illegible]

704 SUZANNE
EDNA, TX 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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- ✓ The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note

As a land owner, this will be determental to me. this will be the second time this has happened to our family!

Signed: Lisa C. Burris 109 W. Main Edna TX

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

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- ✓ The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note
I don't want another dam. We don't need another dam.

Signed: Loretta Lynn Ramirez

502 Fannin St.
Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note

Signed: Lucinda Rodriguez

401 S. Pumphrey
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 28 2010

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Personal Note We don't need no more dam dam's.

Signed: Rupe Lopez 8059 St. Hwy 111 N. Edna, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Melinda Manzanalez

Edna, Texas

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [illegible] Edna, Tx

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Paula Muschalek

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note The Lavaca River is an important place in our county.

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

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CC: Representative Geanie Morrison
Region P Water Board
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Personal Note: I don't want to lose my land..

Signed: Sylvia Butler

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: Do Not Need another damn Dam

Signed: Renee Johnson 1643 US Hwy 59 S.
Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dennis Duane Curlee Jr.
904 Pin Oak
Edna, TX 77957

Dear Senator Hegar,

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Personal Note

Signed: Barbara Curlee

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Barbara Curlee
904 Pin Oak
Edna, Texas 77957

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Personal Note

Signed: Michael Kyle Dodds

Michael Kyle Dodds
204 Dugger
Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Sandy Twardowski

SANDY TWARDOWSKI
1008 S. SECOND ST
GANADO, TX 77962
P.O BOX 194

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

Belinda Dodds
204 Dugger St.
Edna, Texas
77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

Steve Twardowski
PO Box 194
Ganado, Texas
77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

Holly Tegeler Morgan
PO Box 93
Ganado, TX 77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

Lisa Janica
1120 Gilbert Rd
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We Need to keep our water if we keep this up the Lavaca River will dry up.

Signed: Jackie Hudson

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Jackie Hudson
412 E. Rogers
Ganado, Tx 77962

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Personal Note LNRA says "water is gold" - if so land is platinum. Detriment to economy and environment; would only benefit Formosa.

Signed: Erno Sattler

ERNO L. SATTLER
7828 FM 1822
EDNA, TX 77957-4746

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

I am a property owner and tax payer.

GILBERT SATTLER 7828 FM 1822 EDNA TX 77957

Signed: Gilbert Sattler

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
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Personal Note

Signed: Lynn Burchum

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

511 Wilson
Edna, TX 77957

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Wade Buchum

511 Wilson
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

They need to leave our rivers alone. It's natural / leave it that way.

Signed: Shelby Cunningham

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Leave the fucking river alone.

Signed: [illegible signature]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

411 Harris St.

Dear Senator Hegar,

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Personal Note

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

[illegible signature]
1210 Cobb St

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Personal Note
Just leave us alone

Signed: Mrs. Pattie Butler 521 E Cedar Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
It is just not fair anymore. We have little say. hopefully this will help

Signed: Anna Yaws Po Box 115 Edna Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Anastacia Garza
Edna, TX

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Reyes Cater
Edna, TX

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Odilia H. Garza
Edna, TX

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Personal Note: Please Do Not Destroy The Natural Habitats of this River! We Do NOT need another river dammed, just to help another county!

Signed: Crystal Merechka

Crystal Merechka
#2315 Cty. Rd. 19a
Hallettsville, Tx. 77964

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Leave our land alone

Signed: Jesse Jaymes Lopez 8059 St Hwy 111 N Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Leave all the land alone

Signed: Bradly Ryan 454 CR 131 Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We don't want another dam

Signed: Kaci Ryan 454 CR 131 Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Leave our land alone.

Signed: Jimmy G Lopez Jr. 8059 St. Hwy 111 N Edna, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
Jackson County receives no benefits from LNRA water sales.

Signed: M Sue Sims - PO Box 806 Ganado Tx 77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
Leave our land alone

Signed: Jimmy G. Lopez Jr. 8059 St. Hwy 111 N Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
MAY 28 2010
TWDB

Marcus & Sharon Tomas
2303 CR 306
Edna, TX 77957

Lavaca Regional Water Planning Group (Region P)
J. Kevin Ward, Executive Administrator
Texas Water Development Board
P. O. Box 13231
Austin TX 78711-3231

May 26, 2010

I hear a lot ot talk as to why we need State II of the Palmetto Dam and the benefits will it bring to Jackson County. Unfortunately, most of what I hear is the same rethoric that was ballyhooed many years ago before Stage I of Palmetto Dam was built. Some of the claims were a huge rise in population, burgeoning retail business growth, a broader tax base resulting in lower taxes per capita, lots of new jobs, a beautiful recreational area for both residents and tourists and developement of a large industrial/manufacturing center.

Most of these pie-in-the-sky promises weren't true then and they still aren't true now. Our population barely grew, the jobs situation is still pretty stagnant, we have less retail businesses open now that before, taxes haven't been reduced, Formosa, etc. is actually located in Calhoun County and Lake Texana should have been named "Mud Lake."

The real question is: do we, the citizens of Jackson County want Stage II to happen? My opinion and the opinion of the majority of landowners/taxpayers is a resounding NO!!!

The Lavaca River is the last free-flowing river in Texas. The Navidad River was obiliterated years ago by the same people who are pushing Stage II of Palmetto Dam now. They didn't care all those years ago about perserving the rich history, the wild beauty of the river and its surrounding fertile river bottom and they don't care about destroying the Lavaca now.

Jackson County doesn't need Stage II. We have enough water for our use now and in the forseeable future. Stage II is about stealing our land, our livelihoods and our history in order to high-jack our water resources for use in other cities and counties. There must be other options available to develop water resources nearer these places that are looking to us for their water.

The citizens and taxpayers of Jackson County are concerned about losing the last free-flowing river in Texas, their homes, farms and ranches, and the destruction of family histories and the loss of many local historicial sites. They worry about losing their livelihoods and the freedom to continue to live their lives where and in the manner they and their forebearers chose many, many years ago.

We speak out now against Stage II of Palmetto Dam and the loss and destruction that it will bring to Jackson County. We speak out against Stage II of Palmetto Dam because it is our right, our duty and our priviledge to be involved in and protect the future of Jackson County. We speak out against Stage II of Palmetto Dam now because in less than four months the results of the feasibility study will be revealed and then it may be too late to speak out.

We hope that you will listen to us, take up our cause and speak out with us to "Save Our Lavaca" before it is too late for anything but regrets.

Thank you for your time.

Sincerely,

Marcus Tomas
Sharon Tomas

Marcus & Sharon Hamman Tomas

We Are Two Third-Generation Jackson County Residents.
We Live On the Banks of the Lavaca River.
We Appreciate It As It Was, As It Is and
As We Hope It Will Remain -
Wild, Open and Free!

RECEIVED
JUN 21 2010
TWDB

Dear Senator Hegar,

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Personal Note
Taking hard earned family land away from families that built it for financial gain angers me to the core. The facility that we have now is useless, we don't need another!

Signed: Melissa Sappington

310 W. Cypress
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 21 2010
TWDB

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Personal Note
I don't need our taxes going up anymore -

Signed: Mindy Yandrey

501 Caroline
Edna, TX.
77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 21 2010
TWDB

Dear Region P Water Board

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

These are the issues I am deeply concerned about:

- I don't want or need another dam like the one we already have.
- We were taxed before on Stage I and will be taxed again on Stage II.
- We need more tax relief not more taxes.
- Where the water goes, the job goes. The water needs to stay in Jackson County and let the industries come to us.
- Damming the last remaining free river in Texas is simply the wrong thing to do when there are other choices.
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- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note
My family lost land to Lake Texana. Now we're stuck with a fence @ the back of the property that keeps us from even accessing the lake. LNRA uses our land that is not under water to grow hay. Don't take away any more land! Don't dam up the river.

Signed: Norman Hunt

152 Co. Rd. 253
Ganado, TX 77962

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 30 2010
TWDB

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Patsy Porche

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Patsy Porche
P.O. Box 473
Edna, TX 77957

Dear Senator Hegar:

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Personal Note I served on the LNRA board for 5 years. Formosa Plastics had years of opportunity to buy the water Corpus Christi is currently receiving. Formosa should be leading industry toward a desalinization plant.

Signed: [illegible], DVM

2395 St. Hwy. 111 S
Edna, Tx. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We do not need or want a new dam.

Signed: [illegible]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

409 Maxine
Edna, TX 77957

Dear Senator Hegar,

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Personal Note

Signed: [signature] (STAN HUBENAK)
804 S. ALLEN
EDNA, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature]

Michael Goldman
471 CR 284
Edna TX 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Matthew Goldman

Matthew Goldman
471 CR 284
Edna TX 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Marcus Farquhar
213 N. Wells
Edna, TX 77957

Signed: MF

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
Please hear our calling! They say power works with numbers so please don't let us down. This is not an issue to be brushed under the rug... it needs to be addressed and SOON!

Signed: Kamey Karl

616 CR 131
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note
ARE YOU LISTENING???

Signed: Linda Karl

616 CR. 131
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Chico Deleon P.O. Box 454 EdNA, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Pamela Frein PO Box 281 Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

Tony Doyle
325 CR 306
Edna Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

We don't need another dam

Signed: [illegible]

P.O BOX 1331
Edna, Tx
77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
We don't need a dam.

Signed: [illegible] 507 North Alexs. ST. EdNATX.

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note
We DO NOT need another Dam!

Signed: Annabelle Villela 501 N Alleas Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note To been honest, I really believe we don't need another dam. Also I believe that landowners should keep their land that has been in their family forever. Why take land for something that we don't have use for.

Signed:

Loretta S. Soto
6-27-2010
507 N Kleas St.
Edna, Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note I just believe we dont need another dam.

Signed: [signature] 507 N Kleas
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
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Personal Note I don't want a dam.

Signed: Robert Ramirez

502 Fannin St.
Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We do not need another dam.

Signed: Frances Martinez

507 N. Kleas
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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- ✓ The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note
Don't need a dam.

Signed: Beatrice Hernandez

2486 Hwy 1115
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
We have 1 dam already, need no more taxes, leave the Lavaca River alone and we bought our property close to the river for a reason. Leave us alone!

Signed: Shiela B. Hart
296 CR 307
Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note I have not seen any major positive results from the existing dam and I am against any project which takes land from landowners

Signed: Troy Quinn
8583 State Hwy 111 North
Edna, Tx. 77957
361-781-4154

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note You can't replace the land they take for the price they will pay you for it.

Signed: Fred Stafford Jr.

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We Need To Keep Our WAter Here IN JACKSON COUNTY!!

Signed: Jimmy Jansky 691 C.R. 283 EdNA Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note This is uncalled for.

Signed: Joyce Campbell

Joyce Campbell
504 Susanne St.
Edna, Texas
77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Our Current Lake has No Place for us to Swim
It's like a swamp and we don't need another one!

Signed: Jaime Bednarz

Jaime Bednarz
1513 N. East St.
Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

The present lake has no recreation for our kids. No swimming area or etc. as promised. No one goes fishing at the lake. Just a big mud hole.

Signed: Caroline Kizer

Caroline Kizer
1606 Green St
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Cities Can not & Should not ~~Starve~~ Starve but smaller ones just to grow larger - All Cities have the right to grow where they are - Use what u have!

Signed: Judy Marek

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Our water need to stay ~~here~~ here - won't want to lose land just Bought

Signed: Kathy Roddy 1003 W. Main Edna Tex 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: JACKSON County FARM Bureau opposes this DAM. Together with TFB, the JACKSON County FARM Bureau wrote A resolution to Be sent to LNRA. Please help us with this. Thanks

Signed: Clinton Shefcik JACKSON County FARM Bureau VICE-President

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: I think that the big cities are going to have to look at other options for water needs (desalination?) rather than looking to other counties for water needs

Signed: Karen Meador

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Kathy Dugger

1918 Co. Rd 303
Edna, TX. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Mitzi J Porche

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Mitzi J. Porche
207 W. Division
Edna, TX 77957

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Personal Note

Signed: Clifford R. Born

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Lee Kafernik

3334 State Hwy 111 N
Edna, Tx. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUL 02 2010

TWDB

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Personal Note

Signed: Robert E. Lee, DDS, FAGD

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
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RECEIVED

JUL 02 2010

TWDB

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Personal Note

Signed: Dana Mickey

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Jeana Yndrey

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
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Personal Note

Signed: Lynette Goldman

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear To Whom it Concerns -

I am very concerned about Jackson County's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Tracy McNeley

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Lisa Downs

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
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Representative Geanie Morrison
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Personal Note Please do not allow the LNRA to dam the last free flowing in Texas. Protect your district.

Signed: Jena O. Lee

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Kristin Cameron

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 21 2010
TWDB

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Personal Note more land-grabbing!

Signed: [signature] 122 E. MAIN ST. EDNA, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 30 2010
TWDB

Dear Kevin,

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Personal Note

Signed: [signature]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUL 01 2010
TWDB

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Personal Note
LNRA was not developed to be a money/profit Company. Jackson County gave enough land for the first Dam. Why should Jackson County be expected to furnish water for South Texas. San Antonio can conserve their own water. We love the Lavaca River bottoms and a Company doesn't need to control the River bottoms and destroy them.
Jackson County has wildlife and is like a jungle — we are blessed with grapevines and large oak trees. The first Dam was built for our benefit — [illegible]

Signed:

Sue Quinn
1079 Co Rd. 401
Edna, Tex. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Minerva Tapia

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

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Personal Note

Signed:

David Blakenship
1465 CR 401
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Kristen Thurmond

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

6878 CR 283
Edna, TX 77957

RECEIVED
JUN 21 2010
TWDB

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Personal Note

Taking peoples land that has been in there family for a very long time. The people do not need this.

Signed: Jina McDonald

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

207 Dugger
Edna, Tx 77957

RECEIVED

JUN 21 2010

TWDB

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Personal Note: Hope & Tony Carrozar
113 E Cordelle
Edna Tx 77957

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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Personal Note: 1205 N. East St. Edna, TX. 77957

Signed: Sybil E. Norman

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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Personal Note Oda Gonzales

P.O. 498 Lolita Tx. 77971

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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Personal Note We do not want another dam.

Signed: Bianca Arocondo

105. Cherry St.
Edna Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 23 2010

TWDB

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Personal Note

The future of Jackson County is questionable with everything were been taxed for, if the other Dams Comes in more taxes, the County will not be able to Stand it.

Signed: Bryan Muska 202 W. Main Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Paul D [illegible]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Box 759
Edna, Tx 77957

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- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note DON'T NEED IT !!

Signed: [illegible] 2955 St. Hwy. 111 N. Edna, Texas 77957-8057

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note We don't need another damn

Signed: [illegible]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

We Realy dont a dam please leave our Lavaca Alone

Harold Wilkins 29 Brown Edna TX

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

As a landowner, we do not need another entity using eminent domain and then taxing us more.

Thanks,

Signed: Edna city council District 1

213 Sandra
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note
I BELIEVE WE HAVE AT THE PRESENT TIME ALL THE WATER THAT LNRA NEEDS IN THE FIRST STAGE!

Signed: [signature]

6778-FM 822
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note
The Lavaca River bottom is an incredible ecosystem. It should not be allowed to disappear. I'm a life long resident of Jackson Co. and I'm against what is being forced upon us.

Signed: Mary Kim Layden Pelham
602 Laura, Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

PS. My land will be empacted. It is the most important legacy I want to leave for my children. Please help us.
Kim Pelham

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

The citizens of Jackson Co. will not benifit at all from another dam

Signed:

7123 FM 234 S.
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

~~[illegible]~~ people are never paid the amount for the taking of their land. they are tax paying citizens who are just going to be taxed more for basically giving their land away

Signed: Jie Kubecka

P.O. Box 573
Edna, Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

I am a concerned tax payer and feel damming the Lavaca River will be detrimental to our community.

Signed: Cynthia Lucera

405 Sunset Dr.
Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [illegible]

PO BOX 1005
EDNA, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
leave the Lavaca the way God Created it - NO DAM

Signed: Loine Simons

LOINE SIMONS
505 SUZANNE
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
MY FAMILY + I SUPPORTED STAGE I, BUT I DON'T FEEL STAGE II WOULD BENEFIT JACKSON COUNTY

Signed: Glenn T. Martin

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

Please don't dam the river

Signed: Sheri Martin

8798 FM 3131
Edna, TX.
77971

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

We dont need no more Hotes

Signed:

Clayton Butler
521 E. Cedar
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note - not a resident of Jackson County.
- still in opposition

Signed: [signature]

508 Mueller Cn.
Victoria Tx 77905

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Please don't take our land away!

Signed: Alana Sue Curlee

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

P.O. Box 601
Edna, Tx. 77957

Dear Senator Hegar,

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Personal Note STOP THE PROPERTY THEFT!

Signed: Nick Bone

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Nick Bone
P.O. Box 560
Inez Tx 77968

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note Stop the Dam, we don't need it!!!

Signed: Alice M Payne

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

ALICE M PAYNE
P.O. Box 245
EDNA, TX 77957

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note
I am concerned that the citizens of Jackson County are being mislead and are not getting all of the facts.

Signed: Patti Payne Bone

Patti Payne Bone
PO Box 560
Inez, Texas 77696

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note
The Lavaca River is only a creek, not a river, so where will you get the water to fill a dam

Signed: Ray Nickel 1093 FM 234 - EDNA, Tex

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note

DON'T STEAL MY LAND!

Signed: J. A. Rogers
1206 Virginia St
Edna Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

I am a feed store & we sell gas, pecans, chemicals and this would kill our business!

Signed: T. Jacobs

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
More Water equals more problems

Signed:

P.O. Box 423
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
We don't need another dam

Signed:

2030 CR 303
Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [illegible]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

CR 306
775
Edna, TX 77957

Dear Senator Hegar,

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Personal Note

Signed: Lesli Lipton 2030 CR303, Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Calhoun County should not be allowed in Water District P!

Signed:

(Fred Westhoff)
PO Box 314
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

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Region P Water Board
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Personal Note

Signed:

CC: Representative Geanie Morrison
Region P Water Board
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Personal Note

Signed: Clyde Kay

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

DENNIS RAY
BOX 653
EDNA TX 77957

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Our family stands to lose over 700 Hundreds Acres of farm and Ranch land we have had for over 20 years and cannot afford to lose.

Signed: Mitch Malek

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note I am a river bottom land owner and do not want my land taken from me for someone else to make money off of. This land has been in my family since the 1930s.

Signed: Mary Beth Caraway Wildwood, MO.

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note THE LAND THAT WE OWN HAS BEEN IN MY FAMILY FOR THREE GENERATIONS. A PRIVATE ENTERPRISE, OR EVEN THE STATE, HAS ABSOLUTELY NO BUSINESS ROBBING PETER SO PAUL CAN MAKE MORE MONEY AT MY LOSS!!!

Signed: [signature] (ROBERT SCHROETER)

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Its my Land NO One has a right to take it away. Been in our family over 50 years.

Signed: Susan Anderson

Taxes are high enough in Jackson County

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Do Not Dam the Dam River and take 70 Acres of my Land

Signed:

Jan Bone
P.O. Box 560
Inez Tx

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Q. M. Peterson II

2740 Loop 521
EDNA, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Linda Foster
[illegible]

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Linda Foster
P.O. Box 299
Edna, Tex 77957

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Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Ronald Gates
2955 Hwy 111 N.
Edna, Tex 77957

Signed: Ronald D. Gates

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Lucille Jacobs

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: Taking land away from family we use to make a living. Plus off Tax Roll.

Signed: [illegible]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: As a land owner and local business owner this will greatly affect my livelihood drastically. [illegible]

Signed: [illegible]

205 W main
Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature] 3898 SH 111 N. Edna, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Teresa & Frank Durham
P.O. Box 697
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Kendall + Lance Upton

206 Brazos Gardens DR.
Richmond, TX
77968

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Barbara Martin

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 25 2010
TWDB

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Personal Note

Signed: Caroline Pitzer

NAME Caroline Pitzer
Address 618 Hanover
Edna, Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
I'm a concerned citizen and land owner of Jackson County and feel and a new damn would be detrimental to our county.

Signed: Sherri Ellis

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Larry + Sherri Ellis
PO Box 157
Laward TX 77970

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Personal Note
I dont agree with another lake texana.

Signed: Connie M. Rodriguez
315 Buffalo Street
Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
In addition all water Boards Should be Elected - Not Appointed by Gov. The Texas Water Code should be Changed.

Signed: Lois Druskel

Henry + Lois Druskel
110 W Main
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Brooke Conner

Name Brooke Conner
Address 1109 S. Second
Ganado, Tx. 77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

To Whom It May Concern: Mr. Ward:

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Personal Note

Signed: [illegible]

CC: ~~Senator Glenn Hegar~~
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Belinda Emmons.

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Robin D Webb

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
Formosa Plastics does not need to be put into region P.

Signed: Robert [illegible] Jr.

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
LNRA Has the only Fenced in Lake that I have ever seen in our state, Taking 7,000 acres of land away from people that could have been used for persons to come into our County and have lake front houses, bringing more people into our County, also bringing in more taxes for our County. We need something to help our County, not bring more taxes and something else that will take land away from more families.

Signed: Zac Ferguson

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note As a taxpayer and land owner in Jackson County I believe that we Do Not Need to damn the Lavaca River.

Name Clara Conner

Address 1109 S. Second
Ganado, TX. 77962

Signed: Clara Conner

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Cory Ellison

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Cory Ellison
509 W. Division St.
Edna, Tx 77957

To Whom It May Concern: Mr. Ward:

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Personal Note

Signed: Weseleen Johnston

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Signed:

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Personal Note

Signed: August E. Westhoff Jr.

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

To Whom It May Concern: Mr. Stand:

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Personal Note

Signed: Macob Johnston

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note I am a business owner in Jackson County and do not want another dam. It does nothing for our community!

Signed: [illegible signature]

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Kari Scott

601 Taylor Rd
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Courtney [illegible]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Warren Johnston

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Mr. Staud:

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Johnny Driggers

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed:

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Region P,

RECEIVED

JUN 21 2010

TWDB

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Personal Note
I am already opposed to the Stage II dam. There are alternatives to an archaic dam.
Do NOT DAM THE LAVACA

Signed: Carol Pivonka Lee
118 N. Wells
Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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JUN 30 2010

TWDB

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Personal Note
We don't live in Jackson County, but we have two pieces of family owned land in Jackson County. These two properties would be directly affected by the proposed dam. We are against it's construction.

Signed: Chal Pit / Laura Rihoda

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 21 2010
TWDB

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Personal Note

NO DAM!

Clifton Hicks

Signed: Leah Hicks

509 SUZANNE
EDNA, TX. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 21 2010
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Personal Note

I DON'T AGREE WITH THE CONCEPT OF DAMMING THE LAVACA RIVER. IN MY OPINION, DESALINIZATION IS THE ONLY VIABLE OPTION FOR LONGTERM WATER SUPPLIES.

Signed: D W. [signature]

DAVID W. SHEBLAK
P.O. BOX 421
EDNA, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

We received correspondence from Mr. Ward stating that Mr. Bryzowski was the contact person for Region P.

We are not comfortable sending our correspondence to Mr. Bryzowski for several reasons.

Sorry for the inconvenience.

RECEIVED
JUL 01 2010
TWDB

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Personal Note: Our water and natural resources are far more valuable than Formosas Greed. This is not in the best interest of the citizens of Jackson and Surrounding Counties. Please note our sincere opposition to the LNRA decisions to dam the Lavaca River. Water is our most precious resource. Formosa has a negative environmental record.

Signed: Eric Quinn

Eric Quinn
1988 Hilltop Drive
Wimberley, Texas 78676

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Jamie Hajek

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
14317 State Hwy 111 N. Edna, TX 77957

Signed: Elisha James

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Jesus Topia

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note Dont Mess with our Texas RIVER! It cannot be replaced!! We don't want another mud pit!

Signed: Charlotte Hicks 393 Co. Rd. 131 Edna, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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JUN 21 20
TWDB

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note
As a landowner I can say this is going to raise our taxes and interfere with the basic right of ownership.

Signed: Frances Wells Shaw

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Mr. Ward

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

RECEIVED
JUN 30 2010
TWDB

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Personal Note
We don't live in Jackson County, but we have two pieces of family owned land in Jackson County. These two properties would be directly affected by the proposed dam. We are against it's construction.

Signed: Fred A Pustoda

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 30 2010

TWDB

To: Mr. J.Kevin Ward

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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I own 45 acres on land on Jackson County Road 306; if a dam is built a minimum of 25 acres will be flooded. The land that will be flooded has beautiful Oak, Pecan and many other trees. All that would be left of my homestead would be my house and about 20 acres of pasture that is above the flood plain. I am 61 years old and raised 3 kids on this land. I always assumed this would be a place for my grandchildren to come, spend time, and enjoy the beauty and wildlife of the Lavaca River. Now it appears that LNRA has decided it can make more money and to heck with what the people of Jackson County want.

I appreciate you taking your time to read this letter.

Jim Green

Jim Green

2214 County Road 306
Edna, Texas, 77957

RECEIVED

JUN 28 2010

TWDB

Dear J. Kevin Ward

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: James R. Tuttle & Shirley J. Tuttle

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Jeanne Bridges

PO Box 1253
Ganado, Tx 77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 28 2010

TWDB

Dear Senator Hegar,

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Personal Note I grew up in Edna and now live in Houston; but I know the importance of the River in the community and the state of Texas. I am a firm believer in keeping the Lavaca River in its natural state.

Signed: Joey Rodriguez

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED
JUN 28 2010
TWDB

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Personal Note Very opposed to Stage II. There are other viable means of water conservation that are utilized in the world as alternatives to dam building. It's time we CATCH UP with the times and not follow old practices!

Signed:

4988 Fm 1822
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note I AM CONCERNED THAT LNRA IS NOT DEALING IN GOOD FAITH WITH THE PUBLIC TRUST. IT APPEARS LNRA IS BEING OPERATED LIKE A FOR PROFIT BUSINESS, SUBSIDIZED BY TAKING PRIVATE LAND.

Signed:

4988 FM 1822
EDNA, Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note: No one needs to take anyones lands for this.

Signed:

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Amy Brown
224 CR 131
Edna, TX

Dear Senator Hegar,

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Personal Note
How can you take peoples Land, home, livelyhood - Have you No respect!

Signed: Susan Grissom

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

509 Nancy
Edna, Tx 77957

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Personal Note

Signed:

Judy S. Lundy
403 W. Breckenridge
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

I am a concerned citizen in the county & do not agree with the damming of the Lavaca River

Signed: [illegible]

PO Box 111
La Ward, Tx 77970

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
Don't want another dam

Signed: [illegible]

307 S. Bryan
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

To Whom It May Concern: [illegible]

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Personal Note

Signed: [illegible]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [illegible]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Edward Gates

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

402 DENNIS
EDNA, TX 77957

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Personal Note

Signed: Maxine Gates

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

402 Dennis
Edna, Tx. 77957

Dear Mr. Ward:

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Personal Note

Signed: [illegible]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 28 2010

TWDB

Dear Senator Hegar,

~~Live~~ own property in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

We do not need to furnish more water to out of county users —

Signed: [illegible]

John Koop
340 Marshall Johnson Ave. S.
Port Alto, Tx 77979

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I ~~live~~ grew up in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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- The estuaries are already in danger, especially since the BP oil spill. Cutting off the fresh water flow just doesn't make sense.

Personal Note

Leave our river alone, Let it be natural, the way it was made —

Signed: [illegible]

Jinnifer Koger
7512 Eastcrest Dr.
Austin, Tx 78752

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I ~~live~~ RAISED MY FAMILY in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

These are the issues I am deeply concerned about:

- o I don't want or need another dam like the one we already have.
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- ✓ We need more tax relief not more taxes.
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Personal Note

Signed: H.J. Houck

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

H.J. HOUCK
521 DAVIES RD.
INEZ, TX 77968

Dear Senator Hegar,

I ~~live~~ grew up in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Virgie Houck

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

VIRGIE HOUCK
521 DAVIES RD.
INEZ, TX 77968

Dear Senator Hegar,

I ~~live~~ own property in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note: We do not need to dam this river in order for out of county users ~~can~~ to have our water. Please block this Stage II.

Signed: Linda Koop

Linda S. Koop
340 Marshall Johnson Ave. S.
Port Alto, TX 77979

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I own land in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Please let the Lavaca River flow. Thank you.

Signed: Lesley A. Koop

Lesley A. Koop
202 Childers Dr. #422
Bastrop, TX 78602

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I grew up in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Thank you.

Signed: Shirley K. Moyer

Shirley Koop Moyer
13919 Crooked Hollow Dr.
San Antonio Texas 78232

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note
If Stage II comes through my family will lose the land that has been in our family for many generations. It makes me sick to think of them taking our homes especially my 85 year old grandparents who would be at a loss trying to figure out what to do or where to go. I honestly think it would kill them.

Signed: Jamie Koop [illegible] 389 Co. Rd. 309
Edna, Tx. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear

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Personal Note

Signed: Virginia Newbern 410 Maxine St. Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Dwayne Newbern Capt. ~~Dw~~ Dwayne Newbern 410 MAXINE ST EDNA, TX. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
PO Box 707
El Campo Tx 77437

Rachel Charkalis

Signed: R Charkalis

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear

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Personal Note
403 W. Brackenridge
EDNA 77957

Signed: Daniel Reavey

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature] Mathew Charkalis P.O. Box 707 El Campo, TX 77437

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature] James Curlee P.O. Box 601 Edna Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Chelsea Hunt

Chelsea Hunt
P.O. Box 3
La Ward, TX 77970

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

Signed: Anthony & Kristin Hunt

Tony + Kristin Hunt
701 CR 312
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: [signature] 6/18/10

Cord Beard
9019 FM 822
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note
It devastates me to think that future generations will not be able to experience the "magic" of the river bottoms. It is such a beautiful area.

Signed: [signature]

Jessica Hunt
P.O. Box 542
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note: It is not right for an entity to steal the land that people have worked so hard to obtain & cultivate. Not only will LNRA take the land away from Jackson County citizens they then will ship the water out of the county.

Signed: [signature]

Dennis Brian Hunt
P.O. Box 542
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Dear Senator Hegar,

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Personal Note

Signed: Diane Hunt

Diane Hunt
PO Box 3
La Ward, TX 77970

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Genevieve Wolter

Genevieve Wolter
492 Live Oak
Inez, TX. 77968

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Shawn Egg

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

ShawN Egg
1480 CR 324
Edna. Tx 77957

Dear Senator Hegar,

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Personal Note

Signed: Jayme Blackwell

Jayme Blackwell
2291 FM 234 S
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Shae Mabry

Shae Mabry
PO Box 112
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Darvis Jones

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

Darvis Ray Jones
205 1/2 Hanover
Edna, TX. 77957

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Personal Note

Signed: Bob Sr

BOB SHORT
1406 WEST MAIN
EDNA, TX. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Robin Bedna
203 W. Main
Edna, TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note We are concerned about all the issues above. We own land on the Lavaca, own a small business in Jackson County and are natives of Jackson County. We are not against "growth" in our area - we just want any growth and jobs to benefit Jackson County and its citizens including our 3 grown children and their families who all live in Jackson County.

Signed: Marcus Jones
Sharon Hamman Jones

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Maureen Andel

Maureen Andel
FM 234 N
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note: Dont Want another lake that my Kids cannot Swim in!

Signed: Heath Bednarz

Heath Bednarz
1513 N East St.
Edna TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

STAGE 1 DID NOT Benefit JACKSON CO, QUITE THE CONTRARY, IN THE FACT WE LOST LAND, TAXES. STAGE 2 IS NO DIFFERENT, TAKE PEOPLES LAND TO Benefit FOMOSA, IT IS illegal FOR imminent Domain TO be USED FOR MONETARY GAIN

Signed: [signature]

JON BRADFORD
507 S. GILBERT
EDNA, TX 77957
LNRA BOARD member.

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

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Signed: Lisa Porche

P.O. Box 442
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

HELP! Please

Signed: Carol Janssen Carol Janssen

Box 256
Ganado, Tx
77962

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Not only damming the last remaining free river in Texas. The land that was taken in Stage 1 & what will be taken in Stage 2 can never be replaced. We're talking homes & history.

Signed: Lu Egg

Lu Egg
1209 St Hwy 111N
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

To Whom It May Concern:

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Personal Note

-Management of LNRA has intentionally mislead Regions L,P&N that the people ~~of~~ of Jackson county are for Stage II... WE ARE NOT!!!
-Desalinization Plants are the future & all water boards & River Authorities should focus on this technology... not Damming a River!!!!!

Signed: Clay Whitley 209 Cottonwood St. Edna, Tx 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

I do not personally live in Jackson County, but am concerned with the effects ~~of~~ damming the [illegible] will have on our ecosystem and the Lavaca/Matagorda Bay System in general.

Signed: Michael D. Blackwell

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Clayte Adkins

Clayte Adkins
Hwy 111 N
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Joetta Adkins

Joetta Adkins
Hwy 111 N
Edna, Tx 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

3305 Fm 234N Edna Tx. 77957

Signed: Jerry Soto

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Jennifer Dierlam

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

3008 Fm 1822
Edna, Tx. 77957

Dear Senator Hegar,

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Personal Note

Signed: Dianne Juroske

Dianne Juroske
909 Co. Rd. 110
EDNA TX 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Thomas Sowell

Thomas Sowell
607 Jackson St.
Edna, Tx. 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note
I have property in Jackson Co. and pay taxes

Signed: Dorothy Schneider

504 Edinburgh
Victoria, TX 77904

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

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Personal Note

Signed: Camilia Salazar

807 Ward St
Edna Texas 77957

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

Dear Region, P,

I live in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note

Signed: Glen Odehm

132 Koni
Bastrop, Tx 78602

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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Personal Note

Signed: Michele Orsak | Keith Orsak

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

901 S. Gilbert
Edna, Tx 77957

Kenneth & Carole Koop
1422 County Road 110
Edna, TX 77957
June 29, 2010

Kevin
FYI
Kenneth

RECEIVED
JUL 02 2010
TWDB

Representative Geanie Morrison
P.O Box 4642
Victoria, TX 77904

Dear Representative Morrison: Reference: Lavaca-Navidad River Authority and their desire to dam the Lavaca River

This is not about water, but about a family heritage and livelihood. I live in Jackson County, on the Lavaca River, one mile North of US 59 in the El Toro area. My farm is a 6 generation farm being in my family since 1871. At least that is the earliest recorded deed I have. But, my Uncle William Putnam tells me that the old homestead home was built 12 years before the Civil War. The hardships of the past are recorded in various bank notes and land deals that were secured by my great grand parents and grand parents as they struggled to survive and hold on to the farm.

When my wife and I made a commitment to buy the farm, we had to purchase bits and pieces of inherited portions from different family members as we struggled to keep the old farm, especially the river bottom, in tack. Both being school teachers, we worked extra part time jobs for 25 years as we gradually took hold of about two thirds of the original 335 acres. We barely survived the Carter administration when interest rates on loans went from 8% to 12.5% plus. Over the years through hard work, we have transformed the overgrown thicket of huisache, rose hedge, and yaupons into beautiful river bottom grassland that sustains our cattle operation during winter or even a severe drought, as we just experienced.

Wildlife is abundant along the old river named by the explorer LaSalle. The river is no more than a creek during the summer, but the grand kids, neighborhood kids, local scout groups and church youth groups have a great time on the sand bars regardless of the water flow. Our trees are massive giants along the river and we are awed by Gods creation, beauty and serenity as we walk or ride ATV's throughout the bottom lands.

Carole and I lived in the Hill Country near Boerne and sold everything we had seven years ago so we could move onto the farm. We have ZERO interest in having to sell any part of our farm for lake water. You can not put a price on family heritage. There are three generations of family wanting to hold it together and not let it be destroyed. You would not want someone to take your land for all the reasons listed on the form letters being sent out.

Most of the year I can walk or step across the Lavaca River without getting water above my knees. I have not seen much change over a 60 year period. I wonder if the evaporation rate for a 10,000 acre lake would be greater than the amount of water flowing from the river into the lake. I can see the benefit of an off channel reservoir for capturing and holding flood water. It would definitely affect fewer land owners.

If you confiscate my land through eminent domain, you will create another muddy waste land for water hyacinth, trash, driftwood and alligators. You can see a mirror image of what my property will look like when you drive down US 59 and look north as you cross Lake Texana.

Representative Morrison, I respectfully request your help. Please do not support the damning of the Lavaca River.

Respectfully Yours,

Kenneth & Carole Koop

CC: Region P, L, N Water Board

RECEIVED
JUN 28 2010
TWDB

Dear J. Kevin Ward

I grew up in Jackson County and am very concerned about our county's future. The LNRA has the power to make some decisions that can positively or negatively affect the lives of the people who live and work in the county. They are not being responsive to our concerns and we need your help.

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Personal Note _____I grew up right down the road from the dam on FM 3131. I have never figured out what good it has done for the county. All the water is sent to Corpus Christi. How is that good for the counties farmers? The river bottom is beautiful but they want to destroy that also. I never got the chance to actually see the town site of Texana a very historic part of Texas because of the dam. We would be losing our history and livelihood.

Signed: Kristi K Yeate [illegible]

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

Dear SENATOR HEGAR

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Personal Note: All water empounded in Jackson County needs to stay in Jackson County for Industry in our county, so our county can grow.

Signed: Lance & Melissa Koop

398 Co. Rd. 3011
Edna, TX. 77957

CC: Senator Glenn Hegar
Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

RECEIVED

JUN 21 2010

TWDB

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Personal Note: Leave us alone!!!

Signed: Layo Clowers

2594 FM 1822 Edna Tx 7795

CC: Representative Geanie Morrison
Region P Water Board
Region L Water Board
Region N Water Board

John Aimone
203 Fairway Street
Victoria, Texas 77904

RECEIVED
JUN 29 2010
TWDB

June 24, 2010

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711

Dear Mr. Ward,

I am writing this letter in protest of damming the Lavaca River in Jackson County. Jackson County tax payers supported the 1st dam on the Navidad for over 25 years, but every drop of water being sold is going OUT of the county and that is exactly where the water from this proposed dam will go. We should keep this valuable resource in Jackson County until we can get an industry to locate IN Jackson County.

Please help us STOP the dam! I hate to displace the landowners in that area just for the benefit of Formosa, which is in Calhoun County, and Corpus Christi, which is in Nueces County.

Thank you, in advance, for your assistance.

Sincerely,

John Aimone

Nancy Aimone
203 Fairway Street
Victoria, Texas 77904

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TWDB

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Texas Water Development Board
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Sincerely,

Nancy Aimone

Roy Aimone, M.D.
203 Fairway Street
Victoria, Texas 77904

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Sincerely,

Roy Aimone

Callaway Aimone
203 Fairway Street
Victoria, Texas 77904

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JUN 29 2010
TWDB

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Executive Administrator
Texas Water Development Board
P.O. Box 13231
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Thank you, in advance, for your assistance.

Sincerely,

Callaway Aimone

RECEIVED
JUN 29 2010
TWDB

Callaway S. Vance
P.O. Box 340
Edna, Texas 77957

June 24, 2010

J. Kevin Ward
Executive Administrator
Texas Water Development Board
P.O. Box 13231
Austin, Texas 78711

Dear Mr. Ward,

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Sincerely,

Callaway Vance

Appendix 10C

Response to Public and Agency Comments

AECOM

AECOM
5757 Woodway Drive, Suite 101W, Houston, Texas 77057-1599
T 713.780.4100 F 713.780.0838 www.aecom.com

Memorandum

Date	August 2010
To	Texas Water Development Board
From	Jason D. Afinowicz, P.E.
Subject	TWDB Comments for LRWPG Initially Prepared Plan Contract No. 0904830875

The text below provides response to TWDB's comments on the Initially Prepared Plan for the Lavaca Regional Water Planning Area. TWDB comments are in italics.

LEVEL 1. Comments and questions must be satisfactorily addressed in order to meet statutory, agency rule, and/or contract requirements.

<u>General Comment</u>

1. *Please include a table listing alternative strategies, if alternative water management strategies were included. [Contract Exhibit "C" Sections 4.3, 11.1]*

   The RWPG has not included any alternative WMS as part of the 2011 RWP. While a number of strategies were considered to meet projected needs, the only potential WMS that could be financially supported by irrigation (which shows the projected needs for the Region) was Conjunctive Use of Groundwater. None of the other strategies examined were deemed to be viable alternatives.

2. *Table of Contents, List of Tables: Summary tables listed (e.g. ES.3, ES.4, and ES.5) for Lavaca, Jackson and Wharton Counties were not found in the plan. Please revise as appropriate.*

   These summary tables were removed from the Plan earlier in the planning process as they were felt to be unnecessary. The reference to them in the Table of Contents should have been removed for the IPP. This has now been corrected.

<u>Executive Summary</u>

3. *Executive Summary, Page 1, Table ES-1; Chapter 2, Pages 2-12 and 2-17: The water demand projections for Lavaca County-Other in the Guadalupe River basin appear to not be included in Table ES-1. Please revise as appropriate.*

   The values presented for Lavaca County in Table ES-1 match the tables in Chapter 2 as well as the water demands shown in DB12.

Chapter 1

4. *Please describe the plan's impact to navigation. [Title 31 Texas Administrative Code (TAC) §357.5(e)(8)]*

   The Plan would not be expected to impact navigation in any significant way, as the only WMS recommended in the Plan is Conjunctive Use of Groundwater. A discussion of navigation has been added to Section 1.7 of Chapter 1. The text states the following: "Navigation within the LRWPA is generally recreational in nature, with boaters and fishermen utilizing rivers and streams as well as Lake Texana. There is also heavy recreational use in the bays and estuaries at the southern end of the Region. The current recommended water management strategy in the 2011 Regional Water Plan for LRWPA, conjunctive use of groundwater, is not anticipated to adversely impact navigation in the Region."

5. *Please identify the threats to agricultural or natural resources due to water quality problems in the region. [31 TAC §357.7(a)(1)(L)]*

   The following text was added to Section 1.7 of Chapter 1 in order to address this comment: "The Regional Water Plan Guidelines (31 TAC §357.7(a)(i)(L) require that planning groups identify threats to the State's agricultural and natural resources due to issues with water quantity or water quality problems related to supply. Any potential threat to agricultural resources would be of particular concern for the Lavaca Region, as irrigated agriculture is by far the largest water user in the Region. Irrigation in the Region relies almost exclusively on groundwater. Groundwater conditions have been favorable and should continue to be favorable within the Lavaca Region for the pumping of substantial quantities of good quality water. There is the potential for agriculture in some portions of the Region to experience shortages under drought conditions coupled with peak production, with the likely result being temporary conjunctive use of groundwater resources.

   Natural resources in the Region, particularly steams and riparian habitat, can also be impacted by drought conditions. Flows for many streams in the Region show a high seasonal variability, and flows in some streams may be drastically reduced or eliminated under prolonged dry conditions. Irrigation return flows play an important role in maintaining streamflows during moderately dry conditions. While observations of streamflow during a recent drought event indicate that irrigation returns and streamflow are both minimal under exceptional drought conditions, it is likely that for moderately dry conditions the increased amount of groundwater entering a stream through irrigation return flows would help to sustain habitat that would otherwise be water stressed."

6. *Page 1-4, sixth paragraph: The plan does not refer to the most recent groundwater management plan for the Coastal Bend Groundwater Conservation District which was approved by TWDB on November 4, 2009. Please revise if appropriate.*

   The reference in Section 1.2.1 of Chapter 1 has been revised to reflect the most recent Coastal Bend GCD groundwater management plan approved by TWDB. The text now reads: "The original management plans for the Coastal Bend and Texana districts were certified by TWDB on September 28, 2004. Subsequently, an updated groundwater management plan for the Coastal Bend GCD was approved by TWDB on November 4, 2009."

Chapter 2

7. *Please include a summary of information regarding water loss audits specific to Region P. [31 TAC § 357.7 (a)(1)(M)]*

This data is included in detail in Chapter 6. The following text was added as section 1.8.3 to Chapter 1: "House Bill 3338, passed by the 78th Texas Legislature, requires public utilities providing potable water to file water audits with the TWDB once every five years giving the most recent year's water loss. TWDB subsequently commissioned a study of available loss data. For the first phase of water auditing, a number of issues have been identified with the data provided, and work to correct inconsistencies is ongoing. Year 2005 water loss audit information was provided to LRWPG by TWDB and was available for eight public utilities in LRWPA. Total loss rates were found to vary from 7.8 to 28.9 percent. Losses may vary annually and could currently be higher or lower than the values shown here.

Total losses are not limited to loss from known leaks, although for some utilities leakage is responsible for a majority of lost water. Total loss also includes meter inaccuracy, unmetered or unauthorized water use, line leaks, and storage overflows. Reliability of the 2005 dataset is limited by considerable error in the water balance for a number of utilities; for several utilities, the water balance error is higher than the estimated total water loss. It is hoped that data submitted to TWDB for subsequent water audits will more accurately portray water balance components for the utilities in LRWPA."

Chapter 3

8. *Page 3-16, second paragraph: Please clarify the source of the 12,000 acft/yr of interruptible water supply.*

Lake Texana is the source of LNRA's 12,000 ac-ft/yr of interruptible supply. The text of Section 3.5 of Chapter 3 has been revised to clarify the source of this interruptible supply.

Chapter 4

9. *Please describe how the plan considered regional water supply facilities and providing regional management of regional resources. [31 TAC §357.5(e)(6)]*

The following was added to Section 4.2 of Chapter 4: "Regions are required to consider regional water supply facilities and providing regional management of regional resources. However, due to the dependence of the Lavaca Region on groundwater supplies, regional-level supply infrastructure has not developed in the region, nor is it anticipated to develop or be needed in the foreseeable future. WUGs and individual agricultural irrigators predominantly are supplied by their own wells. Municipal WUGs are unlikely to display interest in regional water infrastructure development as they have access to adequate supplies and for a majority of municipal WUGs no growth is projected. At the same time, irrigated agriculture cannot financially support development of large-scale water infrastructure."

10. *Please explain how the region considered emergency transfers of non-municipal use surface water without causing unreasonable damage to the property of the non-municipal water rights holder pursuant to Texas Water Code §11.139. [31 TAC §357.5(i)]*

The following text was added to section 4.2 of Chapter 4: "Regions are required to consider emergency transfers of non-municipal use surface water per 31 TAC §357.5(i). Emergency transfers of surface water are granted by the Texas Commission on Environmental Quality on an interim basis during periods where an imminent threat to public health and safety exist, including multi-year droughts, spikes in demands, or failure of water supply systems where demands are unable to be met by available resources. As the regional water planning process considers supplies and demands over decadal periods, temporary emergency transfers of water were not considered. As all supplies allocated are considered available during drought of record (DOR) conditions, the need for additional supplies in the water planning process are due to unmet demands rather than temporary unavailability of supplies. If shortages are identified in a decade within the planning period, they are met with new supplies developed in a WMS. Currently, non-municipal users in the LRWPA rely almost entirely on groundwater, and thus there is no infrastructure available to convey water from non-municipal users under emergency conditions. Furthermore, all needs within the Plan are assigned to irrigated agriculture; in the event of an emergency such as drought, municipal WUGs would be expected to simply increase their use of groundwater."

11. *Page 4-3, second paragraph, last sentence: Plan indicates that water management strategy costs have not been updated. Please revise plan to ensure that all costs of projects presented are in September 2008 dollars as required. [Contract Exhibit "C" Section 4.1.2]*

    The following language was added to Section 4.2.2 of Chapter 4 to clarify cost calculations presented in the Plan: "The costs for those strategies presented in the 2006 RWP have been adjusted to a September 2008 reference per Texas Water Development Board Guidance. However, a full reassessment of strategy costs was not executed for any strategy other than conjunctive use of groundwater, since the last planning cycle as none of the strategies were remotely within reasonable costs set by LRWPG."

<u>Appendix 4B</u>

12. *Appendix 4B: Please describe how plan considered environmental water needs of bay and estuary inflows, including freshwater inflows to Matagorda and Lavaca Bays. [31 TAC §357.5(l)]*

    The following text has been added to Appendix 4B: "Per 31 TAC §357.5(l), Regional Planning Groups are required to consider in the Plan the environmental water needs of bay and estuary inflows. For the Lavaca Region, this would include freshwater inflows into Matagorda and Lavaca Bays. It is important to note that water demands in the Lavaca Region are currently met almost entirely by groundwater, with this trend expected to continue into the foreseeable future. Thus, the Plan is not anticipated to have a significant impact on bay and estuary inflows. The only water management strategy deemed feasible and recommended in the Plan is Conjunctive Use of Groundwater. During periods of drought, return flows from increased groundwater usage could maintain some portion of streamflow and in turn contribute freshwater inflows to the bay system. The volume and timing of any freshwater contributions from irrigation return flows would be dependent on the intensity and duration of drought conditions as well as the magnitude of non-agricultural streamflows."

13. *Appendix 4B: Please provide a quantitative reporting of environmental factors for each potentially feasible water management strategy evaluated. [31 TAC §357.7(a)(8)(A)(ii)]*

    The following text has been added to Appendix 4B: "Per 31 TAC §357.7, Regional Planning Groups are required to consider in the Plan a quantitative assessment of environmental factors for each potentially feasible water management strategy evaluated. Because of the Lavaca Region's predominant dependence on surface water supplies and the fact that any projected shortages would be limited to irrigated agriculture, all potential strategies but one were deemed infeasible due to implementation costs in excess of the level that could be supported by irrigators. Thus, a detailed environmental assessment was not carried out for these strategies as they were not viable options for meeting needs. The sole recommended water management strategy was Conjunctive Use of Groundwater. An assessment of the impacts of this strategy on aquifer storage is included in Chapter 3. Impacts of irrigation return flows and the Conjunctive Use of Groundwater WMS are discussed in greater detail in Sections 4.4 and 4.5 of Chapter 4. It should be noted that the analysis of demand and supply was done assuming certain acreages were in agricultural production during the DOR conditions. The overpumping will occur only if peak agricultural production is combined with DOR hydrological conditions. It is possible that the acreages of rice grown would be reduced during record drought conditions to the extent that pumping of the aquifer beyond the sustainable yield amounts would not occur."

14. *(Attachment B) Comments on the online planning database (i.e. DB12) are herein being provided in spreadsheet format. These Level 1 comments are based on a direct comparison of the online planning database against the Initially Prepared Regional Water Plan document as submitted. The table only includes numbers that do not reconcile between the plan (left side of spreadsheet) and online database (right side of spreadsheet). An electronic version of this spreadsheet will be provided upon request.*

    Responses to the DB12 comments are included in the attached Excel file.

LEVEL 2. Comments and suggestions that might be considered to clarify or enhance the plan.

Chapter 4

1. *Please consider revising the fourth line of the last paragraph of Appendix 4D where it states "..and likely make it longer economically viable…" to read: "…and likely make it no longer economically viable…".*

   This comment is noted. However, because the appendix is not a Planning Group document but rather is an independent informational document provided by a WWP, we are not able to make alterations to its contents.

2. *Appendix 4B: The plan states that "a schedule for freshwater releases will be established during permitting of the [Construction of Lavaca River Off-Channel Reservoir Diversion] project." Please consider mentioning that the natural unappropriated flows would be subject to environmental conditions for the proposed reservoir.*

   This comment is noted. The project would not rely on the existing Stage II permit but would be permitted from currently unappropriated flows. As such, it would be required to meet any environmental flow requirements in place at the time of permitting and included with the permit.

Appendix 3A

1. *Appendix 3A, Table 3A-1: The last entry for the Gulf Coast Aquifer has "K" listed in the "RWPG" column. Please revise, if appropriate, to "P".*

   The table is correct. Because Wharton County is split between Regions P and K, a portion of the total groundwater availability calculated for the Gulf Coast Aquifer in the county is allocated to Region K. The Region K entry is included in the table to signify this. The following footnote has been added for clarification: "A portion of the Gulf Coast Aquifer in Wharton County is a supply for Region K ."

		IPP document		Response
Region IPP	Item	Page number	Table number	Comment
P	Lake Texana DOR Supply	ES-2		4,500 afy of 79,000 afy is used for environmental flows purposes
P	Shortages in ac-ft/yr, Jackson Co. Irrigation	ES-2	ES-2	This has been corrected to match DB12
P	Population, CRU, Lavaca County-Other	2-11	2-1	The value shown in the report is for all of the County-Other WUG in Lavaca County. The values ranging from 44 afy down to 35 afy only reflect one of the County-basin splits.
P	Supplies,WUG 2962, Lavaca County-Other	3A-2	3A-2	1,140 afy is the correct value. DB12 has been updated to reflect this.
P	Total Lavaca County-Other supply	na	3A-2	1,145 afy is the correct value. DB12 has been updated to reflect this.
P	Total Region supply	na	3A-3	164,148 is the correct value. DB12 has been updated to reflect this.
P	Jackson Co. Irrigation and County Total shortage	Appendix 4A	4A.1	This has been corrected to match DB12.
P	Regional Shortage Total	Appendix 4A	4A.1	This has been corrected to match DB12.
P	Alternate - Off-Channel Stage II	4C.2	Table 4C.2	Neither the on-channel nor off-channel Stage II project is reccommended as a WMS in the Region P Plan.
P	Construction of Lavaca River Off-Channel	4C.2	Table 4C.2	The WMS was listed in the database as a supply for Region N. However, it is not a reccommmended WMS for Region P.
P	Palmetto Bend Stage II - firm yield	14-Apr	na	26,242 afy is the yield of the Off-Channel Stage II project. 22,964 afy is the yield for the on-channel impoundment.
P	Lake Texana DOR Supply	7-2		4,500 afy of 79,000 afy is used for environmental flows purposes. Hence, 74,500 afy is the usable supply volume.
P	Regional irrigation demand	7-2		220,000 afy is a rounded number. The text has been revised to show 217,846 afy.

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ross Melinchuk
Deputy Executive Director, Natural Resources
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744-3291

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Melinchuk,

The Lavaca Regional Water Planning Group (LRWPG) appreciates the Texas Parks and Wildlife Department's thorough review and comments on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding listed species, Palmetto Bend Stage II, water conservation, and unique stream segments have been reviewed and considered by the LRWPG. Please note that Palmetto Bend Stage II is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration.

Per your comment, Table 1-7 will be updated to include recently-listed mussel species. In regard to water conservation, the LRWPG requested inclusion of an investigation in springflows as a task to be carried out in the first biennium of 2011 Regional Water Plan development; this task was not approved at that time by the Texas Water Development Board. However, information on potential long-term effects of groundwater pumping is presented in *Section 3.3* of the 2011 Regional Water Plan. The issue of designation of Unique Stream Segments was considered by the LRWPG at their July 19, 2010 meeting. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 17, 2010

James Warren Evans
3200 FM 822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Evans,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration.

Conjunctive Use of Groundwater is the only WMS currently recommended by the LRWPG, as the only projected shortages in the Region are for agriculture which cannot support the cost of major infrastructure projects such as brackish desalination or aquifer storage and recovery. However, in the event that municipal shortages are projected in the Region during future planning rounds, the Group encourages the study of any viable potential strategies.

The LRWPG supports your efforts to make the Texana GCD functional. Given the importance of groundwater not only to Jackson County but to the Lavaca Region as a whole, active GCDs are a key element in preserving and protecting our groundwater supplies for future generations (*Chapter 8, Section 8.2.7)*. LRWPG understands large-scale groundwater mining of the Gulf Coast aquifer is in direct opposition to the concept of sustainable yield for aquifer management and recommends establishment of fees for groundwater export as part of the 2011 Regional Water Plan (*Chapter 8, Section 8.2.8*). Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Shelley Srp
407 Dennis St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Srp,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration.

Please note that per Texas Administrative Code, Title 31, Part 10, Chapter 357, Rule §357.9, a regional water planning group may recommend a unique reservoir site if "site-specific reservoir development is recommended as a specific water management strategy or in an alternative long-term scenario in an adopted regional water plan." Development of Palmetto Bend Stage II was recommended by Region N as part of the 2006 Region N Regional Water Plan and continues to be a recommended strategy in the 2011 Plan.

The issue of designation of Unique Stream Segments was considered by the LRWPG at their July 19, 2010 meeting.

Conjunctive Use of Groundwater is the only WMS currently recommended by the LRWPG, as the only projected shortages in the Region are for agriculture which cannot support the cost of major infrastructure projects such as brackish desalination or aquifer storage and recovery. However, in the event that municipal shortages are projected in the Region during future planning rounds, the Group encourages the study of any viable potential strategies. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Clayte Adkins
State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Adkins,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Joetta Adkins
State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Adkins,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Callaway Aimone
203 Fairway St.
Victoria, TX 77904

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Aimone,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

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Larry Waits
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August 16, 2010

Mr. John Aimone
203 Fairway St.
Victoria, TX 77904

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Aimone,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Nancy Aimone
203 Fairway St.
Victoria, TX 77904

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Aimone,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

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August 16, 2010

Mr. Roy Aimone
203 Fairway St.
Victoria, TX 77904

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Aimone,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Maureen Andel
FM 234 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Andel,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

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August 16, 2010

Ms. Blanca Arredondo
105 Cherry Street
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Arredondo,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Cord Beard
9019 FM 822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Beard,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

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August 16, 2010

Mr. Heath Bednarz
1513 N. East St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Bednarz,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jamie Bednarz
1513 N. East St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bednarz,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

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Phone: 361-782-5229 Fax: 361-782-5310

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August 16, 2010

Ms. Robin Bedry
203 W. Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bedry,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. John Belicek
4389 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Belicek,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 17, 2010

Ms. Lynn Birchum
511 Wilson
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Birchum,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

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August 17, 2010

Mr. Wade Birchum
511 Wilson
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Birchum,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jayme Blackwell
2291 FM 234 S.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Blackwell,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
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August 16, 2010

Mr. David Blankenship
1465 CR 401
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Blankenship,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jan Bone
P.O. Box 560
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bone,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

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P.O. Box 560
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Bone,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Patti Bone
P.O. Box 560
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bone,

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Mr. Justin Bonnot
213 Sandra
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Bonnot,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Gerald Boyd
2395 State Highway 111 S
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Boyd,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Jon Bradford
507 S. Gilbert
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Bradford,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lindsey Bradford
507 S. Gilbert
Edna, TX

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bradford,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Jeanne Bridges
P.O. Box 1253
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Bridges,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Amy Brown
264 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Brown,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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August 16, 2010

Ms. Lisa Burris
109 W. Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Burris,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Clayton Butler
521 E. Cedar
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Butler,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
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August 16, 2010

Ms. Patti Butler
521 E. Cedar
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Butler,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Joyce Campbell
504 Suzanne St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Campbell,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Andy Castin
307 S Bryan
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Castin,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Hope & Tony Cavazos
113 E. Cordele
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Cavazos,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Mr. Mathew Charkalis
P.O. Box 707
El Campo, TX 77437

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Charkalis,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Rachel Charkalis
P.O. Box 707
El Campo, TX 77437

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Charkalis,

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Larry Waits
Agricultural

August 16, 2010

Ms. Laya Clowers
2594 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Clowers,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Brooke Conner
1109 S. Second
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Conner,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Clara Conner
1109 S. Second
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Conner,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Alana Curlee
P.O. Box 601
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Curlee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Barbara Curlee
904 Pin Oak
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Curlee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Dennis Curlee Jr.
904 Pin Oak
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Curlee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 17, 2010

Mr. James Curlee
P.P. Box 601
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Curlee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Paul Davis
3898 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Davis,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
Agricultural

August 16, 2010

Mr. Chico DeLeon
P.O. Box 454
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. DeLeon,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jennifer Dierlam
3008 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Dierlam,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Ms. Belinda Dodds
204 Dugger St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Dodds,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Michael Dodds
204 Dugger St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Dodds,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Mr. Tony Doyle
325 CR 306
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Doyle,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lois Drushel
110 W. Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Drushel,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 17, 2010

Henry and Lois Drushel
110 W Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Drushel,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Kathy Dugger
1918 CR 303
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Dugger,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Teresa & Frank Durham
P.O. Box 697
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Durham,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lu Egg
1209 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Egg,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Mr. Shawn Egg
1480 CR 324
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Egg,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Larry and Sherri Ellis
P.O. Box 157
LaWard, TX 77970

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Ellis,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Cory Ellison
509 W. Division St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Ellison,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jane Gates
2955 State Highway 111 N
Edna, TX 77957-5057

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Gates,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Maxine Gates
402 Dennis
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Gates,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Ronald Gates
2955 State Highway 111 N
Edna, TX 77957-5057

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Gates,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Mr. Matthew Goldman
471 CR 284
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Goldman,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Michael Goldman
471 CR 284
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Goldman,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Adam Gonzales
P.O. Box 498
Lolita, TX 77971

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Gonzales,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jim Green
2214 CR 306
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Green,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 17, 2010

Ms. Susan Grissom
509 Nancy
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Grissom,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Marcus Farquhar
213 N. Wells
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Farquhar,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Mr. Paul Fern
P.O. Box 759
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Fern,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Linda Foster
P.O. Box 299
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Foster,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Pamela Frein
P.O. Box 281
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Frein,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Lee Hafernick
3334 State Highway 111 N.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Hafernick,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Ms. Sheila Hart
296 CR 307
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hart,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jason Hayden
7123 FM 234 S.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Hayden,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
Agricultural

August 16, 2010

Ms. Beatrice Hernandez
2486 State Highway 111 S
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hernandez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Patricia Hertz
2541 FM 234 South
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hertz,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Ms. Charlette Hicks
393 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hicks,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Clinton and Leah Hicks
509 Suzanne
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Hicks,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. H.J. Houck
521 Davies Rd.
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Houck,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Virgie Houck
521 Davies Rd.
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Houck,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Stan Hubenak
804 S. Allen
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Hubenak,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jackie Hudson
412 E. Rogers
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hudson,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Anthony and Kristin Hunt
701 CR 312
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 | Edna, Texas 77957
Phone: 361-782-5229 | Fax: 361-782-5310

August 16, 2010

Ms. Chelsea Hunt
P.O. Box 3
LaWard, TX 77970

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Dennis Hunt
P.O. Box 542
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Diane Hunt
P.O. Box 3
LaWard, TX 77970

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Jessica Hunt
P.O. Box 542
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Norman Hunt
152 CR 253
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Hunt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Ms. Joleen Jackson
132 Koali
Bastrop, TX 78602

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Jackson,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Elisha James
14317 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. James,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lisa Janica
1120 Gilbert Rd.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Janica,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 — Edna, Texas 77957
Phone: 361-782-5229 — Fax: 361-782-5310

August 16, 2010

Ms. Carol Janssen
P.O. Box 256
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Janssen,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 — Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Ms. Anna Jarvis
P.O. Box 115
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Jarvis,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jimmy Jausky
691 CR 283
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Jausky,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Glen Johns
6778 FM 822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Johns,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Renee Johnson
1643 US Highway 598
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Johnson,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Darvis Jones
205 1/2 Hanover
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Jones,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Dianne Juroske
909 CR 110
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Juroske,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
Agricultural

August 16, 2010

Ms. Kamey Karl
616 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Karl,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Linda Karl
616 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Karl,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Commissioner David E. Wagner
Counties

Larry Waits
Agricultural

August 16, 2010

Mr. Daward Gates
402 Dennis
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Gates,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jamie Kinsfather
389 CR 309
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kinsfather,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 17, 2010

Ms. Caroline Kizer
1606 Green St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kizer,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jinnifer Kogor
7512 Eastcrest Dr.
Austin, TX 78752

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kogor,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Mr. John Koop
340 Marshall Johnson Avenue S.
Port Alto, TX 77979

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Kenneth & Carole Koop
1422 CR 110
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Lance & Melisa Koop
398 CR 3011
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lesley Koop
202 Childers Dr. # 422
Bastrop, TX 78602

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
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August 16, 2010

Ms. Lesley Koop
704 Suzanne
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Linda Koop
340 Marshall Johnson Avenue S.
Port Alto, TX 77979

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Koop,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lois Kruschwitz
107 W. Gayle St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kruschwitz,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jill Kubecka
P.O. Box 573
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kubecka,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Ms. Cynthia Kucera
405 Sunset Dr.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Kucera,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Carol Lee
118 N. Wells
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Lee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
Agricultural

August 16, 2010

Dr. McHenry Lee
118 N. Wells
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Dr. Lee,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jesse Lopez
8059 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Lopez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jimmy Lopez
8059 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Lopez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Lupe Lopez
8059 State Highway 111 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Lopez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Ms. Judy Lundy
403 W. Brackenridge
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Lundy,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Shae Mabry
P.O. Box 112
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Mabry,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Harrison Stafford

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Sheri Martin
8798 FM 3131
Lolita, TX 77971

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Martin,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Harrison Stafford

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Gilbert Martinez
507 North Kleas St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Martinez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Ms. Frances Martiz
507 North Kleas St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Martiz,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 — Edna, Texas 77957
Phone: 361-782-5229 — Fax: 361-782-5310

August 16, 2010

Ms. Tina McDonald
207 Dugger
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. McDonald,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 — Edna, Texas 77957
Phone: 361-782-5229 — Fax: 361-782-5310

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Water Districts

Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Ms. Crystal Merechka
2315 CR 19a
Hallettsville, TX 77964

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Merechka,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Bryan Miska
202 W Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Miska,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
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Counties

Larry Waits
Agricultural

August 16, 2010

Ms. Holly Morgan
P.O. Box 93
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Morgan,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Shirley Moyer
13919 Crooked Hollow Dr.
San Antonio, TX 78232

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Moyer,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Capt. Dewayne Newbern
410 Maxine St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Capt. Newbern,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Virginia Newbern
410 Maxine St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Newbern,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Mr. Ray Nickel
11093 FM 234
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Nickel,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Tyrol Norman
1205 N. East St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Norman,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Keith & Michele Orsak
901 S. Gilbert
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Orsak,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Alice Payne
P.O. Box 245
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Payne,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Harrison Stafford II

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
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Larry Waits
Agricultural

August 16, 2010

Mr. Daniel Peavy
403 W. Brackenridge
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Peavy,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Harrison Stafford II

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 17, 2010

Ms. Mary Pelham
602 Laura
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Pelham,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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August 16, 2010

Mr. Q.M. Peterson III
2740 Loop 521
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Peterson,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Caroline Pitzer
618 Hanover
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Pitzer,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Ms. Ana Plotin
409 Maxine
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Plotin,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lisa Porche
P.O. Box 442
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Porche,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Mitzi Porche
207 W. Division
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Porche,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Patsy Porche
P.O. Box 473
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Porche,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Eric Quinn
1988 Hilltop Dr.
Wimberley, TX 78676

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Quinn,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Sue Quinn
1079 CR 401
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Quinn,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Troy Quinn
8583 State Highway 111 N.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Quinn,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Loretta Ramirez
502 Fannin St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Ramirez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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August 16, 2010

Mr. Robert Ramirez
502 Fannin St
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Ramirez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Dennis Ray
P.O. Box 652
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Ray,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Larry Waits
Agricultural

August 16, 2010

Resident
568 Mueller Ln.
Victoria, TX 77905

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Resident,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Resident
775 CR 306
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Jackson County Resident,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Resident
2030 CR 303
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Jackson County Resident,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Resident
P.O. Box 423
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Jackson County Resident,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Commissioner David E. Wagner
Counties

Larry Waits
Agricultural

August 16, 2010

Resident
P.O. Box 1331
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Jackson County Resident,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Kathy Roddy
1003 W. Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Roddy,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Connie Rodriguez
315 Buffalo Street
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Rodriguez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Lucinda Rodriguez
401 S. Pumphrey
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Rodriguez,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Wails
Agricultural

August 16, 2010

Mr. J.A. Rogers
1006 Virginia St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Rogers,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Bradley Ryan
454 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Ryan,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Kaci Ryan
454 CR 131
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Ryan,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Camelia Salazar
807 Ward St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Salazar,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Counties

Larry Waits
Agricultural

August 16, 2010

Ms. Melissa Sappington
310 W. Cypress
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Sappington,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Erno Sattler
7828 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Sattler,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Agricultural

August 16, 2010

Mr. Gilbert Sattler
7828 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 | Edna, Texas 77957
Phone: 361-782-5229 | Fax: 361-782-5310

August 16, 2010

Ms. Kari Scott
601 Taylor Rd
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Scott,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. David Sheblak
P.O. Box 421
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Sheblak,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Dorothy Shneeder
504 Edinburgh
Victoria, TX 77904

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Shneeder,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Mr. Bob Short
1406 West Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Short,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Loine Simons
505 Suzanne
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Simons,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Commissioner David E. Wagner
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Larry Waits
Agricultural

August 16, 2010

Ms. N. Sue Sims
P.O. Box 806
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Sims,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Soto
507 North Kleas St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Soto,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Counties

Larry Waits
Agricultural

August 16, 2010

Mr. Jerry Soto
3305 FM 234 N
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Soto,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Loretta Soto
507 North Kleas St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Soto,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Counties

Larry Waits
Agricultural

August 16, 2010

Mr. Thomas Sowell
607 Jackson St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Sowell,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Jake Srp
407 Dennis St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Srp,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 17, 2010

Mr. Freddie Taucer
205 W Main
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Taucer,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Jane Taylor
4988 FM 1822
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Taylor,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Agricultural

August 16, 2010

Mr. John Taylor
4988 FM 1822
Edna, TX 77957

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Ms. Kristen Thurmond
6878 CR 283
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Thurmond,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

Hon. Harrison Stafford, II
Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

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Larry Waits
Agricultural

August 16, 2010

Ms. Lesli Tipton
2030 CR 303
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Tipton,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

Sincerely,

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Marcus and Sharon Tomas
2303 CR 306
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Tomas,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Sandy Twardowski
1008 S. Second St.
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Twardowski,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Steve Twardowski
P.O. Box 194
Ganado, TX 77962

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Twardowski,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Kendall & Lance Upton
206 Brazos Gardens Dr.
Richmond, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. and Ms. Upton,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Callaway Vance
P.O. Box 340
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Vance,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
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August 16, 2010

Ms. Annabelle Villela
507 North Kleas St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Villela,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Fred Westhoff
P.O. Box 314
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Westhoff,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
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August 16, 2010

Mr. Devon White
P.O. Box 111
LaWard, TX 77970

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. White,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Clayton Whitley
209 Cottonwood St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Whitley,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Agricultural

August 16, 2010

Mr. Harold Wilkins
209 Brows
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Wilkins,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

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Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Hans Wittenburg
P.O. Box 1005
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Wittenburg,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 17, 2010

Ms. Generieve Wolter
492 Live Oak
Inez, TX 77968

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Wolter,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Chairman, Lavaca Regional Water Planning Group

LAVACA REGIONAL WATER PLANNING GROUP

P.O. Box 429 Edna, Texas 77957
Phone: 361-782-5229 Fax: 361-782-5310

August 16, 2010

Mr. Robert Wyatt
122 E. Main St.
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Mr. Wyatt,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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Larry Waits
Agricultural

August 16, 2010

Ms. Mindy Yendrey
501 Caroline
Edna, TX 77957

Subject: Comments on Lavaca Region 2011 Regional Water Plan

Dear Ms. Yendrey,

The Lavaca Regional Water Planning Group (LRWPG) appreciates your comments and input on the Initially Prepared 2011 Lavaca Regional Water Plan. Your comments regarding the proposed project on the Lavaca River have been reviewed and considered by the LRWPG. However, the project in question is not currently considered a recommended or alternative Water Management Strategy (WMS) in the 2011 Plan for the Lavaca Region in either an on-channel or off-channel configuration. Thank you again for making your views known.

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