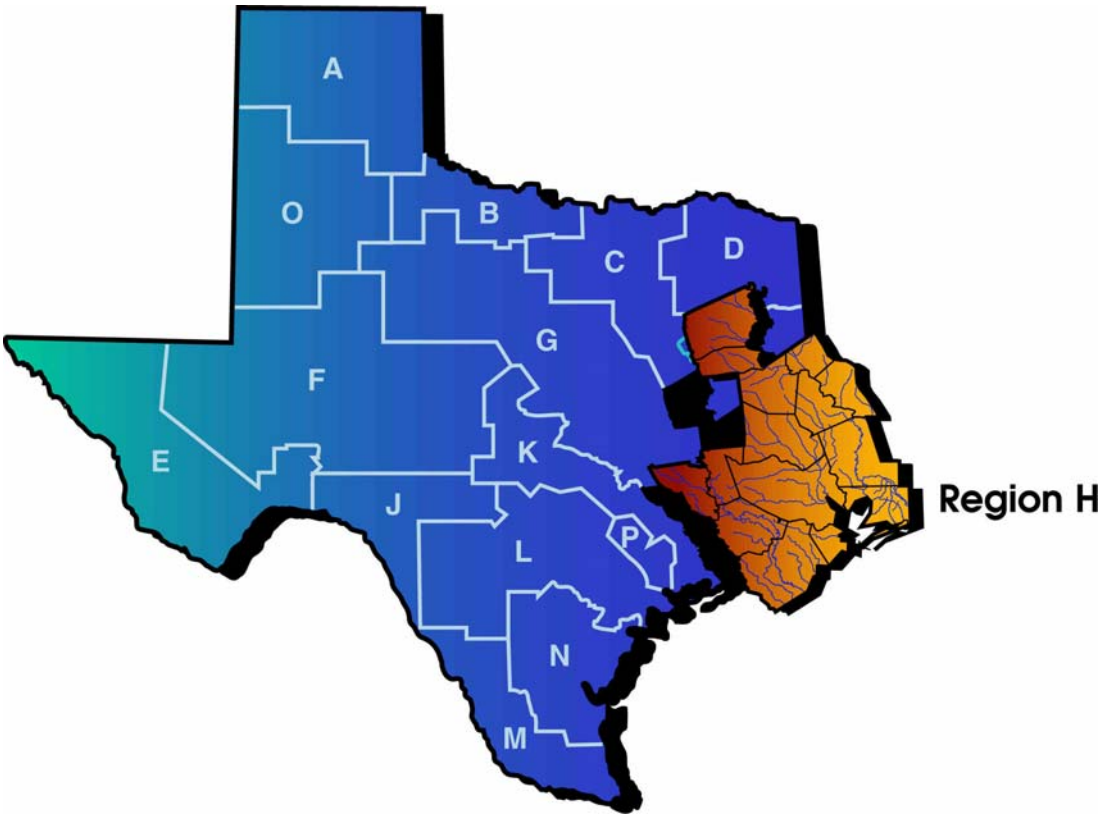
REGION H
WATER PLANNING GROUP



EXECUTIVE SUMMARY OF
2006 REGIONAL WATER PLAN

prepared by

Kellogg Brown & Root / Turner Collie & Braden

Joint Venture

Ekistics Corporation
LBG-Guyton Associates

December 16, 2005

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2006 Region H Water Plan

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Abbreviations used in the Report

Ac-ft/yr	Acre-feet per year
BRA	Brazos River Authority
CBWC	Chocolate Bayou Water Company
CLCND	Chambers-Liberty Counties Navigation District
COH	City of Houston
FBSD	Fort Bend Subsidence District
GBEP	Galveston Bay Estuary Program
GBF	Galveston Bay Foundation
GBFIG	Galveston Bay Freshwater Inflows Group
GCD	Groundwater Conservation District
GCWA	Gulf Coast Water Authority
HGCSD	Harris Galveston Coastal Subsidence District
MGD	Million gallons per day
MUD	Municipal Utility District
MWP	Major Water Provider (2001 Regional Plan Designation)
NHCRWA	North Harris County Regional Water Authority
RWPG	Regional Water Planning Group
RHWPG	Region H Water Planning Group
SB1	Senate Bill 1 from the 1997 State Legislature
SJRA	San Jacinto River Authority
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TRA	Trinity River Authority
TWDB	Texas Water Development Board
WUG	Water User Group
WWP	Wholesale Water Provider
WHCRWA	West Harris County Regional Water Authority

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

8	Austin County
20	Brazoria County
36	Chambers County
79	Fort Bend County
84	Galveston County
101	Harris County
145	Leon County
146	Liberty County
157	Madison County
170	Montgomery County
187	Polk County
204	San Jacinto County
228	Trinity County
236	Walker County
237	Waller County

Basin Codes used in the Tables

6	Neches River Basin
7	Neches-Trinity Coastal Basin
8	Trinity River Basin
9	Trinity-San Jacinto Coastal Basin
10	San Jacinto River Basin
11	San Jacinto-Brazos Coastal Basin
12	Brazos River Basin
13	Brazos-Colorado Coastal Basin

E.1 Introduction

Under legislation passed in 1997, the State of Texas designated 16 regions to plan for future water supply. Regional Water Planning is governed by the Texas Administrative Code, Title 31, Chapter 357, which mandates that plans address 50-year planning horizon and be updated every five years. Region H encompasses all or part of fifteen counties in southeast Texas and includes the entire San Jacinto River basin and the lower reaches of the Brazos and Trinity River basins. A Location Map showing the regional boundaries is included at Figure E-3. The members of the Region H Water Planning Group (RHWPG) and the interests they represent are shown in Table E-3. Regional Water Planning is conducted under the oversight of the Texas Water Development Board. Information on Region H and the State Water Plan can be found at the Board website, www.twdb.state.tx.us. A listing of State points of contact is included in Table E-5.

In 2001, the RHWPG published the first Regional Water Plan, which recommended 16 water management strategies to meet projected shortages for 93 water user groups. In this revision to the plan, water supply estimates are more detailed through the use of the new Water Availability Models (for surface supplies) and Groundwater Availability Models. Additionally, population and water demand estimates are more detailed, now including water districts serving unincorporated areas. This plan compares the water needs and supplies in the region to determine if supplies are adequate through the 50-year planning period. It recommends 23 water management strategies to meet projected shortages for 193 water user groups.

Region H is an economic powerhouse crucial to the Texas and national economies. Adequate water supplies are essential to continued economic health and to the region's future growth. Two thirds of all U.S. petrochemical production and almost a third of the nation's petroleum industries are located in Region H. The area provides some of the state's most popular vacation spots that generate hundreds of millions of dollars in annual tourism revenues. The Port of Houston is the second busiest port in the nation. In 2000, the Houston area employed 1.8 million people or 18 percent of the state's total employment. Region H is generally characterized by urbanizing land uses and broad-based economic development. In areas outside of the urban core, agriculture dominates economic activities. Key contributors to each of six primary economic sectors are:

- Services--Medical (Texas Medical Center in Houston, University of Texas Medical Branch in Galveston), tourism, banking, construction and engineering.
- Manufacturing--Petroleum exploration, production and refining, petrochemicals, biotechnology, chemicals, computers and technology, and pulp and paper.
- Transportation--Port of Houston, rail and highway systems, Intracoastal Waterway, airlines, airports and air cargo facilities.
- Government--Federal, state and local including the Texas Department of Corrections, the Johnson Space Center, numerous law enforcement agencies, universities, colleges and school districts.
- Agriculture--Rice, soybeans, grain sorghum, peanuts, vegetables, hay, cattle, horses, swine, timber and pulp wood.

- Fishing--Commercial (oysters, shrimp, finfish) and recreational.

Any large-scale water supply or conveyance projects will require the close cooperation of political entities in the affected areas. While municipal and county governments are most visible in Region H, there are numerous other governmental and regulatory agencies with jurisdiction over aspects of water supply development in the region. These include, but are not limited to:

- State Agencies
  - Texas Water Development Board (TWDB)
  - Texas Commission on Environmental Quality (TCEQ)
  - Texas Department of Parks and Wildlife (TPWD)
- River and Water Authorities
  - Brazos River Authority
  - San Jacinto River Authority
  - Trinity River Authority
  - Lower Neches Valley Authority
  - Coastal Water Authority
  - North Harris County Regional Water Authority
  - West Harris County Regional Water Authority
  - Gulf Coast Water Authority
- Subsidence and Groundwater Districts
  - Fort Bend Subsidence District
  - Harris-Galveston Coastal Subsidence District
  - Bluebonnet Groundwater Conservation District
  - Lone Star Groundwater Conservation District
  - Mid-East Texas Groundwater Conservation District
- Councils of Governments
  - Houston-Galveston Area Council of Governments
  - Brazos Valley Council of Governments
  - Deep East Texas Council of Governments
- Eleven soil and water conservation districts
- Numerous Utility Districts and Water Supply Corporations

Of particular note are the two subsidence districts, because the regulation of groundwater use to control land subsidence compels many municipalities to seek new surface water sources. The two regional water authorities were formed to collectively address this surface water

transition, and two additional authorities (in Fort Bend and Harris Counties) are currently being formed. The creation of public/private partnerships aligning the interests of the public with those of the manufacturing, agricultural, power generating and mining sectors will be essential in developing the water needed to support the population and economy of Region H.

For public review and comment, copies of the Initially Prepared Region H 2006 Regional Water Plan are available at the County Clerks' offices in each of the 15 Region H counties and are available in one public library in each of the 15 counties. The Plan is comprised of ten chapters:

Chapter 1: Description of Region

Chapter 2: Presentation of Population and Water Demands

Chapter 3: Analysis of Current Water Supplies

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

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

Chapter 6: Water Conservation and Drought Management Recommendations

Chapter 7: Long Term Protection of the State's Water Resources, Agricultural Resources and Natural Resources

Chapter 8: Ecologically Unique Stream Segments, Unique Reservoir Sites, And Legislative Recommendations

Chapter 9: Water Infrastructure Financing

Chapter 10: Public Participation and Adoption of the Plan

For an in-depth discussion of any of the topics addressed in this Executive Summary, the reader is referred to the full of report provided on CD with this Executive Summary, or located in any of the 30 repositories noted above. The full list of addresses of the 30 report holders is shown in Table E-4.

E.2 Population Projections

Population in Region H is projected to grow from 4.8 million in 2000 to 10.9 million in 2060. The doubling of population over the fifty-year planning period represents an annual growth rate of slightly more than one percent. Population projections by county are shown in Table E-6.

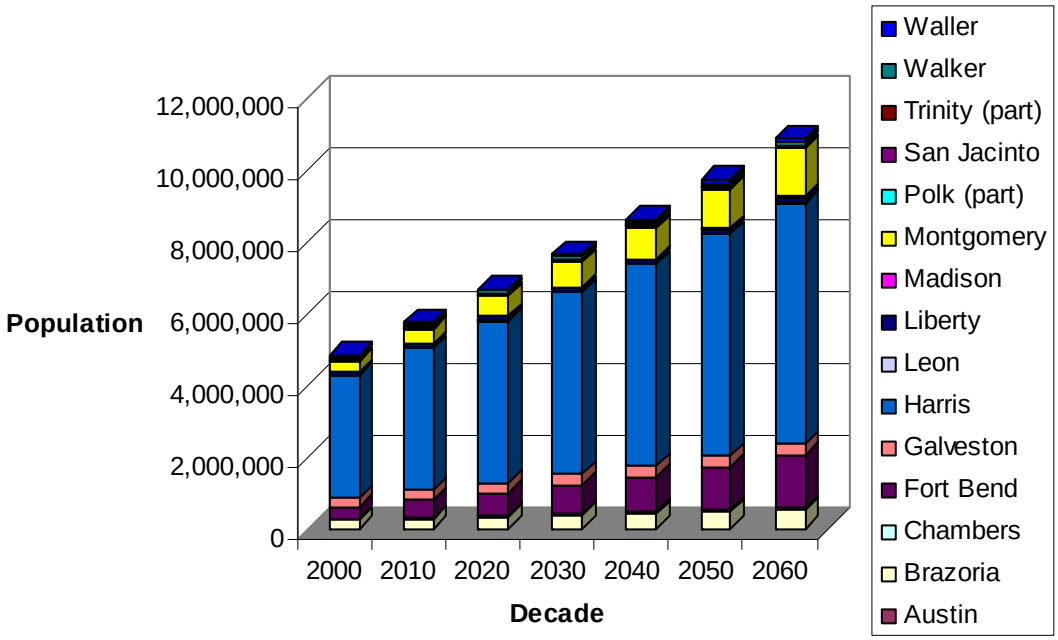
Population data are presented for each of the fifteen counties in the region, for cities of more than 500 persons, water districts providing 280 ac-ft/yr or more (0.25 mgd), and for collective reporting units (CRUs) consisting of grouped utilities having a common association. Within Region H, there are 264 municipal WUGs plus 15 county-other WUGs, further divided by basin and county. All smaller communities and rural areas, aggregated at the county level, are considered a WUG and are referred to as "County-Other" for each county.

County-level population projections were developed using a standard cohort-component procedure in conjunction with data from the 2000 Census and other sources. The projected sub-county population growth from planning decades 2000 to 2060 for municipalities, utilities, and county-other within a county is determined from the county's share-of-growth between 1990 to 2000 and is assumed to be the same in the future.

Figure E-1 shows that population growth in Brazoria, Fort Bend, Harris and Montgomery Counties represents approximately 88 percent of the Region H total population in year 2000 or approximately 4,290,565 persons. In year 2060, these same counties represent approximately 92 percent of the Region H total population or approximately 10,018,143 persons, as shown in Figure E-1.

The approved projections are compiled in Chapter 2: Population and Water Demand Projections. The population projections serve as the basis for calculating municipal water demands.

Figure E-1: Region H Population Projection Comparison



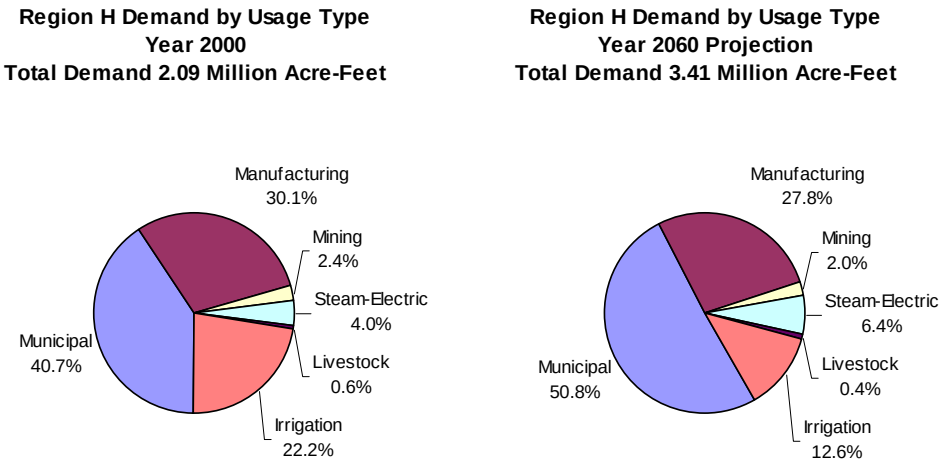
E.3 Water Demand Projections

Region H water demands are projected to increase from approximately 2.1 million acre-feet per year in year 2000 to over 3.4 million acre-feet per year by year 2060. That equals 12 percent of the year 2000 water use in Texas, and 16 percent of the projected 2060 Texas demand. In addition to municipal demand, water consumption for manufacturing, steam electric power generation and mining will increase throughout the planning period. Water demands for livestock production are projected to remain constant within Region H. Irrigation is expected to decrease in Brazoria County and remain constant in the other counties, resulting in an overall reduction in irrigation water demand through the planning period. Table E-7 presents the projected water demands over the planning period, summarized by county and totaled for Region H. Figure E-2 shows that municipal water

demands are projected to account for over half of the total regional water demands by 2060. Manufacturing demands, while still increasing, will account for a smaller percentage of total water use (declining from 30% today to 28% in 2060). The projected municipal water demands reflect existing water conservation programs and expected (passive) conservation from plumbing code changes, the latter reducing per capita demands approximately 8 percent by 2060. Additional water conservation for municipalities, manufacturing and irrigation is recommended as a management strategy. Region H accounts for 40 percent of Texas' manufacturing water use, the largest of the sixteen planning regions. Almost half of the total water demand in the Region is in Harris County.

In addition to the above usage categories, the RHWPG considered the environmental water needs of streams and freshwater inflows into the Galveston Bay system. The Galveston Bay Freshwater Inflows Group (GBFIG) has been working to develop management strategies to ensure freshwater inflows for Galveston Bay. Texas Parks and Wildlife Department has recommended 5.2 million acre-feet per year as the freshwater inflow needed to achieve maximum productivity of the bay. GBFIG has recommended a schedule of target flows shown in Table E-8, which includes meeting the maximum productivity target in at least 50% of future years. The RHWPG has endorsed GBFIG's recommendation, and supports further efforts to develop strategies for meeting the freshwater needs of both humans and the bay.

Figure E-2: Region H Water Demand Comparison



E.4 Water Supplies

The total amount of water supply currently available to Region H from existing water sources is 3,572,500 acre-feet per year (ac-ft/yr). Of that amount, about three-fourths is surface water. By the year 2030, the available supply will be 3,380,000 ac-ft/yr. The reduction in supply between 2000 and 2030 reflects restrictions on use of the Gulf Coast Aquifer, instituted to combat subsidence in a large part of the region. Groundwater supply is based on the projected sustainable yield of each aquifer, which limits extraction to the annual rate of recharge. The predominant sources of surface water supply are derived from three reservoirs: Lakes Conroe and Houston within the San Jacinto River basin and Lake Livingston within the lower Trinity River basin.

Surface water supply was determined using the TCEQ Water Availability Model, which analyzes permitted diversions against the historic rainfall record, which includes the drought of record period in the 1950's. In the Trinity and Brazos River Basins, limited wastewater return flows were included in the model, based on expectations that full reuse would not occur during the planning period. For all other basins, the yields are based upon the no-return-flow scenario used for water rights permitting. Some activities, such as livestock watering and mining, use riparian supplies and/or small impoundments that do not appear in the models. These supplies are considered "local sources" and are not projected to change in amount during the planning period.

A detailed analysis of water supply is found in the Chapter 3: Analysis of Current Water Supplies. A summary of available water supply by source is provided in Table E-9.

E.5 Water Needs and Management Strategies

E.5.1 Water Demand versus Supplies

Water supplies were compared to water demands to determine if any areas in the region are expected to experience water shortages during the planning period. Despite adequate overall water supplies for Region H through the year 2050, the RHWPG has identified communities that will experience water shortages during the planning period unless they take action to increase their supplies. Some of these communities will be able to meet their demands simply by extending or increasing existing water supply contracts.

Of the total 342 Water User Groups (WUGs) in Region H, 149 of them, primarily those reliant on wells in areas with abundant groundwater, will experience no shortages during the planning period. Generally, the northern third of the region is projected to have sufficient long-term water supplies. A detailed comparison of available supplies versus demands revealed 193 WUGs with projected water supply shortages during the planning period. These include 168 municipalities or water districts, unincorporated areas (County Other) in 6 counties, and 19 non-municipal WUGs. Planning focused on meeting demands in the four counties with the greatest projected development: Brazoria, Fort Bend, Harris and Montgomery. Nine of the 22 Wholesale Water Providers (WWPs) are expected to fully allocate their existing supplies meeting the projected growth of their current customers. This is discussed in further detail in Chapter 4: Identification, Evaluation and Selection of Water Management Strategies Based on Needs.

E.5.2 Water Management Strategies

The RHWPG considered a variety of strategies for meeting the projected shortages and solicited input from the public before adopting a management plan. A detailed analysis process was developed to define potential water management strategies. The process addressed the specific shortages of the 193 WUGs discussed above and then developed associated specific strategies assuming the WWPs would be the vehicle to solve WUG shortages. The process generally consisted of the following:

> Municipal Conservation – For WUGs with projected shortages, an appropriate level of water conservation would be implemented, as discussed below.

Contract Extension and Increase - For all WUGs currently served by a WWP, it was assumed that current contracts would be renewed throughout the planning period. Additionally, it was assumed that WUGs would increase their contracts with their current WWPs to meet projected growth, until current WWP supplies were fully allocated. This could not be applied to collective WUGs, such as Manufacturing.

This met the supply needs for 15 of the 193 WUGs with shortages. The remainder of the WUGs with shortages were grouped and addressed by County. Potential water management strategies were screened and considered to meet the needs of each County. The strategies considered included those in the 2001 Regional Water Plan, new water rights applications, wastewater reuse and seawater desalination. Significantly, the consideration of new supply sources allowed the RHWPG to replace two reservoir projects recommended in the 2001 Plan. Management strategies that involved adjoining regions were coordinated with the appropriate water planning group.

The water management strategies selected to meet the projected growth in Region H are as follows:

- **Municipal Conservation**--The conservation strategy is applied at the WUG level, reducing demands from 5.5% to 7.0%, depending on the size of the WUG. Projected water savings total 71,109 ac-ft/yr in year 2030 and 101,200 ac-ft/yr in year 2060.
- **Industrial Conservation**—Industries with projected shortages will seek out ways to reduce their water demand as a means of managing their operating costs. The wide range of industries within Region H, and their varying progress in this area, prevented the estimation of projected savings for this strategy.
- **Irrigation Conservation**—Reduction of on-farm demands through land leveling, canal lining and other system improvements. Projected water savings are 18,792 ac-ft/yr in Brazoria County, 24,018 a-ft/yr in Chamber County, 5,198 ac-ft/yr in Fort Bend County, 2,392 ac-ft/yr in Galveston County, 20,877 ac-ft/yr in San Jacinto County and 6,606 ac-ft/yr in Waller County.
- **Expanded Use of Groundwater**—Only a portion of the groundwater available to Region H is developed supply (i.e., existing wells). An additional 91,500 ac-ft/yr of new well capacity is needed to fully utilize this resource.
- **New Contracts for Existing Supply**-- WWPs with unallocated existing supplies were identified, and new contracts were recommended within existing service areas.
- **Luce Bayou Transfer**--This conveyance project enables the City of Houston to transfer water it owns in the Trinity basin to Lake Houston to meet projected growth in north and northwest Harris County.
- **Brazos River Authority System Operations**--The Brazos River Authority has applied for a water right that permits existing additional yield within their reservoirs, and new yield that can be achieved through operation of their reservoirs as a basin-wide system. Approximately 120,000 ac-ft/yr of this water will be available for customers in Region H.
- **Allen's Creek Reservoir**--This proposed reservoir creates 99,650 ac-ft/yr of supplies for the City of Houston and the Brazos River Authority.

- **Little River Off-Channel Reservoir**--This proposed reservoir creates 32,100 ac-ft/yr for the Brazos River Authority.
- **Non-Municipal Contractual Transfer**--This strategy involves the transfer of 21,000 ac-ft/yr of manufacturing, mining and irrigation supplies from WUGs with surpluses to WUGs with needs in Brazoria and Galveston Counties.
- **Wastewater Reclamation for Industry**—This strategy proposes that 67,200 ac-ft/yr of Houston's municipal wastewater be treated and directly reused by industries along the Houston Ship Channel.
- **Houston/Trinity River Authority Contract**--Under this strategy, the City of Houston will purchase up to 150,000 ac-ft/yr of uncommitted supplies from the Trinity River Authority.
- **SJRA/Trinity River Authority Contract**--Under this strategy, the SJRA will purchase up to 50,000 ac-ft/yr of uncommitted supplies from the Trinity River Authority to serve Montgomery County.
- **Houston to Gulf Coast Water Authority Transfer**—Water wheeling strategy, in which Houston provides 28,000 ac-ft/yr to the GCWA in Galveston County, beginning in 2050. The GCWA then reallocates their existing Brazos River supply to meet demands in Fort Bend County. Included is a pumping station and pipeline to convey the water to the GCWA's Texas City reservoir.
- **Houston Indirect Wastewater Reuse**—The City of Houston has applied for a water right permit to indirectly reuse up to 580,900 ac-ft/yr of wastewater discharges. A portion of that is recommended for direct reuse to industry. An additional 98,000 ac-ft/yr is recommended for use beginning in 2050.
- **NHCRWA Indirect Wastewater Reuse**—The North Harris County Regional Water Authority has the potential to indirectly reuse up to 157,000 ac-ft/yr of wastewater discharges. 31,400 ac-ft/yr is recommended for use beginning in 2060.
- **Lake Houston Additional Yield**—Volumetric surveys and WAM analysis show that Lake Houston can yield an additional 32,500 ac-ft/yr of supply (declining over time due to storage losses to sedimentation).
- **Freeport Seawater Desalination**—A pilot plant is being considered under the Governors Desalination Initiative, with an initial capacity of 11,200 ac-ft/yr and a recommended increase to 33,600 ac-ft/yr.
- **Brazos Saltwater Barrier**—A proposed gated structure on the lower Brazos above Freeport to protect lower basin intakes from the seasonal saltwater influence, which is expected to worsen as the basin is fully utilized.
- **Redesignation of Existing Water Rights**—WWPs who identify local changes in water usage types due to development are recommended to add appropriate usage types to their water rights permits.
- **New San Jacinto River Water Rights**—The SJRA and City of Houston have jointly applied for an interruptible supply permit on the San Jacinto River. The conjunctive

use of this supply with existing supplies owned in the Trinity River Basin will reduce interbasin transfers in non-drought years.

- **New Harris County Bayous Water Rights**—The City of Houston has applied for an interruptible supply permit in the lower San Jacinto basin. The conjunctive use of this supply with existing supplies owned in the Trinity River Basin will reduce interbasin transfers in non-drought years.

The 2006 Region H Water Plan meets all projected water demands, at an estimated capital cost of $5.5 billion for the recommended water management strategies. A summary of the selected strategies, their yields and their costs is shown in Table E-10. Table E-11 shows the recommended combination of strategies required for each County to meet its projected water shortages. An in-depth discussion of the recommended plan is contained in Chapter 4: Identification, Evaluation and Selection of Water Management Strategies Based on Needs.

E.5.3 Socioeconomic Impact of Not Addressing Shortages

Water supply is critical to public health, and failure to provide water would severely constrain economic and population growth in Region H. The TWDB has calculated the potential impacts of not meeting projected water demands. Their calculations are based on the following assumptions:

- A drought of record occurs in the year modeled (impacts are single-year values)
- All shortages are due to the difference between average and drought year water supply yields
- No changes in the structural economic relationships within the regional economy
- No technological advances or changes in human behavior occur (i.e., water use patterns remain as they are today)
- Impacts are proportional to the severity of the water shortage (i.e., a 0 to 5 percent shortage does not affect economic output, but a 60 percent shortage reduces output by 60 percent)
- Drought contingency measures can reduce municipal water demand by up to 50 percent (30% from outdoor use and 20% from indoor reductions)

These are broad modeling assumptions, and do not account for infrastructure improvements that must occur in conjunction with the projected population growth and development. However, they do provide a comparative point of reference. Figure E-4 shows that significant economic impacts will occur in the manufacturing, municipal and power generating sectors if water needs are not met. The TWDB model identifies a potential loss of 28,000 jobs and $2.4 billion in income if a drought occurs in the year 2010. If one occurs in 2060, the impact grows to 187,000 jobs and $15.4 billion in income.

E.6 Impacts of Management Strategies on Water Quality and Agricultural Areas

Both surface and groundwater in Region H are generally of good quality, and can be used with conventional treatment only. Advanced treatment measures are recommended to develop direct wastewater reuse and seawater desalination. The management strategies recommended in the plan are not anticipated to directly affect water quality in most basins,

although the reduction of in-streams flows due to full use of water rights may indirectly increase the concentration of some contaminants (by reducing the overall volume of water). The Brazos Saltwater Barrier is specifically recommended to improve water quality in the lower Brazos basin, by preventing seawater from migrating above Freeport during periods of low flows. The Luce Bayou Transfer will introduce Trinity River Water into Lake Houston. It should be noted that Trinity River water is currently transferred into Harris County via other conveyances. The reuse of wastewater and the desalination of seawater will produce a brine concentrate, which must be judiciously discharged to prevent adverse environmental impacts.

Agricultural areas in Region H are generally served by groundwater, with surface water used for irrigation. The groundwater use is not projected to change during the planning period. Surface water used for irrigation is typically contracted on a year-to-year basis. Although met using current supplies, it appears as a projected shortage due to the absence of long-term contracts. All irrigation needs are met in the plan, through a combination of water conservation and supply from new and existing sources.

E.7 Water Conservation and Drought Management

Water conservation is recommended for all water user groups, although it is calculated and applied in the tables only for WUGs with shortages. Drought management plans are required for all WUGs to address brief periods of water shortage, but are not recommended as long-term management strategies. Drought management plans typically force conservation over a limited period of time. However, the drought of record that this plan must address lasted approximately five years. To achieve a sustained reduction in demand, water conservation strategies must be implemented, so that water users do not perceive the required changes as being temporary. Sample water conservation and drought management plans are included in Chapter 6.

E.8 Protection of Water Resources and Natural Resources

The management strategies recommended in this plan will fully utilize the currently available water rights in all but the Trinity River basin. The two reservoirs recommended in the Brazos River basin, and the Luce Bayou Transfer from the Trinity River basin, will require some environmental mitigation due to habitat impacts. The recommended reuse of wastewater will further reduce in-stream flows, particularly during drought conditions. Some of this reduction will be mitigated by an overall increase in wastewater discharges. The use of interruptible supplies in the San Jacinto basin will reduce the transfer of flows from the trinity Basin during non-drought periods.

Groundwater use in the region is projected to increase within the sustainable yield of the aquifers or the regulated withdrawal cap, as applicable. The export of groundwater from its county of origin is not recommended in this plan.

The most significant water-dependant natural resource in the region is Galveston Bay. A Water Availability Model of the 2002 State Water Plan was developed to determine the plan's affects on inflows to this estuary. The results are shown in Table E-12, comparing the inflow frequencies to the GBFIG inflow targets. Under the most likely scenario (full use of water rights with expected wastewater return flows), the minimum frequency targets for Max H (maximum harvest) and for Min Q Sal (minimum inflow to control salinity) are

exceeded. However, the distribution of inflows will change over time, decreasing in Trinity Bay and increasing in the San Jacinto Basin.

E.9 Recommendations to the Legislature

E.9.1 Proposed Unique Stream Segments

The Texas Water Code offers the opportunity to identify river and stream segments of unique ecological value. The selection criteria established within the Texas Water Code are as follows:

- Biological Function
- Hydrologic Function
- Riparian Conservation Area
- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value
- Threatened or Endangered Species/Unique Natural Communities

Stream segments designated by the legislature as having unique ecological value cannot be developed as reservoir sites by the State or any political subdivision of the State. After consideration of the above factors, the eight streams listed in Table E-1 were recommended as Streams of Unique Ecological Value in Region H.

The entire stream segment length was designated for Armand Bayou and Menard Creek (segment within Region H). For the remaining six streams, only those portions adjacent to or within riparian conservation areas were designated as unique streams.

Table E-1: Stream Segments Recommended as Ecologically Unique

Stream Segments (Not in priority order)	County
Armand Bayou	Harris
Austin Bayou	Brazoria
Bastrop Bayou	Brazoria
Big Creek	Fort Bend
Big Creek	San Jacinto
Cedar Lake Creek	Brazoria
Menard Creek	Liberty, Hardin*, Polk
Oyster Bayou	Chambers

*Hardin County portion is in Region I.

E.9.2 Unique Reservoir Sites

The Texas Water Code offers an opportunity to designate sites of unique value for use as surface water supply reservoirs. Designation by the Legislature as unique reservoir site prevents the State from constructing major infrastructure (such as major highways) within the project limits. Through use of a decision-based water management strategy analysis and selection process, the RHWPG selected two surface water reservoir projects, Allens Creek and Little River Off-Channel, for inclusion in the 2006 Regional Water Plan. Two additional reservoir projects, Bedias Creek and Little River, had been recommended in 2001 but were replaced in the current plan. The RHWPG recommends each of these projects locations as unique sites.

Table E-2: Reservoir Sites Recommended as Unique

Name	County	General Location
Allen's Creek	Austin	1 Mile N. of the City of Wallis
Little River, Off-Channel	Milam	Beaver Creek, approx. 5 Miles NE of City of Milano
Bedias Creek	Madison (Principally)	Bedias Creek, 3.5 Miles W. of State Hwy 75
Little River	Milam	Main Stem of Little River, Immediately Upstream of its Confluence with the Brazos River

E.9.3 Regulatory, Administrative and Legislative Recommendations

Section 357.7(a)(10) of the Texas Water Development Board regional water planning guidelines requires that a regional water plan include recommendations for regulatory, administrative, and legislative changes. These recommendations are addressed to each governmental agency that has the appropriate jurisdiction over each subject. It is generally assumed that regulatory recommendations are directed towards the Texas Commission on Environmental Quality (TCEQ), that administrative recommendations are directed towards the Texas Water Development Board (TWDB), and that legislative recommendations are directed towards the State of Texas Legislature.

The Region H Water Planning Group has currently adopted the following regulatory, administrative, and legislative recommendations:

Regulatory and Administrative Recommendations

- Clarify the agency rules to address consistency with the regional water plans.
- Allow more flexibility in the allocation of alternate or multiple water management strategies to meet defined water shortages.
- Modify the notification procedures for amendments to regional water plans that only affect a portion of the region.
- Clarify agency rules on quantitative environmental analysis.

Legislative Recommendations

- Remove barriers to interbasin transfers of water within Region H.
- Adopt the recommended stakeholder process for determining bay and basin environmental flow requirements, and include Region H and the Galveston Bay Freshwater Inflows Group (GBFIG) in the Galveston Bay stakeholder group.
- Increase funding for the Bays and Estuaries programs of state resource agencies and for additional monitoring and research to scientifically determine freshwater inflow needs.
- Maintain the current rule of capture basis of groundwater law within Texas in all areas not subject to defined subsidence or groundwater conservation districts.
- Support development of Groundwater Conservation Districts to protect current groundwater users, and encourage these districts to study and manage aquifer storage and recovery.

- Establish financing mechanisms for development of new water supply projects identified within the adopted regional water plans.
- Act on the RHWPG recommendations of unique stream segments and unique reservoir sites.
- Continue funding of the State of Texas Groundwater Availability Modeling effort.
- Establish funding for agricultural research into the area of efficient irrigation practices.
- Implement the programs recommended by the Water Conservation Implementation Task Force.
- Establish funding for research in advanced conservation technologies.
- Resolve the issues related to water rights permitting for indirect reuse, and advocate water reuse statewide.
- Establish flood damage liability limits for water supply reservoirs.
- Continue funding of the Regional Water Planning process.

Infrastructure Financing Recommendations

- Increase the funding of the State Participation Program as needed to allow development of water supply projects sized to meet projected long-term demands.
- Increase the funding of the State Revolving Fund Programs in future decades, and expand the program to include coverage for system capacity increases to meet projected growth for communities.
- Increase funding of the State Loan Program to allow financing of near-term infrastructure cost projections.
- Increase funding of the Agricultural Water Conservation loan program, leverage Federal grant programs by providing the local matching share, and consider adding a one-time grant or subsidy program to stimulate early adoption of conservation practices by individual irrigators.
- Continue State and Federal support of the Texas Community Development program, and increase the allocation of funds for the Small Town Environment Program.
- Increase funding of the Regional Water Supply and Wastewater Facilities Planning Program in anticipation of upcoming development throughout the state, and expand the program to include the costs for preliminary engineering design and development of detailed engineering cost estimates of recommended facilities.
- Support continued and increased funding of the USDA Rural Utilities Service programs at the Federal level, and fund the State Rural Water Assistance Fund.
- 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 to develop a customer base, and pursue Federal funding for desalination programs.

- Provide increased research grants to study and better develop drought-resistant crop species and efficient irrigation practices.
- Support regulatory changes that will allow USACE to increase water supply storage in new reservoirs that they construct and manage, and investigate other alternatives for increased involvement of USACE in funding water supply projects.
- Region H supports the forming of regional facilities and encourages the State to remove any impediments to these entities, including restrictions to the use of public/private partnerships. Additionally, the State Participation Program should be made available to these public/private partnerships and to private nonprofit water supply corporations.

E.10 Water Infrastructure Financing

The majority of Municipal Water User Groups indicated they were built-out or nearly built out and did not intent to extent service into adjacent areas. Many districts in areas with limited or regulated groundwater uses indicated they would participate in a collective GRP. Regional water authorities and the majority of municipalities expect to finance their capital infrastructure through bonds.

Non-municipal WUG demands are aggregated at the County and Basin level. Local infrastructure will be funded using existing programs or will be paid by the private entities.

Figure E-3: Region H Location Map

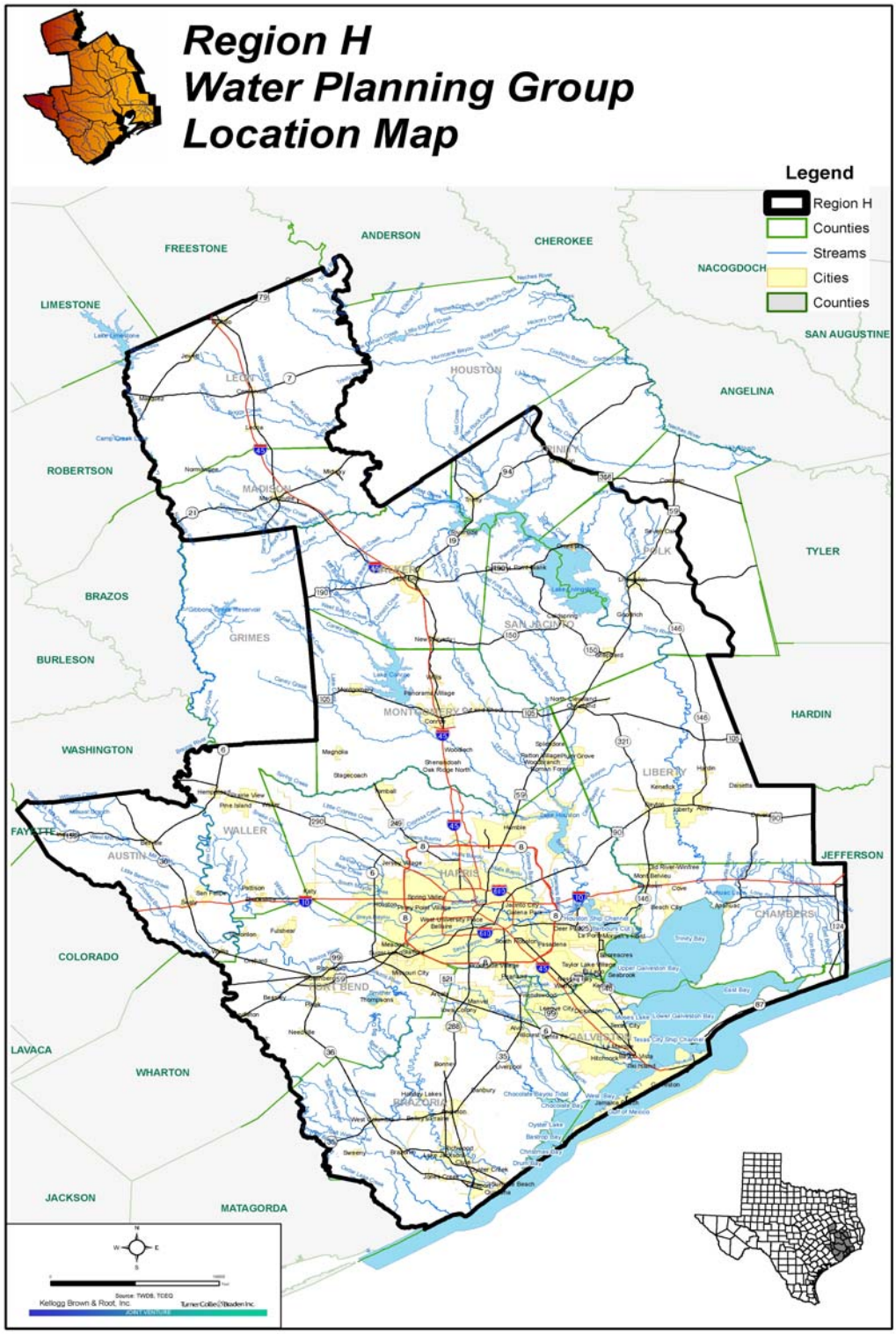


Table E-3: Region H Water Planning Group Member Information

Executive Committee	
Office	**Incumbent**
Chair	Jim Adams
Vice-Chair	Mark Evans
Secretary	Ron J. Neighbors
At-Large	C. Harold Wallace
At-Large	Michael S. Sullivan
Offices	
Office	**Organization**
Administrative	Harris-Galveston Coastal Subsidence District 1660 W. Bay Area Blvd. Friendswood, Texas 775462640 Phone: 281-486-1105 Fax: 281-218-3714
Political Subdivision	San Jacinto River Authority P.O. Box 329 Conroe, Texas 77305-0329 Phone: (936)-588-1111 Fax: (936) 588-1114
NOTES: Administrative Office manages records. Political Subdivision is the entity eligible to apply for State grant funds.	

Voting Membership			
Category	**Member**	**Organization**	**County (Location of Interest)**
Agriculture	David B. Jenkins July 1998 - Present	M & J Fertilizer	Chambers
	Robert Bruner March 1998 – Present	Rancher	Walker
Counties	John Blount, P.E. Sept 2004 – Present	Harris County	Harris
	Mark Evans March 1998 – Present	Trinity County	Trinity
	Jack Harris March 1998 – Present	Brazoria County	Brazoria
Electric Generating Utilities	Jason Fluharty Sept 2004 – Present	Texas Genco	Harris
Environmental	John R. Bartos March 1998 – Present	Galveston Bay Foundation	Harris
Industries	Carolyn Johnson March 1998 – Present	Dow Chemical Company	Brazoria
	James Murray March 1998 – Present	Exxon-Mobil Corp.	Harris
Public	Roosevelt Alexander March 1998 – Present	Retired	Waller

Voting Membership			
Category	**Member**	**Organization**	**County (Location of Interest)**
Municipalities	Robert Istre July 2003 – Present	Gulf Coast Water Authority	Galveston
	Jeff Taylor Oct 2002 – Present	City of Houston	Harris, Fort Bend, Montgomery
River Authorities	Jim Adams March 1998 – Present	San Jacinto River Authority	Montgomery (service in central portion of region)
	John Baker June 2004 – Present	Brazos River Authority	McLennan (service in west and southwest portion of region)
	Danny F. Vance March 1998 – Present	Trinity River Authority	Tarrant (service in east and southeast portion of region
Small Business	Mary Alice Gonzalez March 1998 – Present	Stewart Title - Fort Bend Division	Fort Bend
	Michael S. Sullivan March 1998 – Present	Sea-Master Marine Coatings	Harris
	Steve Tyler March 1998 – Present	Steve Tyler Creative Services	Trinity
Water Districts	Marvin Marcell July 1998 – Present	Fort Bend Subsidence District	Fort Bend
	Ron J. Neighbors March 1998 – Present	Harris-Galveston Coastal Subsidence District	Harris, Galveston
	Jack C. Searcy, Jr. March 1998 – Present	Spirit of North Harris County Coalition, Inc.	Harris
Water Utilities	C. Harold Wallace March 1998 – Present	West Harris County WSC	Harris
	James Morrison March 1998 – Present	Walker County Rural WSC	Walker
	William Teer, P.E. March 1998 – Present	Retired	Leon

Non-Voting Membership	
Member	**Organization**
Wayne G. Ahrens, P.E.	West Harris County Regional Water Authority
David Alders	East Texas Water Planning Group
Jennifer Bailey	Texas Department of Agriculture
Sabina Finnegan	Chocolate Bayou Water Company
Rick Gangluff	South Texas Project-Electric Generating Station / Lower Colorado Regional Planning Group
Larry Jacobs	Montgomery County Soil and Water Conservation District
Wayne Wilson	Agriculture Representative / Brazos G Water Planning Group
Phil Kaiser	Just Trees
Bill Roberts	Texas Water Development Board
Robert Stroder, P.E.	Lower Neches Valley Authority
Danny Vance	Region C Water Planning Group (also a voting member)
Woody Woodrow	Texas Parks & Wildlife Department

Table E-4: Public Repositories of the Region H Regional Water Plan

AUSTIN COUNTY County Clerk County Courthouse 1 East Main Bellville, TX 77418	**AUSTIN COUNTY** Gordon Library 917 Circle Drive Sealy, TX 77474
BRAZORIA COUNTY County Clerk County Courthouse 111 East Locust Angleton, TX 77515	**BRAZORIA COUNTY** Angleton Public Library 401 East Cedar Angleton, TX 77515
CHAMBERS COUNTY County Clerk County Courthouse Anahuac, TX 77514	**CHAMBERS COUNTY** Chambers County Library – Main Branch 202 Cummings Anahuac, TX 77514
FORT BEND COUNTY County Clerk 301 Jackson Richmond, TX 77469	**FORT BEND COUNTY** George Memorial Library 1001 Golfview Richmond, TX 77469
GALVESTON COUNTY County Clerk County Courthouse 722 Moody Galveston, TX 77550	**GALVESTON COUNTY** Rosenberg Library 2310 Sealy Galveston, TX 77550
HARRIS COUNTY County Clerk Harris County Administration Building 1001 Preston Avenue Houston, TX 77002	**HARRIS COUNTY** Houston Public Library 1st Floor, Bibliographic Information Center 500 McKinney Houston, TX 77002
LEON COUNTY County Clerk Leon County Courthouse Centerville, TX 75833	**LEON COUNTY** Leon County Library 129 East Main Centerville, TX 75833
LIBERTY COUNTY County Clerk County Courthouse 1923 Sam Houston Liberty, TX 77575	**LIBERTY COUNTY** Sam Houston Regional Library And Research Center FM1011 Liberty, TX 77575

MADISON COUNTY
County Clerk
101 West Main, Room 102
Madisonville, TX 77864

MADISON COUNTY
Madison County Library
605 South May
Madisonville, TX 77864

MONTGOMERY COUNTY
County Clerk
County Courthouse
301 N. Thompson
Conroe, TX 77301

MONTGOMERY COUNTY
Montgomery County Central Library
104 Interstate 45 North
Conroe, TX 77301

POLK COUNTY
County Clerk
County Courthouse, 1st Floor
101 West Church
Livingston, TX 77351

POLK COUNTY
Murphy Memorial Library
601 West Church
Livingston, TX 77351

SAN JACINTO COUNTY
County Clerk
County Courthouse
#1 Highway 150
Coldspring, TX 77331

SAN JACINTO COUNTY
Coldspring Library
220 South Bonham
Coldspring, TX 77331

TRINITY COUNTY
County Clerk
County Courthouse
1st and Main
Groveton, TX 75845

TRINITY COUNTY
Blanche K. Werner Library
Highway 19
Trinity, TX 75862

WALKER COUNTY
County Clerk
County Courthouse
1100 University Avenue
Huntsville, TX 77340

WALKER COUNTY
Huntsville Public Library
1216 – 14th Street
Huntsville, TX 77340

WALLER COUNTY
County Clerk
County Courthouse
836 Austin Street
Hempstead, TX 77445

WALLER COUNTY
Waller County Library -
Brookshire/Pattison
3815 Sixth Street
Brookshire, TX 77423

Table E-5: State Agencies with Oversight of Water Planning

Texas Water Development Board

J. Kevin Ward
Executive Administrator
PO Box 13231, 1700 N. Congress Ave., Austin, TX 78711-3231
(512) 463-7847

William Mullican
Deputy Executive Administrator, Office of Planning
PO Box 13231, 1700 N. Congress Ave., Austin, TX 78711-3231
(512) 936-0813

Texas Commission on Environmental Quality (plan review)

Glenn Shankle
Executive Director
12500 Park 35 Circle, Austin, TX 78753
(512) 239-3900

Texas Parks and Wildlife Department (plan review)

Robert Cook
Executive Director
4200 Smith School Road, Austin, TX 78744-3291
(512) 389-4800

Table E-6: Region H Population Projections

County	2000	2010	2020	2030	2040	2050	2060
Austin	23,590	27,173	30,574	32,946	34,355	35,031	35,958
Brazoria	241,767	285,850	331,731	375,664	416,157	459,078	503,894
Chambers	26,031	31,375	37,328	42,867	47,667	52,535	57,521
Fort Bend	354,452	490,072	630,624	802,486	979,196	1,210,945	1,475,761
Galveston	250,158	268,714	284,731	294,218	298,057	300,915	302,774
Harris	3,400,578	3,951,682	4,502,786	5,053,890	5,604,994	6,156,098	6,707,202
Leon	15,335	18,231	21,137	22,863	22,971	22,809	23,028
Liberty	70,154	81,930	94,898	107,335	119,519	132,875	147,845
Madison	12,940	13,905	14,873	15,644	16,364	17,002	17,560
Montgomery	293,768	417,692	542,051	692,548	858,410	1,077,190	1,331,286
Polk (part)	33,098	37,650	42,196	45,779	48,561	51,535	54,380
San Jacinto	22,246	27,443	32,541	36,617	39,159	40,630	41,299
Trinity (part)	10,380	11,571	12,485	12,786	12,631	12,131	11,673
Walker	61,758	70,672	77,915	81,402	80,547	80,737	80,737
Waller	32,663	41,137	51,175	62,352	74,789	89,598	106,608
Region H Total	4,848,918	5,775,097	6,707,045	7,679,397	8,653,377	9,739,109	10,897,526
Texas Total	20,851,790	24,909,072	29,108,012	33,040,035	36,877,046	41,054,973	45,533,734
Reg. H Percent	23.3%	23.2%	23.0%	23.2%	23.5%	23.7%	23.9%

Table E-7: Region H Water Demand Projections (in ac-ft/yr)

AUSTIN	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	3,918	4,258	4,494	4,590	4,639	4,756
Manufacturing	210	233	253	272	288	313
S.E. Power Cooling	0	0	0	0	0	0
Mining	51	56	59	62	65	67
Irrigation	10,617	10,617	10,617	10,617	10,617	10,617
Livestock	1,615	1,615	1,615	1,615	1,615	1,615
Total Water Use	16,411	16,779	17,038	17,156	17,224	17,368
BRAZORIA	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	44,685	50,822	56,754	62,022	68,202	74,967
Manufacturing	260,239	286,554	309,841	333,348	354,093	379,241
S.E. Power Cooling	0	0	0	0	0	0
Mining	4,104	4,502	4,737	4,969	5,201	5,419
Irrigation	135,033	123,115	118,544	115,788	115,788	115,788
Livestock	1,614	1,614	1,614	1,614	1,614	1,614
Total Water Use	445,675	466,607	491,490	517,741	544,898	577,029
CHAMBERS	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	4,625	5,438	6,180	6,824	7,506	8,249
Manufacturing	11,802	12,959	13,987	15,011	15,932	17,122
S.E. Power Cooling	4,435	3,536	4,134	4,863	5,751	6,834
Mining	37,422	40,532	42,427	44,286	46,130	47,742
Irrigation	117,777	117,777	117,777	117,777	117,777	117,777
Livestock	462	462	462	462	462	462
Total Water Use	176,523	180,704	184,967	189,223	193,558	198,186
FORT BEND	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	89,579	111,680	138,770	165,904	202,470	245,404
Manufacturing	6,863	7,199	7,468	7,685	7,829	7,410
S.E. Power Cooling	66,026	68,046	79,553	93,582	110,682	131,527
Mining	3,010	3,070	3,105	3,138	3,169	3,196
Irrigation	53,455	53,455	53,455	53,455	53,455	53,455
Livestock	1,171	1,171	1,171	1,171	1,171	1,171
Total Water Use	220,104	244,621	283,522	324,935	378,776	442,163
GALVESTON	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	46,090	47,390	47,818	47,487	47,393	47,641
Manufacturing	41,005	44,330	47,046	49,692	51,967	55,491
S.E. Power Cooling	5,034	4,013	4,692	5,519	6,528	7,757
Mining	265	279	286	293	300	307
Irrigation	10,342	10,342	10,342	10,342	10,342	10,342
Livestock	325	325	325	325	325	325
Total Water Use	103,061	106,679	110,509	113,658	116,855	121,863
HARRIS	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	677,684	756,765	834,747	915,339	999,189	1,089,188
Manufacturing	395,997	424,761	449,218	470,881	487,094	478,957
S.E. Power Cooling	7,728	23,962	28,015	32,955	38,977	46,317
Mining	1,282	1,434	1,529	1,624	1,720	1,805
Irrigation	15,300	15,300	15,300	15,300	15,300	15,300
Livestock	1,133	1,133	1,133	1,133	1,133	1,133
Total Water Use	1,099,124	1,223,355	1,329,942	1,437,232	1,543,413	1,632,700

LEON	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	2,122	2,364	2,475	2,441	2,400	2,422
Manufacturing	714	842	967	1,093	1,207	1,313
S.E. Power Cooling	0	0	0	0	0	0
Mining	1,517	1,464	1,435	1,409	1,384	1,364
Irrigation	542	542	542	542	542	542
Livestock	1,691	1,691	1,691	1,691	1,691	1,691
Total Water Use	6,586	6,903	7,110	7,176	7,224	7,332
LIBERTY	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	10,283	11,370	12,401	13,455	14,670	16,176
Manufacturing	393	465	537	611	678	736
S.E. Power Cooling	2,962	4,240	4,957	5,831	6,896	8,195
Mining	8,730	8,753	8,766	8,778	8,790	8,800
Irrigation	82,901	82,901	82,901	82,901	82,901	82,901
Livestock	757	757	757	757	757	757
Total Water Use	106,026	108,486	110,319	112,333	114,692	117,565
MADISON	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	1,792	1,864	1,918	1,952	2,007	2,072
Manufacturing	260	289	316	343	367	398
S.E. Power Cooling	0	0	0	0	0	0
Mining	24	24	24	24	24	24
Irrigation	19	19	19	19	19	19
Livestock	750	750	750	750	750	750
Total Water Use	2,845	2,946	3,027	3,088	3,167	3,263
MONTGOMERY	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	68,638	90,346	111,441	133,994	164,466	200,243
Manufacturing	2,045	2,332	2,608	2,883	3,126	3,392
S.E. Power Cooling	5,046	8,537	9,981	11,741	13,886	16,502
Mining	480	509	526	543	559	573
Irrigation	66	66	66	66	66	66
Livestock	510	510	510	510	510	510
Total Water Use	76,785	102,300	125,132	149,737	182,613	221,286
POLK (P)	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	4,859	5,230	5,486	5,662	5,913	6,205
Manufacturing	0	0	0	0	0	0
S.E. Power Cooling	0	0	0	0	0	0
Mining	29	31	32	33	34	35
Irrigation	0	0	0	0	0	0
Livestock	134	134	134	134	134	134
Total Water Use	5,022	5,395	5,652	5,829	6,081	6,374
SAN JACINTO	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	3,161	3,622	3,972	4,158	4,262	4,329
Manufacturing	48	52	56	60	63	68
S.E. Power Cooling	0	0	0	0	0	0
Mining	30	29	28	27	26	26
Irrigation	667	667	667	667	667	667
Livestock	284	284	284	284	284	284
Total Water Use	4,190	4,654	5,007	5,196	5,302	5,374

TRINITY (P)	2010	2020	2030	2040	2050	2060
Municipal Water Use	1,203	1,260	1,255	1,206	1,145	1,102
Manufacturing	0	0	0	0	0	0
S.E. Power Cooling	0	0	0	0	0	0
Mining	6	6	6	6	6	6
Irrigation	467	467	467	467	467	467
Livestock	211	211	211	211	211	211
Total Water Use	1,887	1,944	1,939	1,890	1,829	1,786
WALKER	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	16,512	17,941	18,516	18,146	18,097	18,097
Manufacturing	3,208	3,718	4,188	4,666	5,083	5,517
S.E. Power Cooling	0	0	0	0	0	0
Mining	13	13	13	13	13	13
Irrigation	11	11	11	11	11	11
Livestock	632	632	632	632	632	632
Total Water Use	20,376	22,315	23,360	23,468	23,836	24,270
WALLER	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	5,393	6,310	7,380	8,530	10,016	11,757
Manufacturing	89	101	112	123	133	144
S.E. Power Cooling	0	0	0	0	0	0
Mining	80	80	80	80	80	80
Irrigation	22,978	22,978	22,978	22,978	22,978	22,978
Livestock	939	939	939	939	939	939
Total Water Use	29,479	30,408	31,489	32,650	34,146	35,898
REGION H TOTAL	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	980,544	1,116,660	1,253,607	1,391,710	1,552,375	1,732,608
Manufacturing	722,873	783,835	836,597	886,668	927,860	950,102
S.E. Power Cooling	91,231	112,334	131,332	154,491	182,720	217,132
Mining	57,043	60,782	63,053	65,285	67,501	69,457
Irrigation	450,175	438,257	433,686	430,930	430,930	430,930
Livestock	12,228	12,228	12,228	12,228	12,228	12,228
Total Water Use	2,314,094	2,524,096	2,730,503	2,941,312	3,173,614	3,412,457
TEXAS TOTAL	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	4,761,887	5,473,988	6,109,591	6,727,858	7,438,852	8,245,271
Manufacturing	1,826,145	2,005,125	2,163,880	2,320,372	2,452,566	2,579,041
S.E. Power Cooling	737,170	868,580	1,012,212	1,156,170	1,321,733	1,515,556
Mining	255,455	265,423	271,308	272,619	275,446	284,088
Irrigation	10,090,546	9,737,234	9,354,028	8,966,499	8,594,659	8,304,269
Livestock	344,495	374,724	381,241	388,243	395,945	404,397
Total Water Use	18,015,698	18,725,074	19,292,260	19,831,761	20,479,201	21,332,622
REG. H PERCENT	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Municipal Water Use	20.6%	20.4%	20.5%	20.7%	20.9%	21.0%
Manufacturing	39.6%	39.1%	38.7%	38.2%	37.8%	36.8%
S.E. Power Cooling	12.4%	12.9%	13.0%	13.4%	13.8%	14.3%
Mining	22.3%	22.9%	23.2%	23.9%	24.5%	24.4%
Irrigation	4.5%	4.5%	4.6%	4.8%	5.0%	5.2%
Livestock	3.5%	3.3%	3.2%	3.1%	3.1%	3.0%
Total Water Use	12.8%	13.5%	14.2%	14.8%	15.5%	16.0%

Table E-8: Environmental Water Needs for Galveston Bay

The frequency of annual Galveston Bay system freshwater inflows recommended by the Galveston Bay Freshwater Inflows Group.

Inflow Scenario	Quantity Needed (acre-feet/year)	Historical Frequency	Target Minimum Frequency
Max H	5.2 million	66%	50%
Min Q	4.2 million	70%	60%
Min Q-Sal	2.5 million	82%	75%
Min Historic	1.8 million	98%	90%

Scenario Descriptions:

Max H: Modeled inflows recommended for maximum bay and estuary fisheries harvest by Texas Parks & Wildlife Department.

Min Q: Minimum modeled inflow recommended to maintain the bay and estuary fisheries harvest.

Min Q-Sal: Estimated minimum acceptable inflow recommended to maintain the salinity needed for bay and estuary fisheries viability.

Min Historic: Minimum annual inflow calculated for Galveston Bay over the period of record (1941-1990).

Note: The health and productivity of Galveston Bay must consider the quantity, quality, seasonality (monthly inflows), and location of inflows. It is anticipated that the inflow needs projections will continue to be refined over time. The use of improved data focused on the fisheries production solely from the Galveston Bay system is one example of an anticipated means of refinement.

Table E-9: Summary of Water Supplies Available for Study Years 2000, 2030 and 2060

Supply Source	Supply Available (acre-feet/year)		
	Year 2000	Year 2030	Year 2060
Groundwater			
Gulf Coast Aquifer	803,271	616,204	616,648
Carrizo-Wilcox Aquifer	10,940	9,756	9,610
Queen City Aquifer	7,906	7,906	7,906
Sparta Aquifer	17,414	17,414	17,414
Brazos River Alluvium	41,539	41,539	41,539
Yegua-Jackson Aquifer	6,400	6,400	6,400
Undifferentiated Aquifer	1,117	1,117	1,117
Subtotal	**888,587**	**700,336**	**700,634**
Surface Water			
Neches River Basin[1]	60,727	60,727	60,727
Neches-Trinity Coastal Basin	21,702	21,702	21,702
Trinity River Basin	1,605,262	1,605,262	1,605,262
Trinity-San Jacinto Brazos Coastal Basin	34,232	34,232	34,232
San Jacinto River Basin	303,900	300,600	297,300
San Jacinto-Brazos Coastal Basin	39,181	39,181	39,181
Brazos River Basin[1]	611,016	611,016	611,016
Brazos-Colorado Coastal Basin	12,019	12,019	12,019
Local Supplies, all basins	30,169	31,599	31,895
Subtotal	**2,683,976**	**2,682,106**	**2,679,102**
Total	**3,572,563**	**3,382,442**	**3,379,736**

[1] Supplies represent current contracts to Region H only. Total supply is greater but may not be available to Region H.

Table E-10: Recommended Water Management Strategies

WMS	Yield (ac-ft/yr)	Capital Cost	Starting Decade
Municipal Conservation*	101,200	$ 0	2000
Irrigation Conservation	77,900	$ 573,000	2010
Industrial Conservation	TBD	TBD	2000
Expanded Use of Groundwater**	91,497	at WUG level	2010
Expand/Increase Current Contracts	68,300	at WUG level	2010
New Contracts from Existing Supply	215,400	see Luce Bayou	2010
Luce Bayou IBT Conveyance	N/A	$ 239,000,000	2020
BRA System Operations Permit	120,000	$4,500,000	2010
Allens Creek Reservoir	99,700	$ 170,040,000	2030
Little River Off-Channel Reservoir	32,100	$ 96,512,000	2050
Non-Municipal Contractual Transfers	21,000	at WUG level	2010
Wastewater Reuse for Industry	67,200	$ 234,158,000	2020
TRA to Houston Contract	150,000	see Luce Bayou	2030
TRA to SJRA Contract	50,000	see Luce Bayou	2030
Houston to GCWA Transfer****	42,000	$ 102,382,000	2010
Houston Indirect Wastewater Reuse***	98,000	TBD	2050
NHCRWA Indirect Wastewater Reuse***	31,400	TBD	2060
Lake Houston Additional Yield	13,500	$ 0	2010
Freeport Seawater Desalination	33,600	$ 255,699,000	2020
Brazos Saltwater Barrier	N/A	$ 30,300,000	2030
Redesignation of Existing Water Rights	N/A	N/A	2010
New San Jacinto River Water Rights	0	$ 0	2010
New Harris County Bayous Water Rights	0	$ 9,013,000	2010

* Includes COH voluntary conservation.
** Future development of groundwater shown as available to each WUG
***Indirect reuse recommended at 20% of potential yield
****Two Tier plan that include 14,000 ac-ft/yr in 2010 option or up to 42,000 ac-ft/yr in 2050.

Table E-11: Recommended Water Management Strategies by County (in ac-ft/yr)

Brazoria County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-89,813	-105,436	-130,046	-156,160	-183,164	-215,117
Municipal Conservation	1,321	2,290	2,713	2,976	3,274	3,600
Contract Expansions	2,350	3,220	4,715	4,835	4,835	4,835
Net Shortage**	-87,719	-102,277	-125,098	-149,903	-175,921	-206,703
Irrigation Conservation	18,792	18,792	18,792	18,792	18,792	18,792
New Contracts (BRA)	10,500	10,500	10,500	10,500	10,500	10,500
Contractual Transfers (MIN, IRR)	21,000	21,000	21,000	21,000	21,000	21,000
BRA System Operations	70,000	70,000	70,000	70,000	70,000	70,000
Allens Creek Resv. (BRA, COH)	0	0	44,650	44,650	44,650	44,650
Little River Off-Channel Resv.	0	0	0	0	24,114	24,114
Freeport Desal (Demo)	11,200	11,200	11,200	11,200	22,400	33,600
Brazos Saltwater Barrier		Earliest	Moderate	Latest		
Total as Recommended	43,773	29,215	51,044	26,239	35,535	15,953
Contract expansions by Brazosport Water Authority						

Chambers County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-42,551	-46,868	-50,186	-53,441	-56,621	-59,871
Municipal Conservation	114	137	158	174	196	216
Net Shortage	-42,437	-46,731	-50,028	-53,267	-56,425	-59,655
Irrigation Conservation	24,018	24,018	24,018	24,018	24,018	24,018
New Contracts (TRA)	20,000	20,000	20,000	25,000	25,000	25,000
New Contracts (CLCND)	20,000	20,000	20,000	25,000	25,000	25,000
Total as Recommended	21,581	17,287	13,990	20,751	17,593	14,363

Fort Bend County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-22,118	-38,990	-68,177	-93,433	-127,206	-166,155
Municipal Conservation	2,792	3,998	6,749	8,357	10,418	12,869
Contract Expansions	0	1,178	1,178	1,178	1,178	1,178
Net Shortage**	-19,326	-34,518	-60,609	-83,898	-115,610	-152,108
New Contracts (BRA)	12,000	12,000	12,000	12,000	12,000	12,000
BRA System Operations	50,000	50,000	50,000	50,000	50,000	50,000
Allens Creek Resv. (BRA, COH)	0	0	55,000	55,000	55,000	55,000
Little River Off-Channel Resv.	0	0	0	0	7,996	7,996
GCWA - Fort Bend	0	0	0	0	28,000	28,000
Total as Recommended	42,674	27,482	56,391	33,102	37,386	888
Contract expansion by City of Houston for WHCRWA						

Galveston County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-14,114	-14,561	-14,440	-14,524	-14,634	-14,772
Municipal Conservation	548	604	636	643	649	657
Net Shortage	-13,566	-13,957	-13,804	-13,881	-13,985	-14,115
Irrigation Conservation	2,392	2,392	2,392	2,392	2,392	2,392
New Contracts (BRA, COH)	12,000	12,000	12,000	12,000	12,000	12,000
Contractual Transfers (MIN)	33	33	33	33	33	33
Houston - GCWA Transfer	0	0	0	0	28,000	28,000
GCWA - Fort Bend	0	0	0	0	-28,000	-28,000
Total as Recommended	859	468	621	544	440	310

* Shortage values reflect the sum of all WUG shortages without offsets for other WUG surpluses.

** Net Shortage value is not the mathematical difference because conservation and expansions do not align exactly with WUG shortages.

Harris County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-59,699	-171,740	-252,923	-302,492	-355,445	-403,428
Municipal Conservation	5,100	18,153	21,179	23,845	26,468	29,296
Contract Expansions	10,334	62,198	62,268	62,313	62,313	62,322
Net Shortage**	-47,592	-93,664	-171,016	-218,193	-267,168	-311,813
Houston Add'l Mun. Consv. (7%)	27,236	30,045	32,693	35,423	38,345	41,517
New Contracts (COH)***	24,510	24,510	24,510	24,510	24,510	24,510
Lake Houston Additional Yield	13,500	11,000	8,500	6,000	3,500	1,000
Wastewater Reuse for Industry	0	67,200	67,200	67,200	67,200	67,200
TRA - Houston Contract	0	150,000	150,000	150,000	150,000	150,000
WW Reuse – Houston (20%)	0	0	0	0	98,045	98,045
WW Reuse - NHCRWA (20%)	0	0	0	0	0	31,400
Houston - GCWA Transfer	0	0	0	0	-28,000	-28,000
Luce Bayou Transfer	0	Earliest	Moderate	Latest	0	0
Total as Recommended	17,654	189,091	111,887	64,940	86,432	73,859

Contract expansions by Cities of Houston and Pasadena, and Baytown Area Water Authority
*** Values after contract expansions

Liberty County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Irrigation Shortage*	-19,535	-19,774	-21,089	-22,558	-24,303	-26,405
Irrigation Conservation	20,877	20,877	20,877	20,877	20,877	20,877
New Contracts (TRA)	4,500	4,500	9,500	9,500	9,500	9,500
New Contracts (CLCND)	5,000	5,000	10,000	10,000	10,000	10,000
Total as Recommended	10,842	10,603	19,288	17,819	16,074	13,972

Montgomery County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-11,332	-34,393	-55,432	-79,866	-112,578	-151,047
Municipal Conservation	4,285	5,695	6,971	8,312	10,112	12,230
Net Shortage	-7,047	-28,698	-48,461	-71,554	-102,466	-138,817
New Contracts (SJRA)***	96,000	96,000	96,000	96,000	96,000	96,000
Lake Houston Additional Yield	13,500	11,000	8,500	6,000	3,500	1,000
TRA - Houston Contract	0	50,000	50,000	50,000	50,000	50,000
Luce Bayou Transfer	0	Earliest	Moderate	Latest	0	0
Total as Recommended	102,453	128,302	106,039	80,446	47,034	8,183

*** Values after contract expansions

San Jacinto County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Irrigation Shortage*	-492	-492	-492	-492	-492	-492
New Contracts (TRA)	500	500	500	500	500	500
Total as Recommended	8	8	8	8	8	8

Waller County	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortage*	-52	-101	-121	-120	-469	-2,165
Municipal Conservation	10	10	10	10	167	602
Net Shortage	-42	-91	-111	-110	-302	-1,589
Irrigation Conservation	6,606	6,606	6,606	6,606	6,606	6,606
Total as Recommended	6,564	6,515	6,495	6,496	6,304	5,017

Region H Totals	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Initial Shortages	-259,706	-432,355	-592,906	-723,086	-874,912	-1,039,452
Net Shortages	-237,756	-340,202	-490,708	-613,856	-756,672	-911,697
Total as Recommended	246,408	408,971	365,763	250,345	246,821	132,568

* Shortage values reflect the sum of all WUG shortages without offsets for other WUG surpluses.
** Net Shortage value is not the mathematical difference because conservation and expansions do not align exactly with WUG shortages.

Table E-12: Overall Frequencies of Meeting Monthly Inflow Targets

Inflow Target	Max H	Min Q	Min Q-Sal
Historical Frequency	66%	78%	82%
GBFIG Target Frequency	50%	60%	75%
Naturalized	68%	67%	83%
Current Conditions	64%	59%	79%
Full Diversions with Return Flows	65%	59%	81%
Full Diversions with no Return Flows	43%	42%	55%
Full Diversions with RF and Region C & H Strategies (2001 Plans)	71%	67%	87%

Figure E-4: Distribution of Lost Income by Water Use Category

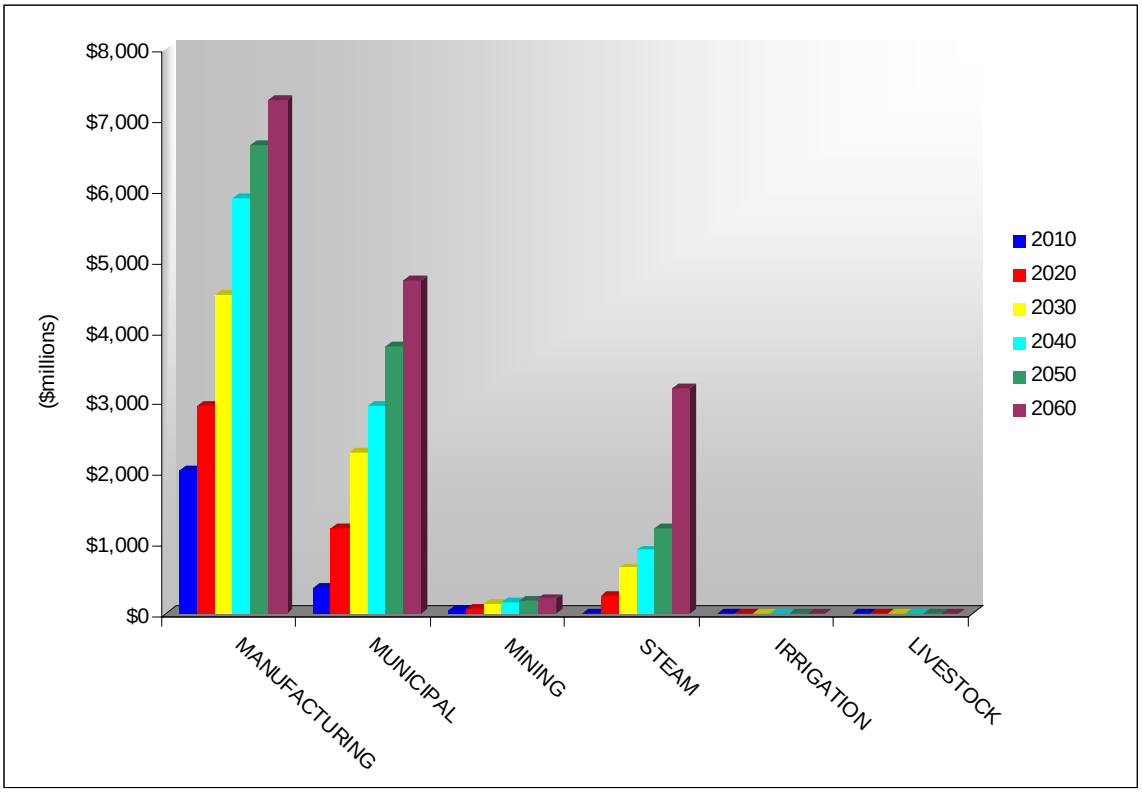


Figure from TWDB Report; Socioeconomic Impacts of unmet Water needs in the Region H Water Planning Area, May 2005. Values in constant year 2000 dollars.

2006 Region H

Water Plan

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Chapter 3: Analysis of Current Water Supplies

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Chapter 8: Ecologically Unique Stream Segments, Unique Reservoir Sites and Legislative Recommendations

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Abbreviations used in the Report

Ac-ft/yr	Acre-feet per year
BRA	Brazos River Authority
CBWC	Chocolate Bayou Water Company
CLCND	Chambers-Liberty Counties Navigation District
COH	City of Houston
FBSD	Fort Bend Subsidence District
GBEP	Galveston Bay Estuary Program
GBF	Galveston Bay Foundation
GBFIG	Galveston Bay Freshwater Inflows Group
GCD	Groundwater Conservation District
GCWA	Gulf Coast Water Authority
HGCSD	Harris Galveston Coastal Subsidence District
MGD	Million gallons per day
MUD	Municipal Utility District
MWP	Major Water Provider (2001 Regional Plan Designation)
NHCRWA	North Harris County Regional Water Authority
RWPG	Regional Water Planning Group
RHWPG	Region H Water Planning Group
SB1	Senate Bill 1 from the 1997 State Legislature
SJRA	San Jacinto River Authority
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TRA	Trinity River Authority
TWDB	Texas Water Development Board
WUG	Water User Group
WWP	Wholesale Water Provider
WHCRWA	West Harris County Regional Water Authority

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

8	Austin County
20	Brazoria County
36	Chambers County
79	Fort Bend County
84	Galveston County
101	Harris County
145	Leon County
146	Liberty County
157	Madison County
170	Montgomery County
187	Polk County
204	San Jacinto County
228	Trinity County
236	Walker County
237	Waller County

Basin Codes used in the Tables

6	Neches River Basin
7	Neches-Trinity Coastal Basin
8	Trinity River Basin
9	Trinity-San Jacinto Coastal Basin
10	San Jacinto River Basin
11	San Jacinto-Brazos Coastal Basin
12	Brazos River Basin
13	Brazos-Colorado Coastal Basin

1. Description of the Region

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13	Brazos-Colorado Coastal Basin

1.1 Regional Water Planning in Texas

In 1997 the State Legislature, through Senate Bill 1, determined that the Texas State Water Plan for the 2000 - 2050 time frame, would be developed through a regional water planning approach. To accomplish this task the Texas Water Development Board (TWDB) divided the state into 16 regional water planning areas and appointed representational Regional Water Planning Groups (RWPG) that have guided the development of each region's plan. In 2001 a new set of rules and guidelines from the TWDB were enacted through Senate Bill 2. With the help of the Senate Bill 2, the 2002 State Water Plan received enormous public involvement compared to previous plans. The planning process is cyclic, with updated Regional and State Water Plans produced every five years.

1.2 Description of Region H

Region H, located along the upper Texas coast, consists of all or part of 15 counties; Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Leon, Liberty, Madison, Montgomery, Polk, San Jacinto, Trinity, Walker and Waller. The eastern portions of Trinity and Polk counties are included in the Region I planning area. The Region spans three river and four coastal basins in southeast Texas. Region H encompasses the San Jacinto River basin, the lower portions of the Trinity and Brazos River Basins, and includes part or all of the Brazos-Colorado, the San Jacinto-Brazos, the Trinity-San Jacinto and the Neches-Trinity coastal basins. This area includes the Galveston and Trinity Bay estuaries, the urbanized, rapidly growing Houston-Galveston Metropolitan Area encompassing Brazoria-Harris-Galveston-Ft. Bend and Montgomery counties, the coastal port communities of Galveston and Freeport, and agricultural areas in Austin, Chambers, Leon, Liberty, Madison, Polk, San Jacinto, Trinity, Walker and Waller counties. Figure 1-1 is a map of the Region H area. The Region H Water Planning Group (RHWPG) is a 25-member committee representing the diverse interests of the Region. Table 1-1 lists the RHWPG membership.

Figure 1-1: Region H Water Planning Area

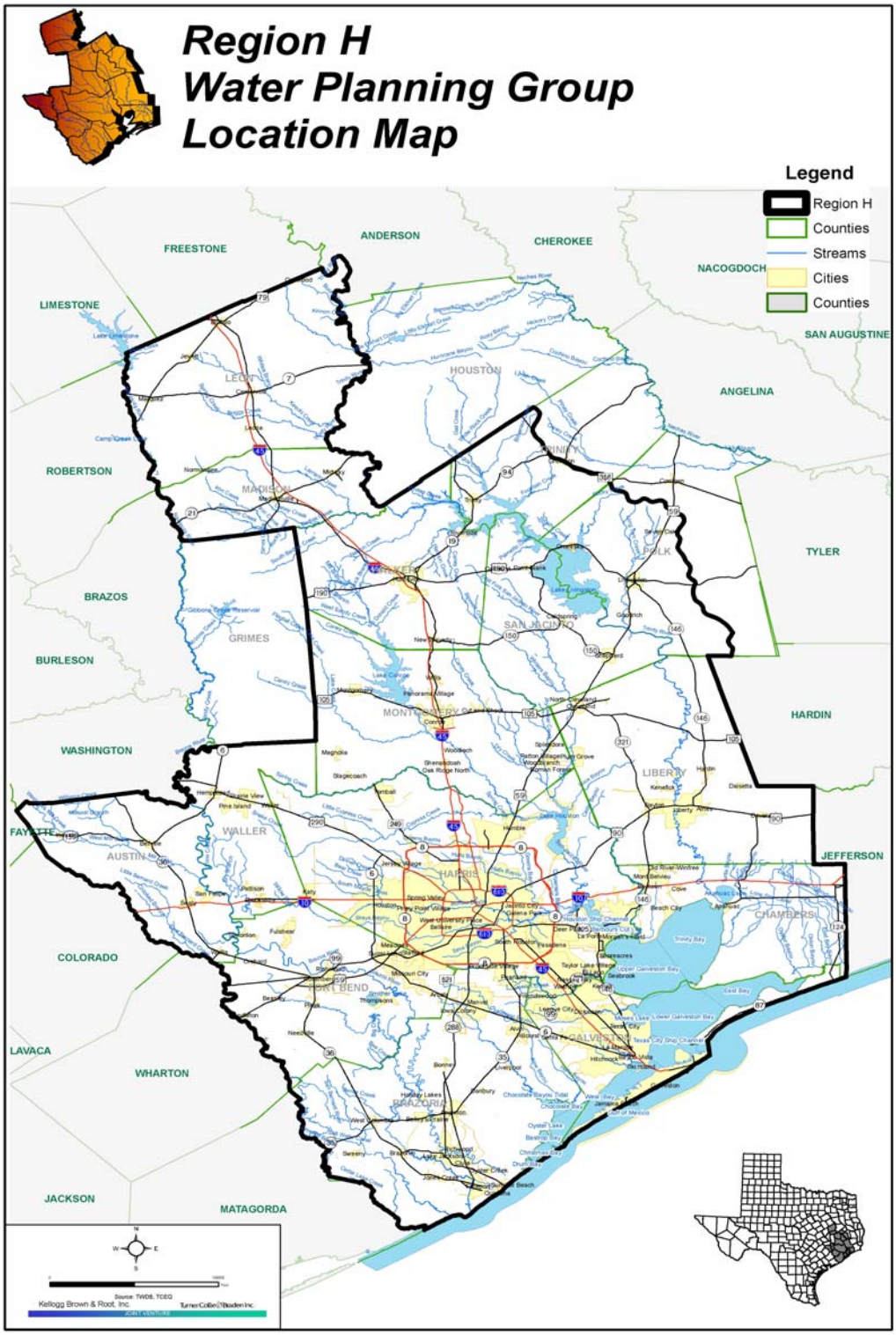


Table 1-1: Member Information for the Region H Water Planning Group

Executive Committee	
Office	**Incumbent**
Chair	Jim Adams
Vice-Chair	Mark Evans
Secretary	Ron J. Neighbors
At-Large	C. Harold Wallace
At-Large	Michael S. Sullivan
Offices	
Office	**Organization**
Administrative	Harris-Galveston Coastal Subsidence District 1660 W. Bay Area Blvd. Friendswood, Texas 775462640 Phone: 281-486-1105 Fax: 281-218-3714
Political Subdivision	San Jacinto River Authority P.O. Box 329 Conroe, Texas 77305-0329 Phone: (936)-588-1111 Fax: (936) 588-1114
NOTES: Administrative Office manages records. Political Subdivision is the entity eligible to apply for State grant funds.	

Table 1-1 (continued)

Voting Membership			
Category	**Member**	**Organization**	**County (Location of Interest)**
Agriculture	David B. Jenkins July 1998 - Present	M & J Fertilizer	Chambers
	Robert Bruner March 1998 – Present	Rancher	Walker
Counties	John Blount, P.E. Sept 2004 – Present	Harris County	Harris
	Mark Evans March 1998 – Present	Trinity County	Trinity
	Jack Harris March 1998 – Present	Brazoria County	Brazoria
Electric Generating Utilities	Jason Fluharty Sept 2004 – Present	Texas Genco	Harris
Environmental	John R. Bartos March 1998 – Present	Galveston Bay Foundation	Harris
Industries	Carolyn Johnson March 1998 – Present	Dow Chemical Company	Brazoria
	James Murray March 1998 – Present	Exxon-Mobil Corp.	Harris
Municipalities	Robert Istre July 2003 – Present	Gulf Coast Water Authority	Galveston
	Jeff Taylor Oct 2002 – Present	City of Houston	Harris, Fort Bend, Montgomery
Public	Roosevelt Alexander March 1998 – Present	Retired	Waller
River Authorities	Jim Adams March 1998 – Present	San Jacinto River Authority	Montgomery (service in central portion of region)
	John Baker June 2004 – Present	Brazos River Authority	McLennan (service in west and southwest portion of region)
	Danny F. Vance March 1998 – Present	Trinity River Authority	Tarrant (service in east and southeast portion of region
Small Business	Mary Alice Gonzalez March 1998 – Present	Stewart Title - Fort Bend Division	Fort Bend
	Michael S. Sullivan March 1998 – Present	Sea-Master Marine Coatings	Harris
	Steve Tyler March 1998 – Present	Steve Tyler Creative Services	Trinity
Water Districts	Marvin Marcell July 1998 – Present	Fort Bend Subsidence District	Fort Bend
	Ron J. Neighbors March 1998 – Present	Harris-Galveston Coastal Subsidence District	Harris, Galveston
	Jack C. Searcy, Jr. March 1998 – Present	Spirit of North Harris County Coalition, Inc.	Harris

Table 1-1 (continued)

Voting Membership (continued)			
Water Utilities	C. Harold Wallace March 1998 – Present	West Harris County WSC	Harris
	James Morrison March 1998 – Present	Walker County Rural WSC	Walker
	William Teer, P.E. March 1998 – Present	Retired	Leon

Non-Voting Membership	
Member	**Organization**
Wayne G. Ahrens, P.E.	West Harris County Regional Water Authority
David Alders	East Texas Water Planning Group
Jennifer Bailey	Texas Department of Agriculture
Sabina Finnegan	Chocolate Bayou Water Company
Rick Gangluff	South Texas Project-Electric Generating Station / Lower Colorado Regional Planning Group
Larry Jacobs	Montgomery County Soil and Water Conservation District
Wayne Wilson	Agriculture Representative / Brazos G Water Planning Group
Phil Kaiser	Just Trees
Bill Roberts	Texas Water Development Board
Robert Stroder, P.E.	Lower Neches Valley Authority
Danny Vance	Region C Water Planning Group (also a voting member)
Woody Woodrow	Texas Parks & Wildlife Department

1.2.1 Governmental Authorities in Region H

While municipal and county governments are the primary governmental entities there are three regional councils of government represented in the region. The Houston-Galveston Area Council of Governments represents thirteen counties in the central and eastern part of the planning area, Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Harris, Liberty, Matagorda, Montgomery, Wharton , Walker and Waller Counties. The Brazos Valley Council of Governments includes Leon and Madison counties, the two northwestern counties of the region. The Deep East Texas Council of Governments represents Trinity, Polk and San Jacinto counties located in the northeastern part of Region H.

In addition to these regional councils there are several other entities with regulatory or management authority of importance to long range water planning for the region. The State exercises certain responsibilities over water planning, supply and quality through the Texas Water Development Board (TWDB), the Texas Commission on Environmental Quality (TCEQ), and Texas Department of Parks and Wildlife (TPWD). Points of contact for these state agencies are listed in Table 1-2. Three river authorities manage surface water supply in the region's three river basins: the Brazos River Authority, the San Jacinto River Authority and the Trinity River Authority. There are eleven soil and water conservation districts within Region H. Five groundwater conservation districts (GCD) in Region H have the authority to

regulate groundwater withdrawals. The Harris-Galveston Coastal Subsidence District and the Fort Bend Subsidence District have existed for some time. Three new districts were formed in 2001: the Lone Star GCD in Montgomery County, the Bluebonnet GCD which includes Austin, Grimes and Walker Counties, and the Mid-East Texas GCD which includes Leon, Madison and Freestone Counties.

During the initial planning period, two new regional water planning entities were formed: the North Harris County Regional Water Authority and the West Harris County Regional Water Authority. Municipalities have joined informally to study regional water supply facilities in Mid-Brazoria County, North Fort Bend County and Central Harris County.

Table 1-2: State Agencies with Oversight of Water Planning

Texas Water Development Board

J. Kevin Ward
Executive Administrator
PO Box 13231, 1700 N. Congress Ave., Austin, TX 78711-3231
(512) 463-7847

William Mullican
Deputy Executive Administrator, Office of Planning
PO Box 13231, 1700 N. Congress Ave., Austin, TX 78711-3231
(512) 936-0813

Texas Commission on Environmental Quality (plan review)

Glenn Shankle
Executive Director
12500 Park 35 Circle, Austin, TX 78753
(512) 239-3900

Texas Parks and Wildlife Department (plan review)

Robert Cook
Executive Director
4200 Smith School Road, Austin, TX 78744-3291
(512) 389-4800

1.2.2 General Economic Conditions

Two thirds of all U.S. petrochemical production and almost a third of the nation's petroleum industries are located in Region H. The area provides some of the states most popular vacation spots that, in 1994, generated approximately $390 million dollars. The Port of Houston handled 161.2 million tons in 2002, to make it the sixth busiest port in the world. In 2000 the Houston area employed 1.8 million people or 18 percent of the state's total employment. Region H is generally characterized by urbanizing land uses and broad-based economic development. In areas outside of the urban core agriculture dominates economic activities. The region supports six primary economic sectors: services, manufacturing, transportation, government, agriculture and fishing.

The service sector employs the greatest number of people in Region H. Medical specialties are concentrated at the Texas Medical Center in Houston and the University of Texas

Medical Branch in Galveston. Tourism is also a major industry for both Galveston and Houston.

The region's manufacturing industry is based on the historically important energy industries. Petroleum refining and chemical production are the largest two industries in the region. Technology and biotechnology firms have contributed to the diversification of the region's economic base. Petro-chemical, chemical and pulp and paper industries are major employers outside of the urban core of the region.

The transportation industry includes the Port of Houston and the Houston Ship Channel, the second largest port in the nation. A well-developed highway system and rail connections support this activity. The Gulf Intracoastal Waterway connects the ports of Freeport, Galveston, Houston and Texas City.

Government sector jobs are disbursed throughout the region, with the Texas Department of Corrections a major employer at prisons located in the region. The Johnson Space Center has program management responsibility for the International Space Station, ensuring continued economic importance into the next decade. There are numerous colleges in the region, and local school districts continue to grow and expand with population increases.

The agricultural industry, while providing limited numbers of jobs, contributes significantly to the region's economy. Major agricultural crops in the region include rice, soybeans, vegetables and hay. Cattle are the principal livestock, followed by horses and hogs.

Fishing, both commercial and sport, within Galveston Bay is a major contributor to the local economic base. One third of the state's commercial fishing income and one half of the state's expenditures for recreation fishing come from Galveston Bay. Oysters, shrimp and finfish are important commercial species in the bay.

1.3 Population and Water Demand in Region H

Based on the 2000 census, the population for Region H is approximately 4,848,948. Approximately 65% (3,170,496) of this population resides in 98 cities and towns with populations of over 500 persons, 16 of these cities have populations in excess of 25,000.

Table 1-3 lists the cities with over 25,000 persons and their 2000 census population and associated retail water demand. The balance of the population resides in smaller communities or the unincorporated portions of the 15 counties of the region.

Table 1-3: Cities with Populations Over 25,000

City	2000 Census Population	2000 Reported Municipal Use (acre-feet/year)
Baytown	66,430	10,938
Conroe	36,811	7,175
Deer Park	28,520	4,312
Friendswood	29,037	3,968
Galveston	57,247	16,228
Houston	1,953,631	347,947
Huntsville	35,078	5,108
La Porte	31,880	4,928
Lake Jackson	26,386	3,754
League City	45,444	6,617
Missouri City	52,913	10,239
Pasadena	141,674	18,567
Pearland	37,640	5,650
Sugar Land	63,328	15,677
Texas City	41,521	6,604
The Woodlands	55,649	13,714

Source: Texas Water Development Board

The 2000 total county populations and reported water use are listed in Table 1-4. Detailed information on local, county and regional population estimates and projections for the 50-year planning period are included in the Chapter 2 of this plan. In 2000 municipal uses accounted for 41 percent of the region's total reported water use. In addition to municipal water use, 2000 estimates of other water use types were prepared by the TWDB for use in the planning process.

Table 1-4: County Population and Municipal Water Demand

County	2000 Census Population	2000 Reported Municipal Use (acre-feet/year)
Austin	23,590	3,535
Brazoria	241,767	40,127
Chambers	26,031	3,908
Fort Bend	354,452	67,566
Galveston	250,158	44,544
Harris	3,400,578	598,596
Leon	15,335	1,880
Liberty	70,154	9,350
Madison	12,940	1,728
Montgomery	298,768	51,193
Polk*	33,098	4,489
San Jacinto	22,246	2,698
Trinity*	10,380	1,231
Walker	61,758	14,741
Waller	32,663	4,610
Region H Total	4,848,918	850,196

* Includes portion of the county in the Region H area
Source: Texas Water Development Board

Manufacturing uses accounted for 30 percent and irrigation uses represented 22 percent of the region's total 2000 reported use. Figure 1-2 illustrates the distribution of 2000 water demand by use type. Total water demands for each county are listed in Table 1-5.

Figure 1-2: Percentage of 2000 Total Water Demand by Use

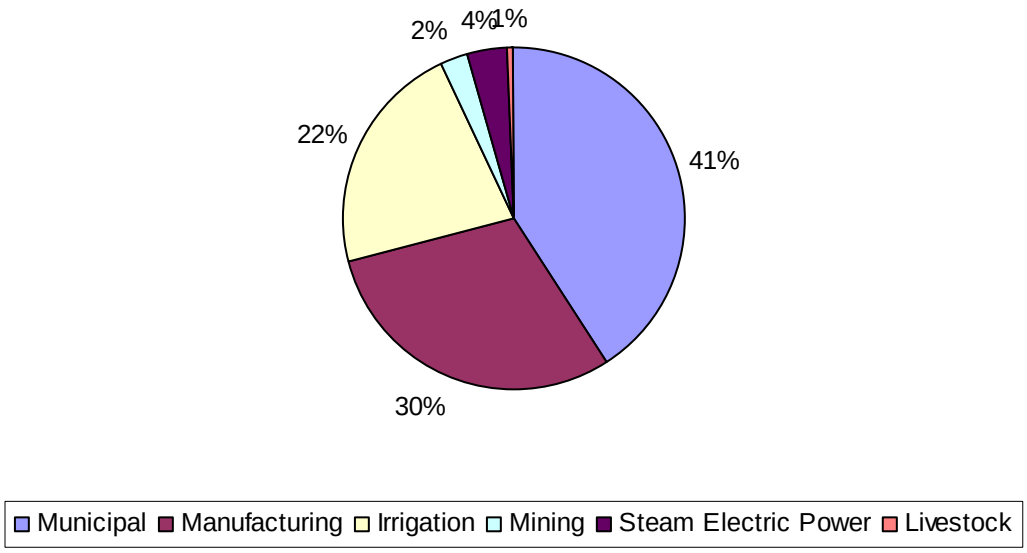


Table 1-5: Reported 2000 Non-municipal Water Use

County	MFR	IRR	MIN	POW	STK	Total
Austin	167	10,617	42	0	1,615	12,441
Brazoria	221,930	149,188	3,330	0	1,614	376,062
Chambers	9,752	117,777	31,027	5,334	462	164,352
Fort Bend	6,117	53,455	2,840	61,761	1,171	125,344
Galveston	35,381	10,342	230	6,054	325	52,332
Harris	349,420	15,300	1,011	7,606	1,133	374,470
Leon	545	542	1,740	0	1,691	4,518
Liberty	296	82,901	8,656	0	757	92,610
Madison	205	19	23	0	750	997
Montgomery	1,587	66	414	2,507	510	5,084
Polk *	0	0	24	0	134	158
San Jacinto	39	667	36	0	284	1,026
Trinity *	0	467	8	0	211	686
Walker	2,518	11	12	0	632	3,173
Waller	68	22,978	80	0	939	24,065
Region H Total	628,025	464,330	49,473	83,262	12,228	1,237,318

* Includes the portion of the county in Region H.
Source: Texas Water Development Board

1.3.1 Major Demand Centers

Major demand centers are locations or water uses that require a significant portion of the region's water supply. As would be expected major urban areas with large populations and major industrial development are typically major demand centers. In Region H major demand centers are defined for municipal, manufacturing and irrigation uses as having a reported 2000 use, by use type, exceeding 25,000 acre-feet for counties and 10,000 acre-feet for cities.

Harris County has the greatest overall water demand in the region, as was shown in Table 1-4. The next highest demands are Fort Bend, Montgomery, Galveston, and Brazoria counties. Harris County and the City of Houston dominate municipal water use in Region H. The City of Houston used 347,947 acre-feet or 42 percent of the total regional municipal use. As shown in Table 1-6, Brazoria, Fort Bend, Galveston and Montgomery Counties are major demand centers with 2000 reported use in excess of 25,000 acre-feet. In addition to the City of Houston, municipalities identified as major demand centers (reported municipal demands in excess of 10,000 acre-feet in 2000) include the cities of Pasadena, Galveston, Baytown and Sugar Land.

Table 1-6: Major Municipal Demand Centers

County/City	2000 Municipal Use (acre-feet)
City of Houston	347,947
Harris County (excluding Houston)	250,649
Fort Bend	67,566
Galveston	44,544
Montgomery	51,193
Brazoria	40,127
City of Pasadena	18,567
City of Galveston	16,228
City of Baytown	10,938
City of Sugar Land	15,677

Source: Texas Water Development Board

The largest manufacturing demand center is Harris County, which used 349,420 acre-feet of water in 2000 (68 percent of the regional total). Two other major demand centers are identified; Brazoria County, with reported 2000 manufacturing use of 221,930 acre-feet, and Galveston County with a reported 2000 manufacturing use of 35,381 acre-feet. The principal water using industries in the region are Petroleum Refining, Chemical Products and Pulp and Paper Mills. The three largest manufacturing demand centers are shown in Table 1-7.

Table 1-7: Major Manufacturing Demand Centers

County	2000 Manufacturing Use (acre-feet)
Brazoria	221,930
Galveston	35,381
Harris	349,420

Source: Texas Water Development Board

The four largest irrigation demand centers are Brazoria, Chambers, Liberty and Fort Bend counties. Table 1-8 highlights each county's reported 2000 irrigation use. The major irrigated crops in the region are rice, soybeans, vegetables and cotton.

Table 1-8: Major Irrigation Demand Centers

County	1996 Irrigation Use (acre-feet)
Chambers	117,777
Brazoria	149,188
Liberty	82,901
Fort Bend	53,455

Source: Texas Water Development Board

Livestock and mining water use represent smaller demands in the Region H area. Mining water demands in Region H are associated primarily with oil and gas production.

1.4 Region H Water Supply Sources and Providers

Groundwater, surface water captured in reservoirs and run-of-river sources comprise the available water supply within a river basin. Reused and recycled water and saline sources are additional supply sources utilized in Region H.

1.4.1 Groundwater Sources

Four aquifers supply groundwater within the Region H area. The aquifer that furnishes the most groundwater within the area is the Gulf Coast aquifer. This aquifer is composed of the Evangeline, Chicot and Jasper formations and extends from near the shoreline to approximately 100 to 120 miles inland, to Walker and Trinity counties. The other major aquifer in the study area is the Carrizo-Wilcox, which begins 115 to 125 miles inland and extends beyond the northern boundary of the region. There are also three minor aquifers in this part of the state; the Sparta and Queen City aquifers occur in Leon County, the southern part of Madison County and northern parts of Walker and Trinity Counties. In Leon and Madison Counties, they lie above the Carrizo-Wilcox Aquifer. The Brazos River alluvium occurs along the main stem of the Brazos as it passes through the region, except in Brazoria County. Figure 1-3 and Figure 1-4 illustrate these groundwater sources. Groundwater use is regulated in Harris, Galveston and Fort Bend Counties due to the potential for over-drafting the Gulf Coast Aquifer. Groundwater Management Plans have been published for Austin, Leon, Madison Montgomery and Walker Counties. Groundwater withdrawals in 2000 accounted for approximately 34 percent of the total regional water supply.

1.4.2 Surface Water Sources

Surface water sources in Region H are reservoir storage and run-of-river supply for the three rivers in the area, the Trinity, the San Jacinto and the Brazos. There are no major springs located within Region H, although small springs and seeps supply based flows for some streams. Historically there were numerous small seeps identified throughout the region. Many of these have ceased flowing due to land use changes and groundwater pumping. The most significant spring was Gold Springs in San Jacinto County, above the town of Coldspring, with recorded flows of 32 gpm (50 ac-ft/yr) into the 1960's.

The following discussion of each basin's surface water supply is based upon information in *Water for Texa*s (1997) and (2002). Water availability estimates come from the TCEQ Water Availability Models. Figure 1-5 illustrates the region's surface water sources. A selected bibliography of related references is included at Appendix 1A.

Figure 1-3: Region H Major Groundwater Sources

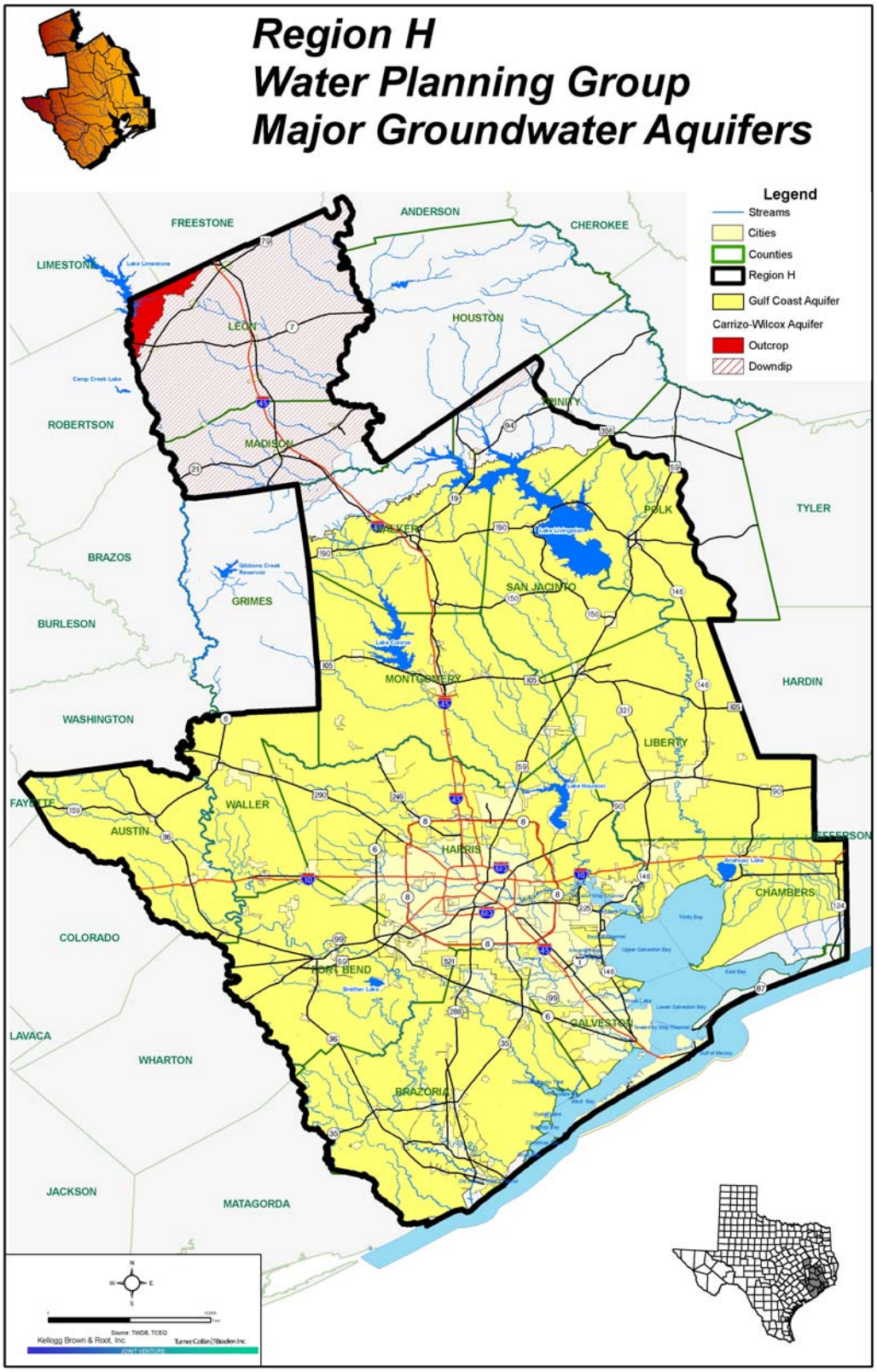


Figure 1-4: Region H Minor Groundwater Sources

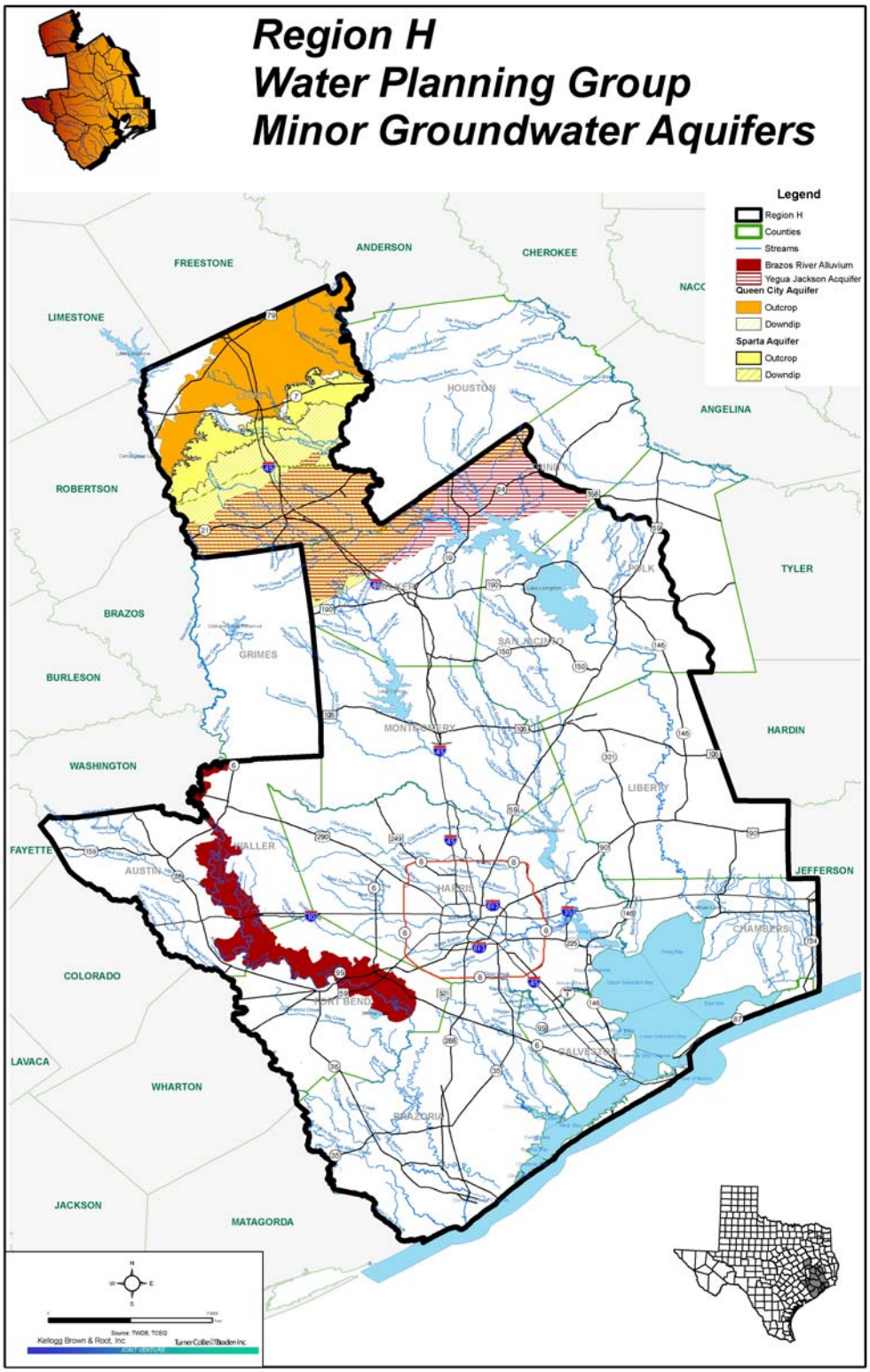
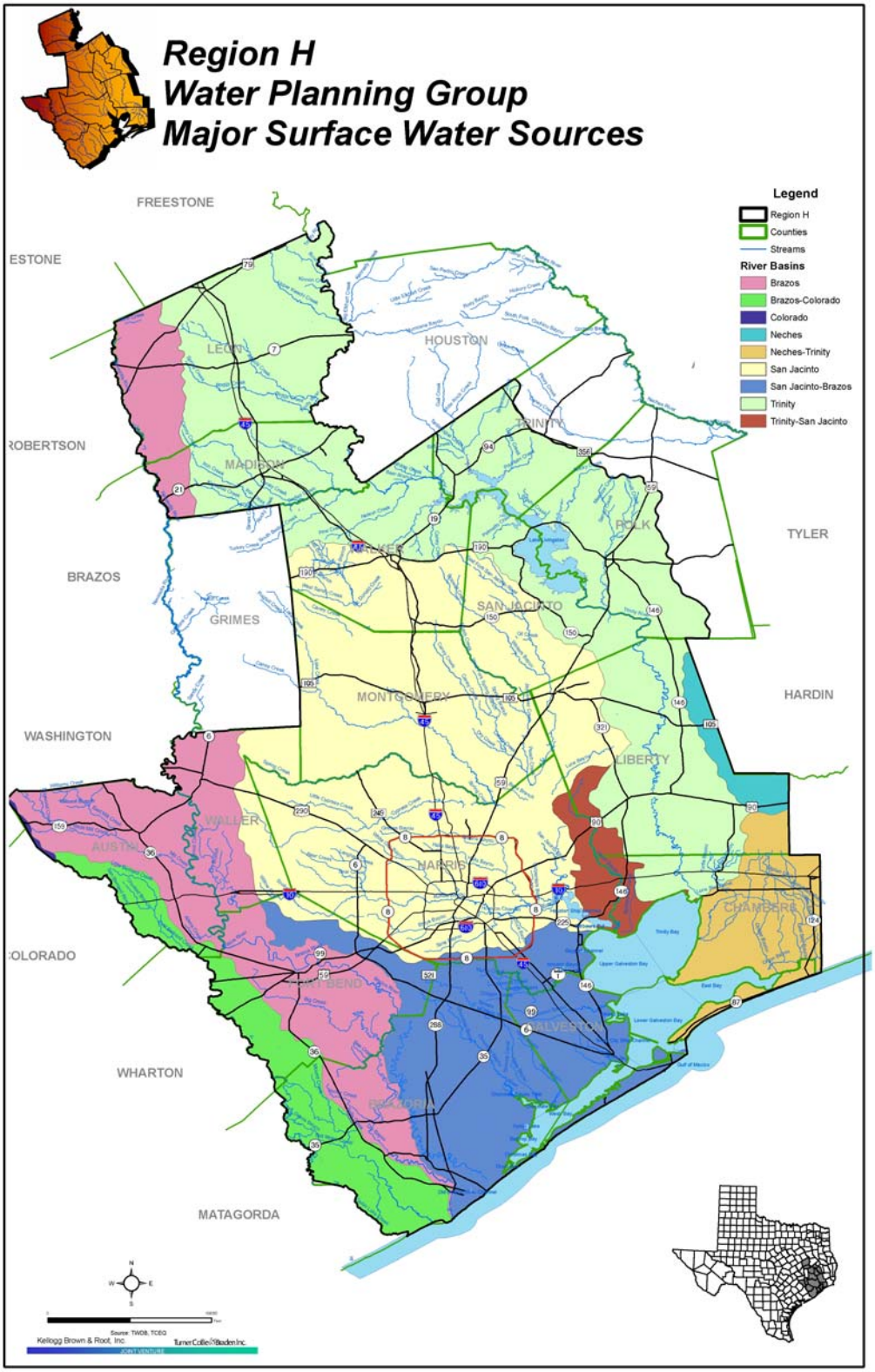


Figure 1-5: Region H Surface Water Sources



Trinity River Basin

The Trinity River basin contains two water projects in Region H, Lake Livingston and the Wallisville Salt Water Barrier. The City of Houston and the Trinity River Authority (TRA) sponsored Lake Livingston's construction. It is operated by the TRA to meet the service demands of the City of Houston and other local users in the Trinity Basin and in the Neches-Trinity Coastal Basin. The U.S. Army Corps of Engineers recently completed the Wallisville Saltwater Barrier. These two projects are operated as a system, Livingston primarily to store water and Wallisville to control the migration of salt water from Trinity Bay. Lake Livingston and Wallisville computed yields are 1,255,500 acre-feet/year and 89,700 acre-feet/year respectively. The sum of these permitted yields is the combined yield of the system (1,345,200 acre-feet per year). Additional permitted run-of-the-river water supplies downstream of Lake Livingston total 220,230 acre-feet per year. These supplies are associated with the water rights agreements established at the time of Lake Livingston permitting.

San Jacinto River Basin

The San Jacinto River Basin has two major public water supply reservoirs, Lake Houston and Lake Conroe. Lake Houston, with a permitted yield of 151,400 acre-feet/year, is owned and operated by the City of Houston for use in its service area. The City of Houston and San Jacinto River Authority (SJRA) jointly own Lake Conroe, with the City holding two-thirds of the permitted rights (66,667 acre-feet/year) and SJRA holding one-third (33,333 acre-feet/year). SJRA manages Lake Conroe, providing supply to the City of Houston and other local users. The SJRA has additional run-of-the-river water rights of 55,000 acre-feet per year.

Brazos River Basin

The Brazos River Authority (BRA) manages the water supply resources from 13 reservoirs within this basin. Several of these reservoirs are operated by BRA as a System Operation where commitments made to downstream demands can be met from any upstream reservoir storage available in the system. The U.S. Army COE owns 9 of these reservoirs and BRA owns four reservoirs within the basin. In addition to the BRA water supply reservoirs, there are several other reservoirs in the basin. While none of these reservoirs are located within the Region H area, supply from the "system" is committed in Region H.

The total Brazos Basin supply is estimated at over 1,200,000 acre-feet per year and the estimated yield from BRA's reservoirs is almost 700,000 acre-feet per year. Over 450,000 acre-feet per year is committed under contracts to various entities upstream of Region H with approximately 130,000 acre-feet per year used in the Region H area. Lower-Brazos River Basin run-of-river permits in excess of 450,000 acre-feet per year have been granted.

San Jacinto - Brazos Coastal Basin

There are several significant water users within the San Jacinto-Brazos Coastal Basin supported by the run-of-river water supplies from the Brazos Basin. Suppliers include the Chocolate Bayou Water Company (80,000 acre-feet per year), Dow Chemical (280,000 acre-feet per year), and the Richmond Irrigation Company (40,000 acre-feet per year). Each of these entities diverts surface water from the Brazos River and enhances the reliability of their supplies through off-channel surface reservoirs.

1.4.3 Use by Source

TWDB reports that Region H used 2,087,514 acre-feet of water in 2000. Of that, 709,990 acre-feet (34%) came from groundwater wells, and 1,377,524 acre-feet (46%) came from rivers and other surface sources. Industrial water users (principally chemical industry users) in the region used approximately 1,000,000 acre-feet of saline (sea) water and the petroleum industry reported the reuse of just over 3,000 acre-feet of treated effluent. Table 1-9 summarizes the groundwater and surface water usage for each county. Table 1-10 lists the estimated year 2060 reliable yields available from existing sources to Region H.

Table 1-9: 2000 County Water Use by Source

County	Groundwater (acre-feet)	Surface Water (acre-feet)	Total Use (acre-feet)
Austin	15,928	48	15,976
Brazoria	50,397	365,792	416,189
Chambers	23,005	145,255	168,260
Fort Bend	122,416	70,494	192,910
Galveston	5,001	91,875	96,876
Harris	336,044	637,022	973,066
Leon	6,398	0	6,398
Liberty	40,199	61,761	101,960
Madison	2,725	0	2,725
Montgomery	55,701	576	56,277
Polk (P)	2,906	1,741	4,647
San Jacinto	3,057	667	3,724
Trinity (P)	1,601	316	1,917
Walker	16,259	1,655	17,914
Waller	28,353	322	28,675
Total	709,990	1,377,524	2,087,514

Source: TWDB Annual Survey of Ground and Surface Water Use

Table 1-10: Projected 2060 Supplies Available for Use in Region H

Groundwater	**Projected Yield (acre-feet/year)**	
Gulf Coast Aquifer	611,609	
Carrizo-Wilcox Aquifer	9,610	
Queen City Aquifer	7,906	
Sparta Aquifer	17,414	
Brazos River Alluvium	41,539	
Undifferentiated Aquifer	1,117	
Subtotal	689,195	
Basin/Reservoir/Run-of-River		
Neches Basin		
Sam Rayburn Contract1	60,727	
Neches-Trinity Coastal Basin		
Run-of-River	23,209	
Trinity Basin		
Lake Livingston/Wallisville	1,344,000	
Run-of-River, Lower Basin	220,230	
Trinity-San Jacinto Coastal Basin		
Run-of-River	34,232	
San Jacinto Basin		
Lake Houston	168,000	
Lake Conroe	74,300	
Run-of-River	69,944	
San Jacinto-Brazos Coastal Basin		
Run-of-River	39,181	
Brazos Basin		
Brazos River Authority System2	138,913	(System total 691,717)
Run-of-River, Lower Basin	472,103	
Brazos-Colorado Coastal Basin		
Run-of-River	12,019	
Local Supplies (i.e., stock ponds) all basins	32,071	
Subtotal	2,688,929	
Total	**3,378,124**	

[1] Values based on long-term contracts from LNVA to Region H customers
[2] Values based on long-term contracts from BRA to Region H customers

1.4.4 Major Water Providers

A major water provider is an entity that delivers and sells a significant amount of raw or treated water for municipal and/or manufacturing use on a wholesale and/or retail basis. Generally major providers serve as a primary water source for a significant portion of the region's municipal or industrial water users and are those entities likely to develop future major water supply projects. As in the rest of the state, Region H has relatively few entities

that hold the rights to significant amounts of water, particularly surface water, and provide retail or wholesale water supplies to a significant number of area users.

Five entities in Region H own over 100,000 acre-feet per year of municipal and/or industrial water rights. Their total holdings represent approximately 62 percent of the region's municipal and industrial water rights. The Chocolate Bayou Water Company and the Chambers-Liberty Counties Navigation District each has rights to over 100,000 acre-feet per year, but their supplies are currently used primarily for irrigation. Additionally, portions of these supplies are not 100 percent reliable. Reliability is based on modeling diversions under drought of record conditions. Irrigation rights can be issued for supplies that are available 75-percent of the time. These entities are listed in Table 1-11 along with other substantial water rights holders.

Table 1-11: Major Region H Water Rights

Provider	Permitted Amount (acre-feet/year)
City of Houston	1,220,467
Gulf Coast Water Authority	236,932
Trinity River Authority *	403,200
Chocolate Bayou Water Co.	212,500
San Jacinto River Authority	174,933
Brazos River Authority *	138,913
Brazosport Water Authority	45,000
Chamber-Liberty County Navigation Dist.	112,947

* Portion available within Region H only
Source: TNRCC Master Water Rights Database

One other group of water rights holders should be noted, industrial entities that hold large manufacturing use water rights to provide for plant operations. These entities, listed in Table 1-12, generally do not act as providers to other industrial customers. DOW Chemical, however, provides municipal water supply to the Brazosport Water Authority.

Table 1-12: Large Industrial Water Rights Holders

Industrial Water Rights Holder	Fresh Water Permits (acre-feet/year)
Dow Chemical Company	280,000
Reliant Energy / Texas Genco	166,238
Occidental Chemical Corporation	140,000
Phillips Petroleum Company	39,880

Over 2,300 public water suppliers deliver water to communities and businesses in Region H. A review of these suppliers indicates that 70 percent serve fewer than 500 customers. Of the over 700 municipal providers serving 500 or more customers, over 250 are addressed in this plan as part of collective reporting units. The North Harris County Regional Water Authority accounts for 152 Utility Districts (the two cities in the Authority, Tomball and Jersey Village,

and listed separately in the plan. The West Harris County Regional Water Authority accounts for 107 Utility Districts, with its member city (Katy) similarly listed separately. A final collective unit in the plan is The Woodlands, a planned community in Montgomery County served by a series of related utility districts.

1.5 Water Quality and Natural Resources

1.5.1 Water Quality

TNRCC published *The 15th State of Texas Water Quality Inventory* (2000) addressing water quality in light of recent Federal Clean Water Act amendments. Also that year, participating water authorities compiled and published their *Regional Water Quality Assessments* as part of the Texas Clean Rivers Program. These reports established the condition of each river and stream segment and identified those segments with water quality concerns for a number of parameters. In Region H, the Brazos, San Jacinto and Trinity River Authorities participate in the Texas Clean Rivers Program and have each published reports on the water quality conditions within their respective basins.

Groundwater within the region is generally of good quality, with total dissolved solids below 1,000 mg/l. Iron is a concern in some portions of the Carrizo-Wilcox Aquifer, and calcium, magnesium and sulfate cause high total hardness in portions of the Brazos River Alluvium. There are many naturally occurring constituents in ground water with arsenic and radon being two of them. The current maximum contaminant level (MCL) for arsenic in water used for public supply is 0.05 mg/l with the MCL scheduled to be lowered to 0.01 mg/l in January of 2006. Currently ground water produced within Region H has an arsenic content below the existing MCL. There is a limited area within the northwest part of Harris County where the concentration of arsenic in some sands of the Gulf Coast aquifer exceeds 0.01 mg/l. Wells are now constructed to not screen these sands and in some instances consideration is being given to treating the water from older wells to lower the arsenic content below 0.01 mg/l.

Radon is not a regulated constituent as an MCL has not been established for it. There are some areas in the west part of Harris County where isolated sands can contain water with higher concentrations of radon. Through geophysical logging to identify these depth intervals and by the use of well construction techniques that isolate the sands from providing water to a well, production wells are constructed that produce water with low levels of radon.

Surface water throughout Region H is treated for municipal use using conventional measures. Contact recreation use is limited in the Lower Trinity River due to fecal coliform bacteria levels. Growth in the San Jacinto River Basin has increased nutrient loading and fecal coliform levels in many streams, particularly Buffalo Bayou. Likewise, nutrients, dissolved minerals and elevated fecal coliform levels have been identified in the Lower Brazos River. Also of concern in the Lower Brazos River are seasonal low flows, which allow the tidal salt-wedge to reach municipal and industrial freshwater intakes in Freeport.

1.5.2 Topography

Region H is located in the Gulf Coastal Plains of Texas. It is primarily made up of two vegetational areas, the Gulf Prairies and Marshes and the Piney Woods.

The Gulf Prairies make up the majority of the region. They hold marsh and saltwater grasses in tidal areas, and bluestems and tall grasses inland. Oaks, elms and other hardwoods grow in limited amounts. The natural grasses make the region ideal for cattle grazing, and the fertile soils support rice, cotton, wheat and hay farming as well. Wildlife in the area includes alligator, river otter, Attwater's prairie chicken, eastern brown pelican, Eskimo curlew, piping plover and whooping crane. Counties in the Gulf Prairie include Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris and Waller.

The Piney Woods encompass the northeastern portion of Region H, consisting of pine forests interspersed with native and improved grasslands. Longleaf, shortleaf and loblolly pine are the dominant native species harvested, but slash pine and various hardwood species are cultivated as well. Timber production and cattle are the principal agricultural products in that portion of the region. Wildlife in the area includes bobcat, ringtail, river otter, red-cockaded woodpecker and bald eagle. Counties in the Piney Woods include Leon, Liberty, Madison, Montgomery, Polk, San Jacinto, Trinity and Walker.

1.5.3 Public Lands

The Region contains 325,394 acres of state and national forests, supporting hiking, camping, picnicking and horseback riding. It also contains 107,138 acres of coastal wildlife refuges for migratory waterfowl, as well as native waterfowl and plant species. It contains a portion of the Big Thicket National Preserve, designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as part of the International Biosphere Reserve. Finally, the region holds 12,170 acres of Texas Wildlife Management Areas, preserved for bird watching in coastal areas and seasonal hunting inland. The area names and locations are presented in Table 1-13, and a location map is provided at Figure 1-6.

Table 1-13: Public Lands

Resource Area	Acreage	County
State and National Forests		
W. Goodrich Jones State Forest	1,725	Montgomery
Davey Crockett National Forest	162,012	Total
	67,329	Trinity
Sam Houston National Forest	161,657	Total
	47,777	Montgomery
	60,247	San Jacinto
	53,633	Walker
Big Thicket National Preserve	86,000	Total
National Wildlife Refuges		
Anahuac NWR	30,000	Chambers

Brazoria NWR	42,338	Brazoria
San Bernard NWR	28,000	Brazoria
Trinity River NWR	6,800	Liberty
Texas Wildlife Management Areas		
Candy Cain Abshier WMA	207	Chambers
Atkinson Island WMA	151	Harris
Keechi Creek	1,500	Leon
Peach Point	10,312	Brazoria

Source: Texas Almanac, Texas Parks & Wildlife Department

1.5.4 Navigation

Navigation within Region H rivers is generally limited to the lower reaches of the main stems of the Brazos, San Jacinto, and Trinity Rivers including the Houston Ship Channel and Turning Basin. In addition the Gulf Intracoastal Waterway, an inland canal system that connects ports in the Gulf of Mexico, traverses the Region H coastline through the ports of Galveston and Freeport. There is significant use of rivers, streams and reservoirs throughout the region by recreational boaters and fishermen. There are no navigation water permits in the Region H area.

1.5.5 Threats to Agricultural and Natural Resources

The Regional Water Planning Guidelines (31 TAC 357) require planning groups to "identify threats to agricultural and natural resources of the state due to water quantity problems or water quality problems related to water supply."

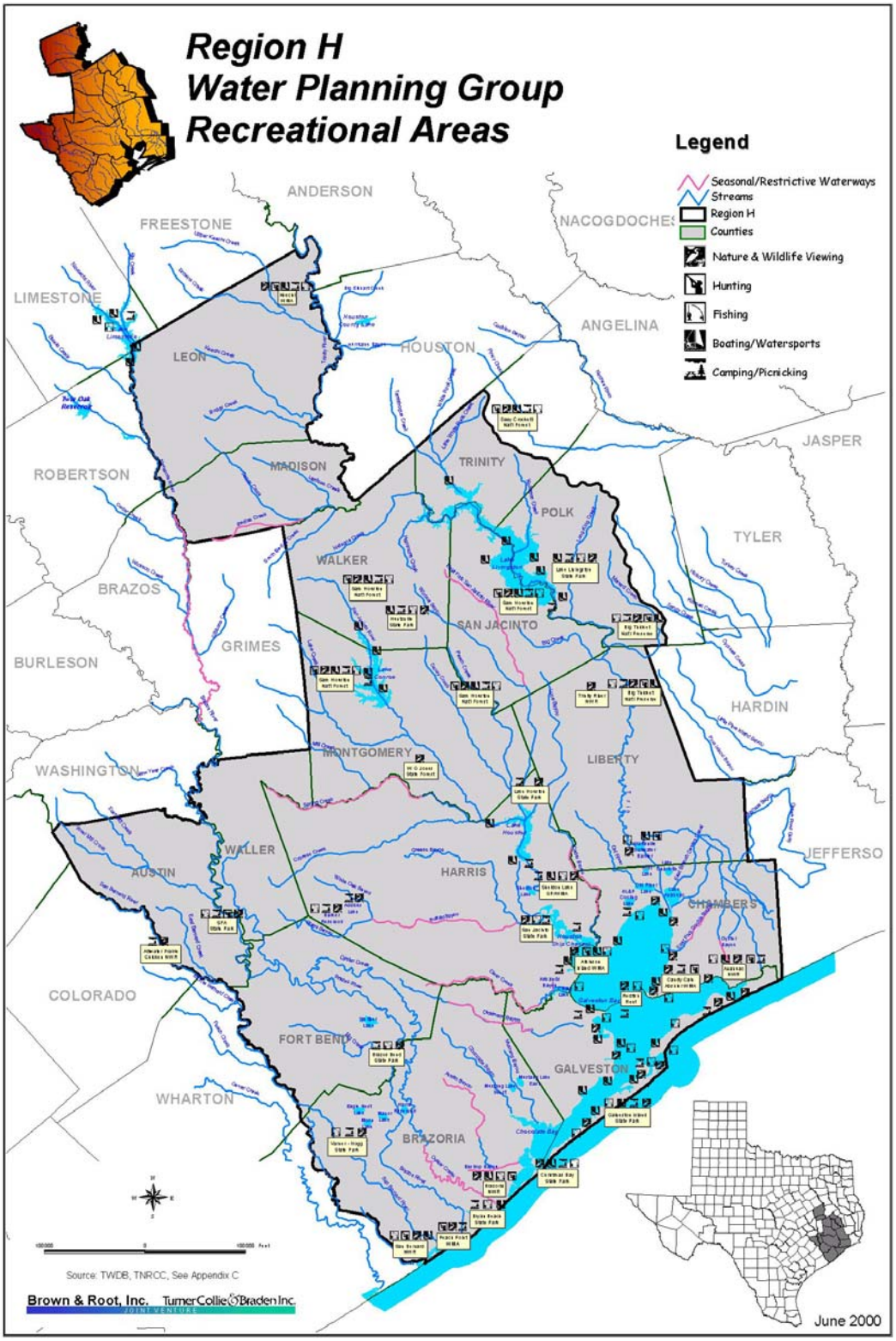
There are no water quantity problems for agriculture in Region H. However, it is common practice in the region for irrigation supply to be purchased on a year-to-year basis. The absence of long-term contracts prevents the full representation of irrigation supply as "allocated" in the regional plan. As a result, irrigation is represented as having a shortage met through water management strategies. The current plan meets all projected irrigation demands. Increased water costs, coupled with decreasing prices for rice and other irrigated crops, may cause agricultural water demand to decline in the future. No water quality concerns for agriculture have been identified.

Galveston Bay estuary is the most significant natural resource in Region H. The estuary is dependent upon freshwater inflows to maintain seasonal salinity ranges for wildlife habitat and fisheries productivity. The estuary is capable of withstanding to natural flood and drought cycles, but the amplified affects of water diversions during a drought may pose a threat to this resource. Target inflow amounts and frequencies for Galveston Bay are discussed in Chapter 3, and inflows with and without water management strategies are analyzed in Chapter 4.

Other natural resources within the region also enjoy in-stream flows. As with Galveston Bay, peak diversions during drought periods may reduce flows to the point that detrimental affects are felt by the environment. Texas is currently developing policies and procedures to

determine and protect the required minimum flows in the streams and estuaries of the State. Threatened and endangered species are discussed in Chapter 7.

Figure 1-6: Public Lands within Region H



1.6 Existing Water Planning

1.6.1 Existing Regional and Local Water Management Plans

The first Region H Water Plan was published in 2001. It was incorporated into the State Water Plan in 2002. The Region H Water Plan recommended several water management strategies to ensure that all water demands in the Region were met. First, advanced water conservation was recommended for all municipalities with projected shortages. Next, supplies that were identified as surplus in one area were recommended for contract or sale to water users in other areas. These transfers included moving TRA water supply from Lake Livingston to Harris County, moving surplus water from Houston into Galveston County, and reducing BRA contract commitments in the upper Brazos basin to supply the lower basin. Three new reservoirs were recommended: Allens Creek Reservoir in Austin County to capture peak flows in the Brazos River, Bedias Reservoir in Madison County to create additional supply for the northern third of the region, and Little River Reservoir in Milam county to supply Region H and the Brazos G Region. In areas with limited groundwater, irrigation conservation was recommended as a means of increasing groundwater for municipal supply.

Before this, the Region H area was part of The Trans-Texas Water Program (TTWP): Southeast Area, a comprehensive water resource planning program created to evaluate a full range of water management strategies for a 32 county area of East Texas. This area encompassed all of Region H, plus the lower Sabine River Basin and portions of the middle Brazos River Basin. *The Phase II Report* (1998) identified a regional long-term shortage by the year 2035. To meet that need, the following management techniques were studied further: water conservation, wastewater reclamation, use of existing reservoir surplus supply, coordinated reservoir system operation, interbasin transfers and contractual transfers.

Technical studies of these management techniques were completed in Phase II of the TTWP. The *Phase II Report* (1998) determined that the Southeast Area could develop adequate supplies to meet expected regional demands, and export water to Central Texas (Regional Planning Regions L and N). Various management strategies would need to be implemented to accommodate growth in the different geographic areas across the fifty-year planning period. Water conservation, wastewater reclamation and coordinated systems operations strategies would extend the period of adequate supply, allowing additional time to plan and develop new water sources. The Allen's Creek Reservoir in the Brazos River Basin, with a yield of approximately 70,000 acre-feet per year, was reported as a potentially feasible project. Contractual transfers were identified that would align surface water rights with the owner's service areas, shortening conveyance systems. Finally, sustained interbasin transfers from the Toledo Bend Reservoir in the Sabine River Basin to the Trinity and San Jacinto River Basins were also reported as feasible strategies to meet the growing needs of the region and areas of central Texas.

Other previously completed regional water supply plans include the City of Houston Master Plan, Brazos Valley Long-Range Resource Plan, the San Jacinto River Authority Water Resources Development Plan, and the Trinity River Basin Master Plan. Within Region H, the BRA plan also recommends development of the Allen's Creek Reservoir. The SJRA plan

recommended development of two reservoirs, Lake Creek and Spring Creek. These projects were tabled when the SJRA purchased part of the Devers Canal Systems water rights, which allowed the transfer of approximately 50,000 acre-feet per year from the Trinity River Basin. The TRA recommends development of thirteen potential reservoirs, six of which are located in Region H. The largest, Bedias Creek, could potentially provide 109,000 acre-feet per year, and is located to allow use in the Trinity, San Jacinto or Brazos River Basins.

The Harris-Galveston Coastal Subsidence District and Fort Bend Subsidence District developed Groundwater Management Plans to address subsidence through reduced groundwater extraction within their respective regulatory areas. These districts adopted regulatory plans in 1999 and 2003, respectively, setting limits on groundwater use as a percentage of total water demand. Three of the four new groundwater conservation districts in the region, Bluebonnet, Lone Star and Mid-East Texas, have published groundwater management plans and started the collection of well data needed to consider if a regulatory plan is needed.

Additional plans are noted in the Region H Bibliography, included as Appendix 1A.

1.6.2 Current Preparations for Drought

The 1997 State Legislature mandated water conservation and drought contingency planning for all holders of municipal, industrial and non-irrigation water rights of 1,000 acre-feet or more and irrigation rights holders of 10,000 or more acre-feet. Previously, all water rights permit applications required a water conservation and drought contingency plan but existing rights holders were not required to prepare or implement plans. New regulations also distinguish between water conservation and drought contingency plans and extend the requirement to prepare and implement drought contingency plans to all holders of water rights as noted above and to public water systems with over 3,300 connections.

In the completed drought plans, the predominant response activities are first a public information effort to alert the public to drought conditions and encourage water conservation. If drought conditions persist, many plans impose mandatory water conservation measures, including restrictions on landscape watering and car washing. Water Conservation and Drought Response are discussed in Chapter 5 of this report.

1.7 Recommendations Made in the 2001 Region H Water Plan

In the 2001 Region H Water Plan, the RHWPG recommended thirteen water management strategies to meet projected water demands through the year 2050. The Plan was amended in 2004 to add nine additional water management strategies. The planning group recommended six stream segments and three reservoir sites as unique, and also recommended regulatory, administrative and legislative changes to the Legislature. Those recommendations are listed below. Recommendations which have been acted upon are noted in italics.

1.7.1 Water Management Strategies Recommended in the 2001 Regional Plan

The RHWPG considered a variety of strategies for meeting the projected shortages and solicited input from the public before adopting a management plan. A detailed analysis process was developed to define potential water management strategies. The process addressed the specific shortages of the 93 WUGs discussed above and then developed associated specific strategies assuming the MWPs would be the vehicle to solve WUG shortages. The process generally consisted of the following:

1. Contract Extension - For all WUGs currently served by a MWP, first extend the existing contracts throughout the planning period for the current contracted amount of water.
2. Contract Extension and Increase - If the current contracted amount of water is insufficient for a Municipal WUG now served by a MWP, then increase the contracted supply from the MWP to meet future water needs of those Municipal WUGs. This could not be applied to collective WUGs, such as manufacturing.

Steps 1 and 2 solved the supply needs for 42 of the 93 WUGs with shortages. The remainder of the WUGs with shortages required additional actions:

3. MWP Association - For the Municipal WUGs not now served by a MWP, for the Municipal County-Other WUGs and for the Non-Municipal WUGs with shortages, associate each of these WUGs with a MWP.
4. Allocation of Uncommitted Supplies - Determine the total supply required to meet shortages of the WUGs defined in Steps 1 through 3 for each MWP. Allocate uncommitted supplies of each MWP to these WUGs until the existing MWP supplies are fully allocated.
5. Define Strategies - Determine the remaining water supplies needed to satisfy the water shortages remaining for each MWP. Define potential water management strategies for each MWP based on its identified water shortages.

Management strategies that involved adjoining regions were coordinated with the appropriate water planning group. This allowed the consideration of larger projects.

The water management strategies selected to meet the MWPs' shortages are as follows:

- **Municipal Conservation**--The conservation strategy is applied at the WUG level and decreases WUG demands on the associated MWP, allowing the MWP to allocate its supplies elsewhere. Projected water savings total 30,383 ac-ft/yr in year 2030 and 30,563 ac-ft/yr in year 2050.
- **Irrigation Conservation**--Also applied at the WUG level, this strategy allows allocation of MWP supplies to other users. Projected water savings are 24,312 ac-ft/yr in Brazoria County, 14,259 ac-ft/yr in Fort Bend County, and 5,010 ac-ft/yr in Waller County.
- **Contractual Transfer**--This strategy involves the transfer of 28,500 ac-ft/yr of manufacturing water rights to irrigation water rights within the boundaries of the Brazos River Authority service area.
- **Allen's Creek Reservoir**--This proposed reservoir creates 99,650 ac-ft/yr of supplies for the City of Houston and for the Brazos River Authority.
- **Little River Reservoir**--This proposed reservoir creates 101,000 ac-ft/yr for the Brazos River Authority (of which 30,000 ac-ft/yr are consumed outside Region H) and 28,000 ac-ft/yr for the Gulf Coast Water Authority.
- **Bedias Reservoir**--This proposed reservoir creates 90,700 ac-ft/yr for the San Jacinto River Authority and the Trinity River Authority.
- **Wastewater Reclamation**--This strategy proposes that 90,700 ac-ft/yr of Houston's municipal wastewater be treated and reused by industries along the Houston Ship Channel.
- **Luce Bayou**--This conveyance project enables the City of Houston to transfer water it owns in the Trinity basin to Lake Houston to meet projected growth in north and northwest Harris County.
- **Houston/Trinity River Authority Contract**--Under this strategy, the City of Houston will purchase up to 200,000 ac-ft/yr of uncommitted supplies from the Trinity River Authority.
- **Brazos River Authority Voluntary Redistribution**--The Brazos River Authority is in the process of re-purchasing unused supplies from current customers in the upper Brazos basin and will then be able to sell up to 75,000 ac-ft/yr of this water to customers in Region H.
- **Bedias Reservoir to San Jacinto River Authority Transfer**--In conjunction with the Bedias Reservoir construction, this strategy is the conveyance system to facilitate the interbasin transfer of 75,000 ac-ft/yr to the San Jacinto River Authority service area.
- **Houston to Gulf Coast Water Authority Transfer**--To meet 2050 demands of the Gulf Coast Water Authority, this strategy calls for the sale of 23,000 ac-ft/yr of Houston's raw water supplies. Included is a pumping station and pipeline to convey the water to the GCWA's Texas City reservoir.

- **San Jacinto River Authority/Chambers-Liberty Counties Navigation District Contract**--Under this strategy, the San Jacinto River Authority will purchase 30,000 ac-ft/yr of uncommitted supplies from the Chambers-Liberty Counties Navigation District.

The following water management strategies were added to the 2001 Water Plan under Amendment 1:

- **Expanded Use of Groundwater** - This strategy differentiates between existing well capacity and future well capacity, and reflects the addition of future well capacity as a management strategy.
- **Redesignation of Existing Water Rights** - Local surface water providers recognizing land use changes within their service areas should add appropriate usage types to their water rights permits, in anticipation of future demands.
- **Additional Lake Houston Yield** – This strategy recognizes the water right permit application made by the City of Houston and the San Jacinto River Authority for 32,500 ac-ft/yr of firm yield in Lake Houston.
- **Interruptible San Jacinto River Supply** – This strategy recognizes the water right permit application made by the City of Houston and the San Jacinto River Authority for 80,000 ac-ft/yr of interruptible supply in the San Jacinto River above Lake Houston. Diverting this supply, when available, reduces interbasin transfers from the Trinity Basin.
- **Interruptible Bayous Supply** – This strategy recognizes the water right permit application made by the City of Houston for 160,000 ac-ft/yr of interruptible supply in the lower San Jacinto basin. Diverting this supply, when available, reduces interbasin transfers from the Trinity Basin.
- **SJRA Indirect Reuse** – This strategy recognizes the San Jacinto River Authority water right permit for reuse of 14,944 ac-ft/yr of wastewater return flows above Lake Houston.
- **City of Houston Indirect Reuse** – This strategy recognizes the water right permit application made by the City of Houston for 490,223 ac-ft/yr of wastewater return flows from city-owned facilities. This is in addition to the direct reuse strategy for industry.
- **NHCRWA Indirect Reuse** – This strategy recognizes the planned water right permit application by the North Harris County Regional Water Authority for up to 157,000 ac-ft/yr of wastewater return flows from member-district facilities.
- **BRA System Operations Permit** – This strategy recognizes the water right permit application made by the Brazos River Authority for 421,499 ac-ft/yr of run-of-river yield and wastewater return flows, made firm through system operation of the authority's reservoirs.

1.7.2 Unique Streams Segments Recommended in the 2001 Regional Plan

The Texas Water Code offers the opportunity to identify river and stream segments of unique ecological value. The selection criteria established within the Texas Water Code are as follows:

- Biological Function
- Hydrologic Function
- Riparian Conservation Area
- High Water Quality/Exceptional Aquatic Life/High Aesthetic Value
- Threatened or Endangered Species/Unique Natural Communities

After consideration of the above factors, the following six streams were recommended for designation as Streams of Unique Ecological Value in Region H:

Table 1-14: Recommended Unique Stream Segments

Stream Segments (not in priority order)	County
Armand Bayou	Harris
Bastrop Bayou	Brazoria
Big Creek	Fort Bend
Big Creek	San Jacinto
Cedar Lake Creek	Brazoria
Menard Creek	Liberty, Hardin*, Polk (Hardin County is in Region I)

The entire stream segment length was recommended for Armand Bayou and Menard Creek (segment within Region H). For the remaining four streams, only those portions adjacent to or within riparian conservation areas were recommended as unique streams. The Legislature has not yet designated any unique streams.

1.7.3 Unique Reservoir Sites Recommended in the 2001 Regional Plan

The Texas Water Code offers an opportunity to designate sites of unique value for use as surface water supply reservoirs. Through use of a decision-based water management strategy analysis and selection process, the RHWPG selected three surface water reservoir projects for inclusion within the Regional Water Plan. The RHWPG has decided to recommend the locations of each of these projects as unique sites. To date, the Legislature has only designated Allens Creek Reservoir as unique.

The three sites are:

Table 1-15: Recommended Unique Reservoir Sites

Name	County	General Location
Allen's Creek	Austin	1 Mile N. of the City of Wallis
Bedias	Madison (Principally)	Bedias Creek, 3.5 Miles W. of State Hwy 75
Little River	Milam	Main Stem of Little River, Immediately Upstream of its Confluence with the Brazos River

1.7.4 Regulatory and Administrative Recommendations from the 2001 Plan

Revise Population Projections

A number of Municipal WUGs within Region H strongly disagree with the current set of population and water demand projections. Various Municipal WUGs have transmitted evidence that their specific communities have year 2000 populations significantly higher or lower than the projections used in the current regional planning effort. An opportunity exists to rectify this situation with completion of the year 2000 Census. Accurate, consistent information should exist for each Region H Municipal WUG as a result of the Census.

The Region H Water Planning Group recommends that the TWDB immediately revise the existing population and water demand projections upon official acceptance of the Census information. These revised population and water demand projections should then be transmitted to the regional planning groups for amendment, if necessary, of the current regional water plan.

The current round of regional water planning is based on the 2000 census, and every second round of planning will coincide with the release of the US Census data.

Water Management Strategy Flexibility

Section 357.7(a)(8) of the TWDB Regional Water Planning guidelines requires "specific recommendations of water management strategies to meet near term needs…" The TWDB interpretation of these requirements suggests a direct relationship between a defined water shortage with one specific water management strategy. We are concerned that this requirement decreases the local control and flexibility that have been an important part of successful efforts to meet water needs in Region H and throughout the state. Changing circumstances can alter the preferred alternative for new water supplies very quickly. We are also concerned that limiting the options of water suppliers may make negotiations to obtain needed land or water (through contract, for instance) more difficult and drive up the cost of new water supplies.

The Region H Water Planning Group recommends that the TWDB and the TNRCC (now TCEQ) interpret existing legislation to give the maximum possible flexibility to water suppliers. Legislative and regulatory changes should be made to remove this requirement for specificity from the regional water planning guidelines and allow plans to present multiple sources of supply where appropriate.

Contract Expiration Policy

TWDB has interpreted its current regulations to require regional water planning groups to assume that contract water will not be made available after the expiration date of the current contracts. In reality, buyers and sellers of water virtually always renew their contract commitments. The existing TWDB policy therefore appears to create a worst case scenario in regard to the long-term availability of water for WUGs with contracts. Subsequently, this assumption causes an unrealistically enormous estimate of socioeconomic impacts. These impacts occur as a result of projected water shortages, which are based on the assumption that expiring contracts will not be renewed. For some municipalities, these expiring contracts represent the majority of their supply, and the projected impacts (loss of population, loss of industry, etc.) are severe. The magnitude of the socioeconomic impacts in Region H might cause a public official or the public in general to be unduly alarmed, when in fact sufficient water supplies are in existence to address near-term water needs.

The Region H Water Planning Group recommends that the TWDB change its policy to allow water planning groups to assume that current contracts will be extended beyond the current expiration date unless specific information suggests otherwise.

The TWDB has incorporated this assumption into the current round of planning, but still requires that contract expiration dates be recorded in the Planning Database, when available.

Notification Procedures for Regional Plan Amendments

The same notification requirements associated with adoption of a regional water plan should not be used upon amendment of a specific component of the plan. The RHWPG anticipates a number of plan amendments prior to review of the entire plan in approximately five years. These plan amendments will only affect certain aspects of the plan and certain communities and water suppliers. The current notification requirements for the entire plan are expensive.

The Region H Water Planning Group recommends adoption of a revised set of notification procedures for regional water plan amendments.

WAM Analysis Assumptions

The current TNRCC (now TCEQ) Water Availability Modeling (WAM) effort will produce a wealth of information that may assist in the development of future regional water plans. The current TNRCC rules regarding construction of the WAMs are based on a need for water rights permitting (strict prior appropriation doctrine) whereas the regional water planning efforts need WAMs based on a water supply planning basis. This distinction can create very different results.

The Region H Water Planning Group recommends adoption of WAMs predicated on planning based water models that represent current operations of regional water suppliers.

Regional Water Planning Area Definition

There may be a tendency to revise the current water planning regional boundaries. Planning region revision could potentially require large-scale re-analysis of the current plans. Additionally, it is anticipated that modifications to the plans would become more difficult to assess with an added burden of revising the existing regional definitions.

The Region H Water Planning Group recommends maintenance of the current boundary definitions of the sixteen regional water planning areas.

1.7.5 Legislative Recommendations from the 2001 Regional Plan

Permit Exemption from Cancellation for Nonuse

Existing Texas Water Law provides for the potential cancellation of a water right due to 10 years of nonuse of the permitted water supplies. Water rights associated with relatively large water supply projects may be developed many years in advance of the actual need. These projects and their associated water rights are a result of prudent planning and a financial commitment to develop such a project. Cancellation of water rights associated with such a project defeats the purpose of performing long-term planning and project development.

The Region H Water Planning Group supports modification of current Texas Water Law to exempt from cancellation certain water rights that have not been utilized for 10 years or more.

Senate Bill 2 of the 77th Legislature amended the Water Code to exempt certain water rights from cancellation, including reservoirs of 50,000 acre-feet or more and permits obtained to meet demonstrated long-term water supply or electric generation needs.

Permit Exemption of Water Rights of Project Sponsor

Existing Texas Water Law is indiscriminate in regards to potential cancellation proceedings. The sponsors of water supply projects that secure water rights resulting with development of water supplies developed by that project sponsor should be exempt from any potential cancellation proceedings. Water supply project sponsors invest a significant amount of time, energy and capital in the development of water supply projects. These investments should not be subject to forfeiture due to nonuse of the developed water supplies.

The Region H Water Planning Group supports adoption of new legislation to exempt from cancellation those water rights secured by the project sponsor of a water supply project.

Senate Bill 2 of the 77th Legislature amended the Water Code to exempt certain water rights from cancellation, including permits obtained as a result of the construction of a reservoir in whole or in part by the permit holder.

Interbasin Transfers

Senate Bill One states that water rights developed as a result of an interbasin transfer become junior to other water rights granted before the interbasin transfer permit. The effect of this change is to make obtaining a permit for interbasin transfer significantly more problematic

than it was under prior law and thus discourages the use of interbasin transfers for water supply. This is undesirable for several reasons:

Current supplies greatly exceed projected demands in some basins, and the supplies already developed in those basins can only be used via interbasin transfers (Trinity basin within Region H.)

Interbasin transfers have been used extensively in Texas and are an important part of the state's current water supply. For example, three of the five Region H Major Water Providers (City of Houston, Trinity River Authority and San Jacinto River Authority) maintain current permits for interbasin transfers collectively of over 1,000,000 acre-feet per year. Virtually all future water demands within the San Jacinto basin (Harris County in particular) of Region H must rely on interbasin transfers.

Emerging regional water supply plans for major metropolitan areas in Texas (Dallas-Fort Worth and San Antonio) rely on interbasin transfers as a key component of their plans. It is difficult to envision developing a water supply for these areas without significant new interbasin transfers.

The Region H Water Planning Group recommends that the legislature revise the current law on interbasin transfers and remove the unnecessary and counterproductive barriers to such transfers that now exist.

Rule of Capture

Groundwater is a vital resource within Region H. This is especially true within the rural counties of the region that are predominantly dependent on groundwater. Current groundwater law based on the Rule-of-Capture has facilitated orderly development of groundwater systems throughout the State of Texas and, barring the intrusion of private interests, could continue to serve the water usage interests throughout the state. It appears that the Rule-of-Capture could continue per the status quo to serve the groundwater interests within the region.

The Region H Water Planning Group supports continued usage of the Rule-of-Capture as the basis of groundwater law throughout the State of Texas except as modified through creation of certified groundwater conservation districts.

Groundwater Conservation Districts

Region H communities, particularly those within the rural areas of the region, are dependent on groundwater supplies. Groundwater is a very valuable resource to this region. Region H contains counties, specifically Austin, Leon and Madison where some municipalities, water supply corporations and property owners believe groundwater conservation districts (GCD) are needed to retain long-term groundwater supplies within their respective counties. Region H also has several counties, including Brazoria, Waller and Montgomery, where groundwater supplies will, in theory, reach their maximum sustainable yield due solely to projected in-county water usage rates. A GCD is a potential vehicle for these counties to manage and protect groundwater supplies from over-development within each respective county. The

potential of losing these supplies to outside interests before the county of origin can maximize the use of these supplies would create a burden on local water users.

The Region H Water Planning Group supports creation of GCDs, as necessary, by local subarea water interests. The RHWPG supports development of truly regional GCDs as opposed to single county districts to recognize the regional expansiveness of underground aquifers and to provide the greatest degree of regional water supply protections.

Senate Bill 2 of the 77th Legislature authorized the formation of four new GCDs in Region H (Bluebonnet, Brazoria County, Lone Star and Mid-East Texas).

Ongoing RWPG Activities

It is apparent that the RWPGs will have to meet periodically to address changed conditions related to the adopted regional water management plans. Ongoing activities will include, but not be limited to:

Consideration of additions and modifications to the adopted plans

Serving as communications liaisons with the water user communities within each region

Assisting in the reconciliation of inter-regional water issues

It will be necessary to consider additional funding to support maintenance of the RWPGs. Also, the administrative provisions of Senate Bill One and the subsequent policies that have been enacted should be reviewed to determine if the appropriate organizational structure exists to accomplish the work of the RWPGs. Additional funding should be developed to support technical studies necessary to support the needs of the RWPGs.

The Region H RWPG recommends that the TWDB request additional funding and adoption of the appropriate administrative procedures from the legislature to facilitate ongoing activities of the RWPGs.

The current round of Regional Water Planning is funded by the TWDB, with no requirement for local funding participation.

Texas Bays and Estuaries Program Funding

The RHWPG has adopted specific language associated with establishment of freshwater inflows to maintain the health and productivity of the bay. Galveston Bay is an important economic and recreational resource for our region. Current levels of funding within the State of Texas Bay & Estuary program are insufficient to continue the needed monitoring, study and development of management strategies for the bay.

The Region H Water Planning Group recommends establishment of additional funding to pursue necessary future efforts of the Galveston Bay & Estuary program.

Water Supply Project Financing Mechanism

The Region H Regional Water Plan includes development of several surface water reservoirs and other supply projects. The capital cost to develop these projects is significantly higher

than the historic cost of water supply projects. The projected costs are such as to dissuade local communities from making a financial commitment to support future projects. These financing issues will delay the implementation of needed projects.

To address this situation, the Region H Water Planning Group supports establishment of financing methods by the State of Texas to capitalize a fund to support development of water supply projects recommended within adopted regional water management plans.

Following completion of the 2001 Regional Plans, the Regions conducted an Infrastructure Financing Survey among their WUGs with projected infrastructure needs, and reported those results to the Legislature. This is now a required task within the cyclic regional water planning process.

Unique Stream Segments and Reservoirs

While the RHWPG adopted both unique stream segment and reservoirs, there appears to be some confusion on the definition and legislative intent of the designations for each of these elements. It is clear that conflicts may be created for stream segments that might be used for both water supply conveyance and recreational purposes. To assist in the adoption of future unique stream segments and/or unique reservoir sites the RHWPG requests additional legislative clarification.

The Region H Water Planning Group supports clarification and definition of the legislative intent of the unique stream segments and of the unique reservoir sites.

Senate Bill 2 of the 77th Legislature amended the Water Code to restrict political subdivisions from taking certain actions within unique stream segments and unique reservoir sites.

Groundwater Availability Modeling Funding

Many areas of Region H are totally dependent on groundwater to support the long-term viability of these areas. The current Groundwater Availability Modeling effort is supported since it is the most comprehensive groundwater assessment and analysis effort of the previous 20 years. The current GAMs effort, however, is omitting minor aquifers and other groundwater considerations that are vital for certain local communities.

The Region H Water Planning Group supports continued funding for the GAMs effort, and recommends comprehensive analysis of all groundwater resources within the state.

The TWDB, in conjunction with the USGS, is continuing the GAM process.

Agricultural and Irrigation Conservation Funding

The Region H water management plan includes a number of irrigation conservation based water management strategies. It is apparent that adoption of irrigation conservation practices may benefit the irrigation and agricultural industry in addition to local communities that may take advantage of water supply savings resulting from irrigation conservation. Additionally,

the RHWPG supports further research and development of water-efficient and drought-resistant crop and species.

The Region H Water Planning Group supports funding of research and development studies associated with the efficient usage of irrigation technologies and practices.

Desalination

The RHWPG considered desalination of brackish groundwater as a potential water source, but did not include it in the final plan because this strategy was more costly than other strategies. However, the RHWPG recognizes that the cost of desalination technology is decreasing, and that this strategy may merit consideration in future plans. It would be helpful and appropriate for the state to establish a program promoting desalination research and development. Such a program might offer financial assistance or incentives for project implementation.

The Region H Water Planning Group recommends that a research and development program for desalination be established in Texas, and that it include financial assistance and/or incentives for desalination project implementation.

Governor Perry is currently sponsoring a seawater desalination initiative, to study seawater desalination along the Texas Coast as a future source of supply.

Water Conservation

The RHWPG strongly supports water conservation at all levels, and has incorporated it in the regional water plan as a management strategy. However, realizing advanced conservation savings in municipal county-other areas may be difficult, as these practices require some management, funding and oversight. While the RHWPG does not advocate a one-size-fits-all conservation program for the State of Texas, they recommend that the legislature address water conservation and provide some guidance and ability for county and local governments to implement these programs.

The Region H Water Planning Group supports water conservation and recommends that the legislature address and improve water conservation activities in the state.

78th Legislature appointed a Water Conservation Task Force to study water conservation policies and best management practices, and to report their results to the 79th Legislature in 2005.

1.8 Recommendations Made in the 2002 State Water Plan

Water for Texas 2002, the updated State Water Plan, consolidated the plans and recommendations regions. As noted above, many of the legislative recommendations proposed by the Regional Water Planning Groups received some attention during the subsequent legislative sessions. Specific actions that affected Region H included:

- Completion of the Water Availability Modeling program, which is now the basis of surface water planning.

- Initiation of the Groundwater Availability Modeling program, which is on-going and will become the basis for groundwater planning
- Two of the three reservoir sites recommended as unique by Region H (Bedias and Little River) were recommended to the legislature as unique. The third site, Allens Creek, was previously designated as unique by the legislature. The legislature has not acted on these reservoir sites.
- All six of the stream segments recommended by Region H as unique were recommended to the legislature as unique. The legislature has not acted on this recommendation.

Appendix 1A

Selected Bibliography by Topic

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2.1 Introduction

2.1.1 Scope of Work

The overall project scope consists of preparing a regional water supply plan for the Region H Water Planning Group (Planning Group), representing 15 counties. Region H is one of 16 state water supply planning regions defined by the Texas Water Development Board (TWDB). The regional water plans prepared by each Regional Water Planning Group (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 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 DB07. Tables that contain this information are identified below and are located at the end of this chapter.

- *Table 2.1* – Population by City, Collective Reporting Unit, Individual Retail Public Utility, and Rural County
- *Table 2.2* – Water Demand by City and Category
- *Table 2.3* – Water Demand by Wholesale Water Provider 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 Texas population anticipate the population will nearly double, increasing from about 21 million (current population) to more than 45 million people by the year 2060. According to the 2002 State Water Plan, by 2050 almost 900 cities (representing 38 percent of the projected population) and other water users will need to either reduce demand (through conservation and/or drought management) or develop additional sources of water beyond those currently available to meet their needs during droughts. Total inability of current water sources to meet demands increases from 2.4 million acre-feet per year (AFY) in 2000 to 7.5 million AFY in 2050. This includes water users that cannot rely on current sources because contracts expire during the planning period. Twenty percent of irrigation demand cannot be met by existing sources if a drought-of-record were to occur today. Seven percent of municipal demand would not be met by existing sources if a drought were to occur now. However, if a drought occurs in 2050, almost half (43 percent) of the municipal demand could not be satisfied by current

[1] Some of the information used for describing the background came from Water for Texas, published and distributed by the TWDB, January 2002, and referenced as the 2002 State Water Plan.

sources. Similar percentages of manufacturing and steam-electric power generation demands could not be met in 2050.

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 preparation of the state water plan consisting of local consensus on regional plans first. The Region H Water Planning Group is responsible for completing a consensus-based regional water supply management plan for submittal to the TWDB by January 5, 2006. The Region H Water Planning Group contracted with the Kellogg Brown and Root/Turner Collie & Braden Joint Venture (Consulting Team) to develop technical data needed to prepare a regional water plan.

2.1.3 Description of the Region[2]

Region H, located along the southeastern Texas coast, consists of all or part of 15 counties including Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Leon, Liberty, Madison, Montgomery, Polk, San Jacinto, Trinity, Walker, and Waller Counties. The eastern portions of Trinity and Polk Counties are included in the Region I planning area. Region H encompasses the San Jacinto River Basin, the lower portions of the Trinity and Brazos River Basins, and includes part or all of the Brazos-Colorado, San Jacinto-Brazos, Trinity-San Jacinto, and Neches-Trinity Coastal Basins. In addition, Region H includes the Galveston and Trinity Bay Estuaries; the urbanized, rapidly growing Houston-Galveston Metropolitan Area that encompasses Brazoria, Harris, Galveston, Fort Bend, and Montgomery Counties; the coastal port communities of Galveston and Freeport; and agricultural areas in Austin, Chambers, Leon, Liberty, Madison, Polk, San Jacinto, Trinity, Walker, and Waller Counties. *Figure 2.1* is a map of the Region H area.

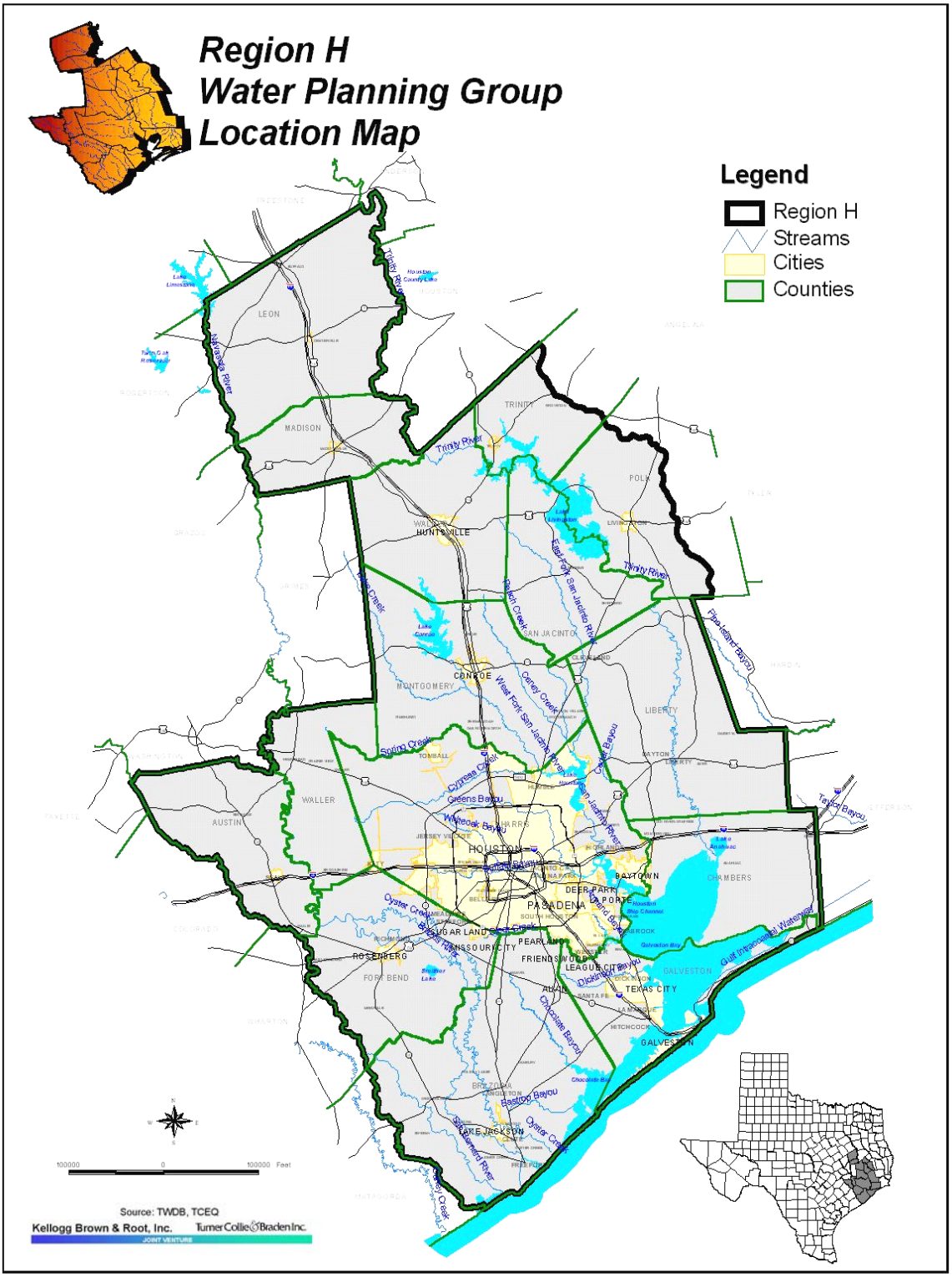
2.2 Methodology[3]

2.2.1 General

A key task in the preparation of the water supply plan for Region H is to determine current and future water demands within the region. Projections of future water demand will be compared with estimates of currently available water supply to identify future water shortages. The TWDB, the Texas Commission on Environmental Quality (TCEQ), the Texas Parks and Wildlife Department (TPWD), the Texas Department of Agriculture (TDA), and the RWPG prepared draft population and water demand projections for all water user groups (WUGs) within Region H.

[2] Region H Water Management Plan: Description of Region, submitted by Consulting Team.
[3] *Exhibit B* Guidelines for Regional Water Plan Development

Figure 2.1 Region H Water Planning Group Location



The term "default estimates" or TWDB projections is used throughout this report to refer to the 2000 census-based municipal population and demand projections and the 2003 consensus-based estimates developed by the TWDB in conjunction with the TCEQ and the TPWD. The new population projections were developed using a standard cohort-component procedure in conjunction with data from the 2000 Census and other sources. The municipal water use estimates were initially developed based on data collected from the TWDB Water Use Survey through Year 2000. This section discusses the guidelines and methodology used to evaluate these projections and to select projections for use in the regional water plan for Region H.

TWDB rules require that the analysis of current and future water demands be performed for each WUG within Region H. To be considered a WUG within the municipal category, one of the following must apply.

- Each city with a population of 500 or more
- Individual utilities providing more than 280 AFY of water for municipal use (for counties having four or less of these utilities)
- Collective Reporting Units (CRUs) consisting of grouped utilities having a common association

All smaller communities and rural 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 wholesale water providers designated by the RWPG. Region H defines wholesale providers as any persons or entities, including river authorities and irrigation districts that have contracts to sell more than 1000 acre-feet of water wholesale in any one year during the five years immediately preceding the adoption of the last Regional Water Plan. The RWPG will also include other persons and entities that enter or that the Planning Group expects or recommends to enter contracts to sell more than 1000 acre-feet of water wholesale during the period covered by the plan. Designated wholesale water providers in the Region H area include:

- Baytown Area Water Authority
- Brazos River Authority
- Brazosport Water Authority
- Chambers-Liberty Counties Navigation District
- Chocolate Bayou Water Company
- City of Houston
- City of Huntsville
- City of Pasadena
- Clear Lake City Water Authority

- Dow Chemical USA
- Fort Bend County WCID No. 1
- Galveston County WCID No. 1
- Gulf Coast Water Authority
- La Porte Area Water Authority
- Lower Neches Valley Authority
- Lyondell-Citgo Refining LP
- North Channel Water Authority
- North Harris County Regional Water Authority
- San Jacinto River Authority
- Texas Genco
- Trinity River Authority
- West Harris County Regional Water Authority

Throughout this section, verbiage excerpted directly from the 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 each municipal, manufacturing, irrigation, steam-electric power generation, mining, and livestock WUG in Region H.

2.2.2.1 Population Projection Methodology

The following procedure was used to develop population projections for each city and County-Other:

a) **Identify the baseline projection:** The baseline population projection for the 2006 Regional Water Plan was determined for each:

1. County

2. Incorporated area (city) of 500 population and greater.

3. Retail public utility for counties that have less than five retail public utilities which provide more than 280 AFY for municipal use.

4. Individual retail public utility or collective data for all such retail public utilities that form a logical reporting unit, such as being served by a common wholesale water provider or having a common source or other association appropriate for the area, in the judgment of the regional water planning group, for counties with more than five retail public utilities which provide more than 280 AFY for municipal use.

5. Categories of water use including municipal not otherwise reported (County-Other), for each county or portion of a county in the regional water planning area. If a county or portion of a county is in more than one river basin, data shall be reported for each river basin.

These projections were presented by decade from 2000 (actual reported data from the year 2000 census) to 2060 to the RWPG for consensus. These TWDB draft projections were used unless revisions were justified per TWDB guidelines.

b) **County Population Projections:** *The cohort-component procedure, which uses separate cohorts such as age, sex, race, ethnic groups, and components of change such as fertility rates, survival rates, and migration rates, was used to calculate future county populations.*

There are four main steps in applying the cohort-component method:

1. The first step is to project the population alive at the beginning of the year who will survive to the target year. Survival rates for each cohort are used to compute the change in the cohort size relating to the number of deaths anticipated to occur between each projection interval.

2. The second step is to project net migration by multiplying net migration rates by the adjusted population in the launch year. Net migration rates for each cohort are used to compute the change in each cohort due to in-migration or out-migration in a specific county.

3. The third is to project the number of births and the net impact of mortality and migration on the youngest age group. Fertility rates for each female cohort are incorporated into the projection procedure for calculating the number of births anticipated to occur between each projection interval.

4. The fourth is to combine the results from the mortality, migration, and fertility modules.

The combinations of the six racial groups used in the 2000 Census results in 63 separate racial categories, as opposed to the eight separate racial categories in the 1990 Census. Before the 2000 Census, the Census Bureau had used four race categories: white; black; American Indian, Eskimo, or Aleut; and Asian or Pacific Islander (U.S. Bureau of the Census, 1992). More detailed categories based on ethnicity and national origin were also used (i.e. Chinese, Filipino, and Samoan). In addition, the population was classified as Hispanic or non-Hispanic, an ethnic category, not a race category. The 2000 Census expanded the number of basic categories from four to five: white; black; American Indian or Alaska Native; Asian; and Native Hawaiian or

Other Pacific Islander. It may currently be impossible to construct racial-ethnic categories that are fully comparable with past categories, but the Texas State Data Center has constructed categories that approximate past categories and are "roughly comparable for those in earlier decades." Because Texans are substantially concentrated in single-race groups, the TWDB has modeled their racial category allocations after those of the Texas State Data Center who has chosen to allocate the 2.4 percent of population found in multiple-race categories to the four single-race categories of Anglo, Black, Hispanic, and Other.

Many counties in Texas have special populations generally referred to as "institutional" populations. These groups of people are assumed not to participate in the same demographic processes as the base population and generally tend to move in and out of these institutional arrangements in fixed intervals. More specifically, these groups are defined as college/university populations, military populations, prison populations, and populations in other institutional arrangements. Institutional populations are removed from the base population for computing future cohort populations, but are added back into the total projected base cohort population at the end of each projection interval.

c) ***Sub-County Population Projections:*** *The 2006 Regional Water Plan will include specific plans for a greater number of entities by projecting population and water demands for unincorporated areas supplied by public water utilities (non-municipal retail water suppliers) above a particular size (see below). In the current, and previous State Water Plans, these unincorporated areas were aggregated into the County-Other WUGs. With a greater public awareness of water planning and a greater emphasis placed on WMSs for any area that may face a water shortage, this aggregation of unincorporated areas has now been reduced. .*

Population projections for areas below the county level were calculated for the following:

1. *Incorporated areas (cities) with populations of 500 or more in the 2000 Census.*
2. *The county population outside cities of more than 500, previously considered as a single Water User Group called County-Other, may be further subdivided based on the following criteria:*

    a. *If the County-Other population for a county is served by at least one, but fewer than five, utilities which in Year 2000 provided more than 280 acre-feet of water to its entire service area, the population served by each utility will be considered a separate Water User Group. TWDB staff will develop draft estimates and projections of population and water demand for*

these Water User Groups and for the remaining County-Other population outside these utility service areas.

b. If the County-Other population for a county is served by five or more utilities which in 2000 provided more than 280 acre-feet of water to its entire service area, the Planning Group shall determine if and how the County-Other population will be subdivided and designate in its contract whether such utilities, in these counties, will be treated as individual Water User Groups or combined with other utilities in logical reporting units (such as being served by a common wholesale water provider, having a common source or other association appropriate for the area). TWDB staff will be responsible for developing estimates and projections of population and water demand for the chosen Water User Groups and for the remaining County-Other population outside utility service areas.

As described above, the use of the cohort-component procedure for the projection of county populations requires detailed data that are not available for areas smaller than the county level. For this reason, the projections for cities, water utilities and the County-Other will be based on a share of the county's population growth between 1990 and 2000.

The share-of-growth ratio method examines the city's (or utility's) share of the county's population growth between 1990 and 2000. It is then assumed that the area's share of the county's population growth will be the same in the future as it was between 1990 and 2000.

Problems arise in this method if the area experienced population decrease between 1990 and 2000 while the county experienced an increase. If the county is then projected to experience greater growth in the future, the city or utility will experience dramatic decreases throughout the planning horizon. In these cases, the share-of-growth ratios will be adjusted by staff to appropriate levels based on historical data.

While the share-of-growth ratio method will be used as the base for sub-county level projections, adjustments may be made in cases where reliable local input may identify cities which have reached their maximum growth potential or cities which are expected to experience significantly greater growth rates than shown by historical data.

The base year for the city, utility and county-other projections will be the Year 2000. All cities will use the Census 2000 figures for the base population. For the utilities, a Year 2000 population will be estimated

through the use of Water Use Survey information and the sum of Census Block populations within the utility's service area.

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:

The second key variable in the TWDB's municipal water demand projections is per capita use, expressed as gallons of water used per person per day. TWDB estimates of per capita water use are derived from data provided by water suppliers annually, and are simply the total annual reported municipal water use divided by total estimated population, and then divided by 365 (days in a year). The starting point in TWDB's default projections is a per capita use estimate for a year with below-normal rainfall when water use is typically high. Region H per capita use values were developed from year 2000 data. The year 2000 was chosen for the following reasons:

1) Due to the year 2000 Census, the population figures will be more accurate than any single-year population estimates between 1990 and 2000.

2) According to the Palmer Drought Severity Index for the past decade, the Year 2000 was the driest year in the last decade for the majority of the regions and for the State as a whole.

3) Year 2000 water use data also takes into account not only a dry-year water usage, but the water use savings that have resulted to date from the 1991 State Water-Efficient Plumbing Act or conservation programs supported by the city or utility.

TWDB guidelines for revisions to municipal water demand projections provide that adjustments in per capita use rates can be proposed if more recent data indicate that per capita use has changed. The guidelines for revision also provide for the modification of TWDB conservation assumptions, if changes to the assumptions are justified.

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.* For all WUGs, including non-municipal categories, they are presented by county, basin, and decade, in *Table 2.2.*

2.2.2.3 Manufacturing Water Demand Projection Methodology

Manufacturing water demand methodology and projections were developed for the TWDB by Waterstone Environmental Hydrology and Engineering, Inc. and the Perryman Group. The contracted firms developed water demand estimates by decade at county level for years 2000 to 2050. Manufacturing demand trends were then used to project the 2060 manufacturing demands.

The plan of research included:

- *Complete industry surveys to update water use efficiency estimates developed for the 2002 State Water Plan.*
- *Analyze the impact of technology adoption and input substitution on the relationship of water used to output.*
- *Develop projections of industry output and associated water use by county.*

2.2.2.4 Irrigation Water Demand Projection Methodology

TWDB, with the aid of other state and federal agencies, developed baseline water demand estimates for irrigation.

A comprehensive irrigation survey was performed in 2000 that provided up to date crop and irrigation data for consideration in making changes to the 2002 State Water Plan water demand projections. These estimates for acreage under irrigation and individual crop needs, supplied by the Natural Resource Conservation Service (NRCS), data developed in the previous two State Water Plans (1997 and 2002), and new data based on Potential Evapotransporation (PET), will be used for verification of baseline values and for trends.

The process of estimating irrigation demand in the Irrigation Survey is straightforward. The acreage planted for each crop under irrigation is estimated for each county. The crop water applications for each crop are estimated by NRCS and multiplied by the acreage to give total irrigation used.

Research is ongoing at TWDB to develop PET-based crop water demands, reduced by the amount of beneficial rainfall received, to be used for comparison to NRCS estimates of irrigation applications. That amount (irrigation needed) is multiplied by the irrigated acreage planted as reported by the Texas Agricultural Statistics Service (TASS).

The results are total irrigation water demands by crop for each county. These individual crop irrigation water demands are added and the county totals and regional totals are calculated. The final step is to add back in water amounts that are lost in the process of transportation to the field for crops using surface water.

Crop acreage data developed from comparing the 2000 Irrigation Survey and the 2002 State Water Plan will be used to represent cropping patterns for the 50-year planning period, unless limited by processes known to exist or anticipated to develop during this time frame. Examples such as water non-availability due to aquifer overdraft thereby reducing cropping, or farmland conversion to municipal land use are two processes that could alter cropping patterns. The rates of change for irrigation water use as projected in the 2002 State Water Plan will be largely retained. The crop water demands contained in the 2002 State Water Plan were approved by each Planning Group and reflect increased on-farm efficiencies and anticipated cropland losses.

The 2007 State Water Plan will use the 2002 State Water Plan projections as a baseline. The 2000 Irrigation Survey (completed after the 2002 projections were approved) will be used to detect changing trends in the most recent years. PET-based estimates, where available and appropriate, may also considered during the development of demand projections.

Adjustments to the 2002 State Water Plan projections will be made based on several factors. One factor is recent increases or decreases in the amount of acreage under irrigation (if the change in irrigated acreage is reasonably expected to be maintained). Another factor is increases or decreases in canal losses (for surface water diversion losses) for those counties reporting canal losses in the past.

Agricultural irrigation water demand is subject not only to the unpredictability of the weather and the available supply of irrigation water; but also to the price fluctuations of the individual crops irrigated. For this reason, demand may be low in a single year because of low price for a certain commodity. Prices are affected by supply and demand, as well as by government policies. Therefore, the larger of the five-year average (1995-1999) or the 2002 State Water Plan estimates were used as a baseline projection and then projected out into future decades following trends developed as discussed above.

2.2.2.5 Steam-Electric Power Generation Water Demand Projection Methodology

The steam-electric power generation water use projections developed by consultants to the TWDB were approved for use by the Region H Water Planning Group. The TWDB consultant's plan of research included the following:

- *Description of water consuming systems currently used in power generation facilities.*

- *Estimation of water consumption rates for each identified water consuming system.*

- *Correlation of current State population with current electric use by region.*
- *Projection of electric power consumption requirements by county and for the State, based on population projections.*
- *Identify current and potential water sources for demand by power generation.*
- *Estimate future water use by power generation.*
- *Develop and apply allocation methodology to derive demand projections by county.*

2.2.2.6 Mining Water Demand Projection Methodology

Mining water demand methodology and projections were developed for the TWDB by Waterstone Environmental Hydrology and Engineering, Inc and the Perryman Group. The TWDB consultants developed water demand estimates by decade at county level for years 2000 to 2050. The mining demand trends were then used to project the 2060 mining demands. The TWDB consultant's plan of research included the following:

- *Complete industry surveys to update water use efficiency estimates developed for the 2002 State Water Plan.*
- *Analyze the impact of technology adoption and input substitution on the relationship of water used to output.*
- *Develop projections of industry output and associated water use by county.*

2.2.2.7 Livestock Water Demand Projection Methodology

The TWDB, with the cooperation of state and federal agencies, developed baseline water demand projections for Livestock.

Estimating livestock water consumption is a straightforward procedure that consists of estimating water consumption for a livestock type and the total number of livestock of that type in each county. Texas A&M University Agricultural Extension Service has published information on water use rates, estimated in gallons per day per head, for each type of livestock: cattle, poultry, sheep and lambs, and hogs and pigs. The Texas Agricultural Statistics Service provides current and historical numbers of livestock by livestock type and county.

The 2006 Regional Water Plan will maintain the same rates of change in livestock water demand as included in the 2002 State Water Plan. Base water use for 2000 will be adjusted using the 2000 livestock inventory along with adjustments in water use per unit, based on research by the Texas Agricultural Experiment Station.

2.2.3 TWDB Guidelines for Revisions to Population and Water Demand Projections

The TWDB established criteria and data requirements to be used in evaluating and developing revisions to the state census-based and/or consensus based population and water demand projections. The criteria applied in developing revisions to the draft TWDB projections for Region H 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.

County-Level Population

Population projections by decade for each county in the state were developed by TWDB. The county populations were summed to determine regional population totals. Adjustments to the county-level population projections must involve the redistribution within the counties within the region so that regional totals remain the same.

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

a) A possible Census undercount took place in the county and action is currently being pursued to request a Census Bureau correction.

b) If there is evidence that the 2000-2010 net migration rate will be significantly different than the net migration rate used for the original projection.

c) There are statistically significant birth and survival rate differences (by appropriate cohorts) between the county and the State.

***Data Requirements:** The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any revisions to the county-level population projections:*

1. Documentation of an action requesting the Census Bureau correct an undercount of population within a county.

2. Projected in migration and out migration of a county, indicating that the net migration of a county will be significantly different than the net migration rates previously used.

3. Birth and/or survival rates for a county population between 1990-2000 by gender, race/ethnicity and single-year age cohorts.

4. Other data that the Planning Group believes is important to justify any changes to the population projections.

Sub-County Population

The projected sub-county population growth from planning decades 2000 to 2060 for municipalities, utilities, and county-other within a county is determined from the county's share-of-growth between 1990 to 2000 and is assumed to be the same in the future. Base populations will be from 2000 census data.

Any revisions to municipality, utility, or county-other population involved a redistribution of the population within the county so that the county total remained the same. The criteria and data requirements for revisions are discussed below.

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 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.

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

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

d) 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.

***Data Requirements:** The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator for justifying any revisions to the sub-county-level population projections:*

a) Population estimates for cities developed and published by the State Data Center or by a regional council of governments will be used to verify criteria (a) for cities.

b) The verified number of residential connections and permanent population served will be used to verify criteria (a) for utilities.

c) The estimated population of an area that has been annexed by a city (for criteria b) or has become part of a CCN or service area for a water utility (for

criteria c). In addition, the geographical boundary of the area must be presented in an acceptable map or ArcView shapefile.

d) Documentation from an official of a city or utility describing the conditions expected to limit population growth and estimating the maximum expected population will be used to verify criteria (d).

e) Other data that the Planning Group believes is important to justify any changes to the population projections.

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 was 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) A revision by the Census Bureau of a city's 2000 population will require revision of the city's annual per capita water use.

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

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

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

e) Evidence that per capita water use from a year between 1995-1999 would be more appropriate because that year was more representative of below-normal rainfall conditions.

f) 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 1990, and evidence that these trends will continue to rise in the short-term future.

g) Evidence that the number of fixture installations to water-efficient fixtures between 1990 and 2000 is different than the TWDB schedule.

Data Requirements: *The Planning Group must provide the following data associated with the identified criteria to the Executive Administrator of the TWDB for justifying any revisions to the municipal water use projections:*

a) Annual municipal water production (total surface water diversions and/or groundwater pumpage and water purchased from other entities) for an entity measured in acre-feet.

b) The volume of water sales by an entity to other water users (cities, industries, water districts, water supply corporations, etc.) measured in acre-feet.

c) Net annual municipal water use, defined as total water production less sales to other water users (cities, industries, water districts, water supply corporations, etc.) measured in acre-feet.

d) Documentation of temporary infrastructure constraints.

e) Drought index or growing season rainfall data to document a year different than 2000 as the dry year.

f) Documentation of the number of water-efficient fixtures replaced between 1990 and 2000.

g) In order to verify increasing per capita water use trends for a city or rural area of a county and therefore revising projections of per capita water use to reflect this increasing trend, the following data must be provided with the request from the Planning Group:

1. Historical per capita water use estimates based on net annual municipal water use for the city, utility or rural area of a county, beginning in 1990.

2. A trend analysis which must take into account the variation in annual rainfall.

3. Revised projections of per capita water use for a city, utility or rural area of a county will be submitted by the Planning Group, where an increasing trend in per capita water use has been verified for a city or rural area of a county.

4. Growth data in the residential, commercial and/or public sectors that would justify an increase in per capita water use.

h) Other data the Planning Group believes is important to justify any revisions to the State Water Plan municipal water use projections.

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 Regional Water Planning Group and the Executive Administrator of the Texas Water Development Board for consideration of revising the irrigation water use projections:*

- *Evidence that a year between 1995-1999 would be more representative of typical irrigated acreage or below-normal rainfall than 2000.*
- *Evidence that irrigation water use estimates for a county from another source are more accurate than those used by TWDB.*
- *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.*

Data Requirements*: The Regional Water Planning Group must provide the Executive Administrator of the Texas Water Development Board the following data associated with the identified criteria for justifying any revisions to the irrigation water demand projections.*

- *Acreage and water use data for irrigated crops grown in a region, as published by the Texas Agricultural Statistics Service, the Texas Agricultural Extension Service, or the Farm Service Agency (USDA), for the base year 2000 and/or a different year that the Planning Group wishes to present for consideration.*
- Any economic, technical, and/or water supply-related evidence that may show cause for revision in the future rate of change in irrigation water use.

2.2.3.4 Other Water User Groups

The TWDB water demand projections were used for other categories of water users (e.g., manufacturing, irrigation, steam-electric power generation, mining, and livestock), except for those cases where more current or more accurate data were provided. Revisions to the projections for these WUGs are described in *Sections 2.2.2.3* to *2.2.2.7* of this report.

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 fifteen counties in Region H. These projections were developed using the general methodology described in *Section 2.2*, with any exceptions described by WUG for each county. *Figure 2.2* and *Table 2.4* at the end of this chapter present a graphical summary of

the total water demand for Region H by water-use category and a summary of Region H's total revised water demand projections by water user category from the 2006 RWP and the 2001 RWP at a county level, respectively.

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 DB07.

Table 2.1 presents Population by City, Collective Reporting Unit, Retail Public Utility, and Rural County; *Table 2.2* presents Water Demand by City and Category. *Table 2.3* presents water demand by Wholesale Water Provider of all water use categories. *Table 2.4* presents a comparison between the 2001 and 2006 RWP water demand projections by county and water use category.

2.3.1 Regional Summary of Projections by Category

Population

The revised population projections indicate that Region H's population will grow from 4,848,918 in year 2000 to 10,897,526 in the year 2060. When comparing the 2001 plan and 2006 plan population estimates for the region, there is a 1.4 percent and 0.4 percent population increase between the two plans for the 2000 and 2050 decades, respectively. *Table 2.1*, located at the end of this chapter, presents the population projections by county, river basin, and decade.

Municipal Water Demand

Revised municipal water demand projections for Region H show an increase in projected demand from 850,091 acre-feet in the year 2000 to 1,732,608 AFY in the year 2060. When comparing the RWP municipal water demand estimates for the region in the 2001 Plan versus the 2006 Plan, there is a 5 percent decrease in year 2000 and a 5 percent increase in year 2050 for municipal water demand. The decrease in year 2000 estimated water demand is a result of the latest baseline population projections and per capita water use estimates. The revised projections by county for each municipal WUG are provided in *Table 2.2*, at the end of this chapter, by county and by river basin.

Manufacturing Water Demand

The proposed manufacturing water demands for all counties, excluding Brazoria County, in Region H are the TWDB default projections. The Brazoria County manufacturing demand was revised to reflect a correction in the TWDB's reported water use survey numbers. The proposed manufacturing water demand for Region H is projected to increase from 628,025 to 950,102 AFY from 2000 to 2060. The revised projections are provided in *Table 2.2* at the end of the chapter as well as in the TWDB Database DB07.

Irrigation Water Demand

Total irrigation water demand for the region is projected to decrease from 464,330 to 430,930 AFY between decades 2000 and 2060. The TWDB draft demand estimates were 349,872 AFY in 2000 (based on irrigation surveys) and 316,473 AFY in 2060. The proposed change results in a 36.17 percent increase over the TWDB projections for the year 2060. The revised projections are provided in *Table 2.2* as well as in the TWDB online database DB07.

Steam-Electric Power Generation Water Demand

Region H adopted the TWDB default steam-electric power generation water demands projections. As a result, the 2006 RWP proposed steam-electric power generation water demands for Region H are 83,262 AFY in 2000 and 217,132 AFY in 2060. When comparing the 2001 and 2006 RWP steam-electric power generation water demand estimates for the region, there is a 12.5 percent decrease and a 74 percent steam-electric power generation water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The revised projections are provided in *Table 2.2* at the end of the chapter as well as in the TWDB Database DB07.

Mining Water Demand

The proposed mining water demands for Region H are the TWDB default projections that include adjustments to the 2002 State Water Plan projected demands. Adjustments were made to the base projections using industry water use surveys to update water efficiency estimates and the analysis of the impact of technology and input substitution on the relationship of water used to output.

The proposed mining water demand by decade for Region H is 49,473 AFY in the year 2000 and 69,457 AFY in 2060. When comparing the 2001 and 2006 RWP mining water demand estimates for the region, there is a 46 percent and 97 percent mining water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. It appears that some of the Mining demands were incorrectly reported as Manufacturing in the 2001 plan and as such have been correctly reported as Mining in this plan. That revision increased the projected growth in Mining, with a corresponding decrease in the Manufacturing demand. The revised projections are provided in *Table 2.2* at the end of the chapter as well as in the TWDB Database DB07.

Livestock Water Demand

The proposed livestock water demands for Region H are the TWDB default projections, which are found using the same rates of change in livestock water demand as the 2002 State Water Plan. The base water use for 2000 was developed using adjusted livestock inventories and adjustments in water usage developed by Texas Agricultural Experiment Station.

The proposed livestock water demand by decade for Region H is 12,228 AFY, which was held constant for all decades between 2000 to 2060. This represents a 6 percent livestock demand decrease when compared to the 2001 RWP. The revised projections are provided in *Table 2.2* at the end of the chapter as well as in the TWDB Database DB07.

Demand of Wholesale Water Providers

The Wholesale Water Providers are the Baytown Area Water Authority, Brazos River Authority, Brazosport Water Authority, Chambers-Liberty Counties Navigation District, Chocolate Bayou Water Company, City of Houston, City of Huntsville, City of Pasadena, Clear Lake City Water Authority, Dow Chemical USA, Fort Bend County WCID No. 1, Galveston County WCID No. 1, Gulf Coast Water Authority, La Porte Area Water Authority, Lower Neches Valley Authority, Lyondell-Citgo Refining LP, North Channel Water Authority, North Harris County Regional Water Authority, San Jacinto River Authority, Texas Genco, Trinity River Authority, and the West Harris County Regional Water Authority.

Wholesale water providers maintain current customer contracts for 2,068,615 acre-feet of supply. Region H wholesale water providers assume the continuation of municipal contracts across the 60-year planning period, at least to the level of existing obligations. *Table 2.3* provides the projected water demands by Wholesale Water Providers of all water use categories as entered in the TWDB Database DB07 as required by the TWDB.

2.3.2 County Summary of Projections

The revised projections by county for each municipal WUG are provided in *Table 2.2*, at the end of this chapter, by county and by river basin. *Table 2.5* is a reference table that summarizes which methodology was used for each water demand category in each county within Region H. Unless otherwise stated, the TWDB default population and water demand projection methodologies, as described in *Section 2.2.3*, were used.

Austin

Municipal population projections for Austin County show population increasing from 23,590 in year 2000 to 35,958 in year 2060. This represents a 52 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Austin County, there is a 0.4 and 14 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

The livestock and irrigation demand for Austin County decreased by 19 and 14 percent, respectively. Manufacturing demands ranged from 167 to 288 AFY from 2000 to 2060. The overall manufacturing demand, when compared to the 2001 RWP, decreased slightly in 2060 but increased in decades leading up to 2060. The mining demand increased by over 100 percent during the 6-decade planning period. The 2006 RWP mining demand projection in the year 2000 is lower than the 2001 RWP year 2000 projection.

Brazoria

Municipal population projections for Brazoria County show population increasing from 241,767 in year 2000 to 503,894 in year 2060. This represents a 108 percent increase in projected population over the six decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Brazoria County, there is a 16 and 16.5 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The increase in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation demands have increased by 51 and 14 percent when compared to the 2001 RWP projections, respectively. Brazoria County manufacturing demand projections have increased slightly compared to the 2001 RWP. Mining demands are predicted to increase over the 60-year planning period. Currently, there are no steam-electric power generation demands projected in Brazoria County.

Chambers

Municipal population projections for Chambers County show population increasing from 26,031 in the 2000 decade to 52,535 in the 2060 planning decade. This represents a 102 percent increase in projected population over the 6 decades.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Chambers County, there is a 0.7 percent decrease and 17 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The change in the baseline municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation water demand projections show a decrease of 40 and 8 percent when compared to the 2001 RWP projection values, respectively. The manufacturing and mining demands in Chambers County, when compared to the 2001 RWP, increased by nearly 156 and 528 percent in the 2050 decade, respectively. The steam-electric power generation demand shows a slight increase over the 60-year planning cycle when comparing the 2050 demands from the 2001 RWP and this plan.

Fort Bend

Municipal population projections for Fort Bend County show population increasing from 354,452 in year 2000 to 1,210,945 in year 2060. This represents approximately a 242 percent increase in projected population over the 6 decades of planning.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Fort Bend County, there is a 2 and 10 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Irrigation and manufacturing demands in Fort Bend County have decreased between the 2001 and 2006 plans. The 2006 RWP shows an increase in mining between the 2001 and 2006 water demand projections. Steam-electric power generation demand projections are slightly lower for the 2000 to 2020 decades when comparing the 2001 RWP to this plan, but the overall water demand increases by nearly 58 percent in the 2050 decade between the 2001 and 2006 plans.

Galveston

Municipal population projections for Galveston County show population increasing from 250,158 in year 2000 to 302,774 in year 2060. This represents a 21 percent increase in projected population over the 6 decades.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Galveston County, there is a 4 percent increase and 25 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. Decreases in municipal water demand start to occur in the 2010, 2020, 2030, and 2040 decades. The change in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation demands increased by 127 and 0.08 percent between this plan and the 2001 RWP. Manufacturing demands in Galveston County are expected to increase by 57 percent over the 60-year planning period. However, the projected manufacturing demands are considerably lower when compared to the projections in the 2001 RWP. Projected mining and steam-electric power generation demands increase over the 60-year planning period, and when compared to the 2001 RWP projections, the demands are 580 and 335 precent higher in the 2050 planning decade, respectively.

Harris

Municipal population projections for Harris County show population increasing from 3,400,578 in the 2000-decade to 6,707,202 in the 2060 planning decade. This represents a 97 percent increase in projected population over the 6 decades.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Harris County, there is a 9 percent decrease and 8 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The change in the baseline municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation demand projections have slightly decreased when compared to the 2001 RWP projections, but remain a constant water demand at 1,133- and 15,300 AFY across the 60-year planning period, respectively. Manufacturing demands in Harris County are expected to increase by 37 percent over the 60-year planning period. However, the projected manufacturing demands are considerably lower when compared to the projections in the 2001 RWP. Steam-electric power generation and mining water demands are expected to increase over the 60-year planning period.

Leon

Municipal population projections for Leon County show population increasing from 15,335 in year 2000 to 23,028 in year 2060. This represents a 50 percent increase in projected population over the 6 decades.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Leon County, there is a 19 and 23 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Manufacturing demand projections are expected to increase by more than 100 percent over the 60-year planning period for Leon County. The manufacturing projections have increased by 200 and 519 percent compared to the 2001 RWP projections for the 2000 and 2050 decades, respectively. Leon County did not have a irrigation demand in the 2001 RWP, but has a 542 AFY irrigation demand for each year in the planning period. Livestock demands have decreased slightly between the 2001 and 2006 RWP demand projections. Mining demands are predicted to decrease by 20 percent over the 60-year planning period. There is not a steam-electric power generation demand in Leon County.

Liberty

Municipal population projections for Liberty County show population increasing from 70,154 in year 2000 to 147,845 in year 2060. This represents a 110 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Liberty County, there is a 3 and 21 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock demand projections have increased by 75 percent in the 2006 RWP when compared to the 2001 RWP. The irrigation demand projections in Liberty County have been decreased from 109,905 to 82,901 AFY between the 2001 and 2006 planning cycles. Manufacturing demand projections show a 150 percent increase over the 60-year planning period. The 2006 RWP mining projections are significantly lower compared to 2001 RWP projections, but remain constant near 8,700 AFY over the 60-year planning period. In the 2001 RWP, there was no steam-electric power generation demand in Liberty County, but some growth in steam-electric power generation is expected in the 2006 RWP.

Madison

Municipal population projections for Madison County show population increasing from 12,940 in year 2000 to 17,560 in year 2060. This represents a 36 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Madison County, there is a 37 and 11 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation demand projections in the 2001 and 2006 RWPs have decreased by 46 and 62 percent, respectively. When comparing the 2001 and 2006 RWP manufacturing water demand estimates, there is a 162 and 270 percent manufacturing water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. Mining demand projections are shown to slightly decrease in 2006 RWP, and there is no steam-electric power generation demand projected in the county.

Montgomery

Municipal population projections for Montgomery County show population increasing from 293,768 in year 2000 to 1,331,286 in year 2060. This represents a 353 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Montgomery County, there is an 11 and 25 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The increase in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation demand projections in the 2001 and 2006 RWPs have increased by 21 and 230 percent, respectively. When comparing the 2001 and 2006 RWP manufacturing water demand estimates, there is a 5 percent decrease and 8 percent manufacturing water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. Mining demand projections show an increase of 38 percent and the steam-electric power generation demand is projected to increase 560 percent in the 60-year planning period covered in the 2006 RWP.

Polk

Municipal population projections for Polk County show population increasing from 33,098 in year 2000 to 54,380 in year 2060. This represents a 64 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Polk County, there is a 4 and 6 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. A minor increase occurs in the 2020 decade. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

There are no demands shown for manufacturing, irrigation, and steam-electric power generation in Polk County. Livestock and mining demands are nearly consistent with the projections in the 2001 RWP.

San Jacinto

Municipal population projections for San Jacinto County show population increasing from 22,246 in year 2000 to 41,299 in year 2060. This represents an 86 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for San Jacinto County, there is a 4 and 0.4 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The increase in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

The 2001 and 2006 RWP projections for livestock water demand in San Jacinto County show a 67 percent livestock water demand increase in the 2006 RWP across the 60-year planning period. Irrigation demand in the 2001 RWP was zero, and this has been modified in the 2006 RWP to reflect a demand of 667 AFY across the 60-year planning period. Manufacturing demands are shown to nearly double between the 2001 and 2006 RWPs. Mining demand projections show a lower baseline projection, but the overall trend shows growth in the mining demands, which is the opposite of projections in the 2001 RWP. Currently, no steam-electric power generation demands are projected for San Jacinto County.

Trinity

Municipal population projections for Trinity County show population increasing from 10,380 in year 2000 to 11,673 in year 2060. This represents a 3 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Trinity County, there is a 33 and 34 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock, manufacturing, and mining projected water demands in Trinity County decreased between the 2001 and 2006 RWP projections. Irrigation demands are projected to increase from 4 to 467 AFY between the 2001 and 2006 water estimates. Currently, there are no projected steam-electric power generation demands in the Trinity County.

Walker

Municipal population projections for Walker County show population increasing from 61,578 in year 2000 to 80,737 in year 2060. This represents a 31 percent increase in projected population over the 6-decade planning period.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Walker County, there is a 40 and 33 percent municipal water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively. The increase in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Irrigation, mining, and steam-electric power generation projected water demands in Walker County decreased between the 2001 and 2006 RWP projections. Livestock water demands are projected to increase from 565 to 632 AFY between the 2001 and 2006 water estimates. When comparing the 2001 and 2006 RWP manufacturing water demand estimates for Walker County, there is a 1000 and 1500 percent manufacturing water demand increase in the 2006 RWP for the 2000 and 2050 decades, respectively.

Waller

Municipal population projections for Waller County show population increasing from 32,663 in the 2000 decade to 106,608 in the 2060 planning decade. This represents a 226 percent increase in projected population over the 6 decades.

When comparing the 2001 and 2006 RWP municipal water demand estimates for Waller County, there is a 28 and 49 percent municipal water demand decrease in the 2006 RWP for the 2000 and 2050 decades, respectively. The decrease in municipal water demand is a result of more accurate baseline population projections and per capita water use estimates.

Livestock and irrigation projected water demands in Waller County decreased between the 2001 and 2006 RWP projections. Irrigation demands are projected to decrease from 28,405 to 22,978 AFY between the 2001 and 2006 water estimates. Livestock demands are projected to decrease from 1,238 to 939 AFY between the 2001 and 2006 water estimates. Manufacturing demand projections are projected to increase from 68 AFY in the 2000 decade to 133 AFY in the 2060 decade. These manufacturing demand increases are approximately 50 percent when the projected demands are compared to the 2001 RWP projections. Currently, there are no projected steam-electric power generation demands in Waller County.

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]
H	BELLVILLE	AUSTIN	3,794	4,191	4,567	4,830	4,986	5,061	5,164		
H	COUNTY-OTHER	AUSTIN	12,508	14,619	16,623	18,020	18,850	19,248	19,794		
H	SAN FELIPE	AUSTIN	868	1,106	1,332	1,490	1,584	1,629	1,691		
H	SEALY	AUSTIN	5,248	5,922	6,562	7,008	7,273	7,400	7,574		
H	WALLIS	AUSTIN	1,172	1,335	1,490	1,598	1,662	1,693	1,735		
		AUSTIN Total	**23,590**	**27,173**	**30,574**	**32,946**	**34,355**	**35,031**	**35,958**		
H	ALVIN	BRAZORIA	21,413	23,231	25,123	26,935	28,605	30,375	32,223		
H	ANGLETON	BRAZORIA	18,130	18,951	19,805	20,623	21,377	22,176	23,010		
H	BAILEY'S PRAIRIE	BRAZORIA	694	744	795	844	889	938	988		
H	BRAZORIA	BRAZORIA	2,787	2,845	2,906	2,964	3,017	3,074	3,133		
H	BRAZORIA COUNTY MUD #1	BRAZORIA	4,110	7,517	11,063	14,458	17,587	20,904	24,368		
H	BRAZORIA COUNTY MUD #2	BRAZORIA	2,838	4,857	6,959	8,971	10,826	12,792	14,845		
H	BRAZORIA COUNTY MUD #3	BRAZORIA	2,727	4,987	7,340	9,593	11,669	13,870	16,168		
H	BRAZORIA COUNTY MUD #4	BRAZORIA	3,438	3,438	3,438	3,438	3,438	3,438	3,438		
H	BRAZORIA COUNTY MUD #5	BRAZORIA	4,743	4,743	4,743	4,743	4,743	4,743	4,743		
H	BROOKSIDE VILLAGE	BRAZORIA	1,960	2,282	2,618	2,939	3,235	3,549	3,877		
H	CLUTE	BRAZORIA	10,424	11,217	12,043	12,834	13,563	14,335	15,141		
H	COUNTY-OTHER	BRAZORIA	65,266	61,157	69,005	77,326	84,965	93,088	101,592		
H	DANBURY	BRAZORIA	1,611	1,747	1,888	2,023	2,148	2,280	2,418		
H	FREEPORT	BRAZORIA	12,708	15,794	19,006	22,082	24,917	27,922	31,059		
H	HILLCREST	BRAZORIA	722	744	767	789	810	832	855		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop. [2]	County Split Pop. [3]
H	HOLIDAY LAKES	BRAZORIA	1,095	1,141	1,189	1,235	1,278	1,323	1,370		
H	IOWA COLONY	BRAZORIA	804	911	1,022	1,129	1,227	1,331	1,440		
H	JONES CREEK	BRAZORIA	2,130	2,130	2,130	2,130	2,130	2,130	2,130		
H	LAKE JACKSON	BRAZORIA	26,386	29,383	32,502	35,488	38,241	41,159	44,205		
H	MANVEL	BRAZORIA	3,046	3,046	3,046	3,046	3,046	3,046	3,046		
H	ORBIT SYSTEMS INC	BRAZORIA	3,746	4,717	5,728	6,696	7,589	8,535	9,523	P	P
H	OYSTER CREEK	BRAZORIA	1,192	1,424	1,666	1,897	2,110	2,336	2,572		
H	PEARLAND	BRAZORIA	35,696	63,685	80,689	96,167	110,461	125,585	141,358		P
H	RICHWOOD	BRAZORIA	3,012	3,244	3,486	3,717	3,930	4,156	4,392		
H	SOUTHWEST UTILITIES	BRAZORIA	597	632	668	703	735	769	804	P	P
H	SURFSIDE BEACH	BRAZORIA	763	889	1,020	1,146	1,262	1,385	1,513		
H	SWEENY	BRAZORIA	3,624	3,895	4,177	4,447	4,696	4,960	5,236		
H	VARNER CREEK UD	BRAZORIA	1,850	2,341	2,852	3,341	3,792	4,270	4,769		
H	WEST COLUMBIA	BRAZORIA	4,255	4,158	4,057	3,960	3,871	3,777	3,678		
		BRAZORIA Total	**241,767**	**285,850**	**331,731**	**375,664**	**416,157**	**459,078**	**503,894**		
H	ANAHUAC	CHAMBERS	2,210	2,405	2,623	2,825	3,000	3,178	3,360		
H	BAYTOWN	CHAMBERS	3,154	3,541	3,972	4,373	4,720	5,072	5,433		P
H	BEACH CITY	CHAMBERS	1,645	2,358	3,153	3,892	4,532	5,182	5,848		
H	COUNTY-OTHER	CHAMBERS	3,841	3,788	3,728	3,673	3,627	3,578	3,527		
H	MONT BELVIEU	CHAMBERS	2,324	3,224	4,227	5,160	5,968	6,788	7,628		
H	OLD RIVER-WINFREE	CHAMBERS	1,364	1,482	1,613	1,735	1,841	1,948	2,058		
H	TRINITY BAY CONSERVATION DISTRICT	CHAMBERS	11,493	14,577	18,012	21,209	23,979	26,789	29,667		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
		CHAMBERS Total	**26,031**	**31,375**	**37,328**	**42,867**	**47,667**	**52,535**	**57,521**		
H	ARCOLA	FORT BEND	1,048	2,500	2,750	3,025	3,328	3,661	4,026		
H	BEASLEY	FORT BEND	590	701	815	955	1,099	1,288	1,504		
H	BIG OAKS MUD	FORT BEND	2,055	4,215	6,453	9,190	12,004	15,695	19,913		
H	CINCO MUD #2	FORT BEND	3,971	8,145	12,471	17,760	23,198	30,330	38,480		
H	CINCO MUD #6	FORT BEND	1,139	2,336	3,577	5,094	6,654	8,700	11,038		P
H	CINCO MUD #7	FORT BEND	2,711	5,560	8,513	12,124	15,837	20,706	26,270		
H	CINCO MUD #8	FORT BEND	2,395	3,500	3,500	3,500	3,500	3,500	3,500		
H	CINCO MUD #9	FORT BEND	3,373	6,918	10,592	15,085	19,704	25,762	32,685		P
H	CORNERSTONES MUD	FORT BEND	1,740	2,870	4,041	5,473	6,945	8,876	11,082		P
H	COUNTY-OTHER	FORT BEND	**38,168**	**64,065**	**120,315**	**196,004**	**274,061**	**388,409**	**503,197**		
H	FAIRCHILDS	FORT BEND	678	929	1,189	1,507	1,834	2,263	2,754		
H	FIRST COLONY MUD #9	FORT BEND	6,171	8,561	8,561	8,561	8,561	8,561	8,561		
H	FORT BEND COUNTY MUD #106	FORT BEND	2,562	3,285	3,285	3,285	3,285	3,285	3,285		
H	FORT BEND COUNTY MUD #108	FORT BEND	2,490	2,817	2,817	2,817	2,817	2,817	2,817		
H	FORT BEND COUNTY MUD #111	FORT BEND	3,315	3,315	3,315	3,315	3,315	3,315	3,315		
H	FORT BEND COUNTY MUD #2	FORT BEND	8,308	9,792	9,792	9,792	9,792	9,792	9,792		
H	FORT BEND COUNTY MUD #23	FORT BEND	2,961	5,968	9,084	12,895	16,813	21,952	27,824		
H	FORT BEND COUNTY MUD #25	FORT BEND	6,700	11,336	16,141	22,016	28,057	35,979	45,032		
H	FORT BEND COUNTY MUD #30	FORT BEND	2,937	3,962	5,024	6,323	7,658	9,409	11,410		
H	FORT BEND COUNTY MUD #37	FORT BEND	1,367	2,362	3,394	4,655	5,952	7,653	9,597		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop. [2]	County Split Pop. [3]
H	FORT BEND COUNTY MUD #41	FORT BEND	3,453	6,144	8,933	12,343	15,849	20,447	25,701		
H	FORT BEND COUNTY MUD #67	FORT BEND	3,306	3,306	3,306	3,306	3,306	3,306	3,306		
H	FORT BEND COUNTY MUD #68	FORT BEND	3,717	3,717	3,717	3,717	3,717	3,717	3,717		
H	FORT BEND COUNTY MUD #69	FORT BEND	1,701	1,701	1,701	1,701	1,701	1,701	1,701		
H	FORT BEND COUNTY MUD #81	FORT BEND	1,371	2,054	2,762	3,628	4,518	5,685	7,019		
H	FULSHEAR	FORT BEND	716	883	1,056	1,268	1,486	1,772	2,098		
H	GRAND LAKES MUD #4	FORT BEND	1,874	3,844	5,885	8,381	10,947	14,313	18,159		
H	HOUSTON	FORT BEND	33,360	39,890	46,657	54,931	63,439	74,596	87,345		P
H	KATY	FORT BEND	889	1,078	1,274	1,514	1,761	2,084	2,453		P
H	KINGSBRIDGE MUD	FORT BEND	4,547	6,371	8,262	10,574	12,952	16,070	19,633		P
H	MEADOWS	FORT BEND	4,912	4,912	4,912	4,912	4,912	4,912	4,912		
H	MISSOURI CITY	FORT BEND	47,419	76,758	96,601	115,617	134,918	148,313	179,508		P
H	NEEDVILLE	FORT BEND	2,609	3,040	3,486	4,032	4,593	5,329	6,171		
H	NORTH MISSION GLEN MUD	FORT BEND	4,340	7,587	10,952	15,066	19,296	24,844	31,184		
H	ORBIT SYSTEMS INC	FORT BEND	144	163	183	207	232	264	301	P	P
H	PECAN GROVE MUD #1	FORT BEND	12,639	12,936	13,245	13,622	14,009	14,518	15,099		
H	PLANTATION MUD	FORT BEND	3,972	4,130	4,130	4,130	4,130	4,130	4,130		
H	PLEAK	FORT BEND	947	1,158	1,377	1,645	1,920	2,281	2,694		
H	RICHMOND	FORT BEND	11,081	12,173	13,305	14,689	16,112	17,978	20,110		
H	ROSENBERG	FORT BEND	24,043	28,100	32,305	37,446	42,732	49,665	57,587		
H	SIENNA PLANTATION MUD #2	FORT BEND	2,763	5,667	7,000	7,000	7,000	7,000	7,000		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	SIMONTON	FORT BEND	718	719	720	721	722	724	726		
H	STAFFORD	FORT BEND	15,371	23,026	30,959	40,659	50,633	63,714	78,661		P
H	SUGAR LAND	FORT BEND	63,328	72,500	72,500	72,500	72,500	72,500	72,500		
H	WHCRWA (CRU)	FORT BEND	10,553	15,078	19,767	25,501	31,397	39,129	47,964		P
		FORT BEND Total	**354,452**	**490,072**	**630,624**	**802,486**	**979,196**	**1,210,945**	**1,475,761**		
H	BACLIFF MUD	GALVESTON	7,014	7,816	8,509	8,919	9,085	9,209	9,289		
H	BAYOU VISTA	GALVESTON	1,644	1,816	1,964	2,052	2,088	2,114	2,131		
H	BOLIVAR PENINSULAR SUD	GALVESTON	3,853	4,266	4,622	4,833	4,918	4,982	5,023		
H	CLEAR LAKE SHORES	GALVESTON	1,205	1,263	1,313	1,343	1,355	1,364	1,370		
H	COUNTY-OTHER	GALVESTON	9,792	8,523	7,429	6,781	6,517	6,322	6,196		
H	DICKINSON	GALVESTON	17,093	19,955	22,425	23,888	24,480	24,921	25,208		
H	FRIENDSWOOD	GALVESTON	21,237	24,553	27,415	29,110	29,796	30,307	30,639		P
H	GALVESTON	GALVESTON	57,247	57,247	57,247	57,247	57,247	57,247	57,247		
H	GALVESTON COUNTY MUD #1	GALVESTON	2,823	3,493	4,071	4,413	4,552	4,655	4,722		
H	GALVESTON COUNTY WCID #12	GALVESTON	1,386	1,641	1,861	1,992	2,045	2,084	2,110		
H	HITCHCOCK	GALVESTON	6,386	6,660	6,897	7,037	7,094	7,136	7,163		
H	JAMAICA BEACH	GALVESTON	1,075	1,314	1,520	1,642	1,691	1,728	1,752		
H	KEMAH	GALVESTON	2,330	2,985	3,550	3,885	4,021	4,122	4,188		
H	LA MARQUE	GALVESTON	13,682	13,682	13,682	13,682	13,682	13,682	13,682		
H	LEAGUE CITY	GALVESTON	45,306	53,403	60,392	64,532	66,207	67,454	68,265		P
H	SAN LEON MUD	GALVESTON	6,000	6,795	7,481	7,887	8,051	8,173	8,253		
H	SANTA FE	GALVESTON	9,548	10,141	10,653	10,956	11,079	11,170	11,229		
H	TEXAS CITY	GALVESTON	41,521	41,891	42,211	42,400	42,477	42,534	42,571		
H	TIKI ISLAND	GALVESTON	1,016	1,270	1,489	1,619	1,672	1,711	1,736		
		GALVESTON Total	**250,158**	**268,714**	**284,731**	**294,218**	**298,057**	**300,915**	**302,774**		
H	BAYTOWN	HARRIS	63,276	65,231	67,134	69,007	70,861	72,703	74,538		P

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop. [2]	County Split Pop. [3]
H	BELLAIRE	HARRIS	15,642	17,272	18,859	20,420	21,965	23,500	25,029		
H	BLUE BELL MANOR UTILITY COMPANY	HARRIS	2,592	2,592	2,592	2,592	2,592	2,592	2,592		
H	BRITMOORE UTILITIES	HARRIS	1,668	2,061	2,444	2,821	3,194	3,565	3,934		
H	BUNKER HILL VILLAGE	HARRIS	3,654	3,750	3,750	3,750	3,750	3,750	3,750		
H	CANDLELIGHT HILLS SUBDIVISION	HARRIS	1,758	2,213	2,656	3,092	3,523	3,952	4,379		
H	CHIMNEY HILL MUD	HARRIS	5,128	6,412	6,412	6,412	6,412	6,412	6,412		
H	CINCO MUD #6	HARRIS	515	982	1,437	1,884	2,327	2,767	3,205		P
H	CINCO MUD #9	HARRIS	599	1,100	1,588	2,068	2,543	3,015	3,485		P
H	CLEAR BROOK CITY MUD WOODMEADOWS	HARRIS	8,943	10,417	11,852	13,263	14,660	16,048	17,431		
H	CONSUMERS WATER INC	HARRIS	2,667	4,243	5,778	7,288	8,782	10,267	11,746		P
H	CORNERSTONES MUD	HARRIS	2,628	3,947	5,231	6,494	7,744	8,986	10,224		P
H	COUNTY-OTHER	HARRIS	76,009	65,312	51,260	46,837	73,208	101,852	129,437		
H	CROSBY MUD	HARRIS	3,162	3,162	3,162	3,162	3,162	3,162	3,162		
H	CRYSTAL SPRNGS WATER COMPANY	HARRIS	158	234	308	381	453	525	596		P
H	DEER PARK	HARRIS	28,520	29,513	30,480	31,432	32,374	33,309	34,241		
H	EL DORADO UD	HARRIS	2,952	3,350	3,737	4,118	4,495	4,870	5,243		
H	EL LAGO	HARRIS	3,075	3,075	3,075	3,075	3,075	3,075	3,075		
H	FALLBROOK UD	HARRIS	6,065	7,487	8,872	10,234	11,582	12,922	14,257		
H	FOUNTAINVIEW SUBDIVISION	HARRIS	2,444	2,984	3,510	4,027	4,539	5,048	5,555		
H	FRIENDSWOOD	HARRIS	7,800	7,800	7,800	7,800	7,800	7,800	7,800		P
H	GALENA PARK	HARRIS	10,592	11,099	11,592	12,077	12,557	13,034	13,510		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	GREEN TRAILS MUD	HARRIS	2,293	2,694	3,084	3,468	3,848	4,225	4,601		
H	HARRIS COUNTY FWSD #47	HARRIS	4,290	4,290	4,290	4,290	4,290	4,290	4,290		
H	HARRIS COUNTY FWSD #51	HARRIS	16,884	18,866	18,866	18,866	18,866	18,866	18,866		
H	HARRIS COUNTY FWSD #6	HARRIS	3,000	3,722	4,424	5,115	5,799	6,479	7,156		
H	HARRIS COUNTY MUD #11	HARRIS	2,444	2,905	3,354	3,796	4,233	4,668	5,101		
H	HARRIS COUNTY MUD #119 INWOOD NORTH	HARRIS	6,633	8,079	8,725	8,725	8,725	8,725	8,725		
H	HARRIS COUNTY MUD #132	HARRIS	6,963	9,436	11,844	14,212	16,556	18,885	21,206		
H	HARRIS COUNTY MUD #150	HARRIS	8,352	9,606	10,827	12,028	13,216	14,397	15,573		
H	HARRIS COUNTY MUD #151	HARRIS	4,986	7,392	7,392	7,392	7,392	7,392	7,392		
H	HARRIS COUNTY MUD #152	HARRIS	4,062	5,956	7,800	9,614	11,410	13,195	14,973		
H	HARRIS COUNTY MUD #153	HARRIS	4,212	6,887	9,491	12,053	14,589	17,109	19,619		
H	HARRIS COUNTY MUD #154	HARRIS	4,785	6,485	8,141	9,769	11,381	12,983	14,579		
H	HARRIS COUNTY MUD #158	HARRIS	3,918	5,487	7,015	7,015	7,015	7,015	7,015		
H	HARRIS COUNTY MUD #180	HARRIS	4,027	5,339	6,616	7,872	9,115	10,351	11,582		
H	HARRIS COUNTY MUD #189	HARRIS	4,965	6,588	8,169	9,724	11,263	12,792	14,316		
H	HARRIS COUNTY MUD #200	HARRIS	9,339	16,788	24,041	31,175	38,236	45,253	52,244		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop. [2]	County Split Pop. [3]
H	HARRIS COUNTY MUD #23	HARRIS	0	0	0	0	0	0	0		
H	HARRIS COUNTY MUD #261	HARRIS	1,374	1,374	1,374	1,374	1,374	1,374	1,374		
H	HARRIS COUNTY MUD #33	HARRIS	4,977	5,800	6,601	7,389	8,169	8,944	9,716		
H	HARRIS COUNTY MUD #345	HARRIS	3,879	5,285	5,285	5,285	5,285	5,285	5,285		
H	HARRIS COUNTY MUD #46	HARRIS	4,140	6,326	6,326	6,326	6,326	6,326	6,326		
H	HARRIS COUNTY MUD #5	HARRIS	4,062	4,062	4,062	4,062	4,062	4,062	4,062		
H	HARRIS COUNTY MUD #50	HARRIS	3,048	3,334	3,612	3,885	4,156	4,425	4,693		
H	HARRIS COUNTY MUD #53	HARRIS	13,181	17,972	22,637	27,225	31,767	36,281	40,778		
H	HARRIS COUNTY MUD #55	HARRIS	11,556	11,556	11,556	11,556	11,556	11,556	11,556		
H	HARRIS COUNTY MUD #8	HARRIS	5,469	6,225	6,961	7,685	8,402	9,114	9,823		
H	HARRIS COUNTY UD #14	HARRIS	1,522	1,699	1,871	2,040	2,208	2,375	2,541		
H	HARRIS COUNTY UD #15	HARRIS	2,712	3,259	3,792	4,316	4,835	5,351	5,865		
H	HARRIS COUNTY WCID #1	HARRIS	8,004	9,665	11,283	12,874	14,449	16,014	17,573		
H	HARRIS COUNTY WCID #109	HARRIS	0	0	0	0	0	0	0		
H	HARRIS COUNTY WCID #133	HARRIS	4,502	4,577	4,652	4,727	4,802	4,877	4,877		
H	HARRIS COUNTY WCID #21	HARRIS	9,500	10,120	10,724	11,318	11,906	12,490	13,072		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	HARRIS COUNTY WCID #36	HARRIS	9,300	10,451	11,572	12,674	13,765	14,849	15,929		
H	HARRIS COUNTY WCID #50	HARRIS	4,100	4,700	5,284	5,859	6,428	6,993	7,556		
H	HARRIS COUNTY WCID #76	HARRIS	1,788	1,788	1,788	1,788	1,788	1,788	1,788		
H	HARRIS COUNTY WCID #84	HARRIS	2,430	2,475	2,519	2,562	2,605	2,648	2,691		
H	HEDWIG VILLAGE	HARRIS	2,334	2,334	2,334	2,334	2,334	2,334	2,334		
H	HILSHIRE VILLAGE	HARRIS	720	770	770	770	770	770	770		
H	HOUSTON	HARRIS	1,919,813	2,199,988	2,472,783	2,741,099	3,006,695	3,270,641	3,533,585		P
H	HUMBLE	HARRIS	14,579	16,862	19,085	21,272	23,436	25,587	27,730		
H	HUNTERS CREEK VILLAGE	HARRIS	4,374	4,755	5,126	5,491	5,852	6,211	6,568		
H	JACINTO CITY	HARRIS	10,302	11,171	12,017	12,849	13,673	14,492	15,308		
H	JERSEY VILLAGE	HARRIS	6,880	8,742	10,555	12,338	14,103	15,857	17,604		
H	KATY	HARRIS	10,082	13,372	16,576	19,727	22,846	25,946	29,034		P
H	KINGSBRIDGE MUD	HARRIS	1,074	1,353	1,625	1,892	2,157	2,420	2,682		P
H	LA PORTE	HARRIS	31,880	35,467	38,960	42,394	45,794	49,173	52,539		
H	LEAGUE CITY	HARRIS	138	143	147	151	155	159	163		P
H	LONGHORN TOWN UD	HARRIS	1,038	1,907	2,753	3,585	4,409	5,228	6,044		
H	MASON CREEK UD	HARRIS	8,600	9,050	9,050	9,050	9,050	9,050	9,050		
H	MISSOURI CITY	HARRIS	5,494	6,887	8,243	9,577	10,898	12,210	13,517		P
H	NASSAU BAY	HARRIS	4,170	4,170	4,170	4,170	4,170	4,170	4,170		
H	NHCRWA (CRU)	HARRIS	410,523	524,304	634,767	741,167	846,439	951,057	1,055,278		
H	NORTH BELT UD	HARRIS	2,600	3,916	5,197	6,457	7,705	8,945	10,180		
H	NORTH GREEN MUD	HARRIS	3,060	3,503	3,935	4,359	4,779	5,197	5,613		
H	NORTHWEST HARRIS COUNTY MUD #23	HARRIS	3,231	4,482	5,700	6,898	8,084	9,262	10,436		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop. [2]	County Split Pop. [3]
H	NORTHWEST PARK MUD	HARRIS	9,693	10,999	12,271	13,522	14,760	15,990	17,216		
H	PARKWAY UD	HARRIS	2,889	2,911	2,932	2,953	2,974	2,994	3,014		
H	PASADENA	HARRIS	141,674	161,678	181,156	200,314	219,278	238,124	256,898		
H	PEARLAND	HARRIS	1,944	2,364	2,773	3,175	3,573	3,968	4,362		P
H	PINE TRAILS UTILITY	HARRIS	5,553	6,166	6,763	7,350	7,931	8,508	9,083		
H	PINEY POINT VILLAGE	HARRIS	3,380	3,546	3,708	3,867	4,024	4,180	4,336		
H	ROLLING FORK PUD	HARRIS	2,334	2,453	2,571	2,689	2,808	2,926	3,044		
H	SEABROOK	HARRIS	9,443	11,943	14,377	16,771	19,141	21,496	23,842		
H	SHOREACRES	HARRIS	1,488	1,644	1,796	1,945	2,093	2,093	2,093		
H	SOUTH HOUSTON	HARRIS	15,833	17,307	18,742	20,153	21,550	22,938	24,321		
H	SOUTHSIDE PLACE	HARRIS	1,546	1,686	1,822	1,956	2,088	2,220	2,351		
H	SOUTHWEST UTILITIES	HARRIS	5,335	6,341	7,321	8,285	9,239	10,187	11,131	P	P
H	SPRING VALLEY	HARRIS	3,611	3,810	4,003	4,193	4,381	4,568	4,754		
H	STAFFORD	HARRIS	310	313	316	319	322	325	328		P
H	SUNBELT FWSD	HARRIS	19,533	24,141	28,628	33,041	37,409	41,750	46,075		
H	TAYLOR LAKE VILLAGE	HARRIS	3,694	4,004	4,004	4,004	4,004	4,004	4,004		
H	TOMBALL	HARRIS	9,089	12,059	15,429	18,150	22,954	26,554	31,650		
H	TRAIL OF THE LAKES MUD	HARRIS	4,086	10,970	10,970	10,970	10,970	10,970	10,970		
H	WALLER	HARRIS	388	586	778	967	1,154	1,340	1,525		P
H	WEBSTER	HARRIS	9,083	13,076	16,964	20,788	24,573	28,334	32,081		
H	WEST HARRIS COUNTY MUD #6	HARRIS	1,769	3,500	3,500	3,500	3,500	3,500	3,500		
H	WEST UNIVERSITY PL.	HARRIS	14,211	15,381	16,520	17,641	18,750	19,852	20,950		
H	WHCRWA (CRU)	HARRIS	245,708	282,352	355,073	433,235	483,377	535,519	589,071		P

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	WILLOW RUN SUBDIVISION	HARRIS	3,663	3,663	3,663	3,663	3,663	3,663	3,663		
H	WINDFERN FOREST UD	HARRIS	4,491	6,584	8,622	8,622	8,622	8,622	8,622		
H	WOODCREEK MUD	HARRIS	2,394	3,605	4,784	5,944	7,092	8,233	9,369		
		HARRIS Total	**3,400,578**	**3,951,682**	**4,502,786**	**5,053,890**	**5,604,994**	**6,156,098**	**6,707,202**		
H	BUFFALO	LEON	1,804	2,074	2,345	2,506	2,516	2,501	2,521		
H	CENTERVILLE	LEON	903	1,002	1,101	1,160	1,164	1,158	1,165		
H	COUNTY-OTHER	LEON	7,310	8,035	8,763	9,195	9,222	9,183	9,239		
H	FLO COMMUNITY WSC	LEON	3,782	5,335	6,894	7,820	7,878	7,791	7,908	P	P
H	JEWETT	LEON	861	1,071	1,281	1,405	1,413	1,401	1,417		
H	NORMANGEE	LEON	675	714	753	777	778	775	778		P
		LEON Total	**15,335**	**18,231**	**21,137**	**22,863**	**22,971**	**22,809**	**23,028**		
H	AMES	LIBERTY	1,079	1,140	1,207	1,271	1,334	1,403	1,480		
H	CLEVELAND	LIBERTY	7,605	7,930	8,288	8,631	8,967	9,336	9,749		
H	COUNTY-OTHER	LIBERTY	39,529	48,621	58,633	68,237	77,645	87,959	99,518		
H	DAISETTA	LIBERTY	1,034	1,078	1,127	1,173	1,219	1,268	1,324		
H	DAYTON	LIBERTY	5,709	6,160	6,656	7,132	7,598	8,109	8,682		
H	HARDIN	LIBERTY	755	885	1,028	1,165	1,299	1,446	1,611		
H	HARDIN WSC	LIBERTY	2,600	3,184	3,828	4,445	5,050	5,713	6,456		
H	KENEFICK	LIBERTY	667	824	997	1,163	1,325	1,503	1,702		
H	LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	LIBERTY	1,479	1,670	1,880	2,081	2,278	2,494	2,736	P	P
H	LIBERTY	LIBERTY	8,033	8,265	8,520	8,765	9,005	9,268	9,563		
H	MERCY WSC	LIBERTY	333	404	482	557	630	710	800		P
H	PLUM GROVE	LIBERTY	930	1,234	1,569	1,890	2,205	2,550	2,937		
H	SOUTHWEST UTILITIES	LIBERTY	100	123	148	172	196	222	251	P	P
H	WEST HARDIN WSC	LIBERTY	301	412	535	653	768	894	1,036	P	P

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
		LIBERTY Total	**70,154**	**81,930**	**94,898**	**107,335**	**119,519**	**132,875**	**147,845**		
H	COUNTY-OTHER	MADISON	8,737	9,419	10,104	10,649	11,158	11,609	12,004		
H	MADISONVILLE	MADISON	4,159	4,442	4,725	4,951	5,162	5,349	5,512		
H	NORMANGEE	MADISON	44	44	44	44	44	44	44		P
		MADISON Total	**12,940**	**13,905**	**14,873**	**15,644**	**16,364**	**17,002**	**17,560**		
H	CONROE	MONTGOMERY	36,811	49,602	57,413	72,685	90,440	113,860	141,060		
H	CONSUMERS WATER INC	MONTGOMERY	1,623	2,236	2,610	3,342	4,193	5,316	6,620		P
H	COUNTY-OTHER	MONTGOMERY	99,788	156,912	198,870	287,661	391,340	**535,846**	**703,682**		
H	CRYSTAL SPRNGS WATER COMPANY	MONTGOMERY	3,781	6,212	7,696	10,598	13,972	18,422	23,591		P
H	CUT AND SHOOT	MONTGOMERY	1,158	1,515	1,733	2,159	2,655	3,309	4,068		
H	EAST PLANTATION UD	MONTGOMERY	1,400	2,240	2,753	3,756	4,922	6,460	8,246		
H	H M W SUD	MONTGOMERY	8,450	10,987	12,536	15,565	19,086	23,731	29,126		
H	HOUSTON	MONTGOMERY	458	1,096	1,486	2,248	3,134	4,303	5,661		P
H	MAGNOLIA	MONTGOMERY	1,111	1,350	1,496	1,782	2,114	2,552	3,061		
H	MONTGOMERY COUNTY MUD #18	MONTGOMERY	2,601	6,243	8,467	12,815	17,870	24,538	32,282		
H	MONTGOMERY COUNTY MUD #19	MONTGOMERY	3,200	3,200	3,200	3,200	3,200	3,200	3,200		
H	MONTGOMERY COUNTY MUD #8	MONTGOMERY	3,042	4,439	5,292	6,960	8,900	11,458	14,429		
H	MONTGOMERY COUNTY MUD #9	MONTGOMERY	1,827	3,058	3,810	5,279	6,987	9,240	11,857		
H	MONTGOMERY COUNTY UD #2	MONTGOMERY	1,986	2,937	2,937	2,937	2,937	2,937	2,937		
H	MONTGOMERY COUNTY UD #3	MONTGOMERY	3,160	3,636	3,927	4,495	5,156	6,028	7,040		
H	MONTGOMERY COUNTY UD #4	MONTGOMERY	3,165	4,686	4,686	4,686	4,686	4,686	4,686		

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	MONTGOMERY COUNTY WCID #1	MONTGOMERY	3,500	4,053	4,391	5,051	5,819	6,832	8,008		
H	NEW CANEY MUD	MONTGOMERY	9,363	14,237	17,213	23,032	29,797	38,720	49,084		
H	OAK RIDGE NORTH	MONTGOMERY	2,991	3,743	4,202	5,100	6,144	7,521	9,120		
H	PANORAMA VILLAGE	MONTGOMERY	1,965	2,538	2,888	3,572	3,913	3,913	3,913		
H	PATTON VILLAGE	MONTGOMERY	1,391	1,721	1,923	2,318	2,777	3,382	4,085		
H	POINT AQUARIUS MUD	MONTGOMERY	1,587	3,246	4,259	6,240	8,543	11,581	15,109		
H	PORTER WSC	MONTGOMERY	10,348	14,336	16,771	21,532	27,067	**27,067**	**27,067**		
H	RAYFORD ROAD MUD	MONTGOMERY	7,625	16,556	16,556	16,556	16,556	16,556	16,556		
H	RIVER PLANTATION MUD	MONTGOMERY	3,160	3,286	3,286	3,286	3,286	3,286	3,286		
H	ROMAN FOREST	MONTGOMERY	1,279	1,623	1,833	2,244	2,722	3,353	4,085		
H	SHENANDOAH	MONTGOMERY	1,503	1,503	1,503	1,503	1,503	1,503	1,503		
H	SOUTHERN MONTGOMERY COUNTY MUD	MONTGOMERY	6,529	10,365	12,708	12,708	12,708	12,708	12,708		
H	SOUTHWEST UTILITIES	MONTGOMERY	1,541	2,149	2,520	3,245	4,088	5,201	6,493	P	P
H	SPLENDORA	MONTGOMERY	1,275	2,017	2,470	3,356	4,386	5,745	7,323		
H	SPRING CREEK UD	MONTGOMERY	3,186	4,987	6,087	8,237	10,736	14,033	17,862		
H	STANLEY LAKE MUD	MONTGOMERY	2,025	3,903	5,015	5,015	5,015	5,015	5,015		
H	THE WOODLANDS (CRU/CDP)	MONTGOMERY	55,649	60,080	111,470	119,300	119,300	119,300	119,300		
H	WILLIS	MONTGOMERY	3,985	5,695	6,739	8,780	11,153	14,283	17,918		
H	WOODBRANCH	MONTGOMERY	1,305	1,305	1,305	1,305	1,305	1,305	1,305		
		MONTGOMERY Total	**293,768**	**417,692**	**542,051**	**692,548**	**858,410**	**1,077,190**	**1,331,286**		
H	COUNTY-OTHER	POLK	10,836	13,130	15,422	17,228	18,630	20,129	21,563	P	

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
H	LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	POLK	12,091	13,706	15,319	16,590	17,577	18,632	19,641	P	P
H	LIVINGSTON	POLK	5,433	5,609	5,784	5,922	6,029	6,144	6,254		
H	ONALASKA	POLK	1,174	1,363	1,552	1,701	1,817	1,941	2,059		
H	ONALASKA WSC	POLK	3,498	3,764	4,029	4,238	4,400	4,573	4,739		
H	TRINITY RURAL WSC	POLK	66	78	90	100	108	116	124		P
		POLK Total	**33,098**	**37,650**	**42,196**	**45,779**	**48,561**	**51,535**	**54,380**	**P**	
H	COLDSPRING	SAN JACINTO	691	826	958	1,064	1,130	1,168	1,186		
H	COUNTY-OTHER	SAN JACINTO	9,985	11,698	13,379	14,723	15,561	16,046	16,266		
H	LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	SAN JACINTO	3,419	4,632	5,822	6,773	7,366	7,710	7,866	P	P
H	MERCY WSC	SAN JACINTO	1,422	1,820	2,211	2,523	2,718	2,831	2,882		P
H	POINT BLANK	SAN JACINTO	559	662	763	843	893	922	935		
H	RIVERSIDE WSC	SAN JACINTO	1,219	1,887	2,542	3,066	3,393	3,582	3,668		P
H	SAN JACINTO WSC	SAN JACINTO	2,922	3,697	4,457	5,065	5,444	5,663	5,763		
H	SHEPHERD	SAN JACINTO	2,029	2,221	2,409	2,560	2,654	2,708	2,733		
		SAN JACINTO Total	**22,246**	**27,443**	**32,541**	**36,617**	**39,159**	**40,630**	**41,299**		
H	COUNTY-OTHER	TRINITY	2,571	2,866	3,092	3,167	3,129	3,005	2,891	P	
H	GROVETON	TRINITY	565	630	680	696	688	660	635	P	
H	LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	1,501	1,673	1,805	1,849	1,826	1,754	1,688	P	P
H	TRINITY	TRINITY	2,721	3,033	3,273	3,352	3,311	3,180	3,060		
H	TRINITY RURAL WSC	TRINITY	3,022	3,369	3,635	3,722	3,677	3,532	3,399		P

REGION	WATER USER GROUP	COUNTY NAME	P2000 [1]	P2010	P2020	P2030	P2040	P2050	P2060	Region Split Pop.[2]	County Split Pop.[3]
		TRINITY Total	**10,380**	**11,571**	**12,485**	**12,786**	**12,631**	**12,131**	**11,673**	**P**	
H	CONSOLIDATED WSC	WALKER	87	100	110	115	113	114	114	P	P
H	COUNTY-OTHER	WALKER	14,950	17,107	18,861	19,705	19,499	19,543	19,543		
H	HUNTSVILLE	WALKER	35,078	40,141	44,255	46,236	45,750	45,858	45,858		
H	LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	WALKER	384	439	484	506	501	502	502	P	P
H	NEW WAVERLY	WALKER	950	1,087	1,199	1,252	1,239	1,242	1,242		
H	RIVERSIDE WSC	WALKER	3,656	4,184	4,612	4,819	4,768	4,780	4,780		P
H	TRINITY RURAL WSC	WALKER	233	267	294	307	304	305	305		P
H	WALKER COUNTY RURAL WSC	WALKER	6,420	7,347	8,100	8,462	8,373	8,393	8,393		
		WALKER Total	**61,758**	**70,672**	**77,915**	**81,402**	**80,547**	**80,737**	**80,737**		
H	BROOKSHIRE	WALLER	3,450	3,930	4,499	5,133	5,838	6,678	7,642		
H	COUNTY-OTHER	WALLER	16,755	22,746	29,844	37,747	46,540	57,010	69,038		
H	HEMPSTEAD	WALLER	4,691	5,724	6,947	8,309	9,825	11,630	13,703		
H	KATY	WALLER	804	804	804	804	804	804	804		P
H	PINE ISLAND	WALLER	849	1,102	1,402	1,736	2,107	2,549	3,057		
H	PRAIRIE VIEW	WALLER	4,410	4,780	5,217	5,704	6,247	6,893	7,634		
H	WALLER	WALLER	1,704	2,051	2,462	2,919	3,428	4,034	4,730		P
		WALLER Total	**32,663**	**41,137**	**51,175**	**62,352**	**74,789**	**89,598**	**106,608**		
		REGION H TOTAL	**4,848,918**	**5,775,097**	**6,707,045**	**7,679,397**	**8,653,377**	**9,739,109**	**10,897,526**		

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 Water User Group (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 Water User Group (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 02/17/2004

Table 2.2
Water Demand by City and Category

WUG Name	WUG Basin	WUG County	WUG ID	Water Demand (acre-feet/year)						
				2000	2010	2020	2030	2040	2050	2060
BELLVILLE	BRAZOS	AUSTIN	080048000	884	958	1028	1071	1089	1100	1122
COUNTY-OTHER	BRAZOS	AUSTIN	080757000	1240	1396	1526	1622	1662	1679	1727
COUNTY-OTHER	BRAZOS-COLORADO	AUSTIN	080757000	249	281	307	326	334	338	347
COUNTY-OTHER	COLORADO	AUSTIN	080757000	23	26	29	31	31	32	33
IRRIGATION	BRAZOS	AUSTIN	081004000	743	743	743	743	743	743	743
IRRIGATION	BRAZOS-COLORADO	AUSTIN	081004000	9874	9874	9874	9874	9874	9874	9874
LIVESTOCK	BRAZOS	AUSTIN	081005000	1211	1211	1211	1211	1211	1211	1211
LIVESTOCK	BRAZOS-COLORADO	AUSTIN	081005000	339	339	339	339	339	339	339
LIVESTOCK	COLORADO	AUSTIN	081005000	65	65	65	65	65	65	65
MANUFACTURING	BRAZOS	AUSTIN	081001000	137	172	191	208	223	236	257
MANUFACTURING	BRAZOS-COLORADO	AUSTIN	081001000	30	38	42	45	49	52	56
MINING	BRAZOS	AUSTIN	081003000	33	40	44	47	49	51	53
MINING	BRAZOS-COLORADO	AUSTIN	081003000	3	4	4	4	4	5	5
MINING	COLORADO	AUSTIN	081003000	6	7	8	8	9	9	9
SAN FELIPE	BRAZOS	AUSTIN	080954000	102	124	145	159	167	170	176
SEALY	BRAZOS	AUSTIN	080549000	876	955	1029	1083	1100	1111	1137
WALLIS	BRAZOS-COLORADO	AUSTIN	080630000	161	178	194	202	207	209	214
ALVIN	SAN JACINTO-BRAZOS	BRAZORIA	080013000	2974	3123	3293	3440	3557	3743	3970
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000	2071	2102	2108	2125	2131	2186	2268
BAILEY'S PRAIRIE	SAN JACINTO-BRAZOS	BRAZORIA	080817000	72	75	78	80	82	85	90
BAILEY'S PRAIRIE	BRAZOS	BRAZORIA	080817000	14	15	15	15	16	17	17
BRAZORIA	BRAZOS	BRAZORIA	080072000	70	68	67	66	64	65	66
BRAZORIA	BRAZOS-COLORADO	BRAZORIA	080072000	217	212	209	206	199	201	205
BRAZORIA COUNTY MUD #1	SAN JACINTO-BRAZOS	BRAZORIA	084030000	479	842	1214	1587	1911	2271	2648
BRAZORIA COUNTY MUD #2	BRAZOS	BRAZORIA	084031000	664	1115	1590	2050	2462	2909	3376
BRAZORIA COUNTY MUD #3	SAN JACINTO-BRAZOS	BRAZORIA	084032000	345	603	872	1139	1372	1631	1902
BRAZORIA COUNTY MUD #4	SAN JACINTO-BRAZOS	BRAZORIA	084033000	593	578	570	562	558	558	558
BRAZORIA COUNTY MUD #5	SAN JACINTO-BRAZOS	BRAZORIA	084034000	707	680	669	659	653	653	653
BROOKSIDE VILLAGE	SAN JACINTO-BRAZOS	BRAZORIA	080078000	239	266	296	323	348	378	413
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000	1133	1181	1214	1265	1291	1349	1425
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757000	12245	10696	12132	13715	15056	16609	18309
COUNTY-OTHER	BRAZOS	BRAZORIA	080757000	125	133	141	149	156	164	173
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757000	4005	4242	4500	4759	4965	5229	5529
DANBURY	SAN JACINTO-BRAZOS	BRAZORIA	080693000	202	211	222	231	238	250	265
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000	1447	1752	2057	2366	2633	2936	3281
FREEPORT	BRAZOS	BRAZORIA	080217000	147	140	135	132	130	129	129
HILLCREST	SAN JACINTO-BRAZOS	BRAZORIA	080881000	124	125	126	126	127	130	133
HOLIDAY LAKES	SAN JACINTO-BRAZOS	BRAZORIA	080779000	93	92	91	90	89	90	94
IOWA COLONY	SAN JACINTO-BRAZOS	BRAZORIA	080885000	100	108	118	126	135	145	156
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004000	138447	125311	114251	110009	107452	107452	107452
IRRIGATION	BRAZOS	BRAZORIA	081004000	4624	4186	3816	3675	3589	3589	3589
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004000	6117	5536	5048	4860	4747	4747	4747
JONES CREEK	BRAZOS-COLORADO	BRAZORIA	080308000	105	98	91	84	76	72	72
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000	3754	4015	4332	4611	4883	5210	5595
LIVESTOCK	SAN JACINTO-BRAZOS	BRAZORIA	081005000	968	968	968	968	968	968	968
LIVESTOCK	BRAZOS	BRAZORIA	081005000	242	242	242	242	242	242	242
LIVESTOCK	BRAZOS-COLORADO	BRAZORIA	081005000	404	404	404	404	404	404	404
MANUFACTURING	SAN JACINTO-BRAZOS	BRAZORIA	081001000	36014	42231	46501	50280	54094	57461	61541
MANUFACTURING	BRAZOS	BRAZORIA	081001000	184906	216824	238749	258151	277737	295021	315974

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MANUFACTURING	BRAZOS-COLORADO	BRAZORIA	081001000	1010	1184	1304	1410	1517	1611	1726
MANVEL	SAN JACINTO-BRAZOS	BRAZORIA	080721000	365	355	345	334	324	317	317
MINING	SAN JACINTO-BRAZOS	BRAZORIA	081003000	767	945	1037	1091	1145	1198	1248
MINING	BRAZOS	BRAZORIA	081003000	249	307	337	354	372	389	405
MINING	BRAZOS-COLORADO	BRAZORIA	081003000	2314	2852	3128	3292	3452	3614	3766
ORBIT SYSTEMS INC	BRAZOS-COLORADO	BRAZORIA	084294000	40	47	55	63	71	79	88
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	BRAZORIA	084294000	325	386	451	514	575	638	712
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000	146	166	188	210	229	251	277
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	5358	9202	11479	13465	15343	17443	19634
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000	304	313	324	333	339	354	374
SOUTHWEST UTILITIES	SAN JACINTO-BRAZOS	BRAZORIA	084343000	70	71	73	75	77	79	83
SURFSIDE BEACH	BRAZOS	BRAZORIA	080967000	148	168	189	209	228	248	271
SWEENY	BRAZOS-COLORADO	BRAZORIA	080590000	580	606	636	663	684	717	757
VARNER CREEK UD	BRAZOS	BRAZORIA	084370000	294	359	428	494	556	622	694
WEST COLUMBIA	BRAZOS	BRAZORIA	080640000	480	453	431	410	389	373	363
WEST COLUMBIA	BRAZOS-COLORADO	BRAZORIA	080640000	92	87	83	78	75	71	70
ANAHUAC	NECHES-TRINITY	CHAMBERS	080015000	259	274	292	307	318	334	353
ANAHUAC	TRINITY	CHAMBERS	080015000	75	79	84	89	92	97	102
BAYTOWN	TRINITY-SAN JACINTO	CHAMBERS	080042000	519	571	623	671	708	756	809
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000	200	275	362	439	507	580	654
BEACH CITY	TRINITY	CHAMBERS	080822000	28	39	51	62	72	82	93
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757000	52	50	48	46	44	43	42
COUNTY-OTHER	TRINITY	CHAMBERS	080757000	261	251	240	230	220	213	210
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757000	168	162	155	148	142	137	135
IRRIGATION	NECHES-TRINITY	CHAMBERS	081004000	83269	83269	83269	83269	83269	83269	83269
IRRIGATION	TRINITY	CHAMBERS	081004000	32741	32741	32741	32741	32741	32741	32741
IRRIGATION	TRINITY-SAN JACINTO	CHAMBERS	081004000	1767	1767	1767	1767	1767	1767	1767
LIVESTOCK	NECHES-TRINITY	CHAMBERS	081005000	333	333	333	333	333	333	333
LIVESTOCK	TRINITY	CHAMBERS	081005000	60	60	60	60	60	60	60
LIVESTOCK	TRINITY-SAN JACINTO	CHAMBERS	081005000	69	69	69	69	69	69	69
MANUFACTURING	TRINITY-SAN JACINTO	CHAMBERS	081001000	9752	11802	12959	13987	15011	15932	17122
MINING	NECHES-TRINITY	CHAMBERS	081003000	530	639	692	725	756	788	816
MINING	TRINITY	CHAMBERS	081003000	23414	28240	30587	32017	33420	34811	36027
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003000	7083	8543	9253	9685	10110	10531	10899
MONT BELVIEU	TRINITY	CHAMBERS	080413000	489	669	870	1055	1215	1382	1553
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000	229	314	408	494	570	648	728
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000	186	194	206	216	223	233	247
STEAM ELECTRIC POWER	TRINITY-SAN JACINTO	CHAMBERS	081002000	5334	4435	3536	4134	4863	5751	6834
TRINITY BAY CONSERVATION DISTRICT	NECHES-TRINITY	CHAMBERS	084362000	989	1199	1440	1663	1862	2059	2280
TRINITY BAY CONSERVATION DISTRICT	TRINITY	CHAMBERS	084362000	453	548	659	760	851	942	1043
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	175	403	434	474	514	566	622
BEASLEY	BRAZOS	FORT BEND	081012000	7	8	9	10	12	14	16
BEASLEY	BRAZOS-COLORADO	FORT BEND	081012000	74	84	95	108	122	142	166
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	292	581	875	1246	1614	2110	2677
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	1085	2190	3325	4735	6158	8052	10215
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	204	406	613	873	1133	1481	1879
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	531	1065	1612	2295	2980	3897	4944
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	322	455	447	447	443	443	443
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	691	1387	2100	2991	3885	5079	6444

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				2000	2010	2020	2030	2040	2050	2060
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	351	563	779	1048	1322	1690	2110
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757000	398	404	1040	1955	2852	4387	5726
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757000	1415	1791	5207	10270	15226	23373	30832
COUNTY-OTHER	BRAZOS	FORT BEND	080757000	3796	7498	12784	19094	25150	33407	43056
COUNTY-OTHER	BRAZOS-COLORADO	FORT BEND	080757000	855	786	748	693	628	557	482
FAIRCHILDS	BRAZOS	FORT BEND	081019000	300	406	515	650	787	971	1182
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	1085	1467	1448	1438	1429	1429	1429
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	766	968	960	960	957	957	957
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	533	587	577	574	571	571	571
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	798	780	772	772	769	769	769
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	287	329	320	315	310	308	308
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	1034	1184	1150	1133	1116	1107	1107
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	338	675	1018	1444	1883	2459	3117
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	976	1587	2224	3009	3803	4877	6104
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	382	493	608	751	901	1096	1329
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	377	640	912	1246	1587	2040	2559
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	445	764	1101	1507	1917	2474	3109
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	748	730	722	718	715	715	715
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	604	604	600	600	600	600	600
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	394	391	391	389	389	389	389
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	524	773	1033	1349	1675	2108	2602
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	92	111	131	157	182	216	256
FULSHEAR	BRAZOS	FORT BEND	080869000	141	170	201	240	279	331	392
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	441	887	1345	1915	2489	3255	4129
HOUSTON	SAN JACINTO	FORT BEND	080285000	3490	4068	4667	5386	6136	7166	8391
HOUSTON	SAN JACINTO-BRAZOS	FORT BEND	080285000	2451	2857	3277	3782	4310	5033	5893
IRRIGATION	SAN JACINTO	FORT BEND	081004000	7538	7538	7538	7538	7538	7538	7538
IRRIGATION	SAN JACINTO-BRAZOS	FORT BEND	081004000	9141	9141	9141	9141	9141	9141	9141
IRRIGATION	BRAZOS	FORT BEND	081004000	17907	17907	17907	17907	17907	17907	17907
IRRIGATION	BRAZOS-COLORADO	FORT BEND	081004000	18869	18869	18869	18869	18869	18869	18869
KATY	SAN JACINTO	FORT BEND	080312000	169	199	230	270	312	366	431
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	721	976	1247	1573	1899	2357	2879
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000	28	38	48	61	74	92	112
LIVESTOCK	SAN JACINTO	FORT BEND	081005000	70	70	70	70	70	70	70
LIVESTOCK	SAN JACINTO-BRAZOS	FORT BEND	081005000	199	199	199	199	199	199	199
LIVESTOCK	BRAZOS	FORT BEND	081005000	691	691	691	691	691	691	691
LIVESTOCK	BRAZOS-COLORADO	FORT BEND	081005000	211	211	211	211	211	211	211
MANUFACTURING	SAN JACINTO	FORT BEND	081001000	1764	1979	2076	2154	2216	2258	2137
MANUFACTURING	SAN JACINTO-BRAZOS	FORT BEND	081001000	3252	3649	3827	3970	4086	4162	3939
MANUFACTURING	BRAZOS	FORT BEND	081001000	1101	1235	1296	1344	1383	1409	1334
MEADOWS	SAN JACINTO	FORT BEND	080792000	1352	1332	1312	1297	1282	1276	1276
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000	134	132	130	129	127	127	127
MINING	SAN JACINTO	FORT BEND	081003000	264	280	285	289	292	295	297
MINING	SAN JACINTO-BRAZOS	FORT BEND	081003000	1861	1972	2011	2034	2056	2076	2094
MINING	BRAZOS	FORT BEND	081003000	583	618	630	638	644	651	656
MINING	BRAZOS-COLORADO	FORT BEND	081003000	132	140	144	144	146	147	149
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	1625	2577	3195	3817	4460	4938	6004
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	7353	11664	14464	17280	20186	22351	27175
MISSOURI CITY	BRAZOS	FORT BEND	080409000	198	315	390	466	545	603	733

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NEEDVILLE	BRAZOS	FORT BEND	080428000	144	162	179	200	224	257	297
NEEDVILLE	BRAZOS-COLORADO	FORT BEND	080428000	174	196	216	242	270	310	359
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	520	867	1239	1688	2140	2755	3458
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000	14	15	16	18	20	22	25
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	2293	2301	2321	2339	2368	2441	2539
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000	609	612	617	622	629	649	675
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	543	546	527	518	509	504	504
PLEAK	BRAZOS	FORT BEND	081053000	419	506	597	709	824	976	1153
RICHMOND	BRAZOS	FORT BEND	080500000	1899	2032	2176	2353	2527	2799	3131
ROSENBERG	BRAZOS	FORT BEND	080518000	3420	3872	4306	4866	5457	6286	7289
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	529	1060	1294	1294	1286	1286	1286
SIMONTON	BRAZOS	FORT BEND	081062000	318	316	314	312	310	309	310
STAFFORD	SAN JACINTO	FORT BEND	080577000	239	333	434	552	677	852	1052
STAFFORD	SAN JACINTO-BRAZOS	FORT BEND	080577000	1001	1395	1820	2317	2839	3573	4411
STEAM ELECTRIC POWER	BRAZOS	FORT BEND	081002000	61761	66026	68046	79553	93582	110682	131527
SUGAR LAND	SAN JACINTO-BRAZOS	FORT BEND	080585000	8684	9717	9627	9537	9492	9492	9492
SUGAR LAND	BRAZOS	FORT BEND	080585000	6356	7112	7047	6981	6948	6948	6948
SUGAR LAND	SAN JACINTO	FORT BEND	080585000	637	712	706	699	696	696	696
WHCRWA	SAN JACINTO	FORT BEND	088002000	1785	2500	3188	4056	4959	6136	7522
BACLIFF MUD	SAN JACINTO-BRAZOS	GALVESTON	084012000	526	552	572	569	560	557	562
BAYOU VISTA	SAN JACINTO-BRAZOS	GALVESTON	080759000	396	429	458	471	475	478	482
BOLIVAR PENINSULAR SUD	NECHES-TRINITY	GALVESTON	084027000	1032	1123	1201	1240	1251	1261	1272
CLEAR LAKE SHORES	SAN JACINTO-BRAZOS	GALVESTON	080764000	273	282	287	289	287	287	289
COUNTY-OTHER	NECHES-TRINITY	GALVESTON	080757000	0	0	0	1	0	0	1
COUNTY-OTHER	SAN JACINTO-BRAZOS	GALVESTON	080757000	1272	1098	948	850	795	764	749
DICKINSON	SAN JACINTO-BRAZOS	GALVESTON	080165000	2719	3085	3416	3586	3620	3657	3699
FRIENDSWOOD	SAN JACINTO-BRAZOS	GALVESTON	080219000	2902	3245	3532	3652	3638	3666	3707
GALVESTON	SAN JACINTO-BRAZOS	GALVESTON	080227000	16288	16095	15903	15711	15518	15390	15390
GALVESTON COUNTY MUD #1	SAN JACINTO-BRAZOS	GALVESTON	084135000	357	426	483	514	525	532	540
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000	231	267	296	312	316	320	324
HITCHCOCK	SAN JACINTO-BRAZOS	GALVESTON	080279000	916	933	935	930	914	911	915
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004000	10342	10342	10342	10342	10342	10342	10342
JAMAICA BEACH	SAN JACINTO-BRAZOS	GALVESTON	080886000	250	300	344	368	377	383	389
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000	227	278	322	348	356	360	366
LA MARQUE	SAN JACINTO-BRAZOS	GALVESTON	080342000	2207	2161	2115	2069	2023	1992	1992
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	6597	7477	8253	8674	8751	8840	8947
LIVESTOCK	NECHES-TRINITY	GALVESTON	081005000	16	16	16	16	16	16	16
LIVESTOCK	SAN JACINTO-BRAZOS	GALVESTON	081005000	309	309	309	309	309	309	309
MANUFACTURING	SAN JACINTO-BRAZOS	GALVESTON	081001000	35381	41005	44330	47046	49692	51967	55491
MINING	NECHES-TRINITY	GALVESTON	081003000	118	136	143	147	150	154	158
MINING	SAN JACINTO-BRAZOS	GALVESTON	081003000	112	129	136	139	143	146	149
SAN LEON MUD	SAN JACINTO-BRAZOS	GALVESTON	084329000	585	632	670	680	676	677	684
SANTA FE	SAN JACINTO-BRAZOS	GALVESTON	080743000	963	988	990	982	956	951	956
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	GALVESTON	081002000	6054	5034	4013	4692	5519	6528	7757
TEXAS CITY	SAN JACINTO-BRAZOS	GALVESTON	080602000	6604	6476	6383	6269	6138	6051	6056
TIKI ISLAND	SAN JACINTO-BRAZOS	GALVESTON	080973000	199	243	282	303	311	316	321
BAYTOWN	TRINITY-SAN JACINTO	HARRIS	080042000	9836	9933	9939	9998	10041	10225	10484
BAYTOWN	SAN JACINTO	HARRIS	080042000	583	588	589	592	595	606	621
BELLAIRE	SAN JACINTO	HARRIS	080046000	3452	3734	3993	4254	4527	4817	5131

WUG Name	WUG Basin	WUG County	WUG ID	Water Demand (acre-feet/year)						
				2000	2010	2020	2030	2040	2050	2060
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	581	572	563	555	546	540	540
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	390	471	550	626	705	783	864
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	1478	1504	1491	1479	1466	1462	1462
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	368	451	530	610	691	770	853
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	557	668	646	625	618	611	611
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	92	170	246	323	396	471	546
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	123	221	315	410	501	594	687
CLEAR BROOK CITY MUD WOODMEADOWS	SAN JACINTO	HARRIS	084063000	902	1003	1089	1189	1281	1384	1503
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	269	399	524	653	767	897	1026
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	530	774	1008	1244	1475	1711	1947
COUNTY-OTHER	TRINITY-SAN JACINTO	HARRIS	080757000	3088	1826	1086	646	384	231	140
COUNTY-OTHER	SAN JACINTO	HARRIS	080757000	6869	7350	6275	6254	10856	15614	20154
COUNTY-OTHER	SAN JACINTO-BRAZOS	HARRIS	080757000	3410	2017	1251	813	569	469	439
CROSBY MUD	SAN JACINTO	HARRIS	084078000	613	599	588	577	567	560	560
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000	15	21	27	33	39	45	51
DEER PARK	SAN JACINTO	HARRIS	080154000	1702	1723	1725	1737	1746	1782	1832
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	080154000	2610	2641	2645	2664	2678	2732	2809
EL DORADO UD	SAN JACINTO	HARRIS	084101000	427	465	507	544	584	627	675
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000	548	534	524	513	503	496	496
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	673	797	914	1020	1142	1259	1389
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	290	341	389	438	483	532	585
FRIENDSWOOD	SAN JACINTO-BRAZOS	HARRIS	080219000	1066	1031	1005	979	952	944	944
GALENA PARK	SAN JACINTO	HARRIS	080226000	1222	1231	1234	1245	1252	1285	1332
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	791	917	1036	1158	1276	1396	1520
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000	437	423	408	394	380	370	370
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	2345	2536	2473	2451	2409	2409	2409
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	292	346	396	441	494	544	601
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	364	417	470	523	574	627	686
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	750	878	919	899	880	870	870
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	1334	1755	2176	2579	2986	3385	3801
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	1123	1248	1370	1482	1599	1726	1867
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	882	1275	1267	1259	1250	1250	1250
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	560	787	1014	1228	1444	1670	1895
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	769	1227	1669	2106	2533	2971	3406
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	525	676	830	974	1122	1265	1421
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	369	486	597	589	574	574	574
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	483	616	741	864	990	1113	1245
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	634	804	970	1133	1299	1462	1636
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	1119	1956	2774	3562	4369	5170	5969
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	876	870	867	867	865	865	865
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	881	1001	1109	1225	1336	1453	1578
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	1056	1415	1403	1403	1397	1397	1397
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	566	836	822	808	801	801	801
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	673	655	642	628	614	605	605
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	580	620	655	696	731	773	820
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	1491	1933	2384	2806	3238	3658	4111
HARRIS COUNTY MUD #55	SAN JACINTO-BRAZOS	HARRIS	084187000	1553	1502	1463	1424	1385	1359	1359
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	637	697	756	809	866	929	1001
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	530	582	635	686	737	790	845

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				2000	2010	2020	2030	2040	2050	2060
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	371	427	484	541	596	653	716
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	968	1115	1264	1413	1554	1704	1870
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	756	754	750	747	737	743	743
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	1373	1417	1466	1509	1547	1609	1684
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197000	1240	1346	1452	1547	1650	1763	1891
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	547	605	663	715	770	830	897
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	304	296	290	284	278	274	274
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	599	602	604	606	604	611	621
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	839	831	824	816	808	803	803
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	182	191	188	185	183	182	182
HOUSTON	SAN JACINTO	HARRIS	080285000	323875	361804	398796	433343	468951	506649	547381
HOUSTON	SAN JACINTO-BRAZOS	HARRIS	080285000	18049	20163	22225	24150	26134	28235	30505
HUMBLE	SAN JACINTO	HARRIS	080289000	3233	3664	4062	4456	4857	5274	5715
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	1627	1747	1866	1981	2091	2212	2340
IRRIGATION	TRINITY-SAN JACINTO	HARRIS	081004000	5417	5417	5417	5417	5417	5417	5417
IRRIGATION	SAN JACINTO	HARRIS	081004000	9883	9883	9883	9883	9883	9883	9883
JACINTO CITY	SAN JACINTO	HARRIS	080301000	1235	1301	1346	1410	1455	1526	1612
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	1279	1586	1880	2170	2464	2753	3056
KATY	SAN JACINTO	HARRIS	080312000	1920	2471	2989	3513	4043	4563	5106
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	177	215	255	292	329	369	409
LA PORTE	SAN JACINTO-BRAZOS	HARRIS	080346000	4662	5036	5367	5750	6066	6461	6904
LA PORTE	SAN JACINTO	HARRIS	080346000	266	287	306	328	346	369	394
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000	20	20	20	20	20	21	21
LIVESTOCK	TRINITY-SAN JACINTO	HARRIS	081005000	91	91	91	91	91	91	91
LIVESTOCK	SAN JACINTO	HARRIS	081005000	951	951	951	951	951	951	951
LIVESTOCK	SAN JACINTO-BRAZOS	HARRIS	081005000	91	91	91	91	91	91	91
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000	327	596	857	1112	1368	1622	1875
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001000	64073	72614	77888	82373	86345	89318	87826
MANUFACTURING	SAN JACINTO	HARRIS	081001000	226300	256465	275094	290934	304964	315464	310194
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001000	59047	66918	71779	75911	79572	82312	80937
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	2273	2352	2321	2291	2271	2261	2261
MINING	SAN JACINTO	HARRIS	081003000	992	1258	1407	1500	1593	1688	1771
MINING	SAN JACINTO-BRAZOS	HARRIS	081003000	19	24	27	29	31	32	34
MISSOURI CITY	SAN JACINTO	HARRIS	080409000	1063	1306	1540	1786	2035	2296	2554
NASSAU BAY	SAN JACINTO-BRAZOS	HARRIS	080424000	1042	1028	1014	1000	986	976	976
NHCRWA	SAN JACINTO	HARRIS	088000000	81393	101015	120164	138646	157390	175778	195040
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	317	461	600	731	863	1002	1140
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	319	349	379	405	434	466	503
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	442	587	728	873	1005	1152	1298
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	1216	1331	1443	1545	1653	1773	1909
PARKWAY UD	SAN JACINTO	HARRIS	084298000	311	303	296	288	280	275	277
PASADENA	SAN JACINTO	HARRIS	080456000	14507	15990	17440	18759	20151	21674	23383
PASADENA	SAN JACINTO-BRAZOS	HARRIS	080456000	4060	4475	4881	5250	5639	6066	6544
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	292	342	394	445	496	551	606
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	871	939	1008	1070	1137	1210	1292
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	1230	1275	1317	1360	1402	1451	1506
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	682	706	729	753	777	806	839
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000	1967	2421	2867	3288	3731	4166	4620
SHOREACRES	SAN JACINTO-BRAZOS	HARRIS	080558000	192	204	217	229	239	237	237

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SOUTH HOUSTON	SAN JACINTO	HARRIS	080569000	2164	2288	2393	2528	2631	2775	2942
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	379	406	433	458	482	510	540
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	627	710	795	882	962	1050	1147
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	858	888	915	944	972	1008	1049
STAFFORD	SAN JACINTO	HARRIS	080577000	25	23	23	23	22	23	23
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002000	7169	7284	22585	26405	31062	36738	43656
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	HARRIS	081002000	437	444	1377	1610	1893	2239	2661
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	3741	4489	5227	5922	6663	7389	8154
TAYLOR LAKE VILLAGE	SAN JACINTO-BRAZOS	HARRIS	080751000	629	664	650	637	623	619	619
TOMBALL	SAN JACINTO	HARRIS	080608000	2016	2621	3301	3842	4834	5562	6630
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	549	1413	1376	1364	1339	1339	1339
WALLER	SAN JACINTO	HARRIS	080629000	80	119	154	190	225	260	296
WEBSTER	SAN JACINTO-BRAZOS	HARRIS	080635000	1719	2417	3097	3772	4432	5110	5786
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	301	565	561	561	549	541	541
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	2929	3101	3275	3438	3591	3780	3989
WHCRWA	SAN JACINTO	HARRIS	088002000	41559	46809	57274	68911	76345	83980	92378
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	681	665	652	640	628	620	620
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	573	804	1033	1014	1004	1004	1004
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	426	622	815	999	1184	1374	1564
BUFFALO	TRINITY	LEON	080083000	311	348	384	401	397	392	395
CENTERVILLE	TRINITY	LEON	080105000	174	189	203	210	207	205	206
COUNTY-OTHER	TRINITY	LEON	080757000	406	432	455	462	452	445	448
COUNTY-OTHER	BRAZOS	LEON	080757000	372	396	418	424	415	409	411
FLO COMMUNITY WSC	TRINITY	LEON	084114000	318	418	525	578	574	559	567
IRRIGATION	TRINITY	LEON	081004000	542	542	542	542	542	542	542
JEWETT	TRINITY	LEON	080887000	125	151	177	192	191	188	190
JEWETT	BRAZOS	LEON	080887000	42	51	60	64	64	63	64
LIVESTOCK	TRINITY	LEON	081005000	1268	1268	1268	1268	1268	1268	1268
LIVESTOCK	BRAZOS	LEON	081005000	423	423	423	423	423	423	423
MANUFACTURING	TRINITY	LEON	081001000	545	714	842	967	1093	1207	1313
MINING	TRINITY	LEON	081003000	1487	1296	1251	1226	1204	1183	1166
MINING	BRAZOS	LEON	081003000	253	221	213	209	205	201	198
NORMANGEE	TRINITY	LEON	080927000	95	98	102	103	101	100	101
NORMANGEE	BRAZOS	LEON	080927000	37	39	40	41	40	39	40
AMES	TRINITY	LIBERTY	080676000	114	116	118	120	121	126	133
CLEVELAND	SAN JACINTO	LIBERTY	080116000	1312	1341	1365	1392	1416	1464	1529
COUNTY-OTHER	NECHES	LIBERTY	080757000	132	154	179	203	228	255	288
COUNTY-OTHER	NECHES-TRINITY	LIBERTY	080757000	9	11	12	14	16	18	20
COUNTY-OTHER	TRINITY	LIBERTY	080757000	2524	2930	3408	3868	4345	4859	5498
COUNTY-OTHER	TRINITY-SAN JACINTO	LIBERTY	080757000	161	187	217	247	277	310	350
COUNTY-OTHER	SAN JACINTO	LIBERTY	080757000	1114	1294	1504	1707	1918	2145	2427
DAISETTA	NECHES	LIBERTY	080149000	57	58	59	60	61	62	65
DAISETTA	TRINITY	LIBERTY	080149000	90	91	93	94	95	98	102
DAYTON	TRINITY	LIBERTY	080152000	1356	1428	1521	1606	1685	1789	1916
HARDIN	TRINITY	LIBERTY	080878000	119	136	155	172	191	211	235
HARDIN WSC	TRINITY	LIBERTY	084148000	478	567	669	767	865	973	1099
IRRIGATION	NECHES	LIBERTY	081004000	3317	3317	3317	3317	3317	3317	3317
IRRIGATION	NECHES-TRINITY	LIBERTY	081004000	8289	8289	8289	8289	8289	8289	8289
IRRIGATION	TRINITY	LIBERTY	081004000	53056	53056	53056	53056	53056	53056	53056

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				2000	2010	2020	2030	2040	2050	2060
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004000	17409	17409	17409	17409	17409	17409	17409
IRRIGATION	SAN JACINTO	LIBERTY	081004000	830	830	830	830	830	830	830
KENEFICK	TRINITY	LIBERTY	081033000	79	94	112	128	144	162	183
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	LIBERTY	084226000	103	108	116	124	130	140	153
LIBERTY	TRINITY	LIBERTY	080356000	1494	1509	1527	1532	1543	1578	1628
LIVESTOCK	NECHES	LIBERTY	081005000	104	104	104	104	104	104	104
LIVESTOCK	NECHES-TRINITY	LIBERTY	081005000	35	35	35	35	35	35	35
LIVESTOCK	TRINITY	LIBERTY	081005000	446	446	446	446	446	446	446
LIVESTOCK	TRINITY-SAN JACINTO	LIBERTY	081005000	32	32	32	32	32	32	32
LIVESTOCK	SAN JACINTO	LIBERTY	081005000	140	140	140	140	140	140	140
MANUFACTURING	TRINITY	LIBERTY	081001000	47	62	74	85	97	108	117
MANUFACTURING	SAN JACINTO	LIBERTY	081001000	249	331	391	452	514	570	619
MERCY WSC	SAN JACINTO	LIBERTY	084253000	64	75	88	100	113	126	142
MINING	NECHES	LIBERTY	081003000	32	32	32	32	32	32	33
MINING	NECHES-TRINITY	LIBERTY	081003000	22	23	23	23	24	23	22
MINING	TRINITY	LIBERTY	081003000	4883	4924	4937	4945	4951	4958	4963
MINING	TRINITY-SAN JACINTO	LIBERTY	081003000	3685	3717	3727	3732	3737	3742	3747
MINING	SAN JACINTO	LIBERTY	081003000	34	34	34	34	34	35	35
PLUM GROVE	SAN JACINTO	LIBERTY	081054000	110	141	176	207	240	277	319
SOUTHWEST UTILITIES	SAN JACINTO	LIBERTY	084343000	12	14	16	18	20	23	26
STEAM ELECTRIC POWER	TRINITY	LIBERTY	081002000	0	2962	4240	4957	5831	6896	8195
WEST HARDIN WSC	NECHES	LIBERTY	084383000	22	29	35	42	47	54	63
COUNTY-OTHER	TRINITY	MADISON	080757000	867	897	931	960	973	1000	1034
COUNTY-OTHER	BRAZOS	MADISON	080757000	102	106	110	113	115	118	122
IRRIGATION	TRINITY	MADISON	081004000	19	19	19	19	19	19	19
LIVESTOCK	TRINITY	MADISON	081005000	630	630	630	630	630	630	630
LIVESTOCK	BRAZOS	MADISON	081005000	120	120	120	120	120	120	120
MADISONVILLE	TRINITY	MADISON	080382000	750	781	815	837	856	881	908
MANUFACTURING	TRINITY	MADISON	081001000	205	260	289	316	343	367	398
MINING	TRINITY	MADISON	081003000	14	15	15	15	15	15	15
MINING	BRAZOS	MADISON	081003000	9	9	9	9	9	9	9
NORMANGEE	TRINITY	MADISON	080927000	9	8	8	8	8	8	8
CONROE	SAN JACINTO	MONTGOMERY	080130000	7175	9334	10611	13190	16310	20406	25281
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	164	210	237	299	366	464	578
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757000	14307	21619	26954	38344	51726	70827	93011
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000	368	564	681	914	1189	1568	2008
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	080854000	169	210	235	285	348	430	529
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	284	439	533	719	937	1230	1570
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	1268	1625	1825	2249	2737	3403	4176
HOUSTON	SAN JACINTO	MONTGOMERY	080285000	82	190	253	375	516	704	926
IRRIGATION	SAN JACINTO	MONTGOMERY	081004000	66	66	66	66	66	66	66
LIVESTOCK	SAN JACINTO	MONTGOMERY	081005000	510	510	510	510	510	510	510
MAGNOLIA	SAN JACINTO	MONTGOMERY	080907000	233	275	300	351	412	495	593
MANUFACTURING	SAN JACINTO	MONTGOMERY	081001000	1587	2045	2332	2608	2883	3126	3392
MINING	SAN JACINTO	MONTGOMERY	081003000	414	480	509	526	543	559	573
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	720	1685	2276	3431	4784	6569	8642
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	477	459	452	448	444	444	444
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	651	920	1085	1411	1785	2297	2893
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	522	856	1058	1455	1917	2536	3254

WUG Name	WUG Basin	WUG County	WUG ID	Water Demand (acre-feet/year)						
				2000	2010	2020	2030	2040	2050	2060
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	369	526	520	513	507	507	507
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	425	472	497	554	624	722	844
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	645	924	913	903	892	892	892
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	435	486	512	571	645	750	879
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	965	1371	1600	2116	2670	3470	4398
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	563	683	748	897	1067	1297	1573
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	605	768	864	1056	1153	1148	1148
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	080734000	76	87	88	101	115	136	165
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	334	669	873	1272	1732	2348	3063
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	1391	1847	2104	2653	3305	3274	3274
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	999	2096	2077	2059	2059	2059	2059
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000	811	828	817	806	795	791	791
ROMAN FOREST	SAN JACINTO	MONTGOMERY	080801000	168	202	222	266	317	387	471
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000	517	512	507	502	497	493	493
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	1163	1776	2149	2121	2107	2107	2107
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000	181	241	274	345	426	536	669
SPLENDORA	SAN JACINTO	MONTGOMERY	080962000	126	188	224	297	383	502	640
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	339	503	593	784	1010	1320	1681
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000	367	682	871	865	859	859	859
STEAM ELECTRIC POWER	SAN JACINTO	MONTGOMERY	081002000	2507	5046	8537	9981	11741	13886	16502
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	13714	14671	26596	28330	28197	28063	28063
WILLIS	SAN JACINTO	MONTGOMERY	080655000	424	568	649	816	1024	1296	1626
WOODBRANCH	SAN JACINTO	MONTGOMERY	080807000	156	152	148	143	139	136	136
COUNTY-OTHER	TRINITY	POLK	080757000	1517	1780	2038	2219	2358	2525	2705
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	POLK	084226000	840	890	944	985	1004	1044	1100
LIVESTOCK	TRINITY	POLK	081005000	134	134	134	134	134	134	134
LIVINGSTON	TRINITY	POLK	080362000	1741	1778	1814	1831	1844	1872	1905
MINING	TRINITY	POLK	081003000	24	29	31	32	33	34	35
ONALASKA	TRINITY	POLK	080933000	146	165	183	196	206	217	231
ONALASKA WSC	TRINITY	POLK	084293000	239	240	244	247	242	246	255
TRINITY RURAL WSC	TRINITY	POLK	084363000	6	6	7	8	8	9	9
COLDSPRING	TRINITY	SAN JACINTO	080122000	138	163	186	205	216	222	225
COLDSPRING	SAN JACINTO	SAN JACINTO	080122000	38	44	51	56	59	60	61
COUNTY-OTHER	TRINITY	SAN JACINTO	080757000	496	560	629	679	704	719	729
COUNTY-OTHER	SAN JACINTO	SAN JACINTO	080757000	768	868	974	1052	1091	1114	1129
IRRIGATION	TRINITY	SAN JACINTO	081004000	667	667	667	667	667	667	667
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	SAN JACINTO	SAN JACINTO	084226000	75	95	114	127	133	137	140
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	SAN JACINTO	084226000	162	206	245	275	288	295	301
LIVESTOCK	TRINITY	SAN JACINTO	081005000	142	142	142	142	142	142	142
LIVESTOCK	SAN JACINTO	SAN JACINTO	081005000	142	142	142	142	142	142	142
MANUFACTURING	SAN JACINTO	SAN JACINTO	081001000	39	48	52	56	60	63	68
MERCY WSC	SAN JACINTO	SAN JACINTO	084253000	272	338	404	455	487	504	513
MINING	TRINITY	SAN JACINTO	081003000	8	7	6	6	6	6	6
MINING	SAN JACINTO	SAN JACINTO	081003000	28	23	23	22	21	20	20
POINT BLANK	TRINITY	SAN JACINTO	081056000	75	85	96	104	108	111	112
RIVERSIDE WSC	TRINITY	SAN JACINTO	084323000	94	140	179	213	232	241	247
SAN JACINTO WSC	TRINITY	SAN JACINTO	084328000	337	406	474	528	561	577	587
SHEPHERD	TRINITY	SAN JACINTO	080746000	243	256	270	278	279	282	285
COUNTY-OTHER	TRINITY	TRINITY	080757000	484	526	558	561	547	522	502

WUG Name	WUG Basin	WUG County	WUG ID	Water Demand (acre-feet/year)						
				2000	2010	2020	2030	2040	2050	2060
GROVETON	TRINITY	TRINITY	080255000	109	119	126	127	123	118	113
IRRIGATION	TRINITY	TRINITY	081004000	467	467	467	467	467	467	467
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	TRINITY	084226000	104	109	111	110	104	98	95
LIVESTOCK	TRINITY	TRINITY	081005000	211	211	211	211	211	211	211
MINING	TRINITY	TRINITY	081003000	8	6	6	6	6	6	6
TRINITY	TRINITY	TRINITY	080610000	165	170	172	165	152	142	137
TRINITY RURAL WSC	TRINITY	TRINITY	084363000	264	279	293	292	280	265	255
CONSOLIDATED WSC	TRINITY	WALKER	084071000	7	8	9	9	8	8	8
COUNTY-OTHER	TRINITY	WALKER	080757000	3272	3714	4070	4235	4174	4174	4174
COUNTY-OTHER	SAN JACINTO	WALKER	080757000	5067	5752	6303	6558	6463	6465	6465
HUNTSVILLE	TRINITY	WALKER	080292000	930	1024	1101	1122	1092	1085	1085
HUNTSVILLE	SAN JACINTO	WALKER	080292000	4178	4597	4946	5041	4904	4874	4874
IRRIGATION	TRINITY	WALKER	081004000	6	6	6	6	6	6	6
IRRIGATION	SAN JACINTO	WALKER	081004000	5	5	5	5	5	5	5
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	TRINITY	WALKER	084226000	27	29	30	30	29	28	28
LIVESTOCK	TRINITY	WALKER	081005000	322	322	322	322	322	322	322
LIVESTOCK	SAN JACINTO	WALKER	081005000	310	310	310	310	310	310	310
MANUFACTURING	TRINITY	WALKER	081001000	2065	2631	3049	3435	3827	4169	4524
MANUFACTURING	SAN JACINTO	WALKER	081001000	453	577	669	753	839	914	993
MINING	TRINITY	WALKER	081003000	6	6	6	6	6	6	6
MINING	SAN JACINTO	WALKER	081003000	6	7	7	7	7	7	7
NEW WAVERLY	SAN JACINTO	WALKER	080926000	195	218	235	243	236	235	235
RIVERSIDE WSC	TRINITY	WALKER	084323000	283	309	325	335	326	321	321
TRINITY RURAL WSC	TRINITY	WALKER	084363000	20	22	24	24	23	23	23
WALKER COUNTY RURAL WSC	TRINITY	WALKER	084372000	762	839	898	919	891	884	884
BROOKSHIRE	BRAZOS	WALLER	080077000	522	572	635	707	791	898	1027
COUNTY-OTHER	SAN JACINTO	WALLER	080757000	695	892	1119	1394	1666	2040	2471
COUNTY-OTHER	BRAZOS	WALLER	080757000	675	866	1087	1354	1619	1983	2401
HEMPSTEAD	BRAZOS	WALLER	080271000	946	1128	1346	1582	1860	2189	2579
IRRIGATION	SAN JACINTO	WALLER	081004000	18153	18153	18153	18153	18153	18153	18153
IRRIGATION	BRAZOS	WALLER	081004000	4825	4825	4825	4825	4825	4825	4825
KATY	SAN JACINTO	WALLER	080312000	153	149	145	143	142	141	141
LIVESTOCK	SAN JACINTO	WALLER	081005000	263	263	263	263	263	263	263
LIVESTOCK	BRAZOS	WALLER	081005000	676	676	676	676	676	676	676
MANUFACTURING	SAN JACINTO	WALLER	081001000	55	72	82	91	99	108	116
MANUFACTURING	BRAZOS	WALLER	081001000	13	17	19	21	24	25	28
MINING	SAN JACINTO	WALLER	081003000	71	71	71	71	71	71	71
MINING	BRAZOS	WALLER	081003000	9	9	9	9	9	9	9
PINE ISLAND	BRAZOS	WALLER	080938000	95	117	146	177	210	254	305
PRAIRIE VIEW	BRAZOS	WALLER	080485000	1055	1129	1211	1307	1418	1558	1726
PRAIRIE VIEW	SAN JACINTO	WALLER	080485000	116	124	133	144	156	171	190
WALLER	SAN JACINTO	WALLER	080629000	353	416	488	572	668	782	917

Table 2.3
Water Demand by Wholesale Water Provider of all Water Use Categories

This table will be created when information becomes available from the TWDB online database.

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Austin County

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	3,549	3,754	4,039	4,401	4,793	5,379	NA
2006	3,535	3,918	4,258	4,494	4,590	4,639	4,756
Difference	-14	164	219	93	-203	-740	NA
% Change	-0.4	4.4	5.4	2.1	-4.2	-13.8	NA
Livestock							
2001	1,993	1,993	1,993	1,993	1,993	1,993	NA
2006	1,615	1,615	1,615	1,615	1,615	1,615	1,615
Difference	-378	-378	-378	-378	-378	-378	NA
% Change	-19.0	-19.0	-19.0	-19.0	-19.0	-19.0	NA
Irrigation							
2001	12,291	12,291	12,291	12,291	12,291	12,291	NA
2006	10,617	10,617	10,617	10,617	10,617	10,617	10,617
Difference	-1,674	-1,674	-1,674	-1,674	-1,674	-1,674	NA
% Change	-13.6	-13.6	-13.6	-13.6	-13.6	-13.6	NA
Manufacturing							
2001	120	147	176	207	249	296	NA
2006	167	210	233	253	272	288	313
Difference	47	63	57	46	23	-8	NA
% Change	39.2	42.9	32.4	22.2	9.2	-2.7	NA
Mining							
2001	97	74	53	35	28	27	NA
2006	42	51	56	59	62	65	67
Difference	-55	-23	3	24	34	38	NA
% Change	-56.7	-31.1	5.7	68.6	121.4	140.7	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Brazoria County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	34,698	37,647	41,145	46,751	51,167	58,556	NA
2006	40,127	44,685	50,822	56,754	62,022	68,202	74,967
Difference	5,429	7,038	9,677	10,003	10,855	9,646	NA
% Change	15.6	18.7	23.5	21.4	21.2	16.5	NA
Livestock							
2001	1,066	1,066	1,066	1,066	1,066	1,066	NA
2006	1,614	1,614	1,614	1,614	1,614	1,614	1,614
Difference	548	548	548	548	548	548	NA
% Change	51.4	51.4	51.4	51.4	51.4	51.4	NA
Irrigation							
2001	131,207	118,758	108,276	104,256	101,833	101,833	NA
2006	149,188	135,033	123,115	118,544	115,788	115,788	115,788
Difference	17,981	16,275	14,839	14,288	13,955	13,955	NA
% Change	13.7	13.7	13.7	13.7	13.7	13.7	NA
Manufacturing							
2001	228,424	257,569	274,057	288,204	316,451	344,404	NA
2006	221,930	260,239	286,554	309,841	333,348	354,093	379,241
Difference	-6,494	2,670	12,497	21,637	16,897	9,689	NA
% Change	-2.8	1.0	4.6	7.5	5.3	2.8	NA
Mining							
2001	1,511	1,305	1,169	1,114	1,043	1,063	NA
2006	3,330	4,104	4,502	4,737	4,969	5,201	5,419
Difference	1,819	2,799	3,333	3,623	3,926	4,138	NA
% Change	120.4	214.5	285.1	325.2	376.4	389.3	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands*(in acre-feet per year) by WUG Category
Chambers County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	3,937	4,509	5,262	5,762	6,124	6,420	NA
2006	3,908	4,625	5,438	6,180	6,824	7,506	8,249
Difference	-29	116	176	418	700	1,086	NA
% Change	-0.7	2.6	3.3	7.3	11.4	16.9	NA
Livestock							
2001	768	768	768	768	768	768	NA
2006	462	462	462	462	462	462	462
Difference	-306	-306	-306	-306	-306	-306	NA
% Change	-39.8	-39.8	-39.8	-39.8	-39.8	-39.8	NA
Irrigation							
2001	128,452	128,452	128,452	128,452	128,452	128,452	NA
2006	117,777	117,777	117,777	117,777	117,777	117,777	117,777
Difference	-10,675	-10,675	-10,675	-10,675	-10,675	-10,675	NA
% Change	-8.3	-8.3	-8.3	-8.3	-8.3	-8.3	NA
Manufacturing							
2001	4,675	5,052	5,229	5,383	5,792	6,207	NA
2006	9,752	11,802	12,959	13,987	15,011	15,932	17,122
Difference	5,077	6,750	7,730	8,604	9,219	9,725	NA
% Change	108.6	133.6	147.8	159.8	159.2	156.7	NA
Mining							
2001	13,233	9,379	8,155	7,707	7,388	7,344	NA
2006	31,027	37,422	40,532	42,427	44,286	46,130	47,742
Difference	17,794	28,043	32,377	34,720	36,898	38,786	NA
% Change	134.5	299.0	397.0	450.5	499.4	528.1	NA
Steam-Electric Power Generation							
2001	1,100	1,100	1,100	1,100	1,500	5,000	NA
2006	5,334	4,435	3,536	4,134	4,863	5,751	6,834
Difference	4,234	3,335	2,436	3,034	3,363	751	NA
% Change	384.9	303.2	221.5	275.8	224.2	15.0	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Fort Bend County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	69,084	88,351	113,748	149,905	185,273	225,200	NA
2006	67,566	89,579	111,680	138,770	165,904	202,470	245,404
Difference	-1,518	1,228	-2,068	-11,135	-19,369	-22,730	NA
% Change	-2.2	1.4	-1.8	-7.4	-10.5	-10.1	NA
Livestock							
2001	1,134	1,134	1,134	1,134	1,134	1,134	NA
2006	1,171	1,171	1,171	1,171	1,171	1,171	1,171
Difference	37	37	37	37	37	37	NA
% Change	3.3	3.3	3.3	3.3	3.3	3.3	NA
Irrigation							
2001	62,045	62,045	62,045	62,045	62,045	62,045	NA
2006	53,455	53,455	53,455	53,455	53,455	53,455	53,455
Difference	-8590	-8,590	-8,590	-8,590	-8,590	-8,590	NA
% Change	-13.8	-13.8	-13.8	-13.8	-13.8	-13.8	NA
Manufacturing							
2001	21,139	23,616	25,556	27,401	30,592	33,639	NA
2006	6,117	6,863	7,199	7,468	7,685	7,829	7,410
Difference	-15,022	-16,753	-18,357	-19,933	-22,907	-25,810	NA
% Change	-71.1	-70.9	-71.8	-72.7	-74.9	-76.7	NA
Mining							
2001	258	250	235	219	220	228	NA
2006	2,840	3,010	3,070	3,105	3,138	3,169	3,196
Difference	2,582	2,760	2,835	2,886	2,918	2,941	NA
% Change	1000.8	1104.0	1206.4	1317.8	1326.4	1289.9	NA
Steam-Electric Power Generation							
2001	70,000	70,000	70,000	70,000	70,000	70,000	NA
2006	61,761	66,026	68,046	79,553	93,582	110,682	131,527
Difference	-8,239	-3,974	-1,954	9,553	23,582	40,682	NA
% Change	-11.8	-5.7	-2.8	13.6	33.7	58.1	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands*(in acre-feet per year) by WUG Category
Galveston County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	42,675	46,149	50,632	56,247	60,130	63,522	NA
2006	44,544	46,090	47,390	47,818	47,487	47,393	47,641
Difference	1,869	-59	-3,242	-8,429	-12,643	-16,129	NA
% Change	4.4	-0.1	-6.4	-15.0	-21.0	-25.4	NA
Livestock							
2001	182	182	182	182	182	182	NA
2006	325	325	325	325	325	325	325
Difference	143	143	143	143	143	143	NA
% Change	78.6	78.6	78.6	78.6	78.6	78.6	NA
Irrigation							
2001	10,334	10,334	10,334	10,334	10,334	10,334	NA
2006	10,342	10,342	10,342	10,342	10,342	10,342	10,342
Difference	8	8	8	8	8	8	NA
% Change	0.1	0.1	0.1	0.1	0.1	0.1	NA
Manufacturing							
2001	64,614	70,905	75,743	80,269	88,858	97,460	NA
2006	35,381	41,005	44,330	47,046	49,692	51,967	55,491
Difference	-29,233	-29,900	-31,413	-33,223	-39,166	-45,493	NA
% Change	-45.2	-42.2	-41.5	-41.4	-44.1	-46.7	NA
Mining							
2001	84	63	55	44	42	44	NA
2006	230	265	279	286	293	300	307
Difference	146	202	224	242	251	256	NA
% Change	173.8	320.6	407.3	550.0	597.6	581.8	NA
Steam-Electric Power Generation							
2001	1,500	1,500	1,500	1,500	1,500	1,500	NA
2006	6,054	5,034	4,013	4,692	5,519	6,528	7,757
Difference	4,554	3,534	2,513	3,192	4,019	5,028	NA
% Change	303.6	235.6	167.5	212.8	267.9	335.2	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Harris County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	656,756	720,323	800,122	848,390	884,519	925,140	NA
2006	598,596	677,684	756,765	834,747	915,339	999,189	1,089,188
Difference	-58,160	-42,639	-43,357	-13,643	30,820	74,049	NA
% Change	-8.9	-5.9	-5.4	-1.6	3.5	8.0	NA
Livestock							
2001	1,147	1,147	1,147	1,147	1,147	1,147	NA
2006	1,133	1,133	1,133	1,133	1,133	1,133	1,133
Difference	-14	-14	-14	-14	-14	-14	NA
% Change	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	NA
Irrigation							
2001	17,995	17,995	17,995	17,995	17,995	17,995	NA
2006	15,300	15,300	15,300	15,300	15,300	15,300	15,300
Difference	-2,695	-2,695	-2,695	-2,695	-2,695	-2,695	NA
% Change	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	NA
Manufacturing							
2001	386,430	419,816	446,155	468,909	515,487	561,743	NA
2006	349,420	395,997	424,761	449,218	470,881	487,094	478,957
Difference	-37,010	-23,819	-21,394	-19,691	-44,606	-74,649	NA
% Change	-9.6	-5.7	-4.8	-4.2	-8.7	-13.3	NA
Mining							
2001	702	574	392	316	255	240	NA
2006	1,011	1,282	1,434	1,529	1,624	1,720	1,805
Difference	309	708	1,042	1,213	1,369	1,480	NA
% Change	44.0	123.3	265.8	383.9	536.9	616.7	NA
Steam-Electric Power Generation							
2001	16,500	17,500	20,000	22,500	22,500	22,500	NA
2006	7,606	7,728	23,962	28,015	32,955	38,977	46,317
Difference	-8,894	-9,772	3,962	5,515	10,455	16,477	NA
% Change	-53.9	-55.8	19.8	24.5	46.5	73.2	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands *(in acre-feet per year) by WUG Category
Leon County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	2,320	2,447	2,573	2,746	2,921	3,129	NA
2006	1,880	2,122	2,364	2,475	2,441	2,400	2,422
Difference	-440	-325	-209	-271	-480	-729	NA
% Change	-18.9	-13.3	-8.1	-9.9	-16.4	-23.3	NA
Livestock							
2001	2,105	2,105	2,105	2,105	2,105	2,105	NA
2006	1,691	1,691	1,691	1,691	1,691	1,691	1,691
Difference	-414	-414	-414	-414	-414	-414	NA
% Change	-19.7	-19.7	-19.7	-19.7	-19.7	-19.7	NA
Irrigation							
2001	0	0	0	0	0	0	NA
2006	542	542	542	542	542	542	542
Difference	542	542	542	542	542	542	NA
% Change	NA	NA	NA	NA	NA	NA	NA
Manufacturing							
2001	178	191	192	193	194	195	NA
2006	545	714	842	967	1,093	1,207	1,313
Difference	367	523	650	774	899	1,012	NA
% Change	206.2	273.8	338.5	401.0	463.4	519.0	NA
Mining							
2001	1,459	1,045	508	384	327	335	NA
2006	1,740	1,517	1,464	1,435	1,409	1,384	1,364
Difference	281	472	956	1,051	1,082	1,049	NA
% Change	19.3	45.2	188.2	273.7	330.9	313.1	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Liberty County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	9,605	10,145	12,587	16,376	17,279	18,580	NA
2006	9,350	10,283	11,370	12,401	13,455	14,670	16,176
Difference	-255	138	-1,217	-3,975	-3,824	-3,910	NA
% Change	-2.7	1.4	-9.7	-24.3	-22.1	-21.0	NA
Livestock							
2001	432	432	432	432	432	432	NA
2006	757	757	757	757	757	757	757
Difference	325	325	325	325	325	325	NA
% Change	75.2	75.2	75.2	75.2	75.2	75.2	NA
Irrigation							
2001	109,905	109,905	109,905	109,905	109,905	109,905	NA
2006	82,901	82,901	82,901	82,901	82,901	82,901	82,901
Difference	27,004	27,004	27,004	27,004	27,004	27,004	NA
% Change	24.6	24.6	24.6	24.6	24.6	24.6	NA
Manufacturing							
2001	486	551	615	681	753	826	NA
2006	296	393	465	537	611	678	736
Difference	-190	-158	-150	-144	-142	-148	NA
% Change	-39.1	-28.7	-24.4	-21.1	-18.9	-17.9	NA
Mining							
2001	15,430	16,852	19,021	21,193	23,389	25,827	NA
2006	8,656	8,730	8,753	8,766	8,778	8,790	8,800
Difference	-6,774	-8,122	-10,268	-12,427	-14,611	-17,037	NA
% Change	-43.9	-48.2	-54.0	-58.6	-62.5	-66.0	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	2,962	4,240	4,957	5,831	6,896	8,195
Difference	0	2,962	4,240	4,957	5,831	6,896	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands *(in acre-feet per year) by WUG Category
Madison County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	2,773	2,720	2,629	2,541	2,393	2,262	NA
2006	1,728	1,792	1,864	1,918	1,952	2,007	2,072
Difference	-1,045	-928	-765	-623	-441	-255	NA
% Change	-37.7	-34.1	-29.1	-24.5	-18.4	-11.3	NA
Livestock							
2001	1,379	1,379	1,379	1,379	1,379	1,379	NA
2006	750	750	750	750	750	750	750
Difference	-629	-629	-629	-629	-629	-629	NA
% Change	-45.6	-45.6	-45.6	-45.6	-45.6	-45.6	NA
Irrigation							
2001	50	50	50	50	50	50	NA
2006	19	19	19	19	19	19	19
Difference	31	31	31	31	31	31	NA
% Change	-62.0	-62.0	-62.0	-62.0	-62.0	-62.0	NA
Manufacturing							
2001	78	82	85	87	94	99	NA
2006	205	260	289	316	343	367	398
Difference	127	178	204	229	249	268	NA
% Change	162.8	217.1	240.0	263.2	264.9	270.7	NA
Mining							
2001	42	36	33	28	27	28	NA
2006	23	24	24	24	24	24	24
Difference	-19	-12	-9	-4	-3	-4	NA
% Change	-45.2	-33.3	-27.3	-14.3	-11.1	-14.3	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Montgomery County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	45,944	61,942	73,824	92,270	110,886	131,839	NA
2006	51,193	68,638	90,346	111,441	133,994	164,466	200,243
Difference	5,249	6,696	16,522	19,171	23,108	32,627	NA
% Change	11.4	10.8	22.4	20.8	20.8	24.7	NA
Livestock							
2001	420	420	420	420	420	420	NA
2006	510	510	510	510	510	510	510
Difference	90	90	90	90	90	90	NA
% Change	21.4	21.4	21.4	21.4	21.4	21.4	NA
Irrigation							
2001	20	20	20	20	20	20	NA
2006	66	66	66	66	66	66	66
Difference	46	46	46	46	46	46	NA
% Change	230.0	230.0	230.0	230.0	230.0	230.0	NA
Manufacturing							
2001	1,670	1,935	2,128	2,317	2,604	2,897	NA
2006	1,587	2,045	2,332	2,608	2,883	3,126	3,392
Difference	-83	110	204	291	279	229	NA
% Change	-5.0	5.7	9.6	12.6	10.7	7.9	NA
Mining							
2001	196	98	53	30	19	15	NA
2006	414	480	509	526	543	559	573
Difference	218	382	456	496	524	544	NA
% Change	111.2	389.8	860.4	1653.3	2757.9	3626.7	NA
Steam-Electric Power Generation							
2001	6,000	6,000	6,000	6,000	6,000	6,000	NA
2006	2,507	5,046	8,537	9,981	11,741	13,886	16,502
Difference	-3,493	-954	2,537	3,981	5,741	7,886	NA
% Change	-58.2	-15.9	42.3	66.4	95.7	131.4	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands *(in acre-feet per year) by WUG Category
Polk County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	4,684	4,890	5,174	5,639	5,936	6,288	NA
2006	4,489	4,859	5,230	5,486	5,662	5,913	6,205
Difference	-195	-31	56	-153	-274	-375	NA
% Change	-4.2	-0.6	1.1	-2.7	-4.6	-6.0	NA
Livestock							
2001	136	136	136	136	136	136	NA
2006	134	134	134	134	134	134	134
Difference	-2	-2	-2	-2	-2	-2	NA
% Change	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	NA
Irrigation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA
Manufacturing							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA
Mining							
2001	26	26	27	27	28	29	NA
2006	24	29	31	32	33	34	35
Difference	-2	3	4	5	5	5	NA
% Change	-7.7	11.5	14.8	18.5	17.9	17.2	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
San Jacinto County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	2,586	2,926	3,234	3,547	3,855	4,244	NA
2006	2,698	3,161	3,622	3,972	4,158	4,262	4,329
Difference	112	235	388	425	303	18	NA
% Change	4.3	8.0	12.0	12.0	7.9	0.4	NA
Livestock							
2001	170	170	170	170	170	170	NA
2006	284	284	284	284	284	284	284
Difference	114	114	114	114	114	114	NA
% Change	67.1	67.1	67.1	67.1	67.1	67.1	NA
Irrigation							
2001	0	0	0	0	0	0	NA
2006	667	667	667	667	667	667	667
Difference	667	667	667	667	667	667	NA
% Change	NA	NA	NA	NA	NA	NA	NA
Manufacturing							
2001	24	27	31	34	38	41	NA
2006	39	48	52	56	60	63	68
Difference	15	21	21	22	22	22	NA
% Change	62.5	77.8	67.7	64.7	57.9	53.7	NA
Mining							
2001	76	52	30	10	2	0	NA
2006	36	30	29	28	27	26	26
Difference	-40	-22	-1	18	25	26	NA
% Change	-52.6	-42.3	-3.3	180.0	1250.0	NA	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands *(in acre-feet per year) by WUG Category
Trinity County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	1,683	1,664	1,624	1,634	1,652	1,737	NA
2006	1,126	1,203	1,260	1,255	1,206	1,145	1,102
Difference	-557	-461	-364	-379	-446	-592	NA
% Change	-33.1	-27.7	-22.4	-23.2	-27.0	-34.1	NA
Livestock							
2001	303	303	303	303	303	303	NA
2006	211	211	211	211	211	211	211
Difference	-92	-92	-92	-92	-92	-92	NA
% Change	-30.4	-30.4	-30.4	-30.4	-30.4	-30.4	NA
Irrigation							
2001	4	4	4	4	4	4	NA
2006	467	467	467	467	467	467	467
Difference	463	463	463	463	463	463	NA
% Change	11575.0	11575.0	11575.0	11575.0	11575.0	11575.0	NA
Manufacturing							
2001	3	4	4	5	5	6	NA
2006	0	0	0	0	0	0	0
Difference	-3	-4	-4	-5	-5	-6	NA
% Change	NA	NA	NA	NA	NA	NA	NA
Mining							
2001	10	10	10	10	10	10	NA
2006	8	6	6	6	6	6	6
Difference	-2	-4	-4	-4	-4	-4	NA
% Change	-20.0	-40.0	-40.0	-40.0	-40.0	-40.0	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands* (in acre-feet per year) by WUG Category
Walker County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	10,521	11,095	11,569	12,627	13,285	13,576	NA
2006	14,741	16,512	17,941	18,516	18,146	18,097	18,097
Difference	4,220	5,417	6,372	5,889	4,861	4,521	NA
% Change	40.1	48.8	55.1	46.6	36.6	33.3	NA
Livestock							
2001	565	565	565	565	565	565	NA
2006	632	632	632	632	632	632	632
Difference	67	67	67	67	67	67	NA
% Change	11.9	11.9	11.9	11.9	11.9	11.9	NA
Irrigation							
2001	345	345	345	345	345	345	NA
2006	11	11	11	11	11	11	11
Difference	-334	-334	-334	-334	-334	-334	NA
% Change	-96.8	-96.8	-96.8	-96.8	-96.8	-96.8	NA
Manufacturing							
2001	228	245	260	276	290	306	NA
2006	2,518	3,208	3,718	4,188	4,666	5,083	5,517
Difference	2,290	2,963	3,458	3,912	4,376	4,777	NA
% Change	1004.4	1209.4	1330.0	1417.4	1509.0	1561.1	NA
Mining							
2001	15	16	18	19	21	23	NA
2006	12	13	13	13	13	13	13
Difference	-3	-3	-5	-6	-8	-10	NA
% Change	-20.0	-18.8	-27.8	-31.6	-38.1	-43.5	NA
Steam-Electric Power Generation							
2001	0	10,000	15,000	15,000	20,000	30,000	NA
2006	0	0	0	0	0	0	0
Difference	0	-10,000	-15,000	-15,000	-20,000	-30,000	NA
% Change	NA	-100.0	-100.0	-100.0	-100.0	-100.0	NA

*All values are presented in acre-feet per year

Table 2.4
Comparison Between 2001 RWP and 2006 RWP
Water Demands *(in acre-feet per year) by WUG Category
Waller County (Continued)

RWP	2000	2010	2020	2030	2040	2050	2060
Municipal							
2001	6,394	7,958	10,930	15,103	17,129	19,767	NA
2006	4,610	5,393	6,310	7,380	8,530	10,016	11,757
Difference	-1,784	-2,565	-4,620	-7,723	-8,599	-9,751	NA
% Change	-28	-32	-42	-51	-50	-49	NA
Livestock							
2001	1,238	1,238	1,238	1,238	1,238	1,238	NA
2006	939	939	939	939	939	939	939
Difference	-299	-299	-299	-299	-299	-299	NA
% Change	-24	-24	-24	-24	-24	-24	NA
Irrigation							
2001	28,405	28,405	28,405	28,405	28,405	28,405	NA
2006	22,978	22,978	22,978	22,978	22,978	22,978	22,978
Difference	-5,427	-5,427	-5,427	-5,427	-5,427	-5,427	NA
% Change	-19	-19	-19	-19	-19	-19	NA
Manufacturing							
2001	44	49	56	62	68	75	NA
2006	68	89	101	112	123	133	144
Difference	24	40	45	50	55	58	NA
% Change	55	82	80	81	81	77	NA
Mining							
2001	687	351	192	106	53	30	NA
2006	80	80	80	80	80	80	80
Difference	-607	-271	-112	-26	27	50	NA
% Change	-88	-77	-58	-25	51	167	NA
Steam-Electric Power Generation							
2001	0	0	0	0	0	0	NA
2006	0	0	0	0	0	0	0
Difference	0	0	0	0	0	0	NA
% Change	NA	NA	NA	NA	NA	NA	NA

*All values are presented in acre-feet per year

Table 2.5
Summary of Methodology Used for Revised Projections –
Austin, Brazoria, Chambers Counties

	Category	*TWDB Default*	*Other*	*Notes*
Austin	Municipal	X		
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Brazoria	Municipal	X		
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		The TWDB revised the baseline projection due to a water use survey reporting error.
	Mining	X		
	Steam-Electric	X		
Chambers	Municipal	X		
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

Table 2.5
Summary of Methodology Used for Revised Projections –
Fort Bend, Galveston, Harris Counties (Continued)

	Category	*TWDB Default*	*Other*	*Notes*
Fort Bend	Municipal	X		City of Sugarland Year 2000 actual water demand data used to find GPCD.
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Galveston	Municipal	X		City of Dickinson Year 2000 actual water demand data used to find GPCD.
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Harris	Municipal	X		Green Trails MUD and City of Webster Year 2000 actual water demand data used to find GPCD.
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

Table 2.5
Summary of Methodology Used for Revised Projections –
Leon, Liberty, Madison Counties (Continued)

	Category	*TWDB Default*	*Other*	*Notes*
Leon	Municipal	X		
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Liberty	Municipal	X		
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Madison	Municipal	X		
	Livestock	X		
	Irrigation	X		The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

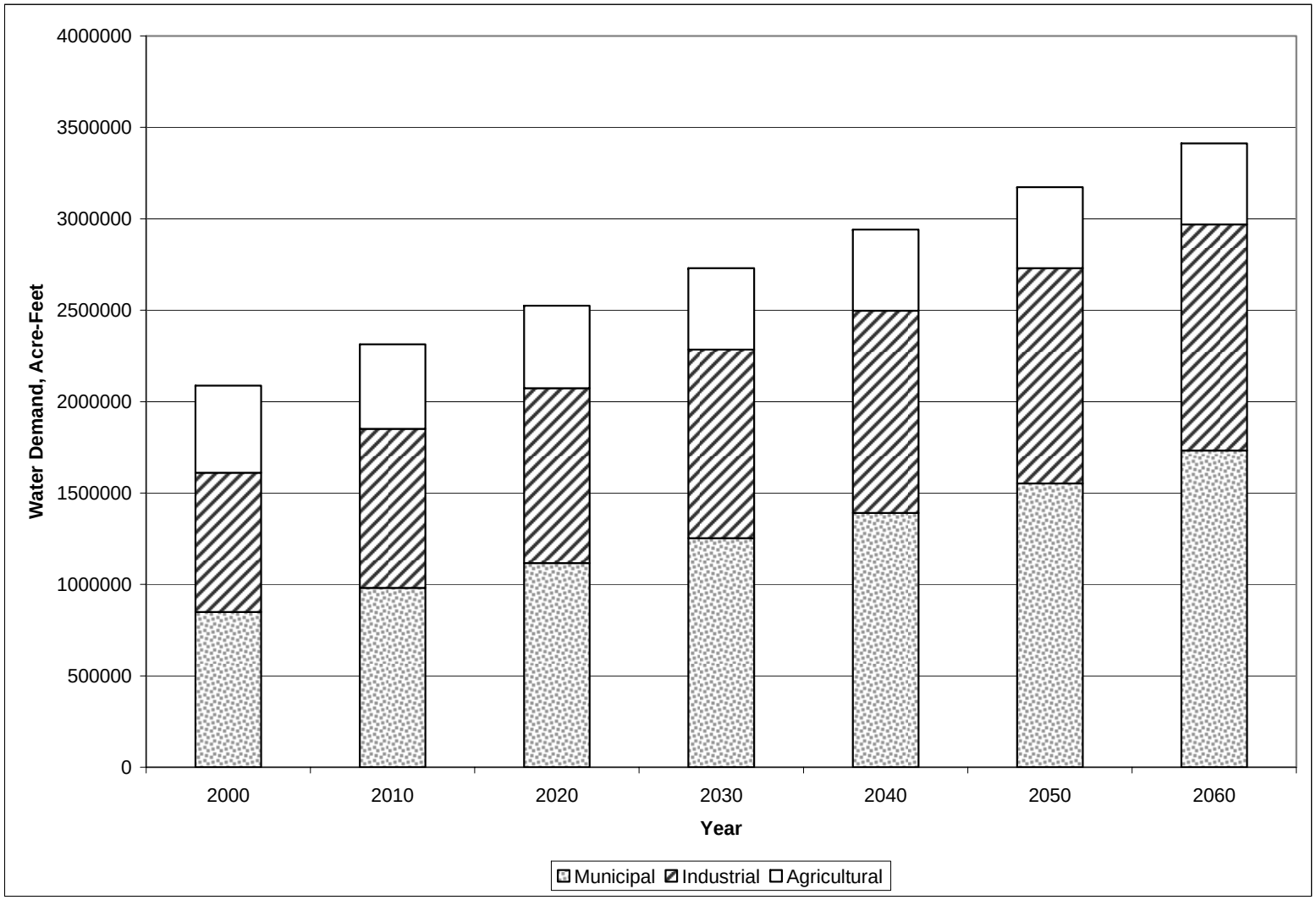
Table 2.5
Summary of Methodology Used for Revised Projections –
Montgomery, Polk, San Jacinto Counties (Continued)

	Category	*TWDB Default*	*Other*	*Notes*
Montgomery	Municipal	X		Porter WSC Year 2000 actual water demand data used to find GPCD.
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Polk	Municipal	X		
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
San Jacinto	Municipal	X		
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

Table 2.5
Summary of Methodology Used for Revised Projections –
Trinity, Walker, Waller Counties (Continued)

	Category	*TWDB Default*	*Other*	*Notes*
Trinity	Municipal	X		
	Livestock	X		
	Irrigation	X		
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Walker	Municipal	X		
	Livestock	X		
	Irrigation	X		The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		
Waller	Municipal	X		
	Livestock	X		
	Irrigation		X	The Region H Agricultural Committee developed revised Year 2000 irrigation demands based on the larger of the 5-year average (1995-1999) or the TWDB Draft demand values.
	Manufacturing	X		
	Mining	X		
	Steam-Electric	X		

Figure 2.2
Water Demand by Decade



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3. Analysis of Current Water Supplies

3.1 Introduction

The available water supply within Region H includes both groundwater and surface water. Groundwater is provided from two major aquifers—the Gulf Coast and the Carrizo-Wilcox; and four minor aquifers—the Sparta, Queen City, Yegua-Jackson, and Brazos River alluvium. Primary surface water sources are reservoir storage and run-of-river (ROR) supply from the three rivers in the area—the Trinity, San Jacinto, and Brazos.

Much of the regional water demand is supplied by surface water. Of the total year 2000 water demand, over 70 percent, or 1,267,410 acre-feet, was supplied by surface water as found in the TWDB Year 2000 Water Use Survey. Surface water supplies are obtained from the Lake Livingston-Wallisville Salt Water Barrier System on the Trinity River; Lakes Conroe and Houston on the San Jacinto River; the Brazos River Authority/U.S. Army Corps of Engineers (BRA/COE) System; ROR flows from the Trinity, Brazos, and San Jacinto Rivers; the corresponding coastal basins; and some smaller tributaries and reservoirs. Groundwater supplies accounted for the remaining 30 percent of the total year 2000 water demand predominately supplied by the Gulf Coast aquifer.

This chapter summarizes the results of Task 3, and describes the resources available to the region and their allocation to Water User Groups (WUGs) throughout Region H. Also, to provide consistency and facilitate the compilation of the different regional plans, Texas Water Development Board (TWDB) required the incorporation of this data into a standardized online database referred to as TWDB DB07. Tables that contain this information are identified below and are located in the appendices accompanying this chapter.

- *Table 3A.1* – Current Water Supply Sources
- *Table 3G.1* – Current Water Supplies Available to Region H by City and Category
- *Table 3H.1* – Current Water Supplies Available to the Regional Water Plan Group by Wholesale Water Provider

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[1]

3.2.1 Groundwater Aquifers

As presented in *Chapter 1*, groundwater resources in Region H consist of two major aquifers and four minor aquifers. The two major aquifers are the Gulf Coast aquifer and the Carrizo-Wilcox aquifer, with the Gulf Coast aquifer furnishing the majority of groundwater within the region south of Waller County. The four minor aquifers present are the Sparta, Queen City, Yegua-Jackson, and Brazos River alluvium aquifers.

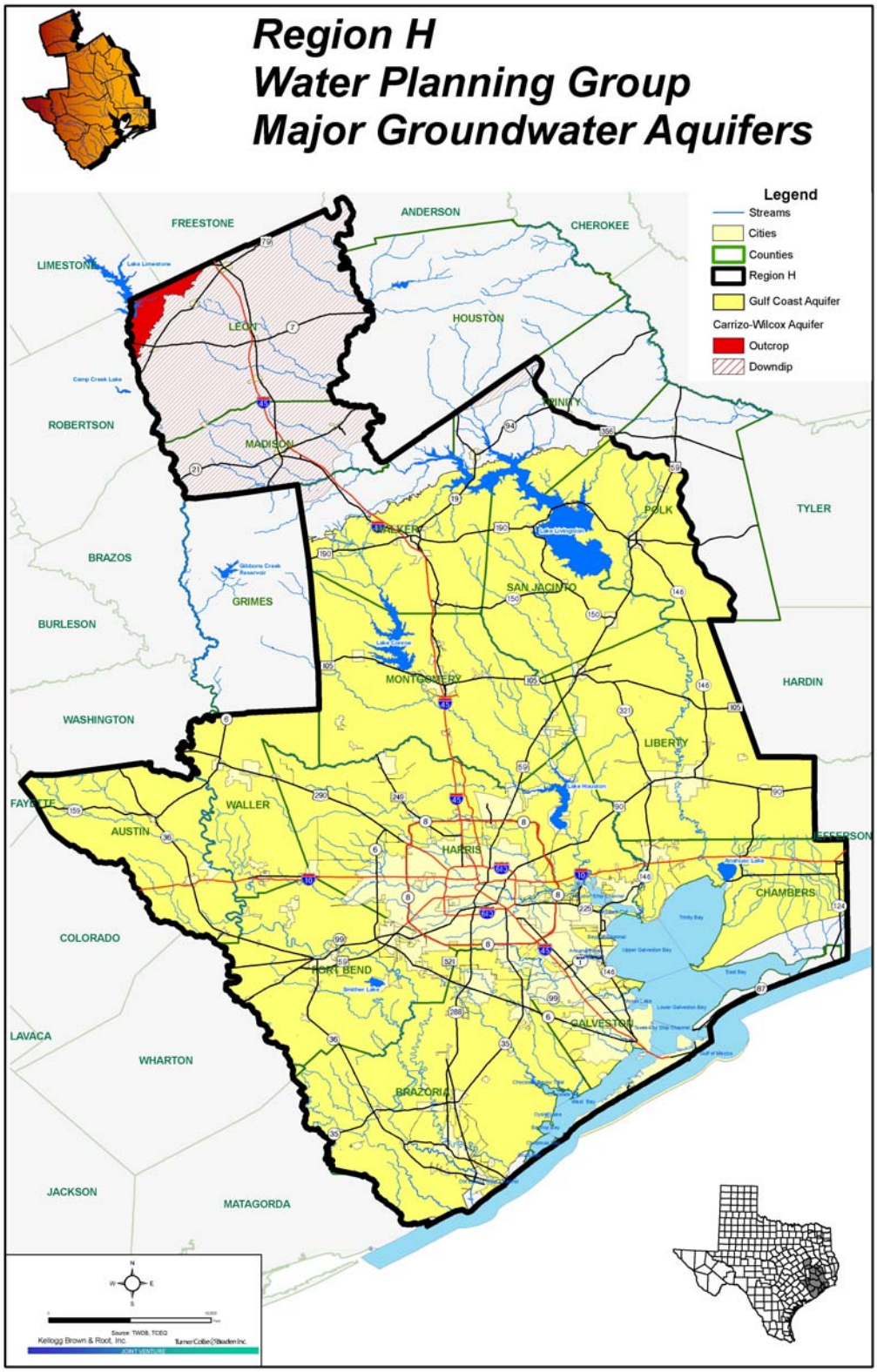
The Carrizo-Wilcox aquifer is the main aquifer in the northern part of Region H in Leon County and the northern portion of Madison County. The aquifer is composed of, in ascending order, the Wilcox Group and the Carrizo Formation. Because they are weakly connected hydraulically, they are generally described as one major aquifer, but for groundwater flow modeling purposes, the major aquifer is modeled as three separate layers. The Wilcox Group is composed of alternating beds of sand, sandy clay, and clay with locally interbedded gravel, silt, clay, and lignite. The Carrizo Formation is a uniform, well sorted sand that contains a few very thin beds of clay with the aquifer dipping downward to the southeast at about 70 to 100 feet per mile. The Carrizo-Wilcox aquifer supplies groundwater for domestic, municipal, manufacturing, and agricultural uses in Leon and Madison Counties. Figure 3-1: Major Groundwater Aquifers provides a map showing the location of the aquifer.

A groundwater availability model (GAM) was developed for the Carrizo-Wilcox aquifer in the area of Leon and Madison Counties and the model is described in a report prepared by the TWDB entitled *Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas*. The model divides the Carrizo-Wilcox aquifer into four layers that are the Carrizo Sand or Carrizo Formation and the Calvert Bluff, Simsboro, and Hooper Formations of the Wilcox. The main layers of the model that provide substantial amounts of water are the Carrizo Sand and Simsboro. Utilization of the model provides an additional method to evaluate the groundwater resources in the northern part of Region H.

The Gulf Coast aquifer consists of four general water-producing units. The geologically youngest unit is the Chicot aquifer, followed by the Evangeline aquifer, the Jasper aquifer, and the Catahoula Formation. The Chicot and Evangeline aquifers are the more prolific water-producing units in the Gulf Coast aquifer followed by the Jasper aquifer and the Catahoula Formation. The aquifer extends from the Gulf Coast to approximately 100 to 120 miles inland in Walker and Trinity Counties. The units are composed of alternating beds of sand, silt, and clay, and at deeper depths shale can occur at and below the base of the Evangeline aquifer. Formation beds vary in thickness and composition. The areal extent and individual beds normally cannot be traced over extended distances. Total aquifer sand thickness varies and can be as great as several hundred feet. The Gulf Coast aquifer supplies groundwater for domestic, municipal, manufacturing, and agricultural uses in Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Polk, San Jacinto, Trinity, Walker, and Waller Counties.

[1] The information contained in this portion of Chapter 3 was provided by LBG-Guyton Associates.

Figure 3-1: Major Groundwater Aquifers



A groundwater flow model is being developed for the Gulf Coast aquifer that includes the counties in Region H. A calibration version of the model has been published and a version for predictive runs should be released by February 2005. The model has four layers to represent the Gulf Coast aquifer, and these layers include Layers 1, 2, 3, and 4 representing the Chicot aquifer, Evangeline aquifer, Burkeville confining unit, and Jasper aquifers, respectively. The model provides an additional tool for evaluating the groundwater resources within Region H.

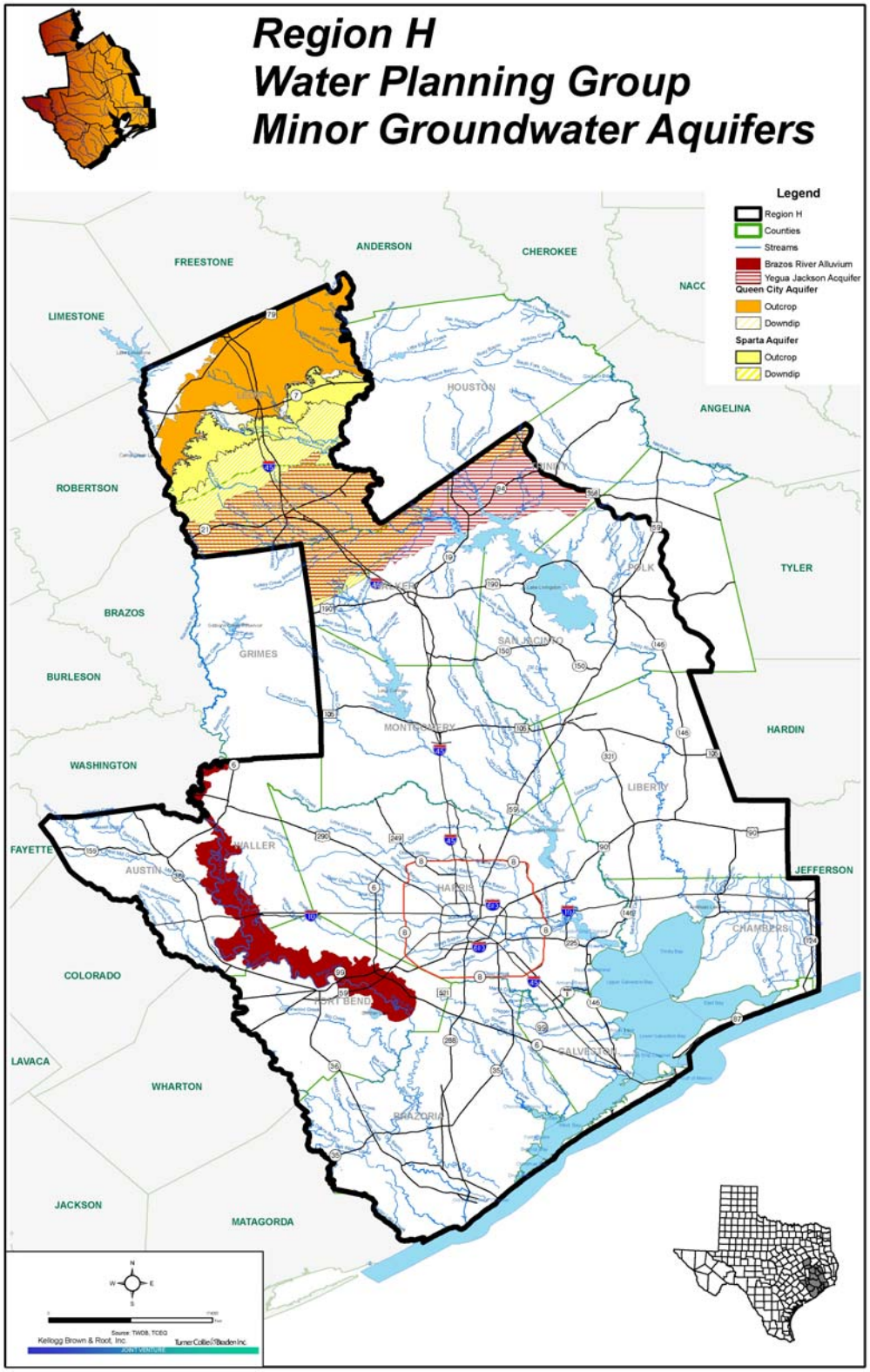
The Queen City Formation is a minor aquifer that occurs in central and southeastern Leon County and in the northern part of Madison County. The Queen City Formation is composed of sand and loosely cemented sandstone with interbedded shale layers occurring throughout. The Queen City Formation ranges in thickness from 250 to 400 feet with approximately 60 to 70 percent of the total thickness being sand according to Texas Water Commission Bulletin 6513, "Availability and Quality of Groundwater in Leon County, Texas, 1965" (Bulletin 6513). Groundwater in small to moderate quantities is provided by the Queen City Formation for domestic, municipal, industrial, and agricultural uses in Leon and Madison Counties.

The Sparta Formation or Sparta Sand is another minor aquifer that occurs in southeastern Leon County, all of Madison County, northwestern Walker County, and northeastern Trinity County. The Sparta Formation consists of sand and interbedded clay, with the lower portion of the aquifer containing massive unconsolidated sands with a few layers of shale. The Sparta Formation ranges in thickness from 200 to 300 feet in Leon County (Bulletin 6513) and Madison County. Groundwater from the aquifer is provided for domestic, municipal, and agricultural uses in Leon County and for domestic, municipal, manufacturing, and agricultural uses in Madison County. The Sparta Formation is the groundwater source for the Town of Madisonville.

The Yegua Formation and Jackson Group make up a minor aquifer, designated as the Yegua-Jackson aquifer that occurs within the region in parts of Madison, Walker, Trinity, and Polk Counties. The Yegua Formation consists of sand, interbedded clay, and scattered lignite. The Jackson Group includes all strata between the Yegua Formation and the Catahoula Sandstone and consists of sand, clay, sandstone, and siltstone. The Yegua Formation ranges in thickness from 1,000 to 1,500 feet, and the Jackson Group is approximately 1,100 feet thick according to Texas Board of Water Engineers Bulletin 5003, "Geology and Ground-Water Resources of Walker County, Texas, 1950" (Bulletin 5003). Small to moderate quantities of groundwater are provided by the Yegua-Jackson aquifer for domestic, municipal, industrial, and agricultural uses.

The Brazos River alluvium is the fourth minor aquifer in the region. The Brazos River alluvium occurs in the floodplain and terrace deposits of the Brazos River in Austin, Fort Bend, and Waller Counties as shown on Figure 3-2: Minor Groundwater Aquifers. The Quaternary alluvial sediments consist of clay, silt, sand, and gravel according to TWDB Report 345, *Aquifers of Texas*, (1995) with the more permeable sand and gravel residing in the lower part of the aquifer. The saturated thickness of the sediment is as much as 85 feet with a width of the alluvium that ranges from less than 1 mile to approximately 7 miles

Figure 3-2: Minor Groundwater Aquifers



according to Report 345. The Brazos River alluvium supplies groundwater for domestic and agricultural purposes in Fort Bend and Waller Counties. In Austin County, it supplies groundwater for domestic, manufacturing, and agricultural uses.

Recharge to the two major and four minor aquifers is principally from the infiltration of precipitation and streamflow on the outcrops, as shown in Figure 3-3: Aquifer Outcrop Areas. A portion of the water infiltrates to the zone of saturation and then moves downdip through the aquifers, while large amounts of precipitation on the outcrops are rejected recharge and become runoff. Average annual precipitation in Region H ranges from about 40 inches/year in the northern area to about 50 to 54 inches in the southeastern area.

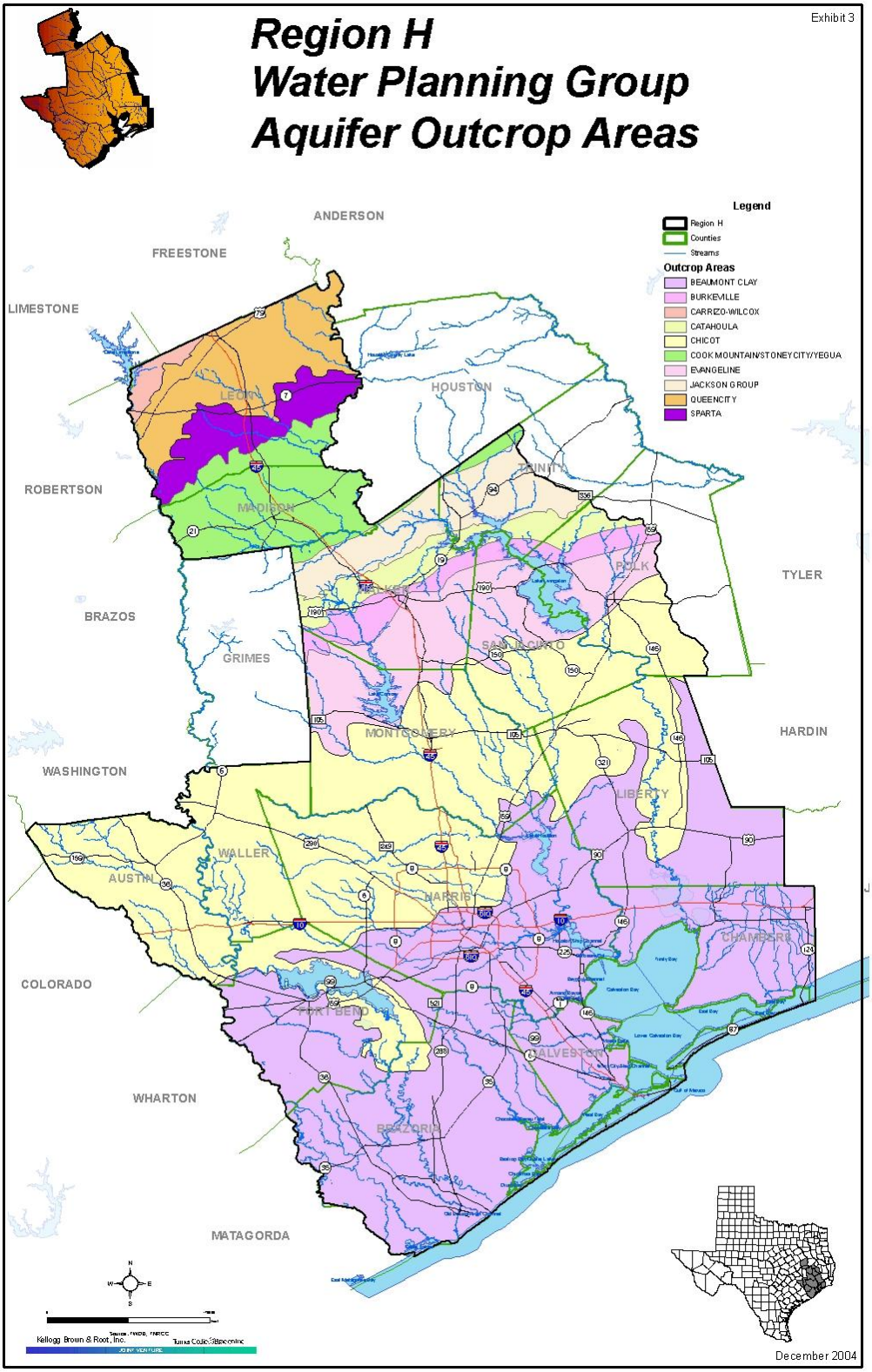
3.2.2 Groundwater Use Overview

According to TWDB and Harris-Galveston Coastal Subsidence District (HGCSD), Region H pumped approximately 671,566 acre-feet of groundwater in 2000. Groundwater in the region is used for domestic, municipal, manufacturing, steam-electric power cooling, and agricultural purposes. The majority of the water is used for municipal purposes. Municipal usage accounts for approximately 78 percent or 527,006 acre-feet of the water pumped. Municipal pumpage consists of water used for cities and communities, parks, campgrounds, and water districts serving principally residential developments. Agricultural usage accounts for approximately 14 percent or 92,953 acre-feet of the groundwater pumped. Major agricultural crops include rice, soybean, corn, cotton, and hay. Cattle are the principal livestock raised in the region. Finally, industrial usage represents approximately 8 percent or 51,607 acre-feet of the groundwater—water pumped for manufacturing, mining, steam-electric power, and other industrial needs. A majority of the overall groundwater usage is in the southern part of the region where more of the population, industrial, and agricultural demands exist and where the aquifer is capable of providing large quantities of water for the various uses.

3.2.3 Aquifer Conditions

Groundwater conditions within the region have been and should continue to be favorable for the pumping of substantial quantities of good quality water to help satisfy the multiple water needs of the region. The principal aquifers that will provide the water include the Carrizo-Wilcox in Leon and Madison Counties, the Sparta aquifer system in Madison and Trinity Counties, and the Gulf Coast aquifer system in the central and southern sections of the region. Smaller amounts of water can be provided by the Queen City, Sparta, Yegua-Jackson, and Brazos River alluvium aquifers with the minor aquifers being particularly important in areas that do not require large quantities of water to reliably meet demands.

Figure 3-3: Aquifer Outcrop Areas



3.2.3.1 Carrizo-Wilcox Aquifer

The Carrizo-Wilcox aquifer was deposited in a manner that resulted in a sequence of geologic formations with a thickness of about 2,000 feet in the northern part of the region. The Carrizo Sand, one of two principal water-producing units of the Carrizo-Wilcox aquifer, is about 100 to 200 feet thick. The Simsboro Sand is the other major water-producing unit, and it is about 200 to 400 feet thick. Currently, the overall availability of water from the Carrizo-Wilcox aquifer in Leon and Madison Counties is about 8,400 acre-feet per year based on the management plan adopted by the Mid-East Texas Groundwater Conservation District that includes Leon and Madison Counties. The estimate of groundwater availability for the two counties is substantially below a previous estimate by the TWDB of 165,900 acre-feet/year. The current estimate of 8,400 acre-feet per year will be reviewed in the upcoming years as additional information is developed for the Carrizo-Wilcox aquifer and groundwater pumpage occurs. In 2000, about 4,030 acre-feet of groundwater was pumped from the aquifer in the two counties based on data from TWDB. Conditions are favorable in the two counties to develop additional supplies from the Carrizo-Wilcox aquifer. The development should be done in a manner that will properly manage the aquifer and monitor its response to the stress of additional groundwater pumping. Water from the aquifer contains less than 1,000 milligrams per liter (mg/l) of total dissolved solids, but water from the Carrizo Sand can contain elevated levels of iron that require sequestering or treatment for removal for water used for most municipal and industrial purposes.

3.2.3.2 Gulf Coast Aquifer

The Gulf Coast aquifer was deposited in a manner that resulted in interbedded sand and clay layers with a substantial thickness of sand that contains freshwater of good quality. The lower unit of the aquifer, the Catahoula Sandstone, is screened by wells for the City of Huntsville. To the south in Galveston County, the Chicot unit is screened in wells used by the City of Galveston. The aquifer is capable of yielding larger quantities of water in the central and southern parts of Region H and has been utilized over the past 100 years to provide part of the water supply. The Gulf Coast aquifer has sand thicknesses ranging from about 200 to 500 feet in the central and southern parts of the region with the sands containing freshwater decreasing in thickness within about 30 to 40 miles of the Gulf Coast.

The pumpage of large quantities of water in the southern part of the region has caused the aquifer potentiometric head to decline from 50 to about 400 feet in parts of Harris County. Subsidence of significant proportions has occurred in parts of Harris and Galveston Counties resulting in the gradual reduction and shift in areal extent of groundwater pumping to the west over the past 25 years. Subsidence is discussed in the next section of this report.

Digital groundwater flow models have been developed over the past 25 years for the Chicot and Evangeline aquifers in the southern part of Region H to help assess the groundwater resources. As mentioned previously, the most recent digital model was developed by the U.S. Geological Survey for the TWDB with a report regarding the model titled "Hydrogeology and Simulation of Ground-Water Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer System, Texas."

3.2.3.3 Queen City and Sparta Aquifers

The Queen City and Sparta aquifers occur in the northern part of the region and are capable of providing some water in Leon, Madison, and Trinity Counties, and the northern part of Walker County. Estimated overall availability from the aquifers is about 25,525 acre-feet/ year based on groundwater supply data from TWDB. Water availability estimates from the Queen City and Sparta aquifers for the year 2000 are approximately 12,455, 10,790, 245, and 2,035 acre-feet per year in Leon, Madison, Trinity, and Walker Counties, respectively. The two aquifers are composed of sands that can provide small to moderate quantities of water to wells. The water-transmitting capabilities of the aquifers are limited but adequate for meeting smaller demands (pumping rates of 50 to 1,000 gallons per minute [gpm]). The aquifers contain water with less than 1,000 mg/l of total dissolved solids to depths that range from about 800 to 1,000 feet. Pumping from the two aquifers in Leon and Madison Counties in the year 2000 was about 3,500 acre-feet based on data from TWDB. No pumpage was recorded in the year 2000 TWDB data for either aquifer for Trinity and Walker Counties.

3.2.3.4 Yegua-Jackson Aquifer

The Yegua-Jackson aquifer is located in the northern part of the region and is capable of providing some water in Madison, Polk, Trinity, and Walker Counties. However, estimated water availability and usage specifically for the Yegua-Jackson aquifer has not yet been determined by the TWDB for these counties. Each of these counties has data available for other-undifferentiated aquifers. According to the year 2000 TWDB data, the total amount used in these four counties in this category was approximately 3,100 acre-feet.

The aquifer is composed of sands that can provide small to moderate quantities of water to wells. According to TWDB estimates in the 2002 Texas State Water Plan, yields of most wells completed in the Yegua-Jackson aquifer are small, less than 50 gpm, and net fresh water sands are generally less than 200 feet at any location within the aquifer. The quality of the water in the aquifer ranges from good to slightly saline. The plan also estimates that the entire Yegua-Jackson aquifer in the state produced about 11,000 acre-feet of water in 1997.

3.2.3.5 Brazos River Alluvium

The Brazos River alluvium is a shallow aquifer that is about one to seven miles wide in a corridor along the Brazos River in Waller, Austin, and Fort Bend Counties. The aquifer typically is not greater than about 100 feet deep with wells mostly constructed to provide water for irrigation of row crops and hay. The aquifer may contain water with total dissolved solids that approach 1,000 mg/l and a high total hardness due to the amounts of calcium, magnesium, and sulfate. Based on estimates from TWDB, the overall availability of water from the Brazos River alluvium in Austin, Waller, and Fort Bend Counties is about 41,500 acre-feet per year with 2000 pumpage in Fort Bend County estimated at 8,737 acre-feet per year by TWDB. No pumpage was recorded in the 2000 TWDB data for either Austin or Waller Counties. The aquifer should continue to be able to provide water for use along the Brazos River.

3.2.4 Subsidence Effects

Subsidence has occurred principally in Harris, Galveston, Brazoria, Fort Bend, and Chambers Counties as the result of the withdrawal of large quantities of groundwater from the Chicot and Evangeline aquifers. Studies and reports prepared by the U.S. Geological Survey and the HGCSD show that about 9-plus feet of subsidence occurred in a small part of the Houston Ship Channel area with fewer amounts away from the channel area. In the City of Katy, total subsidence through the year 2000 is estimated to be about 1.7 feet. In the City of Rosenberg in Fort Bend County, estimated subsidence is less than 1 foot through 2000. HGCSD has developed regulatory plans that have been updated through the years. Groundwater pumping in Harris and Galveston Counties has decreased over the past 23 years as additional surface water was utilized and less groundwater was pumped.

A regulatory plan adopted by HGCSD in 1999 prescribes general areal pumpage limits for the next three decades until 2030. The regulatory plan pumping requirements were used in estimating the availability of groundwater within the Harris and Galveston Counties area with the estimate of groundwater availability in 2010 being 346,040 acre-feet and decreasing to 228,975 acre-feet per year by 2030. HGCSD regulatory plan essentially segments Harris and Galveston Counties into geographic regions and mandates a reduction in groundwater pumpage per a scheduled reduction timeline. Water users located within the southeastern portion of Harris County and all of Galveston County currently must receive no more than 10 percent of their total water supply from groundwater. This limit or another limit adopted by HGCSD will exist throughout the Region H planning period. The remainder of Harris County is segmented within two other regulatory regions. Water users within Regulatory Area 2, which comprises the central portion of the county, must receive no more than 20 percent of their water supply from groundwater as of year 2000. Groundwater users within the remainder of Harris County, within HGCSD Regulatory Area 3, can receive only 70 percent of their water supplies from groundwater by year 2010, 30 percent of their water as groundwater by year 2020, and only 20 percent of their water supply from groundwater by year 2030. These regulatory limitations affect all of the WUGs (except irrigation for agricultural purposes and livestock uses) within Harris and Galveston Counties by year 2010,

causing a continuing decrease in the allowable amount of groundwater that can be pumped in these two counties over time.

A regulatory plan adopted by the Fort Bend Subsidence District (FBSD) in 2003 also prescribes general areal pumpage limits for the next three decades until 2030 for Fort Bend County. The plan includes pumping limits to control subsidence within the District as needed. The FBSD regulatory plan essentially segments Fort Bend County into geographic regions and mandates reductions of groundwater pumpage per a scheduled reduction timeline. Water users located within the northwestern portion of Fort Bend County (Area A) must receive no more than 70 percent of their total water supply from groundwater by 2013 and 40 percent of their water as groundwater by year 2025. This limit or a more stringent limit adopted by FBSD will exist throughout the Region H planning period. Water users within the Richmond/Rosenberg Sub Area, which comprises the central portion of the county, must receive no more than 70 percent of their water supply from groundwater as of year 2015 and 40 percent of their water as groundwater by year 2025. Groundwater users within the remainder of Fort Bend County, FBSD Regulatory Area B, must be permitted for increases in withdrawal but are not currently subject to groundwater reduction requirements. These regulatory limitations affect all of the WUGs (except irrigation for agricultural purposes) within Fort Bend County by year 2013 or 2015, causing a decrease in the allowable amount of groundwater that can be pumped in the county over time.

3.2.5 Groundwater Availability in Fort Bend and Montgomery Counties

Groundwater pumpage in Fort Bend County has been increasing over the past years from approximately 69,000 acre-feet per year in 1990 to about 88,000 acre-feet per year in 2002, based on data provided by FBSD. Groundwater availability for the county was estimated by FBSD at about 109,300 acre-feet per year from the Gulf Coast aquifer in the year 2000, and reduced to 89,600 acre-feet per year in 2030. Over the past 10 years, static water levels within the county in observation wells have been stable or showed a slight water-level recovery in eastern, southern, and western Fort Bend County. In the northern part of Fort Bend County, there has been about 30 to 35 feet of water-level decline over the past 10 years in some Evangeline aquifer screened wells (refer to Figure 3-4 through Figure 3-7).

Figure 3-4:
East Fort Bend County – Static Water Levels in Wells

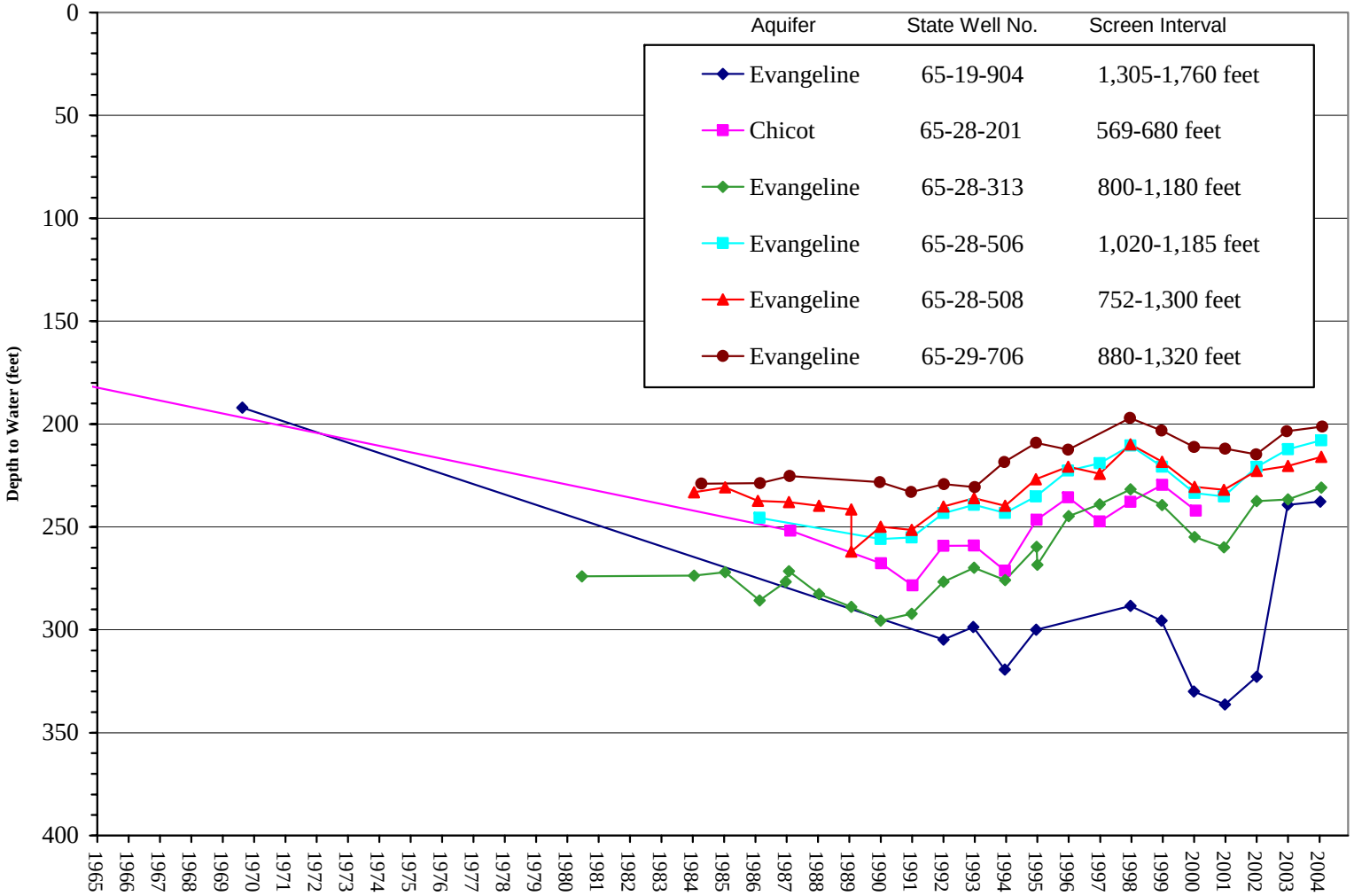


Figure 3-5:
Southwest Fort Bend County – Static Water Levels in Wells

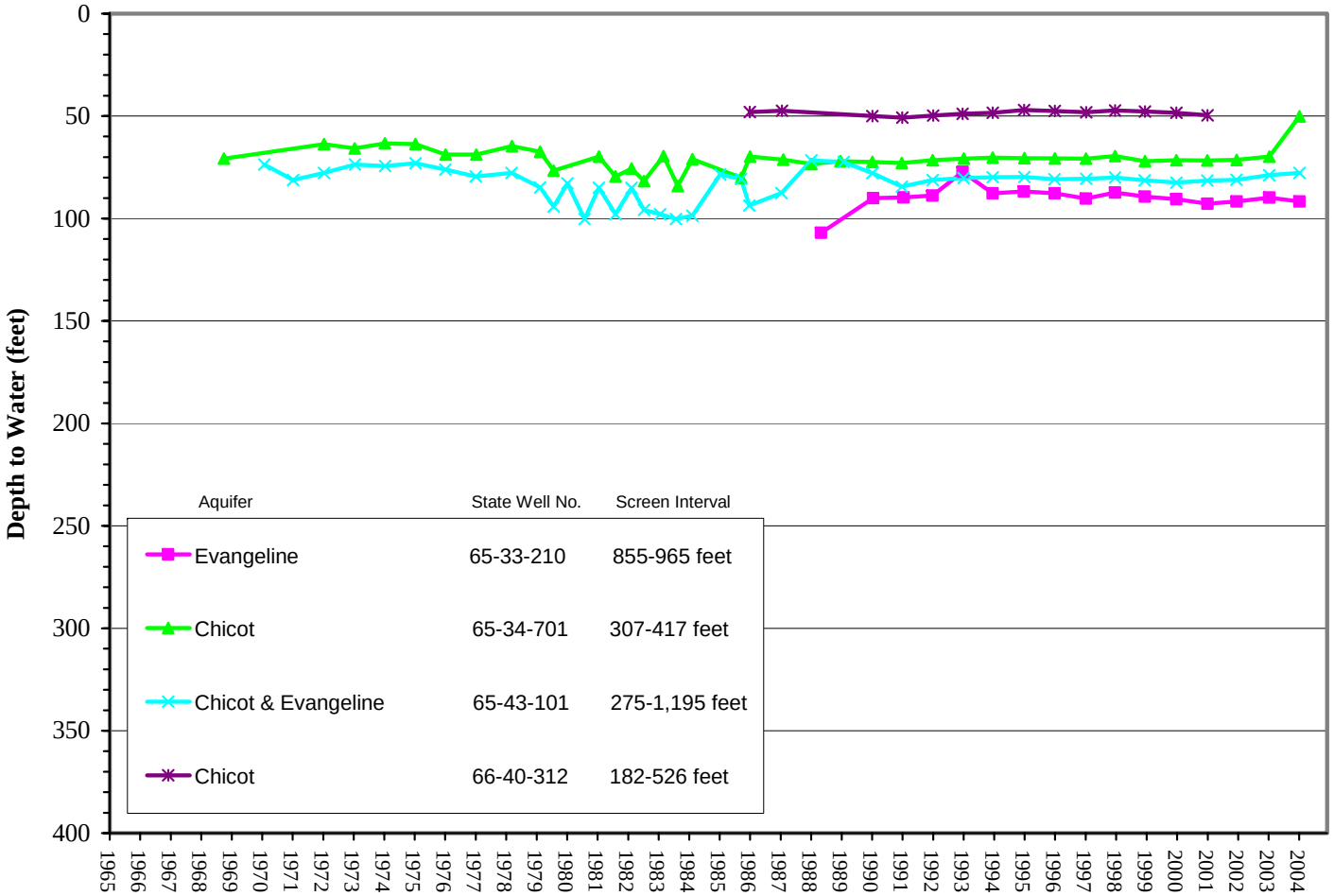


Figure 3-6:
North Fort Bend County – Static Water Levels in Wells

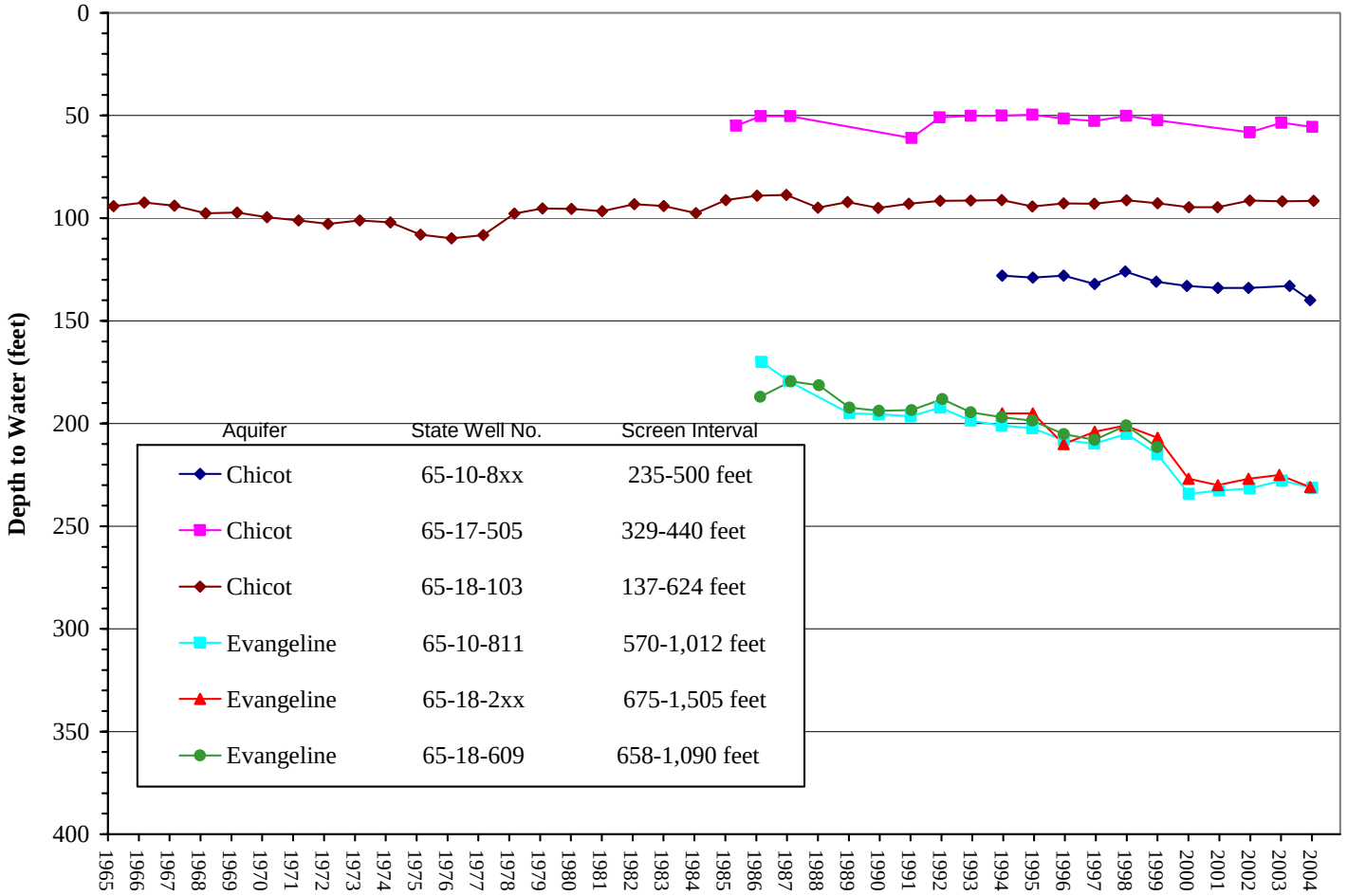
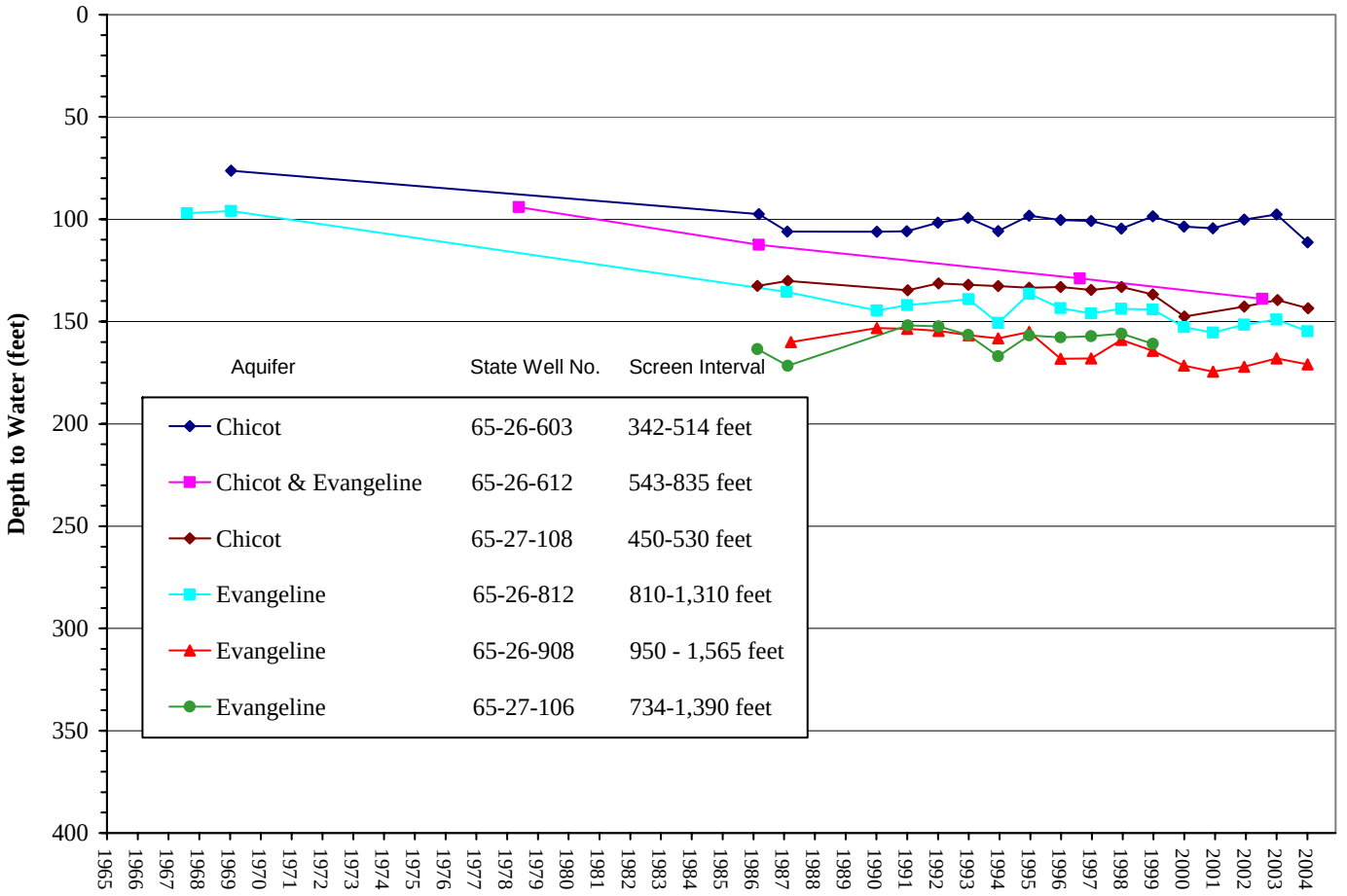


Figure 3-7:
Central Fort Bend County – Static Water Levels in Wells



The Gulf Coast aquifer provides groundwater to Montgomery County with the Jasper aquifer the principal source for about three-quarters of the county, and the Chicot and Evangeline aquifers providing water in the southeastern and very southern part of the county. The estimated groundwater availability from the Gulf Coast aquifer is about 64,000 acre-feet per year, based on the groundwater management plan adopted by the Lonestar Groundwater Conservation District. Pumpage within the county was about 55,990 acre-feet in 2000, based on data from TWDB. Pumpage is concentrated in the central and southern parts of the county along the Interstate Highway 45 (IH 45) corridor, around Lake Conroe, and in the southeastern part of the county north of the City of Humble.

The estimated availability of groundwater within Montgomery County from the Gulf Coast aquifer is about 64,000 acre-feet per year. Past pumpage and subsequent aquifer response to pumpage show that the development of additional groundwater will cause further potentiometric head decline in wells. Groundwater pumpage should be spread through the county to take advantage of developing water in areas where aquifer conditions are favorable but where the demand has not developed for the water, which is principally in the western and eastern portions of the county away from the IH 45 corridor area.

3.2.6 Public Supply Groundwater Usage

Region H relied on groundwater to provide approximately 50 percent or 527,006 acre-feet of the municipal water supply in 2000. Austin, Leon, Liberty, Madison, Montgomery, and Waller Counties relied on groundwater to supply essentially 100 percent of the domestic and municipal demand. Table 3-1 gives the amount of groundwater pumped for municipal purposes for each county in the region as reported by TWDB. Within the region, Harris County accounted for the most municipal groundwater usage in 2000 with 337,837 acre-feet. The next highest demands are Fort Bend County with 68,257 acre-feet, Montgomery County with 52,333 acre-feet, and Brazoria County with 26,796 acre-feet. Municipal users represent cities and communities, parks, campgrounds, and any water districts. The year 2000 had precipitation below normal for the year and during the summer months, so groundwater pumpage in 2000 was higher than normal.

Cities with populations of 1,000 or greater and county-other users that rely on groundwater for at least part of their overall supply are identified in *Table 3G.1*, located in *Appendix 3G*. The amount of groundwater projected to be available to the users can vary through the planning period depending on the demand for water by a user and whether surface water is needed or available in future years to satisfy part of the demand.

3.2.7 Industrial Groundwater Usage

According to TWDB and HGCSD, in 2000, Region H relied on groundwater to provide approximately 8 percent of the water used for industrial purposes, which accounted for approximately 51,607 acre-feet of the groundwater used in Region H. Industrial consumption represents water that is used for manufacturing, mining, and steam-electric power. Table 3-2 shows the amount of groundwater used for industrial purposes for each county in the region. Within the region, Harris County accounted for the most industrial

groundwater usage in 2000 with approximately 20,800 acre-feet. The next highest users were Fort Bend with 9,670 acre-feet, Liberty with 8,952 acre-feet, and Chambers with 4,063 acre-feet.

3.2.8 Agricultural Groundwater Usage

According to TWDB and HGCSD, in 2000, Region H relied on groundwater to provide approximately 32 percent of the water used for agricultural purposes. This equaled approximately 14 percent or 92,953 acre-feet of the total groundwater used in the region. Agricultural usage represents water that is used for livestock purposes and irrigation of crops. The main agricultural crops in the region include rice, cotton, and soybeans in the south and corn, cotton, and hay in the north. Cattle are the principal livestock raised. Table 3-3 shows the amount of groundwater used for agricultural purposes for each county in the region. Within the region, Fort Bend County accounted for the most agricultural groundwater usage in 2000 with 24,971 acre-feet. The next highest user is Waller County with 22,765 acre-feet followed by Harris County with approximately 20,800 acre-feet.

Table 3-1:
Municipal Groundwater Demand From 2000 TWDB Data

County	Total Groundwater Used (acre-feet)	Groundwater Used for Municipal Purposes (acre-feet)	Percent of County's Total Groundwater Used for Municipal Purposes	Percent of County's Municipal Water Demand Supplied by Groundwater
Austin	13,004	3,569	27.4	100.0
Brazoria	36,925	26,796	72.6	66.9
Chambers	6,355	2,014	31.7	45.5
Fort Bend	102,898	68,257	66.3	98.8
Galveston	5,791	5,163	89.2	14.0
Harris	379,209	337,837	89.1	42.1
Leon	4,849	1,883	38.8	100.0
Liberty	22,113	9,401	42.5	100.0
Madison	3,180	2,621	82.4	100.0
Montgomery	55,403	52,333	94.5	100.0
Polk	4,626	3,952	85.4	68.0
San Jacinto	2,931	2,742	93.6	96.8
Trinity	1,370	1,200	87.6	65.6
Walker	5,386	4,625	85.9	31.4
Waller	27,526	4,613	16.8	100.0
Total	**671,566**	**527,006**	**78.5**	

Table 3-2:
Industrial Groundwater Demand From 2000 TWDB Data

County	Total Groundwater Used (acre-feet)	Groundwater Used for Industrial Purposes (acre-feet)	Percent of County's Total Groundwater Used for Industrial Purposes	Percent of County's Industrial Water Demand Supplied by Groundwater
Austin	13,004	204	1.6	97.6
Brazoria	36,925	2,139	5.8	1.9
Chambers	6,355	4,063	63.9	8.8
Fort Bend	102,898	9,670	9.4	13.7
Galveston	5,791	200	3.5	0.5
Harris	379,209	20,800	5.5	6.8
Leon	4,849	1,410	29.1	61.7
Liberty	22,113	8,952	40.5	100.0
Madison	3,180	211	6.6	100.0
Montgomery	55,403	2,800	5.1	62.1
Polk	4,626	419	9.1	79.4
San Jacinto	2,931	75	2.6	100.0
Trinity	1,370	8	0.6	100.0
Walker	5,386	508	9.4	20.1
Waller	27,526	148	0.5	100.0
Total	**671,566**	**51,607**	**7.7**	

Table 3-3:
Agricultural Groundwater Demand From 2000 TWDB Data

County	Total Groundwater Used (acre-feet)	Groundwater Used for Municipal Purposes (acre-feet)	Percent of County's Total Groundwater Used for Municipal Purposes	Percent of County's Agricultural Water Demand Supplied by Groundwater
Austin	13,004	9,231	71.0	75.5
Brazoria	36,925	7,990	21.6	8.0
Chambers	6,355	278	4.4	0.7
Fort Bend	102,898	24,971	24.3	49.9
Galveston	5,791	200	3.5	3.9
Harris	379,209	20,800	5.5	89.8
Leon	4,849	1,556	32.1	69.7
Liberty	22,113	3,760	17.0	13.0
Madison	3,180	348	10.9	40.0
Montgomery	55,403	270	0.5	46.9
Polk	4,626	255	5.5	54.0
San Jacinto	2,931	114	3.9	12.0
Trinity	1,370	162	11.8	18.6
Walker	5,386	253	4.7	40.0
Waller	27,526	22,765	82.7	98.4
Total	**671,566**	**92,953**	**13.8**	

3.2.9 Groundwater Drought Susceptibility

The aquifers within Region H generally have low transmissivity rates and are less susceptible to drought because the static water levels do not fluctuate drastically during a severe drought. In general, Region H water suppliers have established drought triggers for their groundwater systems as a function of system capacity (pumps, storage, etc.) as opposed to other regions where static aquifer groundwater levels are used as drought triggers.

3.2.10 Groundwater Availability Summary

Groundwater has been an important water resource within Region H for the past 100 years. The major Carrizo-Wilcox and Gulf Coast aquifers and minor Sparta, Queen City, Yegua-Jackson, and Brazos River alluvium aquifers should continue providing an important water resource to the region to be used in combination with surface water to help satisfy the regional water demand. Water of good quality continues to be available from the aquifers and should continue in the future with prudent management of the resource. Groundwater supplies were calculated for each county and basin from various sources and are shown in *Table 3A.1*.

For aquifers in Fort Bend, Galveston, and Harris Counties within the jurisdictions of FBSD and HGCSD the available supplies shown in *Table 3A.1* represent the regulated groundwater supplies set by the districts and not necessarily the amount of water available from the aquifer. Water User Groups that are not regulated by the subsidence districts such as irrigators and small domestic well users would be allowed to withdraw water in excess of these supplies in order to meet their demands. The certified groundwater management plan for the Bluebonnet Groundwater Conservation District was used as a basis for estimating groundwater availability in Austin and Walker Counties. The certified groundwater management plan for the Lone star Groundwater Conservation District was used as a basis for determining or estimating groundwater availability in Montgomery County.

3.3 Identification of Surface Water Sources

As stated in *Chapter 1*, surface water sources in Region H consist of reservoir storage, ROR supply from the three rivers (the Trinity, San Jacinto, and Brazos), and four coastal basins (the Neches-Trinity, Trinity-San Jacinto, San Jacinto-Brazos, and Brazos-Colorado). The water supply information presented is based on the Texas Commission on Environmental Quality (TCEQ) Water Availability Models (WAM), updated specifically for the Regional Water Plan. A map showing major surface water sources that serve Region H is included as Figure 3-8.

3.3.1 Available Surface Water

Surface water availability was estimated using the TCEQ WAM for the river basins within Region H. 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. The drought of record (DOR) for most of Texas occurred in the 1950s and is reflected in the historic 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, 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. The Region H Planning Group adopted the Region G – Brazos G WAM which modified the Brazos River WAM Run 3 to allow for some return flows from wastewater plants in the Brazos River basin.. Further discussion of the Brazos G WAM is described in detail in *Section 3.3.1.6 Brazos River Basin*.

Table 3-4 summarizes the projected yield from surface water supply sources currently available to Region H. The total of about 2,679,000 acre-feet per year is approximately equal to the estimated total in the 2001 Regional Water Plan, but the distribution between permits has changed. The yield of several reservoirs decreased due to the projected storage loss as a result of sedimentation, but additional water rights were added as a result of the WAM modeling. The major water rights and modeling assumptions for each basin are discussed in detail below.

Figure 3-8:
Major Surface Water Sources

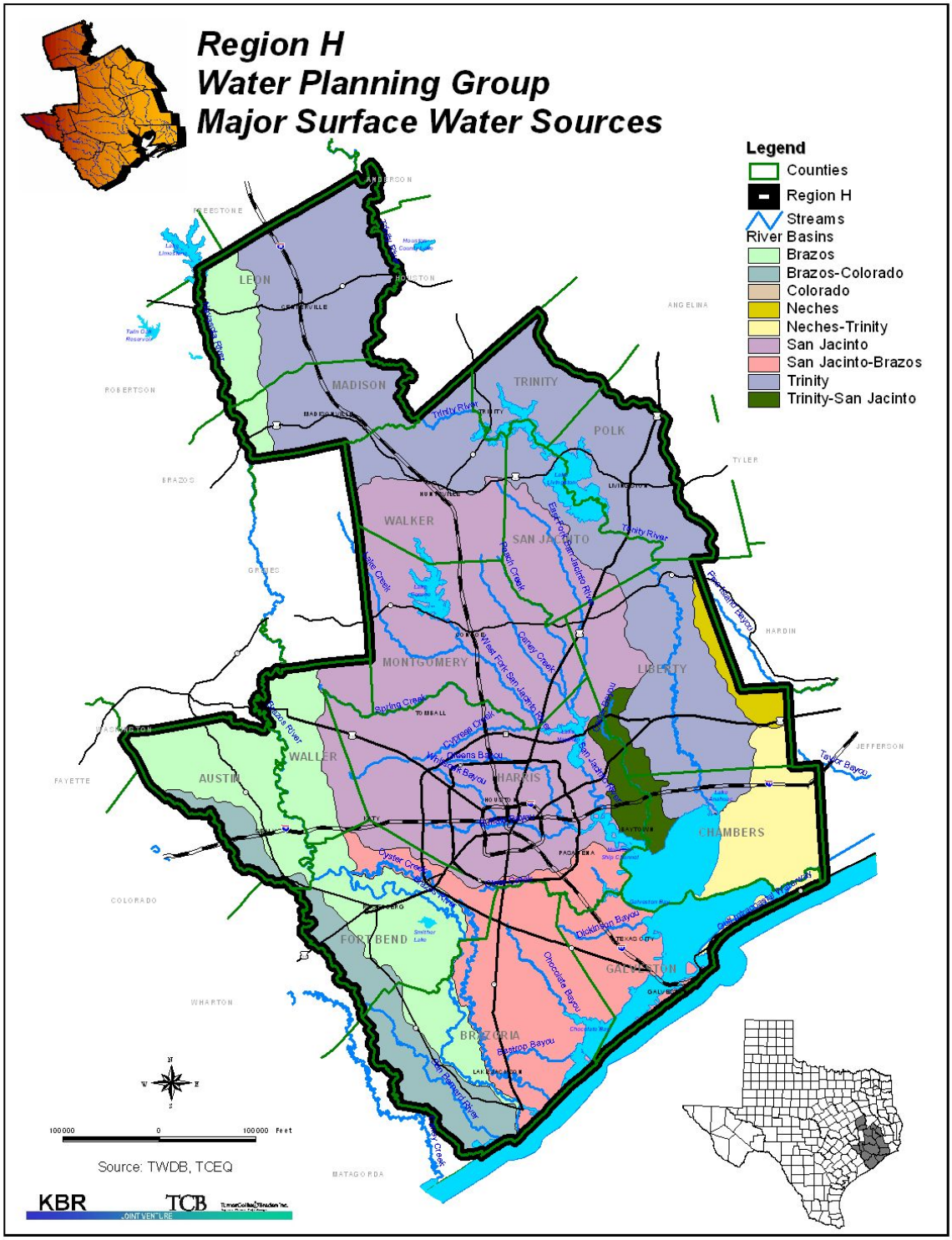


Table 3-4:
Current Surface Water Supply Sources Available in Region H

Projected Year 2060 Available Yield	
Basin/Reservoir/Run-of-River	**(acre-feet/year)**
Sam Rayburn Reservoir and Neches Basin Supplies[1]	60,727
Neches-Trinity Coastal Basin	21,702
Trinity Basin	
Lake Livingston/Wallisville	1,344,000
Run-of-River, Lower Basin	227,030
Trinity – San Jacinto Coastal Basin	34,232
San Jacinto River Basin	
Lake Houston	168,000
Lake Conroe	74,300
Run-of-River	55,000
San Jacinto – Brazos Coastal Basin	39,181
Brazos River Basin	
BRA/COE System[2]	138,913
Run-of-River, Lower Basin	472,103
Brazos – Colorado Coastal Basin	12,019
Local Supplies (i.e. Stock ponds, etc), all basins	31,895
Total Existing Surface Water Supply Available to Serve Region H	**2,679,102**

[1] The total yield of Sam Rayburn Reservoir is 820,000 acre-feet/year. The value shown only includes the portion currently contracted to customers within Region H.

[2] This amount is based on current contracts within Region H. The total yield of the BRA/COE system is 691,717 acre-feet/year.

The TCEQ WAM models were updated to add new water rights and reflect the affects of sedimentation on reservoirs. Reservoirs reduce the velocity of the streams they impound, causing suspended soil particles to settle out. Over time, storage volume is lost due to this accumulation. Sedimentation rates were determined and applied to on-channel reservoirs to calculate the year 2000 and year 2060 storage volumes (see Table 3-5). The WAM model was then run under each storage condition. The storage capacity lost to sedimentation reduced the yield of most reservoirs in the year 2060. This change in yield was represented as a linear decline over time in the summary tables.

Table 3-5:
Water Supply Reservoir Capacities

	Surface	Storage Capacity		
Reservoir	**Elev.**	**Original**	**2000**	**2060**
	feet (msl)	ac-ft	ac-ft	ac-ft
Trinity Basin				
Livingston	131.0	1,741,867	1,738,326	1,717,083
Anahuac	5.0	35,300	25,781	25,691
San Jacinto Basin				
Houston	44.5	133,990	131,547	106,409
Conroe	201.0	416,228	414,143	377,567
Brazos Basin – BRA/COE System				
Aquilla	537.5	52,400	43,304	11,398
Alan Henry	2220.0	115,937	115,689	113,519
Belton	594.0	457,600	431,035	417,208
Georgetown	791.0	37,100	36,981	36,620
Granger	504.0	82,000	52,525	22,597
Stillhouse Hollow	622.0	235,700	224,279	202,868
Granbury	693.0	153,500	132,153	92,129
Possum Kingdom	987.0	504,100	552,013	509,944
Whitney	533.0	627,100	549,788	439,678
Limestone	363.0	217,494	211,229	172,476
Proctor	1162.0	59,400	54,702	47,104
Somerville	238.0	160,100	154,322	145,442

The total supply available from each source available to Region H is included in *Table 3A.1, Current Water Sources*, in *Appendix 3A*. In general, *Table 3A.1* indicates the maximum amount of water supply that could be obtained during DOR conditions from each supply source. This information was compiled from existing contracts and water rights in Region H, the updated WAM for surface water supplies, and groundwater studies addressed in *Section 3.2* of this chapter. Not all of the sources listed in *Table 3A.1* are exclusively available to Region H. Reservoirs located in the upper portions of the Brazos, Trinity, and Neches basins are shown with their firm yield, but the portion of that yield available within Region H is limited to the contracted amounts.

3.3.1.1 Neches-Trinity Coastal Basin

Surface supplies in the Neches-Trinity Coastal River Basin were modeled using the TCEQ WAM Run 3 model. Of the water right permits totaling 69,554 acre-feet per year from the Neches-Trinity coastal basin, 37,269 acre-feet per year were reliable during the DOR. Approximately one-third of this firm total is the U.S. Fish and Wildlife Service water right for the Anahuac National Wildlife Refuge. Water rights yielding over 500 acre-feet per year for consumptive uses (all for irrigation) are listed in *Table 3A.1* and total 21,701 acre-feet per year. This is almost twice the basin yield estimated in the 2001 Regional Water Plan (10,971 acre-feet per year). The WRAP input file for this model is included in *Appendix 3B.*

3.3.1.2 Trinity River Basin

The Trinity River Basin contains 32 major reservoirs, including two Region H sources, Lake Livingston/Wallisville and Lake Anahuac. The permitted yield of Lake Livingston was diminished using WAM Run 3, but showed a firm yield in excess of the permit amount in the TCEQ WAM Run 1 (full use with expected return flows). The Region C Water Planning Group was contacted to discuss the amount of water reuse expected to occur within the upper basin during the planning period. While Region C is pursuing multiple reuse strategies, it is anticipated that sufficient return flows would exist throughout the planning period to make Lake Livingston's permitted yield firm. The WRAP input file for this model is included in *Appendix 3B.*

The reliability of three lower Trinity River ROR supplies came from a set of "fixed right" agreements. The agreements are between the Trinity River Authority (TRA) and the City of Houston (COH) (who jointly own the water rights for Lake Livingston) and three providers of irrigation-water. These irrigation-water providers are the Chambers-Liberty Counties Navigation District (CLCND), the American Rice Growers Co-op Association (Dayton Canal), and the Devers Canal Rice Producers Association (Devers Canal). Pursuant to the fixed right agreement CLCND, Dayton Canal, and Devers Canal are entitled to divert up to 88,820, 33,000, and 86,000 acre-feet per year, respectively. These diversions occur from the Trinity River and some tributaries of the Trinity River. Although these diversions physically take place downstream of Lake Livingston, they are senior in priority to the Lake Livingston water rights.

Approximately 27,500 acre-feet per year of the Devers Canal's 86,000 acre-feet per year is part of the Lake Livingston yield and is reflected in the plan as a contractual commitment of the TRA. Fifty-six thousand of the remaining 58,500 acre-feet per year of the Devers Canal yield was purchased by the San Jacinto River Authority (SJRA), for use in the Trinity-San Jacinto Coastal Basin.

Houston recently purchased outright the entire amount of the Dayton Canal fixed right agreement. Additionally, Houston holds another water right in the Trinity River Basin with an authorized diversion of 45,000 acre-feet per year from the Old River Tributary of the Trinity River.

In addition to the 88,820 acre-feet per year in the fixed right agreements, CLCND also owns the rights (54,127 acre-feet per year, of which 20,200 acre-feet per year is reliable) to the Turtle Bayou (Lake Anahuac) supply in the Trinity River Basin. The SJRA purchased a portion (30,000 acre-feet per year) of CLCND's fixed right in 2001.

The ownership of the Trinity River Basin supplies is summarized in Table 3-6.

Table 3-6:
Ownership of Trinity River Basin Supplies

Owner	Source	Permitted Amount (acre-feet/year)	Reliable Yield (acre-feet/year)
COH	Lake Livingston/Wallisville System	940,800	940,800
TRA	Lake Livingston/Wallisville System	403,200	403,200
COH	Trinity River and Big Ditch	38,000	33,000
COH	Old River Tributary	45,000	26,510
SJRA	Trinity River	86,000	86,000
CLCND	Trinity River	58,820	58,820
CLCND	Lake Anahuac	54,127	14,326
Devers Canal	Trinity River	2,500	2,500

The supply amounts shown for the Lake Livingston/Wallisville Saltwater Barrier system are the total permitted diversions for each body of water, as discussed in the paragraph above. The City of Houston has a permit to divert 902,800 acre-feet per year from Lake Livingston and 38,000 acre-feet per year from the Wallisville Saltwater Barrier. The TRA has a permit to divert 351,600 acre-feet per year from Lake Livingston and 51,600 acre-feet per year from the Wallisville Saltwater Barrier. Not all of this water would be available to Region H. Of the amount that is owned by the TRA, 16,000 acre-feet per year is committed outside of Region H. In addition, it should be noted that physical diversions are not made from the Wallisville Saltwater Barrier, but the combined yield of Lake Livingston is increased when operated in conjunction with the Wallisville Saltwater Barrier. The increase in yield is a result of the barrier precluding the need for salinity reduction releases for downstream senior water rights.

3.3.1.3 Trinity-San Jacinto Coastal Basin

The surface water supply in the Trinity-San Jacinto Coastal Basin was modeled using WAM Run 3. Water right permits totaling 44,374 acre-feet per year from the Trinity-San Jacinto Coastal Basin were analyzed using the water availability model. Of this, 35,065 acre-feet per year was found to be reliable during the DOR. Water rights yielding over 500 acre-feet per year for consumptive uses are listed in *Table 3A.1* located in *Appendix 3A*, and total 34,232 acre-feet per year. Texas Genco's Cedar Bayou plant has a permit to divert 30,000 acre-feet per year of saline water from Cedar Bayou, which accounts for most of the firm supply. The remaining 4,232 acre-feet per year are irrigation rights. The WRAP input file for this model is included in *Appendix 3B.*

3.3.1.4 San Jacinto River Basin

The surface water supply in the San Jacinto River Basin was modeled using WAM Run 3. Water right permits totaling 346,344 acre-feet per year from the San Jacinto River Basin were analyzed using the water availability model. Of the 346,344 acre-feet per year permitted, 297,300 acre-feet per year was found to be reliable during the DOR. The Indirect Reuse Water Right 10-5809 does not appear in the model because it was issued in June 2004, but it is assumed reliable and included in *Table 3A.1* (*Appendix 3A*), bringing the basin total to 312,244 acre-feet per year. The WRAP input file for this model is included in *Appendix 3B*.

The only ROR diversion right included for the basin is the SJRA permit for 55,000 acre-feet per year. SJRA diversions are physically made from Lake Houston and are the primary source of water for the SJRA Highlands Canal System. Other reliable water rights in the basin were either for recreation or less than 500 acre-feet per year and were not included in *Table 3A.1* (*Appendix 3A*).

Lake Houston

Lake Houston remained reliable at its full permitted diversion, even when the year 2060 sedimentation condition was applied. This is due to its downstream location on the San Jacinto River and its seniority relative to other major water rights in the basin. The COH owns the entire permitted yield from Lake Houston.

Lake Conroe

The Lake Conroe yield declined from its permitted amount of 100,000 acre-feet per year to 74,300 acre-feet per year due to the WAM Run 3 condition and the year 2060 storage capacity estimate. The WAM Run 3 assumption that no return flows will be available greatly impacted the streamflows in the lower San Jacinto Basin. Lake Houston is senior to Lake Conroe, which results in Lake Conroe passing inflows when Lake Houston storage levels drop. As a result of the removal of return flows from the model, Lake Conroe passes more inflows in order to keep Lake Houston full. Also, the bathymetric survey used to determine the sedimentation rate for Lake Conroe identifies a potential discrepancy in the original volumetric capacity of Lake Conroe. This discrepancy likely resulted in a higher than actual sedimentation rate, which also reduces the yield over a 60-year period. It was recommended that a second bathymetric survey be conducted around the year 2005 to recalculate the sedimentation rate. The COH and SJRA jointly own the water right for Lake Conroe. The COH portion is to divert 66,667 acre-feet per year from Lake Conroe, with an estimated year 2060 reliable yield of 49,038 acre-feet per year. SJRA is authorized to divert 33,333 acre-feet per year from Lake Conroe, with an estimated year 2060 reliable yield of 25,262 acre-feet per year.

Gulf States Utility Company (now known as Entergy) has a contractual agreement with SJRA to divert water from Lake Conroe into Lewis Creek Reservoir. In the 2001 Region H Water Plan, this permit was represented as a separate water right with

a yield of 6,300 acre-feet per year. This has been corrected to be represented as a contract in this plan.

3.3.1.5 San Jacinto-Brazos Coastal Basin

Surface supply in the San Jacinto-Brazos Coastal Basin was modeled using Run 3. Water right permits totaling 120,919 acre-feet per year from the San Jacinto-Brazos Coastal Basin were analyzed using the water availability model. Of the 120,919 acre-feet permitted, only 33,372 acre-feet per year was found to be reliable during the DOR. Water rights yielding over 500 acre-feet per year for consumptive uses are listed in *Table 3A.1* of *Appendix 3A*, and total 30,627 acre-feet per year. Texas Genco's Webster plant has a permit to divert 4,440 acre-feet per year of saline water from Clear Lake, which is not simulated in the model. The firm portion of this supply is 2,120 acre-feet per year. The WRAP input file for this model is included in the Brazos Basin WRAP input file in *Appendix 3B.*

3.3.1.6 Brazos River Basin

Surface supply in the Brazos River Basin was modeled by HDR for the Brazos G Water Planning Group. A survey of wastewater plant operators within the Brazos Basin was conducted to determine the amount of anticipated reuse during the planning period. Based on the survey results, WAM Run 3 was modified to allow 130,370 acre-feet per year (116.4 million gallons per day [mgd]) of return flows in the model. There are water right permits in the Brazos River Basin of Region H totaling 866,351 acre-feet per year. The modeled yield of these rights was 488,419 acre-feet per year. Water rights yielding over 500 acre-feet per year for consumptive uses are listed in *Table 3A.1* of *Appendix 3A* and total 472,094 acre-feet per year. The WRAP input file for this model is included in *Appendix 3B.*

There was a significant reduction in expected yield from the lower Brazos Basin despite the allowance of limited return flows in the model. The Gulf Coast Water Authority holds two water rights authorizing 224,932 acre-feet per year. In the 2001 Region H Water Plan, the combined yield was estimated at 178,182 acre-feet per year. Under this model scenario, the estimated yield fell to 171,193 acre-feet per year. Similarly, the Richmond Irrigation Company water right yield fell from 40,000 to 29,920 acre-feet per year. The largest decline was seen in the Dow Chemical water right, with an authorized diversion of 305,656 acre-feet per year. The firm portion of this right was estimated as 207,729 acre-feet per year in the 2001 Region H Water Plan, and yields 148,052 acre-feet per year under this model.

Despite the yield reductions for several water rights in the basin, some firm yields increased. The estimated yield of the Chocolate Bayou Water Company rights increased from 46,982 acre-feet per year to 63,812 acre-feet per year, due to modeling of the system storage. Texas Genco's yield from Smithers Lake increased from 9,841 acre-feet per year to 34,300 acre-feet per year, also due to storage modeling. The Brazosport Water Authority water right yield increased from 15,098 acre-feet per year to 23,017 acre-feet per year.

Brazos River Authority/U.S. Army Corps of Engineers System (BRA/COE)

The Brazos River Authority stores water in a system of water supply and flood control reservoirs in the middle and upper basins. The Authority owns Alan Henry, Possum Kingdom, Granbury, and Limestone Reservoirs. The U.S. Army Corps of Engineers owns the remaining reservoirs in the system. The supply amounts included in *Appendix 3A* for these facilities were provided by the Brazos G Water Planning Group. The BRA system total yield is estimated at 691,717 acre-feet per year. The portion of this yield available to Region H is reflected in supply contracts between the BRA and customers in this region. Those contracts total 138,913 acre-feet per year.

3.3.1.7 Brazos-Colorado Coastal Basin

The Brazos-Colorado Coastal Basin contains the lower reach of the San Bernard River. The model for this basin was included in the Colorado River WAM, prepared by RJ Brandes Co. for the TCEQ. Two water rights were identified within Brazoria County, and the WAM Run 3 results for these rights are identified in this report. A year 2060 iteration was not made for this basin, because sedimentation was not anticipated in the off-channel reservoir associated with these rights. The WRAP input file for this model is included in *Appendix 3B.*

3.3.1.8 Lake Sam Rayburn

A water supply allocated from Lake Sam Rayburn in the Neches River Basin, listed in *Table 3A.1*, represents contracted amounts from the Lower Neches Valley Authority by the Trinity Bay Conservation District, the Bolivar Peninsular SUD and irrigators in Chambers and Liberty Counties. The full yield of the lake was obtained from the East Texas Water Planning Group, and the contract amounts are reflected in both regional plans.

3.3.1.9 Local Supplies

Local supplies (stock ponds, catchments, etc.) that cannot be related to reported groundwater or surface water use are currently meeting certain livestock and mining demands. The TCEQ allows a landowner to impound up to 200 acre-feet of water without obtaining a water right. Numerous local supplies are included as surface water supplies in *Appendix 3A.*

3.3.2 Surface Water Drought Susceptibility

Within this report, the surface water reservoir and ROR supplies represent firm yield and reliable quantities, respectively. However, surface water is dependent on rainfall, and future droughts cannot be expected to follow the same pattern as the DOR used in the WAM. Therefore, the river authorities and water providers in Region H maintain Drought Contingency Plans prepared under provision of the *Texas Administrative Code, Section 30, Chapter 288* for their respective shares of these supplies. These drought plans are highlighted in Table 3-7 and tabulated in detail in *Appendix 3C*. While each water provider utilizes unique criteria to define drought stages, their drought contingency plans use a

common methodology. A first-stage trigger is used to initiate customer notification systems and voluntary use reductions. A second-stage trigger is used to initiate mandatory use reductions. Finally, a third-stage trigger is used to initiate additional use reductions and/or the suspension of service to some customers.

3.3.3 Surface Water Conveyance Systems

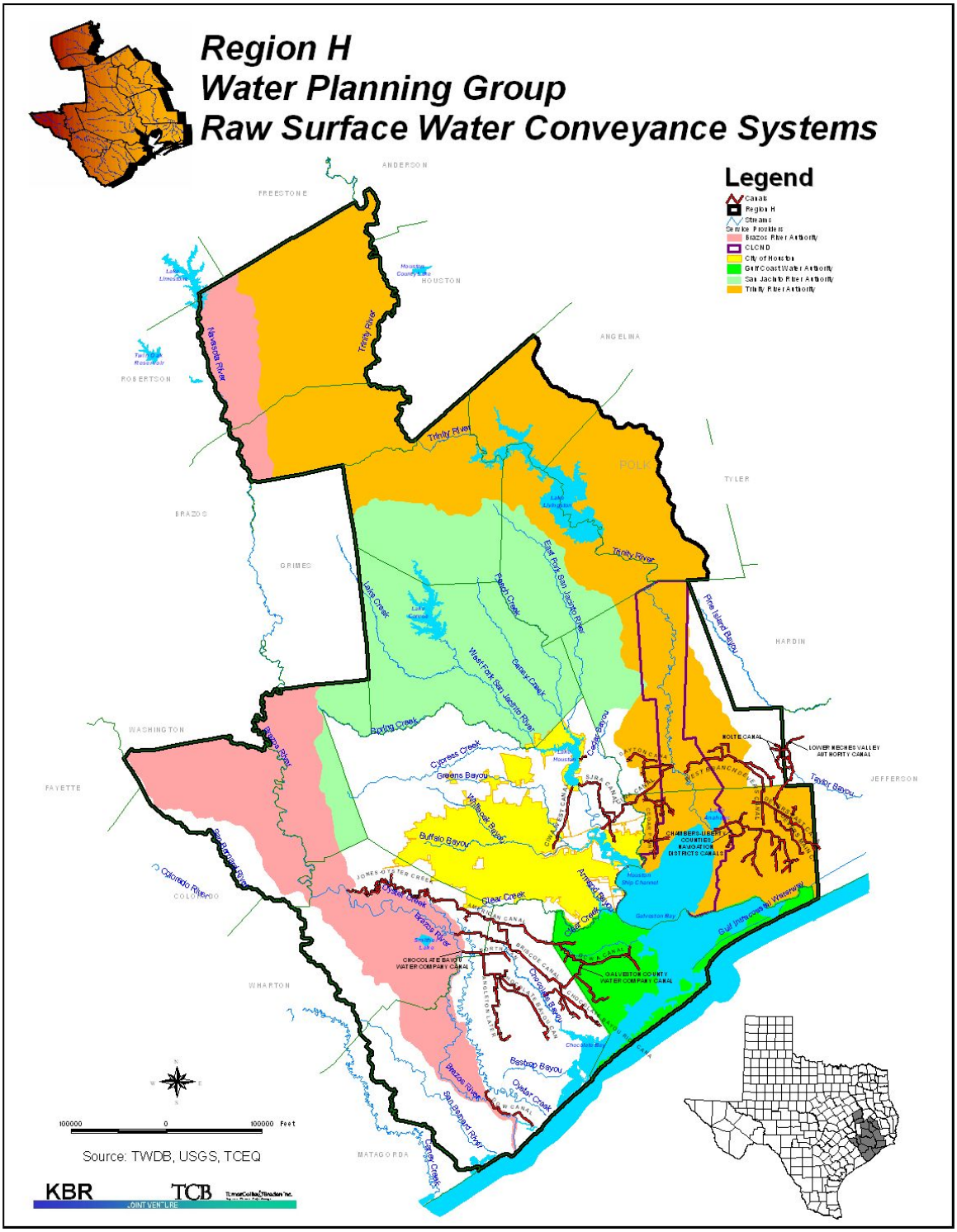
Region H contains a number of raw surface water conveyance systems (pipelines, canals, and pump stations). The conveyance systems lie primarily in the coastal river basins in the southern counties of Region H. The main canal systems belong to the COH, CWA, Gulf Coast Water Authority (GCWA), TRA, Lower Neches Valley Authority (LNVA), Chocolate Bayou Water Company, SJRA, CLCND, and Dow Chemical. The information in this section was gathered from each of the entities listed above and the Trans-Texas Water Program Phase I Report for the Southeast Area. These systems are shown in Figure 3-9.

The CWA network consists of a main conveyance canal system and a pipeline distribution system. The conveyance system includes the Trinity River pump station, the main canal, the Lynchburg Reservoir, the Cedar Point lateral, the Lake Houston pump station, and the west canal. The Trinity River pump station near Liberty has an existing capacity of 880 mgd (700 mgd firm plus standby) and an ultimate design capacity of 1,400 mgd. The main canal runs westerly from the Trinity River pump station about 22 miles to the Lynchburg Reservoir (north of the Houston Ship Channel). The total capacity of the canal is approximately 1,300 mgd from the Trinity River Pump Station to the Cedar Point lateral. Downstream of the Cedar Point lateral, the canal has a capacity of 1,100 mgd. The Lynchburg Reservoir has an impoundment capacity of 4,600 acre-feet. The Cedar Point lateral, with a design capacity of 230 mgd, is located about 8 miles southwest of the Trinity River pump station and diverts water from the main canal southward. The Lake Houston pump station diverts water from Lake Houston into the CWA west canal, which travels southwesterly until it terminates at the COH East Water Purification Plant. The CWA distribution system consists of pressure pipelines that start at the Lynchburg Reservoir with the Lynchburg pump station and extend southwest about 10 miles to the Bayport Industrial Complex and eastward along State Highway (SH) 225 conveying raw water to industrial users.

Table 3-7:
Typical Drought Triggers for Region H Supplies

Water Source/ Established By	Drought Type	Trigger Condition and Duration
Lake Livingston – Wallisville System/TRA	Mild	Lake Livingston elevation is <126.50 feet at USGS gage, condition lasts 1 day
	Moderate	Lake Livingston elevation is <124.00 feet at USGS gage, condition lasts 1 day
	Severe	Lake Livingston elevation is <121.40 feet at USGS gage, condition lasts 1 day
Lake Conroe/SJRA	Mild	Elevation <194 feet (70% of storage capacity), condition lasts 1 day
	Moderate	Elevation <190 feet (55% of storage capacity), condition lasts 1 day
	Severe	Elevation<185 feet (40% of storage capacity), condition lasts one day
Houston System Reservoirs/ City of Houston	Mild	Combined storage (Lakes Livingston, Conroe, and Houston) is less than 24 months surface water supply, condition lasts 10 consecutive days
	Serious	Combined storage (Lakes Livingston, Conroe and Houston) is less than 18 months surface water supply, condition lasts 10 consecutive days
	Severe	Combined storage (Lakes Livingston, Conroe, and Houston) is less than 12 months surface water supply, condition lasts 10 consecutive days
Brazos River at Richmond/GCWA	Mild	12.19 feet or 1700 cfs, condition lasts 1 day
	Moderate	11.93 feet or 1500 cfs, condition lasts 1 day
	Watch	11.65 feet or 1300 cfs, condition lasts 1 day
	Warning	11.23 feet or 1000 cfs, condition lasts 1 day
BRA System Reservoirs/BRA	Watch	Storage <= 20% drought reoccurrence frequency level and could fall below 10% drought reoccurrence frequency level within 12 months
	Warning	Storage <= 10% drought reoccurrence frequency level and could fall below 5% drought reoccurrence frequency level within 12 months
	Emergency	Storage <= 5% drought reoccurrence frequency level

Figure 3-9:
Raw Surface Water Conveyance Systems



The GCWA system consists of three main canals that deliver water from the Brazos River to Fort Bend, Brazoria, and Galveston Counties: the American Canal, the Briscoe Canal, and the Galveston Canal System. The American Canal runs parallel to SH 6 southeasterly from the Brazos River lift station (the Shannon Plant, which is 12 miles north of Rosenberg) to Alvin, Texas. The Briscoe Canal runs southeasterly from the Brazos River pump station (the Briscoe Plant, which is 6 miles west of Arcola) to Alvin and then to an industrial complex in southern Brazoria County. The American Canal is connected to the Briscoe Canal by "Lateral 10" just west of Manvel. The Galveston Canal System extends from the old Briscoe system southeast of Alvin to the GCWA Reservoir (four miles east of Dickinson). The Galveston Canal System connects to the American Canal six miles east of Alvin. The Gulf Coast Water Authority has three pump stations, the Shannon Plant with a total capacity of 347 mgd, the Briscoe Plant with a total capacity of 302.4 mgd, and the American Canal's second lift station located in Sugar Land with a total capacity of 225 mgd.

The Dayton Canal is a small system that serves Liberty County. The canal, which diverts from the Trinity River, extends about 20 miles west of the river and has an estimated capacity of 90 mgd.

The Devers Canal System currently delivers irrigation water easterly from the Trinity River to customers in Liberty and Chambers Counties. The main canal system is 81 miles with 125 miles of laterals. Due to the flat grade of the main canal, the flow can be reversed to flow westerly. The system contains two pump stations. The first one on the Devers main canal at the Trinity River has a total rated capacity of 295 mgd, and the second pump station (near SH 563) has a total capacity of 274 mgd.

The LNVA system diverts water from the Neches River and Pine Island Bayou and delivers it to customers in Jefferson County, farmers in Chambers and Liberty Counties, and to the Bolivar SUD in Galveston County. The LNVA canal consists of two main canals, the Neches Main and the BI Main. After the junction of the two main canals, the Neches Main travels southwesterly until the Nolte Canal branches off traveling westward into Liberty County. At this point the Neches Main turns and extends southward into Chambers County. The Nolte Canal and the end of the Neches Main are the only sections of the LNVA canal system that extend into Region H. The Nolte Canal is divided into two portions by a check structure. The capacity of the Nolte Canal upstream of the check is 130 mgd and 36 mgd downstream from the check structure.

The Chocolate Bayou Water Company has a distribution system that can be divided into two sections. The Juliff section, also known as the old South Texas Water system, transports water from the Juliff pump station on the Brazos River near the Fort Bend-Brazoria County border, and the Chocolate Bayou Canal section, which transports water from Chocolate Bayou near Liverpool. The Juliff section has two main canals (the North Canal and the Main Canal) and the Angleton Lateral. This section provides irrigation water to rice farmers and some industrial water to Brazoria County. The Chocolate Bayou Canal section has its main pump station on Chocolate Bayou, but there are additional pump stations on Mustang Bayou and Halls Bayou as well. This section also provides irrigation and industrial water to Brazoria County.

SJRA provides raw surface water from a point at the Lake Houston dam through its canal system and SJRA's Highlands Reservoir to a point just north of the Houston Ship Channel, providing service to the industrial customers in eastern Harris County. SJRA also contracts with the Coastal Water Authority (CWA) to convey its Trinity Basin water supplies through the CWA Main Canal, and from there to their Highlands System.

The CLCND canal system diverts water from the Trinity River just south of Lake Anahuac. The canal travels easterly and branches to the north and south along the length of the main canal to serve the City of Anahuac and irrigators in Chambers County.

The Dow Chemical Company diverts water from the Brazos River into the Harris and Brazoria Reservoirs in Brazoria County. From Harris Reservoir, water is released into Oyster Creek and rediverted into a canal near Lake Jackson. From the Brazoria Reservoir, water is released into Buffalo Camp Bayou, which joins the Dow canal below the Oyster Creek diversion pump station. The canal travels parallel to the Brazos River and supplies the Brazosport Area Water Authority Water Treatment Plant before entering the Dow complex just north of Freeport. The canal continues east around Freeport to serve the Dow southern facility.

3.3.4 Previously Studied Potential Reservoir Sites

In the City and Basin Master Plans within Region H, twenty-four potential reservoir sites have been identified. Of these, four have been identified in the State and Regional Water Plans as reservoir sites of unique value—Allens Creek in the Brazos Basin, Austin County; Little River in the Brazos Basin, Milam County; Bedias in the Trinity Basin, Madison County; and Tehuacana in the Trinity Basin, Freestone County. Construction of the first three reservoirs was recommended in the Regional Water Plans. From information provided in existing studies and reports, a summary table listing expected yields, costs, and a brief discussion of potential issues of concern regarding each potential reservoir is included in *Appendix 3D*.

The potential reservoir sites for Region H were reassessed as potential water management strategies for this update to the water plan. That discussion is presented in *Chapter 4*. Also, the sites were again considered for recommendation as reservoir sites of unique value. That discussion is presented in *Chapter 8*.

3.3.5 Legal and Regulatory Factors

A number of legal (institutional) and regulatory factors affect water planning, development, and usage within the Region H area. The most notable of these factors are surface water rights, groundwater conservation districts, interbasin transfer rules, wastewater return flow impacts, and environmental flow requirements.

All of the water included in the analysis of surface water supplies for Region H is obtained under water rights issued through the TCEQ and its predecessor agencies. The larger wholesale water providers hold a substantial portion of the rights available to the region, and these large providers contract to supply water obtained under those rights to various WUGs.

Five groundwater conservation districts exist within the Region H area. These districts are the HGCSD, FBSD, Bluebonnet Groundwater Conservation District (includes Austin, Walker, and Waller Counties), Lone Star Groundwater Conservation District (Montgomery County) and Mid-East Texas Groundwater Conservation District (includes Leon and Madison Counties). Each district enacts and enforces groundwater regulations within their respective counties. The specific rules regulating the use of groundwater use were described in the previous section, *Subsidence Effects*. The Harris-Galveston and Fort Bend districts have adopted regulatory plans that limit the withdrawal of groundwater within their respective counties.

The Brown-Lewis Bill (formally Senate Bill 1, 75th Legislature) included restrictions on the interbasin transfer of water. These rules mandate that water supplies obtained by a receiving basin become junior to all other rights in existence within the originating basin of the transfer. This rule applies to all future permits associated with interbasin transfers. As illustrated within this report, a significant quantity of water currently supplied within Region H occurs via interbasin transfers. A portion of the water delivered by all of the larger water providers occurs through some type of interbasin transfer. The most significant of these are the COH and SJRA transfers of Trinity River water into the San Jacinto watershed and the BRA and GCWA transfers of Brazos River water into the San Jacinto-Brazos Coastal Basin. It is anticipated that new interbasin transfers will be needed to support growth throughout Region H, particularly to the San Jacinto and San Jacinto-Brazos Basins where the largest population growth is occurring. Current limitations on interbasin transfers will affect the development of future water resource management strategies.

In the 77th Texas Legislature, the Water Code was amended to remove an obstacle to long-term planning. Under the previous law, any water right that was unused for a period of ten years could be cancelled by the TCEQ, making that water available for diversion under other water rights permits. This is contrary to the state and regional water planning processes, which project demands 50 years in advance and recommend projects to meet demands 30 years in advance. The amendment to the Water Code exempts certain water rights from cancellation for non-use, including permits obtained as a result of the construction of a reservoir in whole or in part by the permit holder, permits for reservoirs of 50,000 acre-feet or larger, and permits obtained to meet demonstrated long-term water supply or electric generation needs.

Wastewater reuse and reclamation is a water management strategy that is growing in usage within the Texas water industry. Wastewater reuse is the reuse of wastewater prior to its discharge into a receiving stream of the state. These reused quantities can become supply for irrigation, manufacturing, mining, steam-electric power and limited municipal purposes (landscaping, etc.). Wastewater reclamation, however, can affect the reliability of existing surface water rights. In particular, within Region H, one of the greatest potential areas of reuse is within Harris and Montgomery Counties upstream of Lake Houston. Reuse within Region C in the Trinity Basin would impact the yield of Lake Livingston. Thus significant reuse of these flows may affect the water rights of SJRA, TRA, and COH. Indirect reuse permits are increasingly being requested within the state, allowing the use of the bed and banks of the receiving stream to carry treated effluent to a downstream diversion point. Unlike direct reuse, this practice is considered a separate diversion and requires a separate

water right permit. These permits typically allow the rediversion of a percentage of the discharged volume, with the difference being allocated to meet carriage losses and instream flow requirements. The amount required to be left instream is determined on a site-specific basis by TCEQ.

3.3.6 Environmental Uses and Requirements

Water right permits for environmental use and enhancement may be granted by TCEQ, although there is no use category within the Water Code for meeting environmental needs. These water rights are typically categorized as Recreational or Other. Within Region H, there are fewer than 20 permits for the diversion or impoundment of water for the purposes of wetland habitat creation/maintenance, wetland mitigation, or wildlife conservation. The larger of these permits are listed in Table 3-8. Since 1985, environmental flow requirements have been included as conditions within new and amended water rights. These requirements may include a specified minimum instream flow or gauge height threshold for diversions under the permit, or specify a percentage of the diverted amount that must be returned to the source stream. The establishment of these permit conditions requires supporting data on environmental needs of rivers, streams, bays, and estuaries for wetlands habitat. To increase this body of knowledge, the Texas Instream Flow Program was initiated in 2003 as a joint effort between TPWD, TCEQ, and TWDB. A series of studies are funded and underway, and the results will be incorporated in future water rights permitting and regional water planning.

Table 3-8:
Major Environmental Water Rights in Region H

Owner	Stream	Use	Diversion (acre-feet/year)
U.S. Anahuac Wildlife Refuge	Oyster Bayou	Anahuac NWR* – wetland habitat	21,000
Texas Parks & Wildlife Department	Carpenters Bayou	Sheldon WMA** – wetland habitat	2,688
U.S. Fish and Wildlife Service	Bastrop Bayou Austin Bayou	Brazoria NWR – fish & wildlife conservation	2,527
U.S. Fish and Wildlife Service	Cedar Lake Creek	San Bernard NWR – wetland habitat	1,086
U.S. Fish and Wildlife Service	Big Slough	Brazoria NWR – fish & wildlife conservation	1,080

*NWR is National Wildlife Refuge
**WMA is Wildlife Management Area

A new provision under the Texas Water Code establishes the Texas Water Trust within the Texas Water Bank. Existing water rights can be placed in the Texas Water Trust to be

dedicated to environmental needs, including instream flows, water quality, fish and wildlife habitat, or bay and estuary inflows. While no water rights from Region H have yet been placed in the Texas Water Trust, it can be anticipated that it will figure in further efforts to address both the technical and institutional issues associated with environmental water rights within Region H.

3.3.6.1 Bay and Estuary Inflows

Estuaries are coastal waters where inflowing stream or river water mixes with and measurably dilutes sea water. The Brazos River has a very small estuary, but Galveston Bay is one of the largest and richest estuary systems in the state. Tides along the Region H portion of the Texas Gulf Coast are small (typical ranging up to 2 feet), but their influence is felt far inland due to the flat topography of the coastal plain. Galveston Bay averages a 7-foot tidal depth, so freshwater inflows are important in balancing the tidal intrusion of seawater into the estuary habitat.

The Region H Water Planning Group requested input from the Galveston Bay Freshwater Inflow Group (GBFIG) to address this resource need. GBFIG was established in December 1996 as an ad hoc technical work group. GBFIG includes representatives of major stakeholders in the use of Galveston Bay and its tributaries including all those groups specifically itemized in Sec. 11.1491 of the Texas Water Code for "estuary advisory councils." Its efforts have been endorsed, and staff participation has been authorized by TWDB, TCEQ, TPWD, and the General Land Office (GLO). GBFIG coordinates with and reports its findings to both the Galveston Bay Estuary Program and RHWPG.

The work of GBFIG builds upon the State Bay and Estuary Studies authorized by the Legislature in 1985 (HB-2) and amended in 1987 (SB-683). On December 31, 1994, *Freshwater Inflows to Texas Bays and Estuaries: Ecological Relationships and Methods for Determination of Needs* was published jointly by TWDB and TPWD. This document details the methodology to be applied in each of seven major estuarine systems. Several draft documents providing historical inflow data (1941-1990) and application of the State's methodology to Galveston Bay followed. In December 1998, TPWD issued a final *Freshwater Inflow Recommendation by Texas Parks and Wildlife Department for the Trinity-San Jacinto Estuary* (hereafter cited as TPWD 1998).

TPWD 1998 presented output from the State's optimization model relating freshwater inflows to biological productivity. Based on that analysis of monthly inflow data, several points on a performance curve were identified, ranging from Max Q, the maximum quantity of freshwater falling within the range of analysis, to Min Q, the minimum modeled quantity of freshwater inflow capable of maintaining bay and estuary fishery harvest. The Galveston Bay system receives average annual inflows of about 10 million acre-feet per year (maf/yr), and median twelve-monthly inflows of just over 7 maf/yr. Because of the uncertainties inherent in analyzing or managing natural processes, TPWD recommended the point of "maximum harvest" (Max H), or a flow of 5.2 maf/yr, as the target inflow for the Galveston Bay system.

Using the data developed by the State, special studies of Galveston Bay freshwater inflows have been performed in conjunction with regional water planning efforts. In April 1998, Brown & Root completed a *Galveston Bay Freshwater Inflow Study* under the Trans-Texas Water Program. Additional modeling by Brown & Root has been performed to address specific analytic needs of GBFIG. The TCEQ WAM program has improved the statistical data and model availability for Galveston Bay. Models of the effects of the Regional Water Plans on freshwater inflows were run, and the results are discussed in *Chapter 4* of this report.

Based on information from state and regional studies, GBFIG set about relating its consideration of freshwater inflow needs to the planning task of Region H. GBFIG developed a recommendation that relates target flows under a range of conditions to target frequencies as shown in Table 3-9, which generally are less frequent than historical frequency of occurrence. GBFIG specifically noted that development of management strategies for freshwater inflows requires the consideration of quantity, quality, seasonality (monthly flows), and location of inflows and that its own analytic efforts would continue. It also noted that flows available to meet environmental water needs included total flows to the system and, as a result, include some sources outside of Region H. The GBFIG recommendation was accepted for incorporation into the Regional Water Plan in March 2000.

Table 3-9:
Environmental Water Needs for Galveston Bay

Inflow Scenario	Quantity Needed (million acre-feet/year)	Historical Frequency	Target Minimum Frequency
Max H	5.2	66%	50%
Min Q	4.2	70%	60%
Min Q-Sal	2.5	82%	75%
Min Historic	1.8	98%	90%

Scenario Descriptions:
Max H: Modeled inflows recommended for maximum bay and estuary fisheries harvest by TPWD.
Min Q: Minimum modeled inflow recommended to maintain the bay and estuary fisheries harvest.
Min Q-Sal: Estimated minimum acceptable inflow recommended to maintain the salinity needed for bay and estuary fisheries viability.
Min Historic: Minimum annual inflow calculated for Galveston Bay over the period of record (1941-1990).

Notes: The health and productivity of Galveston Bay must consider the quantity, quality, seasonality (monthly inflows), and location of inflows. It is anticipated that the inflow needs projections will continue to be refined over time. The use of improved data focusing on the fisheries production solely from the Galveston Bay system is one example of an anticipated means of refinement.

3.3.6.2 Water Quality

The 15th Edition (2000) of the *State of Texas Water Quality Inventory Report* by the Texas Natural Resource Conservation Commission (now the TCEQ) addresses the

streams within all Texas river basins by segment. Each segment is described and classified, the designated water uses are identified, and the water quality is determined. This report was reviewed for the river segments in Region H to identify their uses and any existing conditions or concerns. Region H is fortunate not to have naturally occurring chlorides or minerals affecting surface water quality as in some regions, but the affects of development within the watersheds are reflected in the Inventory Report. Some streams and bayous, predominantly in the lower San Jacinto Basin and the San Jacinto-Brazos Coastal Basin, were found to be non-supportive of contact recreation due to bacterial indicators of concern due to elevated nutrient levels. This condition is typically the result of wastewater discharges and urban watershed runoff. Basin maps from the *Water Quality Inventory Report* are shown in *Appendix 3E*. A search of the TCEQ Water Rights Database revealed two water rights specifically designated for the improvement of instream water quality (see Table 3-10). The larger of these is used to maintain the level of Lake Jackson in Brazoria County.

Table 3-10:
Water Quality Rights in Region H

Owner	Stream	Use	Diversion (acre-feet/year)
Dow Chemical Co.	Brazos River	Stream Quality Control	16,000
Cove Creek Corp.	Cove Creek	Water Quality – Flush sewage effluent	967

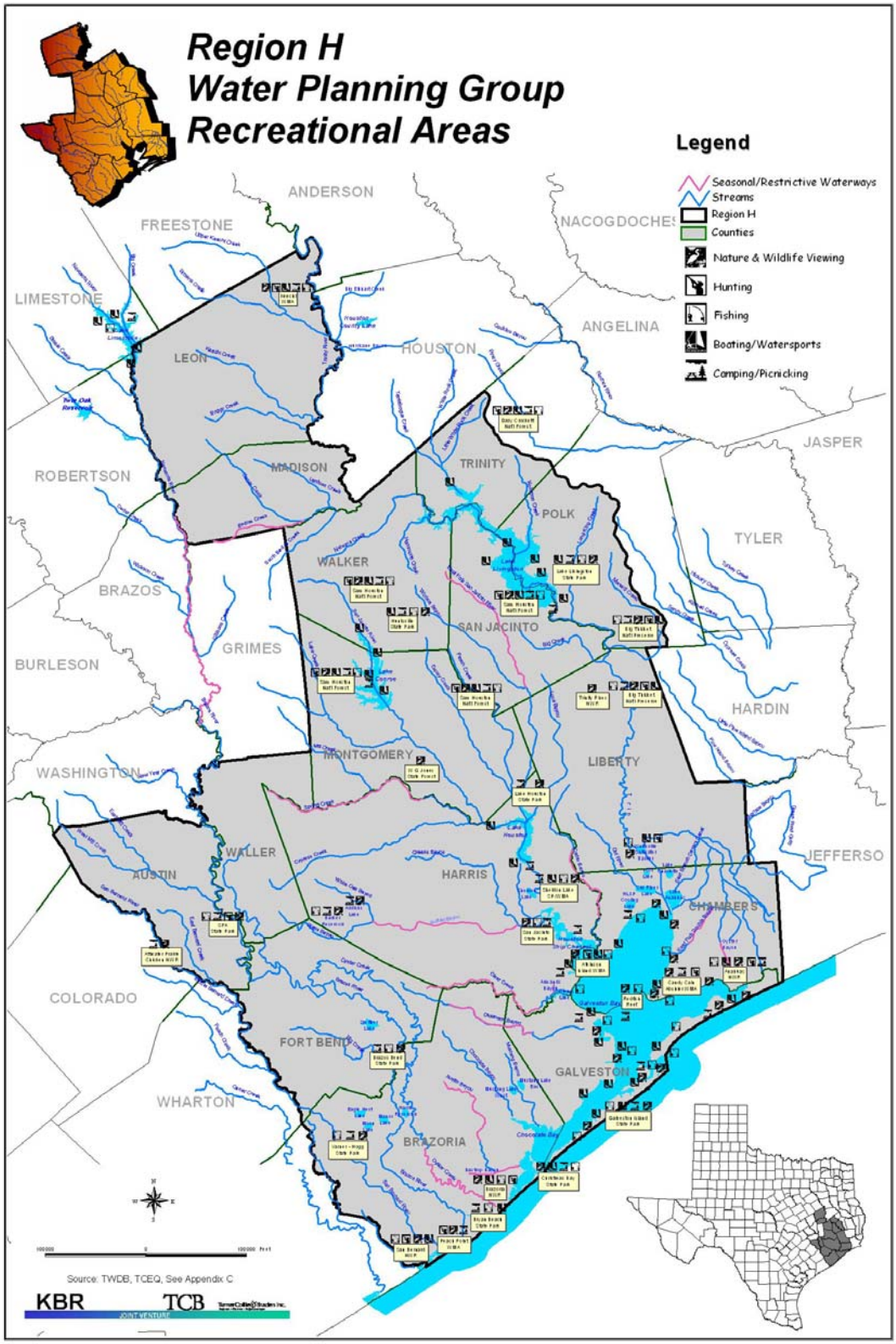
As with the Galveston Bay estuary, instream salinity is a concern in the flat lower reaches of the Trinity, San Jacinto, and Brazos Rivers. The tidal salt wedge migrates upstream during the drier summer months, threatening the intakes of water right holders. This situation has been addressed on the Trinity River by the construction of the Wallisville Saltwater Barrier, and the Lake Houston dam protects the intake points for the COH and SJRA. The effects of the salt wedge on Brazos River water rights are discussed in *Chapter 4* of this report.

The Texas Parks & Wildlife Department conducted an *Analysis of Texas Waterways: A Report on the Physical Characteristics on Rivers, Streams, and Bayous in Texas*. This 1996 report identifies the seasonal and restrictive waterways:

> "those sections of rivers, streams, and bayous… which have been found to contain an insufficient flow of water for recreational use under normal conditions, or for various reasons could not be classified as a major waterway, and would be restricted to seasonal usage"

Figure 3-10 depicts the seasonal and restrictive waterways of Region H.

Figure 3-10: Seasonal and Restrictive Waterways in Region H



3.3.6.3 Unique River and Stream Segments

RHWPG identified six stream segments of unique ecological value in the 2001 Region H Water Plan. These are Armand Bayou in Harris County; Bastrop Bayou and Cedar Lake Creek in Brazoria County; Big Creek in Fort Bend County; another Big Creek in San Jacinto County; and Menard Creek in Liberty, Hardin, and Polk Counties. Several of these streams are used for irrigation and/or recreational supplies, but these water rights were not included in the total Region H supply due to size or reliability. A full discussion of unique stream segments is made in *Chapter 8*.

3.3.7 Navigational Uses

The Texas Natural Resources Code states that if a water body maintains an average width of 30 feet, it is considered navigable. The Texas Department of Transportation, the U.S. Army Corps of Engineers, and several port authorities share responsibility for maintaining the major navigable waterways within the region. These include the Gulf Intracoastal Waterway, the Houston Ship Channel, and the Lower Trinity River.

The Gulf Intracoastal Waterway is a man-made canal paralleling the Gulf Coast. In Texas, it is 433 miles long, and within Region H it crosses Chambers, Galveston, and Brazoria Counties, serving the Ports of Galveston and Freeport. The system is over 50-years old and the U.S. Army Corps of Engineers maintains the canals through a program of scheduled dredging. The flow in the waterway is brackish and not used for water supply.

The Houston Ship Channel is a deep-draft channel connecting ocean-going vessels with the Port of Houston and industries located along Buffalo Bayou. It begins at the mouth of Galveston Bay and continues north past the Barbours Cut Terminal and Bayport Industrial Complex, into the San Jacinto River and Buffalo Bayou, ending at the Port of Houston Turning Basin. Ship channels serving the Port of Galveston and the Port of Texas City branch off from the main channel on the northwestern side of Galveston Island, and the system connects with the Gulf Intracoastal Waterway at that point as well. The respective port authorities and the U.S. Army Corps of Engineers maintain the ship channels at a depth of 45 feet to serve deep-draft vessels. Although the entire length of the Ship Channel is tidally influenced, there is some concern that the deep dredging may influence the salinity of the shallow Galveston Bay estuary, which averages 7 feet deep, particularly during drought periods.

The Lower Trinity River serves the shallow (6-foot draft) cargo Port of Liberty, Texas. Water depth and freshwater quality is maintained in the Lower Trinity River by the Wallisville Saltwater Barrier, which includes a lock system for navigation. Barge traffic connects from the Port of Liberty to the Intracoastal Waterway by traversing a dredged canal along the eastern coast of Trinity Bay. This canal connects to the Houston Ship Channel west of Smith Point.

Numerous recreational ports serve the region. The Texas Department of Transportation recognizes the Port of Anahuac on the Trinity Bay and the Port of Sweeny on the San Bernard River, although there are many others. These ports are located in tidal areas, and do not require freshwater flows to maintain navigability.

3.3.8 Recreational Uses

Water-based recreational uses in Region H include activities that are directly dependent upon the region's rivers, streams, reservoirs, and bays, such as swimming, boating, fishing, and paddle sports, as well as those enhanced by proximity to water sources such as wildlife viewing, camping and hunting, and eco-tourism. There are also economic activities associated with water-based recreation such as marinas, tourist accommodation and services, and other recreation-based businesses. Generally, communities developed adjacent to or near accessible water bodies contribute to an increased tax base from which economic benefits can accrue. Positive local tax base impacts in rural communities of Region H have been and can be significant. Therefore, reservoir development in these areas has been viewed as an economic benefit for these regions. Recreational water needs and requirements have two distinct components – physical and economic.

The physical component addresses the amount (volume) of water needed to perform various recreational activities. This is strictly a function of the geometry of whatever body of water is being considered and the type of activity that is being investigated.

In order to provide for this need, some stakeholders in water-related recreational activities apply for permits from TCEQ that allow them to divert and impound water in man-made lakes and ponds dedicated to recreational purposes. A search of the TCEQ Water Rights Database returned 160 records for recreation water rights with stated total diversion of about 9,200 acre-feet per year. Five of these rights account for 6,572 acre-feet per year in authorized diversions as shown in Table 3-11.

Table 3-11:
Major Recreational Water Rights in Region H

Owner	Stream	Diversion (acre-feet/year)
Brazos River Club	Brazos River	3,000
Indigo Lake Estates	Log Gully	1,164
C E Zwahr ET AL	Austin Bayou	1,003
George W Maxwell	Cow Island	805
The Woodlands Corporation	Bear Branch	600

The majority of the region's freshwater recreation occurs not on dedicated recreational lakes, but on water supply reservoirs. The region's water supply reservoirs provide a broad range of recreational opportunities but were created to meet the region's consumptive water demands. While recreation is permitted on most of the region's water supply reservoirs, there are no dedicated recreational water rights protecting volumes for recreational purposes on these reservoirs. Three water supply reservoirs in Region H provide a significant portion of the freshwater-related recreational activities in the region—Lake Livingston, Lake Conroe, and Lake Houston, in decreasing degrees.

The economic importance of water-based recreational businesses is illustrated in recent studies that indicate water-related recreational activities account for a significant portion of the Texas economy. In 1996, Texas ranked second in the United States in angler expenditures at roughly $2.9 billion, providing more than 80,000 jobs. In the same year, there were an estimated 2.6 million anglers in Texas, with 2.1 million classified as primarily freshwater anglers. Furthermore, one study estimates that, in 1997, Texas ranked fifth in the United States in boat ownership with about $302 million in retail boat sales. The Texas Parks & Wildlife Department reported in February of 2000 that 617,864 boats are registered in the state, 98 percent of which are used as pleasure craft. Counties in Region H account for nearly one-quarter of these (134,289) and 99 percent of these are registered as pleasure craft. In Texas, the 1991 retail sales for migratory bird hunting was $262,600,000, and the 1991 retail sales for migratory waterfowl hunting was $48,900,000. The 1991 retail sales for non-consumptive bird use was $155,300,000; the 1991 non-consumptive waterfowl use in Texas was $103,600,000. Such statistics demonstrate an economic-driven recreational need for water in Texas.

While there is a direct relationship between lake levels and these industries, there is no statistical data available to quantify that relationship. Although anecdotal information suggests negative impacts will accrue to lakeside communities when reservoir levels decrease, there is no economic data available which would allow a comparison to the economic impacts of not meeting municipal, manufacturing and/or irrigation water demands. When considering the impacts of lake levels, one might consider (1) water levels required to operate boat ramps and docks, (2) water levels or depths required to support water recreational activities (boating and fishing), and (3) water levels required to support resident and migratory wildlife. Also important to consider is the acceptable duration of a given condition. Lake levels will decline during droughts, but recover during average-to-wet years. Resident wildlife species will be directly affected by the drought conditions. Migratory species would be indirectly affected, because they would be able to adjust their routes to find the best habitats in a particular year.

All state parks and forests, national parks and forests, wildlife refuges, and wildlife management facilities were identified in order to consolidate a listing of recreational resources in Region H. Every facility was researched to determine if it provided facilities for camping and picnicking, nature and wildlife viewing, hunting, fishing, and boating and other water sports. Sources include various websites and publications from the Texas Parks & Wildlife Department, National Park Service, USDA Forest Service, U.S. Fish and Wildlife Service, National Wildlife Refuge System, Galveston Bay National Estuary Program, U.S. Army Corps of Engineers, U.S. Historical Society, Great Outdoor Recreation Pages, Recreation.Gov, *1998-1999 Texas Almanac*, Texas road atlases, and various county and river authority websites. Additional information was acquired from the Houston Canoe Club on areas within the region of importance to paddle sports. This information was compiled into the following three tables contained in *Appendix 3F*.

- *Region H-River Segments, Bay and Estuaries* – Lists all of the river basins, river segments, bays, and estuaries in the region and the recreational opportunities associated with each.

- *Recreation* – Lists all of the national parks, preserves, wildlife refuges, state parks, wildlife management areas, and forests and the recreational opportunities associated with each.

- *Region H-River Segments, Bay and Estuaries-Special Features* – Lists all of the lakes and reservoir segments in the region and the recreational opportunities associated with each.

From the tables containing the public recreational sites and data obtained from the *Galveston Bay Recreational User's Handbook*, Figure 3-10 was prepared to illustrate the location and each associated recreational activity for Region H. This map also shows the seasonal and restricted waterways within the region. *Appendix 1A* contains a detailed bibliography of all of the sources used for this section.

3.4 Total Water Supply

The total amount of water supply currently available to Region H from existing available water sources is 3,564,602 acre-feet per year. Of that, approximately 71 percent is surface water. By the years 2030 and 2060, the available supply is expected to be 3,371,447 acre-feet per year and 3,368,297 acre-feet per year, respectively. Table 3-12 below summarizes current and projected water supplies.

3.4.1 Water Supplies Available by City and Category

This water supply is distributed to each WUG, i.e. each city, each county-other, and each non-municipal water use category. This distribution is shown in *Table 3G.1*, located in *Appendix 3G*.

In *Table 3G.1*, the ground and surface water supply sources available to Region H are assigned to the various WUGs in the region based on contracts and water rights, limitations of conveyance facilities, and in some cases, current usage patterns. In general, a thorough search was performed to determine how each WUG obtained its water supply. This required identification of third-party contracts as well as water providers in addition to the wholesale water providers (WWPs).

About 72 percent of the year 2000 total available Region H supply is allocated to the region through one of the WWPs. Table 3-13 shows the distribution of the available supply among the providers for the study years of 2000, 2030, and 2060.

Table 3-12
Summary of Water Supply Available for Region H
for Study Years 2000, 2030, and 2060

Supply Source	Supply Available (acre-feet/year)		
	Year 2000	**Year 2030**	**Year 2060**
Groundwater			
Gulf Coast Aquifer	803,271	616,204	616,648
Carrizo-Wilcox Aquifer	10,940	9,756	9,610
Queen City Aquifer	7,906	7,906	7,906
Sparta Aquifer	17,414	17,414	17,414
Brazos River Alluvium	41,539	41,539	41,539
Yegua-Jackson Aquifer	6,400	6,400	6,400
Undifferentiated Aquifer	1,117	1,117	1,117
Subtotal	**888,587**	**700,336**	**700,634**
Surface Water			
Neches River Basin[1]	60,727	60,727	60,727
Neches-Trinity Coastal Basin	21,702	21,702	21,702
Trinity River Basin	1,605,262	1,605,262	1,605,262
Trinity-San Jacinto Brazos Coastal Basin	34,232	34,232	34,232
San Jacinto River Basin	303,900	300,600	297,300
San Jacinto-Brazos Coastal Basin	39,181	39,181	39,181
Brazos River Basin[1]	611,016	611,016	611,016
Brazos-Colorado Coastal Basin	12,019	12,019	12,019
Local Supplies, all basins	30,169	31,599	31,895
Subtotal	**2,683,976**	**2,682,106**	**2,679,102**
Total	**3,572,563**	**3,382,442**	**3,379,736**

[1] Supplies represent current contracts to Region H only. Total supply is greater but may not be available to Region H.

Table 3-13:
Available Supply by Wholesale Water Provider within Region H
for Study Years 2000, 2030, and 2060

Provider	Supply (acre-feet/year)		
	Year 2000	**Year 2030**	**Year 2060**
Baytown Area Water Authority	13,326	13,326	13,326
Brazos River Authority*	138,913	138,913	138,913
Brazosport Water Authority	23,017	23,017	23,017
Chambers-Liberty Counties Navigation District	79,020	79,020	79,020
Chocolate Bayou Water Company	100,972	100,972	100,972
Clear Lake City Water Authority	26,876	26,876	26,876
Dow Chemical	164,061	164,061	164,061
Fort Bend County WCID 1	6,890	6,890	6,890
Galveston County WCID 1	4,915	5,002	5,013
Gulf Coast Water Authority	207,703	207,703	207,703
City of Houston	1306,562	1,306,076	1,303,967
Lower Neches Valley Authority*	60,727	60,727	60,727
Lyondell-Citgo Refining	23,404	23,404	23,404
North Channel Water Authority	9,802	9,802	9,802
North Harris County Regional Water Authority	81,404	56,279	56,279
City of Pasadena	34,892	35,436	36,028
San Jacinto River Authority	197,164	196,636	189,065
Texas Genco	175,676	175,676	175,676
West Harris County Regional Water Authority	43,290	32,486	32,486
Total	**3,747,169**	**3,519,536**	**3,519,939**

*Supplies represent current contracts to Region H only. Total supply is greater but may not be available to Region H.

Current BRA contracts represent 138.193 acre-feet of the 611.016 acre-feet. The remaining portion of the 611.016 acre-feet are other water rights.

General Methodology for Assigning Resources to WUGs

The following methodology summarizes the data collection process and the other procedures followed to arrive at the information in *Table 3G.1*. In general, the methodology includes the following steps.

Data Collection

- Identify contract supplies available to WUGs via a direct or multi-tier transaction with a WWP using contract information from WWPs and the 2001 Regional Water Plan.

- Coordinate with other planning regions to resolve interregional conflicts, where applicable. No interregional conflicts were identified during discussions with regions C, G, and I.

- Identify other possible water providers, using the TWDB Water Use Database and any other available information. Identify the end user WUGs that are supplied by these providers under a contractual or retail agreement. Contact these providers, and request contract information from them.

- Identify surface water supplies being used by self-supplied WUGs, by consulting the TCEQ Water Rights Database and *Table 3A.1*.

- Update information for water providers identified in the 2001 Regional Water Plan.

Groundwater Allocation

Groundwater supplies in Leon and Madison Counties were allocated according to information received from the Mid-East Texas Groundwater Conservation District. For all other counties, groundwater was first allocated to WUGs in each county, with the exception of Brazoria County. This is described below under Brazoria County. Where groundwater resources were not adequate to meet demands, supplies were distributed to WUGs based on total demand. Any exception to this rule is noted below.

Counties With Adequate Groundwater Resources

The available groundwater supplies in Austin, Leon, Madison, Polk, San Jacinto, Trinity and Walker Counties were found to be adequate to satisfy the groundwater demands of WUGs for the planning period.

Water was allocated to WUGs in Leon and Madison Counties and was allocated with guidance provided by the Mid-East Texas Groundwater Conservation District. The plan set forth by the district shows the amount of water allocated from each source to individual customers including irrigation, livestock, manufacturing, and mining users. These values were adjusted, within reasonable limits, to minimize shortages

Counties With Inadequate Groundwater Resources

Brazoria County

Brazoria County has municipal, manufacturing, mining, irrigation, and livestock water demands that cannot be entirely satisfied by surface water and groundwater resources. The groundwater availability of approximately 50,600 acre-feet per year can satisfy part of the water needs but not all of the needs in the county. For this reason, the communities of Alvin, Bailey's Prairie, Brookside Village, Danbury, Hillcrest, Holiday Lakes, Iowa Colony, Jones Creek, Manvel, Surfside Beach, Sweeny, and West Columbia were allocated groundwater to meet their entire demands while others were supplied groundwater in addition to surface water supplies. Adequate groundwater was also budgeted to supply the Brazoria County MUDs, Orbit Systems Inc., Southwest Utilities, and Varner Creek UD entirely from groundwater. After meeting the groundwater demands of these WUGs, the remaining groundwater supply was allocated among users that were connected to surface supplies as well as groundwater.

Brazoria was capable of providing for all of its demands through 2060 by using surface water supplies and was not allocated any of the county's groundwater resources. The communities of Clute, Oyster Creek, and Richwood were shown to experience shortages immediately in the 2000 period. However, no data supports that these shortages actually occurred. It is likely that these communities pump groundwater in excess of the groundwater supplies currently allocated to these communities shown in *Table 3G.1*. Freeport and Pearland would later develop shortages in 2020. Supplies to irrigation and county-other in the Brazos River Basin are anticipated to be insufficient to meet demands beginning in 2020. In the other basins, these shortages begin immediately. Manufacturing shortages in the Brazos and San Jacinto-Brazos River Basins begin in 2000 and 2020, respectively. Livestock demands that were not met by this groundwater supply were assumed to be provided by local water supplies. An adequate amount of local supplies was provided to mining WUGS to relieve shortages after applying other sources of water for the year 2000. This was considered a reasonable assumption as these WUGs are not currently experiencing shortages. These supply values were then carried through the 2060 planning period to represent the maximum amount of local supply available for mining for all periods.

Chambers County

Chambers County will experience groundwater shortages immediately in the 2000 planning period without the use of surface water supplies to meet its municipal, irrigation, manufacturing, mining, and livestock demands. Throughout all of the planning periods, the county will not be able to rely on groundwater supplies alone. Groundwater resources were distributed to each WUG receiving groundwater according to total demand.

Galveston and Harris Counties

Groundwater usage within Galveston and Harris Counties is regulated by HGCSD which provides for reductions in groundwater pumping in these counties based on a percent of total demand over the planning period. The groundwater reductions vary depending upon the Subsidence District area where the WUG is located.

WUGs located in Subsidence District Area 1 were limited to groundwater usage equal to 10 percent of their total demand for all planning periods from 2000 to 2060. In Area 2, WUG groundwater usage was limited to 20 percent of their total demand for the entire time period. Maximum groundwater usage for WUGs located in Area 3 varied by planning period. The maximum allowable groundwater use for 2010 was calculated to be 70 percent of the total water demand for the period, for each WUG. For 2020, this percentage was decreased to 30 percent. For subsequent years, only 20 percent of the total water demand could be met with groundwater sources. Irrigation WUGs within these counties were not subject to this limitation and could be allocated enough groundwater to meet the entirety of their demand. Because of this, the groundwater supplies set by HGCSD for Harris County were increased to meet the remaining portion of irrigation demands after all WUGs were provided their restricted portion of groundwater supply. This was not done for Galveston County, as irrigation demands were far greater than available groundwater supplies.

Shortages due to insufficient groundwater supply begin in the San Jacinto River Basin of Harris County in 2010. Before this time, shortages are due to groundwater restrictions. In the San Jacinto-Brazos and Trinity-San Jacinto Coastal Basins of the county, groundwater shortages through 2060 only occur due to groundwater pumping restrictions and not from limited supply. Municipal WUGs in Galveston County will experience shortages due to restrictions rather than limited supplies for all of the planning periods. Irrigation will not be able to entirely meet demands in this basin with groundwater alone. In the Neches-Trinity Coastal Basin, only livestock and mining WUGs are served by groundwater, and these users will experience shortages due to groundwater restrictions.

In instances where groundwater supplies were not adequate to meet groundwater demands or restricted groundwater demands, the amount supplied was prorated among the WUGs based on restricted demand, or total demand, if no restrictions applied. As the groundwater supplies available to users in Harris and Galveston Counties are based on subsidence restrictions rather than actual available amounts of groundwater and irrigators are not subject to HGCSD restrictions, it was assumed that this supply could be exceeded to meet any remaining irrigation demands after surface water was allocated to irrigation WUGs.

Fort Bend County

Similar to the subsidence restrictions imposed upon Harris and Galveston Counties by HGCSD, the FBSD regulates the quantity of groundwater pumpage in portions of Fort Bend County. However, these restrictions apply only to two zones in the northeastern portion of the county. For the sake of this plan, it was assumed that both zones would be required to lower pumpage to 70 percent of the total demand for each WUG during the 2020 planning period. For the 2030 period and beyond, it was assumed that only 40 percent of the total WUG demands could be met by groundwater. These limitations were not applied to irrigation usage within the county, and available groundwater supplies were increased in order to provide for irrigation demands remaining after groundwater was allocated to other WUGs.

The groundwater restrictions imposed by FBSD are not sufficient to prevent shortages due to supply from 2000 to 2060. The available amount of groundwater was distributed to WUGs

according to their demands or restricted demands, where applicable. As in Harris County, it was assumed that all groundwater demands to irrigators could be met by exceeding the aquifer supply. The FBSD restrictions do not apply to irrigators and small domestic wells and it is assumed that these users would pump the amount of water necessary to meet their demands. Therefore, the total available groundwater supplies were increased to accommodate the additional water usage by irrigators, as well as other unregulated WUGs, such as Pleak, that were not subject to subsidence restrictions.

Liberty County

Irrigation demands in Liberty County are of considerable magnitude. For this reason, groundwater was first provided to nonirrigation WUGs. The remaining groundwater was allocated to irrigation based on demand. Shortages appear in the 2000 period for irrigation in the Neches, Neches-Trinity, and Trinity San Jacinto River Basins. However, surface water supplies are adequate to prevent irrigation in the Trinity River Basin from experiencing further shortages until 2020.

Montgomery County

Available groundwater supplies are projected to be inadequate to meet demands in Montgomery County beginning in the 2010 planning period. At this point, several larger communities will be required to seek additional supplies. However, the communities of Cut and Shoot, Magnolia, Patton Village, Roman Forest, Splendora, and Woodbranch were allocated enough groundwater to satisfy their entire demand. Groundwater was allocated to the remaining WUGs proportional to each demand. The mining water demand remaining after including surface water contracts was fully met by local supplies. Livestock demands were met entirely from local supplies. The small irrigation demand in Montgomery County was supplied by surface water contracts from SJRA.

Waller County

The groundwater resources of Waller County were allocated for municipal, manufacturing, mining, irrigation, and livestock based on the groundwater available for the county. The estimated demands for groundwater within the county can be met with available groundwater supplies through the year 2050 when shortages will develop in the Brazos River Basin. The San Jacinto Basin will experience shortages in 2060. Katy, which receives groundwater from Harris County, will experience shortages due to the subsidence restrictions and limited supplies associated with the Harris County portion of the Gulf Coast Aquifer, San Jacinto River Basin.

Surface Water Allocation

- The values entered into *Table 3G.1* for municipal WUGs are the surface water supply identified from WWPs and smaller water providers.

- It was assumed that the COH provided enough water to meet its remaining surface water demands after the addition of water form other contract sales and groundwater allocation.

- Contracts from GCWA were found to exceed the total of the WWP's contracts from other providers and water rights. Because of this, all GCWA contracts were reduced by approximately 11 percent to ensure that available firm supplies were not exceeded.

- As a general rule, if a WUG is found in different counties, the supply allocated to the WUG in each county was split based on the surface water demand. In cases where this demand was "0," the supply was split equally between these counties. (The surface water demand for each entry WUG/county/basin was calculated by subtracting the allocated groundwater for that entry from that entity's total demand).

- Municipal contracts that were not identified as a municipal WUG were assumed to be a portion of County-Other and assigned to the appropriate county and basin unit.

- For non-municipal WUGs, contracts from water providers were used to determine contractual sources to various categories. Wherever possible, each contract was associated with a basin through available information.

- For non-municipal WUGs, some information was received from water rights information collected in the previous steps and entered in *Table 3A.1* on a WUG/county/basin basis. Ownership and use information for the available firm supplies was provided by the TCEQ Water Rights Database.

- Irrigation entries were compiled from contracts and firm water rights described later in this chapter.

- Livestock entries assumed livestock demands would be provided from local surface water supply sources. This is consistent with past TWDB procedures.

- Mining WUGs with shortages in 2000 were assumed to be supplied from local surface supplies equal to their shortage. This amount was also carried out for the remaining planning periods.

Data Collection

Entities that sell water to WUGs in the region were contacted in order to obtain an up-to-date list of their water commitments. This procedure was repeated at each tier of subsequent transactions until all of the contract water supplies provided by nonmajor water providers could be tracked to an end user, identified as a WUG or part of a WUG.

The remaining water supplies that were entered in *Table 3G-1* are other permit amounts or assumed local supplies. These entries are generally nonmunicipal users. Moreover, with the exception of livestock and mining supplies, the only noncontract supplies that were considered for *Table 3G-1* are the supplies associated with the records listed in *Table 3A-1*.

Supply Allocation

After the data collection process was completed, the contract and non-contract supplies were allocated to each WUG on a county/basin basis. If a portion of the water acquired through a

contract by a WUG was provided to another WUG, through a contract or direct retailing, or by using another intermediary seller, the amount associated with the initial WUG was modified accordingly to avoid double accounting of water. Within each category (county-other, manufacturing, mining, steam-electric, livestock, irrigation), all entities receiving water directly from the same source or obtaining water via contracts from the same provider/self provider and from the same source were aggregated into a single record.

Non-municipal contract supplies were allocated to a specific county/basin unit where possible. This involved the determination of the correct county and basin location for each recipient. Use of the historical data from the water use reports provided by TWDB was instrumental in this process. For example, the COH WWP currently has a wholesale contract with the manufacturing entity, Dixie Chemical Company. It was found that Dixie Chemical is using the water in Harris County in the San Jacinto-Brazos River Basin. Therefore, the current contract supply amount for Dixie Chemical would be added to the overall manufacturing supply available in Harris County, in the San Jacinto-Brazos Basin, and receiving water from the same source (in this case, Lake Livingston).

The allocation of the municipal contract supplies was more complex. Most of the water providers that receive water via a wholesale agreement have retail customers that are in their service areas. Retail customers are defined here as those recipients of water that pay for their service through some means other than a wholesale agreement (i.e., monthly billings). There is not a well-defined methodology for determining the amount of water available to these types of users. For the most part, the availability of water for these WUGs at the city/county level was assessed on a case-by-case basis. For those municipal WUGs that were divided into more than one basin, the availability to each basin was based on the basin's proportionate share of the city/county surface water demand.

For water rights for irrigation that were not found to be sold through contract, such as irrigation rights owned by individuals, the entire supply was allocated to irrigation. Irrigation contracts were used, where available, to determine what portion of a water provider's water right was actually sold for irrigation use. Most of the irrigation supplies are year-to-year contract supplies that are allocated differently with each growing season. For the most part, providers of irrigation water sell water to irrigators in their immediate vicinity. It was assumed that irrigation water rights provided water to the basin in which they originated unless known contracts allocated the water to another location. Contracted water supplies for irrigation were assumed to serve customers along the canal system in which it was conveyed.

For livestock demands not met by groundwater, it was assumed that there would be water available from local surface supply sources (i.e., stock ponds). Much of the mining demand for surface water also appeared to be supplied from local sources. However, it was assumed that these supplies would not increase in quantity over the planning period and alternative sources would be required to supplement any growth in demand. The year 2000 local supply quantity was held constant through the year 2060.

Municipal Contracts Allocation

Anahuac

The City of Anahuac receives 1,049 acre-feet per year from CLCND (nonmajor water provider). This amount was split between the Neches-Trinity and Trinity River Basins based on the surface water demand ratios, by basin.

Angleton

The City of Angleton receives approximately 2,016 acre-feet per year from Brazosport Water Authority (BWA) (nonmajor water provider), provides 202 acre-feet per year (approximately 10 percent) to manufacturing in the Brazoria County/San Jacinto-Brazos Basin (assumed that the split is for the entire length of the contract between City of Angleton and BWA). The amount remaining for the City of Angleton is 1,815 acre-feet per year.

Bacliff MUD

Bacliff MUD is contracted to receive 1,333 acre-feet per year from GCWA for municipal use. After adjusting this quantity in order to prevent GCWA contracts from exceeding supplies, Bacliff MUD will receive 1,185 acre-feet per year.

Bayou Vista

Bayou Vista receives 504 acre-feet per year from GCWA and is no longer a customer of the City of Galveston. This contract amount was reduced to 448 acre-feet per year so as not to exceed available supply.

City of Baytown

Baytown Area Water Authority (BAWA) receives 13,326 acre-feet per year from COH and provides water to several water supplies and to the City of Baytown. BAWA provided information regarding the amounts distributed to each of its customers. It was assumed that the BAWA customers Fresh Water Supply District 1-A, Harris County Fresh Water Supply District 1-B, Harris County Fresh Water Supply District 27, Lake MUD, Country Terrace, and Cedar Bayou represent county-other in the Trinity-San Jacinto Basin. The allocation of BAWA's contract is shown below.

- Baytown 11,036 ac-ft/yr
- Harris County WCID 1 670 ac-ft/yr
- Harris County-Other (Trinity-San Jacinto) 798 ac-ft/yr

The amount of water that the City of Baytown receives was calculated based on the surface water demand. The part of Baytown located in Harris County is also located in two different basins, Trinity-San Jacinto and San Jacinto. The amounts entered in these basins were prorated based on the surface water demands.

Bellaire

Bellaire receives 1,310 acre-feet per year of blended surface water and groundwater from the COH. As the groundwater reduction plan for the area progresses the amount of groundwater used will decrease significantly. The entirety of this contract was assumed to be made up of surface water and was allocated to municipal use.

Bolivar Peninsula SUD

Bolivar SUD contracts to receive 5,039 acre-feet per year from LNVA. It was assumed that 1 acre-feet per year of this contract could be used to provide water to county-other in the Neches-Trinity basin, leaving 5,038 acre-feet per year available to Bolivar SUD.

Brazoria

Brazoria has a contract with BWA for 336 acre-feet per year, and the entire contract was allocated to the City of Brazoria. The City of Brazoria is located in two different basins, the Brazos and Brazos-Colorado. The contract amount was prorated between these two basins based on the total water demand ratios for these two basins.

Bunker Hill Village

The COH provides 635 acre-feet per year of blended water to Bunker Hill Village. This entire supply was allocated as surface water as the portion of this supply from surface water will increase throughout the groundwater reduction plan.

Chimney Hill MUD

Chimney Hill MUD receives water under a contract from the COH. COH provides 420 acre-feet of groundwater/year to the MUD, and it was assumed the groundwater was obtained from the San Jacinto River Basin.

Clear Brook City MUD

The Clear Brook City MUD receives 1,680 acre-feet per year from the COH for municipal use. The MUD is a partner in the Southeast Water Purification Plant.

Clear Lake Shores

Based on information received from Galveston County WCID 12, this water provider serves Clear Lake Shores, Kemah, Lazy Bend (county-other), and a small number of customers in League City. Water provided to Kemah is sold wholesale to the City of Kemah, and then to other customers. All other sales by the district are carried out directly between WCID 12 and the customer. The WCID 12 contract from GCWA, after being reduced according to available supply, was split between Kemah and other customers in the district according to the ratio of usage between Kemah and WCID 12. The portion of water allocated to WCID 12 was further divided among Clear Lake Shores, League City, and county-other

according to the number of connections served in each community. The resulting volumes for each WUG are:

- Kemah 55 ac-ft/yr
- League City (Galveston County) 11 ac-ft/yr
- Lazy Bend (WCID 12) 134 ac-ft/yr
- Clear Lake Shores 689 ac-ft/yr

Clute

The City of Clute has a contract with BWA for 1,120 acre-feet per year; the entire contract was allocated to City of Clute.

County-Other in Brazoria County

BWA has contracts with Clemens Unit-TDCJ and Wayne Scott Unit-TDCJ for 420 acre-feet per year. The demands of these units were considered part of the county-other demand; therefore, since these units are located in Brazoria County, they were allocated to county-other in Brazoria County. The portion for the Clemens Unit was allocated to the Brazos-Colorado Basin while the Wayne Scott Unit supply contract was allocated to the San Jacinto-Brazos River Basin.

County-Other in Fort Bend County

Fort Bend County WCID 2 has an option contract with GCWA for 11,758 acre-feet per year. This contract was reduced so that GCWA contracts did not exceed supplies. Based on the information received from the contacted person, this amount, if used, would be split among its customers. Since GCWA provides retail water to its customers, an exact amount is difficult to estimate; therefore, GCWA estimated the amounts for each entity listed below:

- Missouri City 135 ac-ft/yr
- Sugar Land (San Jacinto-Brazos River Basin) 45 ac-ft/yr
- Harris County MUD 122 (assumed Harris County-other, San Jacinto River Basin) 296 ac-ft/yr
- Fort Bend County, unincorporated area (assumed Fort Bend County-other, San Jacinto-Brazos River Basin) 110 ac-ft/yr
- Stafford 9,865 ac-ft/yr

The amount indicated for Stafford and Missouri City was divided by basin and county according to surface water demand.

County-Other in Harris County

Several water providers including WWPs provide water to county-other in Harris County. These contributions are described below.

The provider with the alpha number 1095 in *Table 3G.1*is the La Porte Area Water Authority (LAWA). LAWA has a contract with COH for 8,734.6 acre-feet per year. According to the information received from LAWA, LAWA provides water to the cities of La Porte, Shoreacres, and Morgans Point. The volumes of water are shown below.

- Shoreacres 364 ac-ft/yr
- Morgans Point (entered as Harris County-Other) 616 ac-ft/yr
- City of La Porte 7,757 ac-ft/yr

As Morgans Point resides within both the San Jacinto and San Jacinto-Brazos River Basins, the water provided to county-other was split based on area. Because Morgans Point is divided fairly equally by the two basins, the 616 acre-feet per year was split in half.

North Channel Water Authority receives 6,681 acre-feet per year from COH that can be split among its customers. A summary of water usage for several years was provided by NCWA and used to prorate the COH contract amount among NCWA customers on a basis of their total water use. Municipal users that were not listed as individual WUGs were combined into county-other. The amount of contract water allocated to each WUG is shown below.

- Harris County FWSD 6 187 ac-ft/yr
- Harris County FWSD 47 288 ac-ft/yr
- Harris County FWSD 51 1,539 ac-ft/yr
- Harris County MUD 53 836 ac-ft/yr
- Harris County WCID 21 913 ac-ft/yr
- Harris County WCID 36 802 ac-ft/yr
- Harris County WCID 84 310 ac-ft/yr
- Pine Trails Utility 480 ac-ft/yr
- County-Other 281 ac-ft/yr
- Manufacturing 1,046 ac-ft/yr

The City of Pasadena receives water from COH, and it is one of the Southeast Purification Plant participants. Contract information was not available from the City of Pasadena and therefore information used in the 2001 Region H Regional Water Plan was used for the current plan. Based on the information received from the City of Pasadena for the 2001

Regional Water Plan, its customers are City of Seabrook (which in turn provides some of this water to the City of El Lago), manufacturing companies located in Harris County (San Jacinto-Brazos River Basin), and Clear Lake Water Authority (CLWA). These amounts are shown below.

- Seabrook and El Lago 1,120 ac-ft/yr
- County-Other 3,360 ac-ft/yr
- Manufacturing 5,040 ac-ft/yr

The remaining supply from Pasadena was assumed to be available to satisfy the demands of the City of Pasadena.

The Fort Bend County WCID 2 contract allocation was described under county-other in Fort Bend County. The amount allocated to county-other in Harris County is 349 acre-feet per year.

Baytown Area Water Authority provides water to several communities in Harris County that are not listed as WUGs. This water was allocated to Harris county-other. The BAWA contract allocation is described under Baytown.

Municipal customers of the COH that were not itemized as WUGs were combined into county-other, based on the customer's location. COH provides groundwater to the San Jacinto, San Jacinto-Brazos, and Trinity-San Jacinto River Basins for use by county-other WUGs.

The SJRA provides 896 acre-feet per year to Harris County MUD 19, located in the San Jacinto River Basin.

County-Other in Galveston County

The 267 acre-feet contract between GCWA and Bayview MUD was reduced to 237 acre-feet and allocated to county-other in Galveston County. The COH has a contract to supply Galveston County with 18,477 acre-feet per year for municipal use and it was assumed that this amount provided supply to the portion of Galveston County in the San Jacinto-Brazos basin. It was also assumed that the infrastructure that provides LNVA water to Bolivar SUD also provides water to county-other in the Neches-Trinity basin.

County-Other in Montgomery County

COH provides 381 acre-feet per year to Montgomery County MUD 98. The entirety of this amount was allocated to county-other.

County-Other in San Jacinto County

Waterwood MUD has a contract for 560 acre-feet per year. This supply was allocated to county-other in the Trinity River Basin.

County-Other in Trinity County

Three contracts from TRA were entered as county-other category in Trinity County. One of the contracts, listed for "Individual Domestic Use" was entirely allocated to county-other in Trinity County. Westwood Shores MUD is the recipient of 56 acre-feet per year from TRA, and it represents part of the demand of the county-other category in Trinity County. The other contract entered in this category is part of the Trinity County Regional Water Supply System (TCRWSS) contract. TCRWSS has a contract with TRA for 2,800 acre-feet per year through 2009, 3,360 acre-feet per year from 2010 through 2014, and 3.921 acre-feet per year following that. TCRWSS provides water, on a retail basis, to the WUGs of Trinity and Groveton, Riverside Water Supply, Trinity Rural Water Supply. It was assumed that enough water would be provided to each WUG TCRWSS serves to meet demands and that the remaining contract would be allocated to county-other in Trinity County.

County-Other in Walker County

Most of the contract of 11,202 acre-feet per year that the Huntsville Regional Water Supply System (HRWSS) has with TRA was allocated to the City of Huntsville. A small portion of this contract (15 percent) was allocated to county-other, based on our assumption that there are unincorporated areas in the vicinity of Huntsville that are supplied by the city. This amount was split by basin based on the surface water demand ratios.

Crosby

Crosby MUD serves the City of Crosby and has a contract with SJRA for 1,120 acre-feet per year. Based on the information received from the City of Crosby, all the water is used for residential purposes except a small amount that is supplied to a manufacturing company located in Harris County. The City of Crosby receives 1,050 acre-feet per year. The remaining 70 acre-feet is allocated to the manufacturing category in Harris County, San Jacinto River Basin.

Deer Park

The City of Deer Park has a contract with COH for 3,956 acre-feet per year, and Deer Park uses the entire amount for residential purposes. The contract was split by basins based on the surface water demand ratios.

Dickinson

Galveston County WCID 1 has a contract with GCWA for 5,224 acre-feet per year and provides this water to Dickinson, Texas City, and League City, which are all retail customers. The contract amount, after adjustment, is equal to 4,643 acre-feet per year. Based on the information received from Galveston County WCID 1, it provides water to 50 houses in Texas City, League City pays for 1 mgd (it currently uses 150,000 gallons/day), and the rest goes to Dickinson. For all decades, Texas City was allocated an amount equal to 2.5 persons/house and a 150 gallons per day per person. League City was allocated the 1 mgd contract.

El Lago

The City of Seabrook receives water from the City of Pasadena and then sells the water to El Lago. The volume of water provided by Pasadena was split between Seabrook and El Lago based on surface water demands.

Freeport

BWA has a contract with Freeport for 2,240 acre-feet per year. Based on the information received from the City of Freeport, 85 percent of this contract is allocated to the City of Freeport, and the remaining 15 percent is allocated to different manufacturers in the San Jacinto-Brazos and Brazos River Basins.

Friendswood

Friendswood has a contract with COH for 6,719 acre-feet per year and is one of the Southeast Purification Plant participants. The contract is entirely allocated to municipal use for the City of Friendswood. The contract was split in two entries in different counties, based on the surface water demand ratios for the two counties.

Galena Park

Galena Park has a contract with COH for 1,008 acre-feet per year. Galena Park personnel indicated that 94.6 percent of this contract goes to municipal use for the City of Galena Park. The remaining 5.4 percent of the contract amount is supplied to manufacturing use in Harris County in the San Jacinto River Basin. Galena Park receives 954 acre-feet per year. Manufacturing in the San Jacinto River Basin receives the balance of the contract, or 54 acre-feet per year.

Galveston

Galveston receives 23,505 acre-feet per year from GCWA, of which 20,893 acre-feet per year is a firm supply. This water is distributed among the city and two wholesale customers, Galveston County MUD 1 and Jamaica Beach. Galveston no longer serves customers that are not located on Galveston Island. As these customers receive water on a retail basis, it is difficult to determine a set amount provided to each one. Instead, this volume of water was divided among the three recipients according to their surface water demands in each decade.

Galveston County MUD 1

The Galveston County MUD 1 surface supply is divided out of the total supply from GCWA to the City of Galveston according to its demand ratio among the other two recipients as described under Galveston.

Galveston County WCID 12

The division of the GCWA supply to Galveston County WCID 12 and the WUGs it provides water to, is described under Clear Lake Shores.

Groveton

Groveton receives 200 acre-feet per year from TCRWSS, as explained in the county-other in Trinity County section above.

Harris County FWSD 6

Harris County FWSD is provided 187 acre-feet of water per year from NCWA as described under county-other in Harris County.

Harris County FWSD 47

Harris County FWSD 47 receives 288 acre-feet per year of water from NCWA. This amountwas allocated as described under county-other for Harris County.

Harris County FWSD 51

Harris County FWSD 51 is also a customer of NCWA and is provided a portion of water according to the description under county-other in Harris County. The estimated supply to FWSD 51 is 1,539 acre-feet per year.

Harris County MUD 8

COH has a contract with Harris County MUD 8 to provide 420 acre-feet of groundwater.

Harris County MUD 53

NCWA provides an estimated 836 acre-feet per year of supply to Harris County MUD 53. This estimate is described for county-other in Harris County.

Harris County MUD 55

The COH provides 3,877 acre-feet per year to Harris County MUD 55. This contract is perpetual and was assumed to continue throughout the planning periods.

Harris County MUD 158

Harris County MUD 158 receives 411 acre-feet of groundwater per year from COH. It was assumed that this water originated from the San Jacinto River Basin.

Harris County MUD 261

Harris County MUD 261 and Windfern Forest UD receive 140 acre-feet of groundwater/year from COH. This amount was split between the two districts according to surface water demands.

Harris County WCID 1

BAWA has a contract to provide 670 acre-feet per year to Harris County WCID 1.

Harris County WCID 21

NCWA provides 913 acre-feet of water per year to Harris County WCID 21 as described under county-other in Harris County.

Harris County WCID 36

The description for county-other in Harris County explains the allocation of water from NCWA and includes the 802 acre-feet per year provided to Harris County WCID 36.

Harris County WCID 84

Harris County WCID 84 provides 310 acre-feet of water per year to Channelview from its source, NCWA. The assignment of this supply is described under county-other in Harris County.

Hedwig Village

Memorial Villages Water Authority (MVWA) has a contract with COH for 747 acre-feet per year of blended water. It was assumed for planning purposes that this water originated from a surface source. Based on the information received from MVWA, this contract is split between Hedwig Village, Piney Point Village, and Hunters Creek. Since these entities are retail customers, without information on exact amounts, the contract was split among the customers based on their total water demand ratios for each planning period.

Hitchcock

Hitchcock is a customer of GCWA and is contracted to receive 1,680 acre-feet per year on a perpetual basis. This volume was reduced to 1,493 to reflect GCWA supplies.

Houston

The City of Houston, in its capacity as water provider to residents within the city limits, receives its water from several sources that are operated as a system. The available supply of this system, less contracts to other parties, was assumed to make up the available supply for Houston. This total volume was distributed among the individual occurrences of the Houston WUG in each basin and county.

Additionally, the Clear Lake City Water Authority provides a portion of its contract from COH to areas of Houston. As some of the authority's contracts are indefinable, it was assumed that Webster and Pasadena received a share of water prorated by the area served in each community. The amount of water remaining was assumed to serve Clear Lake (a portion of the Houston WUG). The amounts of water provided to each CLCWA customer are shown below.

- City of Houston 8,076 ac-ft/yr
- City of Pasadena 8,619 ac-ft/yr

- Taylor Lake Village 1,730 ac-ft/yr
- Nassau Bay 2,184 ac-ft/yr
- Manufacturing 1,792 ac-ft/yr

Humble

The City of Houston provides 47 acre-feet of groundwater per year to Humble.

Hunters Creek Village

This entity receives its water from the MVWA. As described under Hedwig Village, the amount of water that MVWA receives from COH was shared among its customers based on the surface water demand ratios.

Huntsville

Huntsville receives water from the Huntsville Regional Water Supply System (HRWSS). Approximately 15 percent of this water is allocated to county-other to support surrounding communities. The remaining supply was allocated to the City of Huntsville.

Jacinto City

Jacinto City has a contract with COH for 1120 acre-feet per year, and the entire amount of the contract is allocated to municipal use in Jacinto City.

Jamaica Beach

The City of Galveston provides water to Jamaica Beach, as described under Galveston. The portion of water provided to Jamaica Beach for each planning period was prorated from the GCWA supply according to the surface water demands of each end user customer.

Kemah

Galveston County WCID 12 provides water to Kemah, as described for Clear Lake Shores.

La Marque

The GCWA contract to La Marque was reduced from 3,113 to 2,643 acre-feet per year. The contract is entirely allocated for municipal usage.

La Porte

The La Porte Area Water Authority receives water from COH and then distributes water to the City of La Porte and other customers. The City of La Porte receives 7,757 acre-feet per year, as described previously at county-other in Harris County. This contract was split between the city's WUGs in the San Jacinto and San Jacinto-Brazos River Basins.

Lake Jackson

Lake Jackson receives water from BWA, and the entire contract of 2,240 acre-feet per year is allocated to municipal use for Lake Jackson.

League City

League City receives the majority of its water from two providers, GCWA and Galveston County WCID 1. The League City contract with GCWA was reduced from 2,240 to 1,991 acre-feet per year. League City also contracts for 1 mgd with Galveston County WCID 1. Galveston County WCID 12 also provides a small amount of water to customers in a portion of League City in Harris County. This is shown under Clear Lake Shores.

Livingston

Livingston receives water from the Livingston Regional Water Supply System. The entire amount, 5,601 acre-feet per year, is allocated to Livingston for its municipal use.

Missouri City

Missouri City has a contract with GCWA for 16,797 acre-feet per year. However, this amount was reduced to 14,930 to reflect GCWA's limited supply. The other provider for Missouri City is Fort Bend WCID 2. The amount received by Missouri City from Fort Bend County WCID 2 is shown above, at county-other in Fort Bend County. Missouri City in Fort Bend County is split by basins based upon surface water demand ratios.

Nassau Bay

Nassau Bay receives water from Clear Lake Area Water Authority. The current amount contracted, 2,184 acre-feet per year, is assumed to remain constant through 2060. Nassau Bay uses the whole amount contracted for its municipal use.

North Harris County Regional Water Authority

NHCRWA has a contract with COH for 11 acre-feet per year until 2010. Beginning in 2010, the authority will receive 34,714 acre-feet of surface water/year.

Onalaska WSC

The Onalaska WSC receives 672 acre-feet per year from TRA.

Oyster Creek

Oyster Creek receives water from BWA, and the entire contract, 106 acre-feet per year, is allocated for municipal use in Oyster Creek.

Pasadena

Pasadena receives water from COH and from CLWA. The COH contract allocation is described under county-other in Harris County. The CLCWA contribution to Pasadena was described above under Houston.

Pearland

Pearland has a contract with GCWA for 11,198 acre-feet per year, valid until 2010, and a contract with COH for 560 acre-feet per year until 2041. Pearland is located in Harris and Brazoria Counties. Therefore, these contracts are split between the two counties based on surface water demand. The GCWA contract was reduced to 9,954 acre-feet per year to represent firm yield.

Pine Trails Utility

Pine Trails Utility is a customer of NCWA and receives 480 acre-feet per year as estimated under county-other in Harris County.

Piney Point Village

Memorial Villages Water Authority (MVWA) provides Piney Point Village with water from its contract with COH. As described above, under Hedwig Village and Hunters Creek Village, this contract is split between the MVWA customers.

Richwood

Richwood receives water from BWA, and the entire contract of 263 acre-feet per year is allocated for municipal use by Richwood.

Riverside WS Corp

Riverside WS Corp receives 20 acre-feet of water/year from TCRWS as mentioned above in county-other for Trinity County. This amount was allocated to Walker County as San Jacinto County had no shortages for this WUG.

San Jacinto WSC

San Jacinto Water Supply Corporation receives 280 acre-feet per year from TRA. Coldspring is included in their service area, but since Coldspring has enough groundwater to meet its demand, this contract was allocated entirely to the San Jacinto Water Supply Company.

San Leon

San Leon receives water from GCWA. The entire contract between GCWA and San Leon, 1,999 acre-feet per year, was reduced to 1,777 acre-feet per year and is allocated to the municipal use of San Leon.

Santa Fe

Santa Fe (Galveston County WCID 8) has a contract with GCWA for 1120 acre-feet per year. After considering contract reductions to limit GCWA contracted supplies, Santa Fe has 996 acre-feet per year available.

Seabrook

The Pasadena contract was split between El Lago and Seabrook as described under El Lago.

Shoreacres

La Porte provides water to Shoreacres, as shown in the allocation of the contract between the La Porte Area Water Authority and COH described under county-other in Harris County.

South Houston

As one of the Southeast Water Purification Plant partners, South Houston has a contract with COH for 4199 acre-feet per year. The contract is entirely allocated to municipal use for the City of South Houston.

Southside Place

Southside Place has a contract with COH for 319 acre-feet per year, and the entire contract is used to meet its municipal demands.

Stafford

Stafford receives water from Fort Bend County WCID 2. Fort Bend County WCID 2 has an option contract with GCWA. The contract allocation is described above at county-other in Fort Bend County. The amount that Stafford receives is split between Fort Bend County and Harris County based on surface water demand ratios. The amount allocated to the part of Stafford located in Fort Bend County is split by basins, between San Jacinto and San Jacinto-Brazos River Basins, based on their surface water demand ratios.

Sugar Land

Sugar Land has two water providers. Fort Bend County WCID 2 provides water to some residents of Sugar Land, and the amount allocated is described under county-other in Fort Bend County. This amount is assumed to serve the portion of Sugar Land located in the San Jacinto-Brazos River Basin. GCWA has a contract with the City of Sugar Land for 22,396 acre-feet per year. This contract was adjusted to 19,907 acre-feet per year and is entirely allocated to the City of Sugar Land for its municipal use. The GCWA contract amount was split by basins based on the surface water demand ratios.

Sunbelt FWSD

The City of Houston provides 187 acre-feet of groundwater per year to the Sunbelt FWSD, in addition to 299 acre-feet of blended water/year. This blended supply is assumed to be

surface water in *Table 3G.1*. Sunbelt is also a member of the COH Groundwater Reduction Plan.

Taylor Lake Village

Clear Lake City Water Authority provides 1,730 acre-feet of water per year to Taylor Lake Village. The allocation of the CLWA contract with COH was described under Houston.

Texas City

Texas City has two water providers. The entity providing the largest amount is GCWA. The contract from GCWA is 11,663 acre-feet per year and is used entirely by the City of Texas City for its municipal water usage. The actual firm amount of this contract is 10,367 acre-feet per year. The other provider is Galveston County WCID 1, and the allocation of its contract with GCWA is summarized under Dickinson. This small amount of water was estimated to be approximately 21 acre-feet per year.

Tiki Island

Tiki Island receives water from GCWA under a contract for 403 acre-feet per year. The adjusted contract amount is 358 acre-feet per year.

Trinity

Trinity receives water from TCRWSS. The allocation of the TCRWSS contract is described under county-other in Trinity County and is equal to the TWDB demands for Trinity.

Trinity Bay Conservation District

The Trinity Bay Conservation District receives 663 acre-feet per year from CLCND. LNVA provides an additional sum of water on an as-needed basis to the district through the Winnie Treatment Plant. When the new Winnie Water Treatment Plant is completed, the district will have the capacity to receive 2.4 mgd of water from LNVA. Therefore, it is assumed that the available supply from the Rayburn-Steinhagen system is 2,688 acre-feet per year. These supplies were split between the Trinity and Neches-Trinity River Basins according to demand.

Trinity Rural WS Corp

As described under county-other in Trinity County, Trinity Rural WSC supply is provided 160 acre-feet per year by TCRWSS. This entire amount was allocated to the Trinity Rural WSC in Walker County.

Webster

The City of Webster has a contract with COH for 4,535.27 acre-feet per year and is using the entire contract amount for its municipal water use. CLAWA provides an additional 4,475 acre-feet per year from their surface water allocation from COH.

West Harris County Regional Water Authority

WHCRWA will begin a contract with COH for 20,437 acre-feet per year in 2010. This amount was allocated between the portions of WHCRWA located in Harris and Fort Bend Counties based on surface water demand.

West University Place

The City of West University Place has a contract with COH for 2,052 acre-feet of groundwater/year, and it is using the entire contract amount for its municipal water use.

Windfern Forest UD

Windfern Forest UD shares a 140 acre-feet per year contract with Harris County MUD 261. This amount was split between the two districts according to their demands in each decade as described under Harris County MUD 261.

Manufacturing Supplies

BRAZORIA COUNTY

Brazoria County manufacturing supplies are allocated below.

Provider	2000	2010	2020	2030	2040	2050	2060
	(acre-feet/year)						
Angleton	202	202	202	202	202	202	202
CBWC	28,600	28,600	28,600	28,600	28,600	28,600	28,600
Dow	148,061	148,061	148,061	148,061	148,061	148,061	148,061
Freeport	336	336	336	336	336	336	336
GCWA	17,784	17,784	17,784	17,784	17,784	17,784	17,784
Individual Water Rights	12,019	12,019	12,019	12,019	12,019	12,019	12,019

The supply listed by the City of Angleton is provided from their contract from BWA. Chocolate Bayou Water Company provides 28,600 acre-feet per year to Amoco Chemical. It was assumed that this amount was provided for by CBWC's contract with GCWA and a portion of Water Right 3461105357A from Chocolate Bayou. The Dow supply represents the company's firm water right and assumes that the full quantity is either contracted to other entities or used for the Dow facility itself. Freeport allocates approximately 15 percent of its contract from BWA to manufacturing, providing the value listed above. The sum of GCWA contracts to manufacturers in the San Jacinto-Brazos River Basin totals 17,784 acre-feet per year (after adjustment in order to observe available supplies). All contract amounts were allocated to the basin in which the consumer was located. Water rights intended for manufacturing were allocated to the basin the source originated in.

FORT BEND COUNTY

Fort Bend County manufacturing supplies are allocated below.

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
FBC WCID 1	1,000	1,000	1,000	1,000	1,000	1,000	1,000

The Fort Bend County WCID 1 has a contract with Imperial Sugar for 1,000 acre-feet per year. Originally, this contract was for the entire 20,000 acre-feet per year yield from this right. However, this was reduced due to Imperial Sugar's plant closure. This contract was allocated to the San Jacinto-Brazos River Basin.

GALVESTON COUNTY

Galveston County manufacturing supplies are allocated below.

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
GCWA	62,284	62,284	62,284	62,284	62,284	62,284	62,284

The GCWA amount represents the sum of contracts between the Gulf Coast Water Authority and manufacturers in Galveston County, San Jacinto-Brazos River Basin. This sum is adjusted so that the total GCWA contracts do not exceed supplies.

HARRIS COUNTY

Harris County manufacturing supplies are allocated below.

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
COH	380,961	380,961	380,961	380,961	380,961	380,961	380,961
Crosby	70	70	70	70	70	70	70
Galena Park	54	54	54	54	54	54	54
Pasadena	5,040	5,040	5,040	5,040	5,040	5,040	5,040
SJRA	76,952	76,952	76,952	76,952	76,952	76,952	76,952

The COH amount includes Houston and CWA contracts to manufacturers in Harris County. The appropriate portions of the contract sum were allocated to the basin in which the manufacturer was located. The supplies from Crosby and Galena Park represent portions of their contracted supplies provided for manufacturing. The Pasadena supply was split between the San Jacinto and San Jacinto-Brazos River Basins according to surface water demand. The sum of SJRA contracts was split according to the location of the contract customer.

A portion of the water provided by COH, equal to 23,404 acre-feet per year, is actually contracted to Lyondell-Citgo Refining WWP. This water is used for refinery processes by LCR as well as 16,733 acre-feet/year of steam-electric demand by a customer of LCR. Attempts were made to contact LCR regarding how this water is used, which user receives the water first, and which portion of the water is reused between the two users. Lyondell-Citgo was unable to provide any information regarding this use pattern and, therefore, the total sum of water has been shown in the shortage analysis and the table above with COH as the provider.

Irrigation Supplies

BRAZORIA COUNTY

Brazoria County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
CBWC	67,247	67,247	67,247	67,247	67,247	67,247	67,247
Individual Water Rights	10,529	10,529	10,529	10,529	10,529	10,529	10,529

The CBWC supply is provided from the amount of Water Right 3461105357A remaining after contractual commitments to Amoco Chemical and the entirety of 3461205322B. As CBWC average annual contracts actually exceed the amount of this firm supply, it was assumed that the sum of these rights would be allocated to irrigation in the San Jacinto-Brazos River Basin. The water supply listed as individual water rights consists of the firm water rights within each basin. It was assumed that this water was used for agriculture within the source basin.

CHAMBERS COUNTY

Chambers County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
CLCND	10,000	10,000	10,000	10,000	10,000	10,000	10,000
LNVA	33,300	33,300	33,300	33,300	33,300	33,300	33,300
TRA	17,309	16,818	16,552	16,370	16,170	15,941	15,669
Individual Water Rights	23,995	23,995	23,995	23,995	23,995	23,995	23,995

The CLCND amount represents the volume of water provided to Devers Canal customers in the Neches-Trinity River Basin by the CLCND. The LNVA amount is the sum of annual

irrigation contracts to individuals in the Neches-Trinity River Basin. The water supplied by TRA represents the amount contributed to the Devers Canal system, split between Chambers and Liberty Counties according to irrigation surface demand in the basins served by the canal. In Chambers County, this water was only provided to the Neches-Trinity River Basin. Individual water rights for irrigation were assumed to be applied within the basin from which they originated.

FORT BEND COUNTY

Fort Bend County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
CBWC	5,625	5,625	5,625	5,625	5,625	5,625	5,625
GCWA	1,098	1,098	1,098	1,098	1,098	1,098	1,098
Texas Genco	20,944	20,944	20,944	20,944	20,944	20,944	20,944

The irrigation from CBWC represents the contract between the Brazos River Authority to the South Texas Water Company, a portion of the Chocolate Bayou Water Company. The entirety of this amount was allocated to the Brazos River Basin. The GCWA supply represents the adjusted contract amounts between GCWA and several irrigators in the San Jacinto-Brazos River Basin. The supply from Texas Genco represents the firm irrigation supply from the Brazos River Basin contracted to Richmond Irrigation. It was assumed that this entire amount was used within the Brazos River Basin. The balance of this water right was allocated to steam-electric in the Brazos basin.

GALVESTON COUNTY

Galveston County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
GCWA	109	109	109	109	109	109	109

The GCWA allocated amounts equal the contracted volume of water to irrigation users in Galveston County.

HARRIS COUNTY

Harris County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
SJRA	738	738	738	738	738	738	738
Individual Water Rights	1,254	1,254	1,254	1,254	1,254	1,254	1,254

The SJRA amount is equal to the current irrigation contracts between SJRA and customers in Harris County. It was assumed that these annual contracts ran perpetually and that they served irrigation demands in the San Jacinto River Basin.

LIBERTY COUNTY

Liberty County irrigation allocations are tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
COH	33,000	33,000	33,000	33,000	33,000	33,000	33,000
Devers Canal	2,500	2,500	2,500	2,500	2,500	2,500	2,500
LNVA	19,700	19,700	19,700	19,700	19,700	19,700	19,700
TRA	10,191	10,682	10,948	11,130	11,130	11,559	11,831

The COH supply was purchased from the Dayton Canal Irrigation Company and is assumed to be provided to irrigators within the Trinity River River Basin. The Devers Canal irrigation supply listed above is from a water right from the Trinity River and was split between the basins served by the Devers Canal system based on demand. The LNVA amount is the sum of the authority's contracts to individual farmers, assumed to be located in the Neches-Trinity River Basin. The volume of water provided to irrigation by TRA is Liberty County's share of the TRA contribution to the Devers Canal system. The water rights available to irrigation in Liberty County were allocated to the basin in which the supply originated.

MONTGOMERY COUNTY

Montgomery County irrigation allocation is tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
SJRA	497	497	497	497	497	497	497

The SJRA amount is the sum of water contracts between SJRA and irrigators in Montgomery County. These year to year contracts were assumed to be renewed through 2060.

POLK COUNTY

Polk County irrigation allocation is tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
TRA	20	20	20	20	20	20	20

The TRA amount allocated is the sum of contracts to Memorial Point Townhouse Association and Fountain Lake Townhouse Association. These users represent minor irrigators and, therefore, no irrigation demand is shown for Polk County and this supply is not shown in *Table 3G.1*.

SAN JACINTO COUNTY

San Jacinto County irrigation allocation is tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
TRA	175	175	175	175	175	175	175

The TRA amount allocated is the sum of two contracts between Royal Pines and Waterwood National Resort and TRA.

TRINITY COUNTY

Trinity County irrigation allocation is tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
TRA	270	270	270	270	270	270	270

The TRA amount allocated is a lump sum of contracts between several water recipients and TRA. The sum of these contracts, 270 acre-feet per year, is the sum of all the individual irrigation amount contracts in Trinity County.

WALKER COUNTY

Walker County irrigation allocation is tabulated below.

Irrigator	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
TRA	10	10	10	10	10	10	10

The TRA amount represents the irrigation contracts between the authority and irrigators in Walker County, Trinity River Basin.

Mining Supplies

FORT BEND COUNTY

Fort Bend County mining supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
BRA	1,100	1,100	1,100	1,100	1,100	1,100	1,100
GCWA	822	822	822	822	822	822	822

The BRA portion is contracted to CSB materials and provides for mining in the Brazos River Basin. The GCWA contract provides water to Texas Brine in the San Jacinto-Brazos River Basin.

Steam-Electric Supplies

CHAMBERS COUNTY

Chambers County steam-electric supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
Texas Genco	30,000	30,000	30,000	30,000	30,000	30,000	30,000

The portion shown above is provided through Water Right 3460903926 from Cedar Bayou owned by Texas Genco.

FORT BEND COUNTY

Fort Bend County steam-electric supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
Texas Genco	126,276	126,276	126,276	126,276	126,276	126,276	126,276

The sum of supplies represents two individual rights owned by Texas Genco for use in the Brazos River Basin (Water Rights 3461205320 and 3461205325) and a contract from BRA for 83,000 acre-feet per year.

GALVESTON COUNTY

Galveston County steam-electric supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
GCWA	8,405	8,405	8,405	8,405	8,405	8,405	8,405

The GCWA portion represents the sum of two contracts to steam-electric WUGs in the San Jacinto-Brazos River Basin. These contracts have been adjusted according to the procedures outlined above to limit GCWA contracts to available supplies.

HARRIS COUNTY

Harris County steam-electric supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
COH	14,367	14,367	14,367	14,367	14,367	14,367	14,367
Individual Water Rights	2,120	2,120	2,120	2,120	2,120	2,120	2,120

The COH supply is provided to two steam-electric WUGS in the San Jacinto River Basin. Water Right 3461105350 from Clear Creek is assumed to be used by Texas Genco for use in power generation.

MONTGOMERY COUNTY

Montgomery County steam-electric supplies are allocated below:

Provider	2000 ac-ft/yr	2010 ac-ft/yr	2020 ac-ft/yr	2030 ac-ft/yr	2040 ac-ft/yr	2050 ac-ft/yr	2060 ac-ft/yr
SJRA	4,996	4,996	4,996	4,996	4,996	4,996	4,996

The SJRA supply from Lake Conroe provides water to Entergy for steam-electric use.

3.4.2 Wholesale Water Providers

The resources available to Region H through Wholesale Water Providers (WWPs) are listed in *Appendix 3H* in *Table 3H.1*. This list was compiled with the use of the TCEQ Water Rights Database, WAM and GAM results, contract information and clarifications received directly from the WWPs, and the allocation of groundwater resources shown above.

For the sake of this study, water supplies from the CWA have been included with the data for COH. Similarly, water provided by the Trinity County Regional Water Supply System,

Huntsville Regional Water Supply System, and Livingston Regional Water Supply System have been listed as TRA as these providers are operated by TRA.

The groundwater supplies shown in *Table 3H.1* represent the groundwater supplied to a WUG by the WWP and not groundwater used by a WUG from its own wells. These amounts of groundwater are generally the available supply as determined by the groundwater allocation method described above. However, COH was known to provide specified amounts of groundwater to its contract customers. Therefore, for the COH WWP, the available supply of groundwater is equal to the groundwater supplied to the Houston WUG plus the sum of groundwater contracts to customers. The groundwater available to NCWA is equal to the sum of groundwater allocated to its customers as it was assumed that NCWA is the only source of water for these customers. Galveston County WCID 1 was allocated the groundwater associated with Dickinson as part of its available supply. The Woodlands is provided water by SJRA, and the groundwater that was available to The Woodlands was assumed to originate from SJRA. Finally, NHCRWA, the City of Pasadena, WHCRWA, and the City of Huntsville were allocated the groundwater associated with each of the WUGs by the same name.

The volume of WWP supplies available to individual WUGs was determined through contract information from the WWPs, previous records, and further clarification from both the providers and customers. Where it was not possible to determine specific contract amounts to each WUG, other methods were used to approximate the supply to each WUG as described above in the groundwater and surface water allocation sections.

The 2060 supplies available to each WWP are shown below in Table 3-14**.** Wholesale Water Providers that receive water from another WWP through contractual transfer are listed below the original provider.

The surface water supplies are summarized by county, basin and category of use in Table 3-15. The current surface water supplies are summarized by category of water use by basin by WWP in *Table 3H.2.*

Table 3-14: Summary of Supplies Available to Region H Wholesale Water Providers in 2060

Wholesale Water Provider*	Available Supplies (acre-feet)		
	Contracts**	Groundwater	Surface Rights
Brazos River Authority[1]			138,913
Dow Chemical Company	16,000		148,061
Gulf Coast Water Authority[2]	32,668		175,035
Chocolate Bayou Water Company[3]	19,560		81,412
Galveston County WCID 1[4]	4,643	370	
Texas Genco[5]	84,925		90,751
Brazosport Water Authority			23,017
Chambers-Liberty Counties Navigation District[6]			79,020
Fort Bend County WCID 1			6,890
City of Houston[7]		86,619	1,217,348
Baytown Area Water Authority	13,326		
Clear Lake City Water Authority[8]	26,876		
La Porte Area Water Authority	8,735		
Lyondell-Citgo Refining	23,404		
North Channel Water Authority[9]	6,682	3,120	
North Harris County Regional Water Authority	34,714	21,565	
City of Pasadena[10]	33,035	2,993	
West Harris County Regional Water Authority	20,437	12,049	
Lower Neches Valley Authority[11]			60,727
San Jacinto River Authority[12]		7,859	181,206
Trinity River Authority			403,200
City of Huntsville	11,202	5,269	

*WWPs that provide water through contract to other WWPs are shown with the customer WWPs listed below the sellers.

**Water received under contract from another WWP.

[1] Demands represent contractual agreements to Region H customers only. Supply quantities are for the amount of water currently contracted to Region H customers by BRA.

[2] GCWA contracts exceed available firm yield supplies. For the purpose of the shortage analysis, contracts were prorated to not exceed supplies.

[3] CBWC manufacturing and average irrigation sales exceed firm supplies. For the purpose of the shortage analysis, it was assumed that irrigation contracts would be reduced. CBWC receives water through a contract with both BRA and GCWA.

[4] Supplies include GCWA contract and maximum amount of groundwater allowed for Dickinson per HGCSD regulations.

[5] Demands include contractual demands to Richmond Irrigation and Brazos Valley Energy, as well as the entire portion of the GCWA contract, which is assumed to be used by Texas Genco. Actual demands may be greater but are overall split among supply sources since actual data is unavailable.

[6] CLCND supply includes rights from Lake Anahuac, less 30,000 acre-feet sold to SJRA.

[7] Groundwater supply includes the portion of groundwater provided to Houston after prorating available, restricted supplies to WUGs, plus groundwater contracted to other WWPs. Demands include contracts to BAWA, CLCWA, LPAWA, Lyondell-Citgo, NCWA, NHCRWA, Pasadena, and WHCRWA WWPs. Surface water rights for COH include 33,000 acre-feet purchased from the Dayton Canal Irrigation Company; it is allocated entirely to irrigation demands in Liberty County.

[8] Assumes all water remaining after contracts is provided to Clear Lake (Houston WUG).

[9] NCWA groundwater supply estimated from the 2003-2004 ratio of groundwater to contract water. Demands were assumed to equal supplies.

[10] Includes total Pasadena demands, less the portion met by CLCWA.

[11] Demands represent contractual agreements to Region H customers only. Supply quantities are for the entire Rayburn-Steinhagen system and do not represent the portion available to Region H.

[12] Includes water demands and available groundwater supplied to The Woodlands. The 2060 groundwater supply shown above is the least amount of groundwater available throughout the planning periods. Also includes 14,944 acre-feet of permitted indirect reuse.

Table 3-15: Surface Water Supply by Categories of Water Use in Each County and Basin

			Available Supplies (acre-feet)						
County	Basin	Use	Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060
Austin	Colorado	Livestock	48	52	56	58	59	60	61
Brazoria	Brazos	Municipal	258	433	459	443	432	422	414
		Manufacturing	164,348	250,477	250,477	276,477	276,476	311,781	317,401
		Mining	190	398	398	398	398	398	398
		Irrigation	2,300	3,430	3,430	3,430	3,430	3,430	3,430
		Livestock	184	220	228	232	235	236	238
	Brazos - Colorado	Municipal	478	3,119	3,119	3,119	3,119	3,119	3,119
		Manufacturing	12,019	12,019	12,019	12,019	12,019	12,019	12,019
		Mining	1,124	1,412	1,561	1,679	1,797	1,943	2,093
		Irrigation	0	1,971	1,971	1,971	1,971	1,971	1,971
		Livestock	196	200	202	206	210	217	225
	San Jacinto - Brazos	Municipal	19,789	33,380	34,252	39,776	39,913	39,931	39,946
		Manufacturing	46,635	46,634	46,634	57,284	57,285	57,305	57,285
		Mining	305	750	750	750	750	750	750
		Irrigation	75,476	86,094	86,094	86,094	86,094	86,094	86,094
		Livestock	610	545	505	547	591	643	690
Chambers	Neches - Trinity	Municipal	3,112	3,159	3,159	3,158	3,159	3,157	3,158
		Mining	505	778	778	778	778	778	778
		Irrigation	82,311	81,820	81,554	81,372	81,172	80,943	80,671
		Livestock	317	317	317	317	317	317	318
	Trinity	Municipal	1,288	2,970	2,970	2,971	2,970	2,972	2,971
		Mining	18,989	30,539	30,539	30,539	30,539	30,539	30,539
		Irrigation	0	22,059	22,059	22,059	22,059	22,059	22,059
		Livestock	49	50	50	50	50	51	51
	Trinity - San Jacinto	Municipal	520	1,673	1,721	1,762	1,793	1,824	1,853
		Manufacturing	0	13,445	13,445	13,445	13,445	13,445	13,445
		Mining	4,722	8,558	8,558	8,558	8,558	8,558	8,558
		Irrigation	2,293	2,293	2,293	2,293	2,293	2,293	2,293
		Steam Electric	30,000	30,000	30,000	30,000	30,000	30,000	30,000
		Livestock	46	48	49	51	52	53	54
Fort Bend	Brazos	Municipal	14,306	39,130	38,213	52,645	52,642	66,636	66,632
		Manufacturing	0	1,140	1,140	1,140	1,140	1,140	1,140
		Mining	1,100	1,100	1,100	1,100	1,100	1,100	1,100
		Irrigation	26,569	26,569	26,569	26,569	26,569	26,569	26,569
		Steam Electric	120,687	120,687	120,687	120,687	120,687	120,687	120,687
		Livestock	0	0	207	415	415	415	415
	San Jacinto	Municipal	4,336	24,212	27,795	55,475	56,424	59,159	60,608
		Manufacturing	0	1,550	1,550	1,550	1,550	1,550	1,550
		Mining	8	202	202	202	202	202	202
		Livestock	2	13	30	47	47	47	47
	San Jacinto - Brazos	Municipal	29,821	39,668	40,941	57,108	57,647	78,838	79,777
		Manufacturing	1,000	2,969	2,969	2,969	2,969	2,969	2,969
		Mining	822	1,482	1,482	1,482	1,482	1,482	1,482
		Irrigation	1,098	1,098	1,098	1,098	1,098	1,098	1,098
		Livestock	46	64	98	139	139	139	139

Table 3-15: Surface Water Supply by Categories of Water Use in Each County and Basin (Continued)

			Available Supplies (acre-feet)						
County	Basin	Use	Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060
Galveston	Neches - Trinity	Municipal	5,039	5,039	5,039	5,039	5,039	5,039	5,039
		Mining	106	122	129	132	135	139	142
	San Jacinto - Brazos	Municipal	71,429	75,864	76,330	76,943	76,972	76,974	76,960
		Manufacturing	62,284	62,284	62,284	62,284	62,284	90,284	90,284
		Mining	101	134	134	134	134	134	134
		Irrigation	109	7,860	7,526	6,981	6,978	6,994	7,021
		Steam Electric	8,405	8,405	8,405	8,405	8,405	8,405	8,405
		Livestock	296	306	296	280	280	280	281
Harris	San Jacinto	Municipal	301,644	414,858	641,098	688,748	736,778	823,560	877,931
		Manufacturing	364,506	364,506	431,706	431,734	431,743	431,748	431,746
		Mining	992	1,258	1,771	1,771	1,771	1,771	1,771
		Irrigation	738	738	738	738	738	738	738
		Steam Electric	14,367	14,367	31,062	31,062	31,062	43,662	43,662
		Livestock	0	324	666	803	803	803	803
	San Jacinto - Brazos	Municipal	59,463	59,271	60,488	62,065	63,870	65,871	68,090
		Manufacturing	57,391	60,226	71,652	71,624	71,615	74,081	74,083
		Mining	19	34	34	34	34	34	34
		Steam Electric	2,120	2,120	2,120	2,120	2,120	2,395	2,395
		Livestock	82	82	82	82	82	82	82
	Trinity - San Jacinto	Municipal	12,680	12,639	12,593	12,555	12,526	12,497	12,470
		Manufacturing	42,972	75,298	89,318	89,318	89,318	89,318	89,318
		Irrigation	1,254	1,254	1,254	1,254	1,254	1,254	1,254
		Livestock	73	73	73	73	73	73	73
Liberty	Neches	Irrigation	2,500	2,500	2,500	2,500	2,500	2,500	2,500
		Livestock	45	45	45	45	45	45	70
	Neches - Trinity	Irrigation	19,348	20,269	20,228	20,199	20,170	20,134	19,593
	Trinity	Irrigation	43,543	47,113	47,420	47,631	47,860	48,125	48,438
	Trinity - San Jacinto	Irrigation	685	12,185	12,185	12,185	12,185	12,185	9,685
		Livestock	0	0	0	0	0	0	17
Montgomery	San Jacinto	Municipal	0	44,735	79,547	129,636	129,750	129,915	130,120
		Manufacturing	0	2,442	2,442	2,442	2,442	2,442	2,442
		Mining	0	413	413	413	413	413	413
		Irrigation	497	497	497	497	497	497	497
		Steam Electric	4,996	4,996	4,996	4,996	11,881	11,881	11,881
		Livestock	510	510	510	510	510	510	510
Polk	Trinity	Municipal	6,279	6,279	6,280	6,281	6,281	6,282	6,282

Table 3-15: Surface Water Supply by Categories of Water Use in Each County and Basin (Continued)

			Available Supplies (acre-feet)						
County	Basin	Use	Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060
San Jacinto	Trinity	Municipal	840	840	840	840	840	840	840
		Irrigation	175	675	675	675	675	675	675
Trinity	Trinity	Municipal	4,970	4,995	5,016	5,016	5,000	4,980	4,965
		Irrigation	270	270	270	270	270	270	270
		Livestock	211	211	211	211	211	211	211
Waller	Brazos	Livestock	232	232	232	232	232	242	277
Waller	San Jacinto	Municipal	0	111	111	111	111	111	111
		Livestock	90	90	90	90	90	102	107
Walker	San Jacinto	Municipal	0	0	352	2,881	2,124	2,279	2,555
		Livestock	0	0	1	12	8	9	11
	Trinity	Municipal	11,242	11,244	10,894	8,365	9,121	8,966	8,690
		Irrigation	10	10	10	10	10	10	10
		Livestock	71	106	127	138	143	148	154

Appendix 3A

Region H Available Supplies

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Table 3A.1
Current Water Supply Sources

Source Name	Source Type	Source RWPG	Source Basin	Source County	Basin ID	County ID	Source ID	Water Supply (acre-feet/year)						
								2000	2010	2020	2030	2040	2050	2060
LIVINGSTON-WALLISVILLE LAKE/RESERVOIR - COH	00	H	TRINITY	RESERVOIR	08		08400	940,800	940,800	940,800	940,800	940,800	940,800	940,800
HOUSTON LAKE/RESERVOIR	00	H	SAN JACINTO	RESERVOIR	10		10030	168,000	168,000	168,000	168,000	168,000	168,000	168,000
LEWIS CREEK LAKE/RESERVOIR	00	H	SAN JACINTO	RESERVOIR	10		10050	0	0	0	0	0	0	0
BRAZOS RIVER COMBINED RUN-OF-RIVER	00	H	BRAZOS	RESERVOIR	12		3412010	171,193	171,193	171,193	171,193	171,193	171,193	171,193
LIVESTOCK LOCAL SUPPLY	00	H	NECHES	RESERVOIR	06		99706999	45	45	45	45	45	45	70
LIVESTOCK LOCAL SUPPLY	00	H	NECHES-TRINITY	RESERVOIR	07		99707999	317	317	317	317	317	317	318
LIVESTOCK LOCAL SUPPLY	00	H	TRINITY	RESERVOIR	08		99708999	331	367	388	399	404	410	416
LIVESTOCK LOCAL SUPPLY	00	H	TRINITY-SAN JACINTO	RESERVOIR	09		99709999	119	121	122	124	125	126	144
LIVESTOCK LOCAL SUPPLY	00	H	SAN JACINTO	RESERVOIR	10		99710999	602	937	1,297	1,462	1,458	1,471	1,478
LIVESTOCK LOCAL SUPPLY	00	H	SAN JACINTO-BRAZOS	RESERVOIR	11		99711999	1,035	998	991	1,057	1,099	1,150	1,196
LIVESTOCK LOCAL SUPPLY	00	H	BRAZOS	RESERVOIR	12		99712999	593	729	983	1,218	1,241	1,273	1,328
LIVESTOCK LOCAL SUPPLY	00	H	BRAZOS-COLORADO	RESERVOIR	13		99713999	196	200	202	206	210	217	225
LIVESTOCK LOCAL SUPPLY	00	H	COLORADO	RESERVOIR	14		99714999	48	52	56	58	59	60	61
OTHER LOCAL SUPPLY	00	H	NECHES-TRINITY	GALVESTON	07	084	99907084	106	122	129	132	135	139	142
OTHER LOCAL SUPPLY	00	H	SAN JACINTO	HARRIS	10	101	99910101	992	1,258	1,407	1,500	1,593	1,688	1,771
OTHER LOCAL SUPPLY	00	H	SAN JACINTO-BRAZOS	RESERVOIR	11		99911999	120	140	350	791	819	842	865
OTHER LOCAL SUPPLY	00	H	BRAZOS-COLORADO	FORT BEND	13	079	99913079	0	0	0	0	0	0	0
OTHER LOCAL SUPPLY	00	H	BRAZOS-COLORADO	BRAZORIA	13	020	99999901	1,124	1,412	1,561	1,679	1,797	1,943	2,093
OTHER LOCAL SUPPLY	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	99999902	484	533	551	627	708	803	895
OTHER LOCAL SUPPLY	00	H	TRINITY	CHAMBERS	08	036	99999903	18,989	23,333	25,483	26,805	28,105	29,400	30,539
OTHER LOCAL SUPPLY	00	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	99999904	4,722	5,982	6,590	7,098	7,599	8,091	8,558
OTHER LOCAL SUPPLY	00	H	BRAZOS	FORT BEND	12	079	99999905	0	0	0	0	0	0	0
OTHER LOCAL SUPPLY	00	H	SAN JACINTO	FORT BEND	10	079	99999906	8	51	122	194	197	200	202
OTHER LOCAL SUPPLY	00	H	SAN JACINTO	MONTGOMERY	10	170	99999907	0	78	191	259	314	367	412
OTHER LOCAL SUPPLY	00	H	NECHES-TRINITY	CHAMBERS	07	036	99999908	505	609	660	691	721	751	778
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	BRAZORIA	12	020	3411201549	0	0	0	0	0	0	0
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	3460704287	2,528	2,528	2,528	2,528	2,528	2,528	2,528
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	3460704293	1,626	1,626	1,626	1,626	1,626	1,626	1,626
TRINITY RIVER RUN-OF-RIVER	00	H	TRINITY	POLK	08	187	3460804261	26,510	26,510	26,510	26,510	26,510	26,510	26,510
TRINITY RIVER RUN-OF-RIVER	00	H	TRINITY	LIBERTY	08	146	3460804277	33,000	33,000	33,000	33,000	33,000	33,000	33,000
TRINITY RIVER RUN-OF-RIVER	00	H	TRINITY	CHAMBERS	08	036	3460804279	109,020	109,020	109,020	109,020	109,020	109,020	109,020
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	3460903926	30,000	30,000	30,000	30,000	30,000	30,000	30,000
SAN JACINTO RIVER RUN-OF-RIVER	00	H	SAN JACINTO	HARRIS	10	101	3461004964	55,000	55,000	55,000	55,000	55,000	55,000	55,000
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	HARRIS	11	101	3461105350	2,120	2,120	2,120	2,120	2,120	2,120	2,120
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	FORT BEND	12	079	3461205320	29,920	29,920	29,920	29,920	29,920	29,920	29,920
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	FORT BEND	12	079	3461205325	34,300	34,300	34,300	34,300	34,300	34,300	34,300
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	BRAZORIA	12	020	3461205366	23,017	23,017	23,017	23,017	23,017	23,017	23,017
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	BRAZORIA	12	020	3461205492	1,800	1,800	1,800	1,800	1,800	1,800	1,800
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704290WR	1,069	1,069	1,069	1,069	1,069	1,069	1,069
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704291WR	1,078	1,078	1,078	1,078	1,078	1,078	1,078
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704295WR	1,205	1,205	1,205	1,205	1,205	1,205	1,205
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704299WR	1,173	1,173	1,173	1,173	1,173	1,173	1,173
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704306WR	1,818	1,818	1,818	1,818	1,818	1,818	1,818
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10704311WR	2,093	2,093	2,093	2,093	2,093	2,093	2,093
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	10705016WR	901	901	901	901	901	901	901
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	1114201WR	558	558	558	558	558	558	558
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	1114216WR	1,025	1,025	1,025	1,025	1,025	1,025	1,025
TRINITY RIVER RUN-OF-RIVER	00	H	TRINITY	LIBERTY	08	146	3410805271A	2,500	2,500	2,500	2,500	2,500	2,500	2,500
TRINITY RIVER RUN-OF-RIVER	00	H	TRINITY	LIBERTY	08	146	3410805271B	56,000	56,000	56,000	56,000	56,000	56,000	56,000
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	3460704304B	1,997	1,997	1,997	1,997	1,997	1,997	1,997
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	3461105357A	17,600	17,600	17,600	17,600	17,600	17,600	17,600
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	3461105357B	0	0	0	0	0	0	0
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	3461105357C	0	0	0	0	0	0	0
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	FORT BEND	12	079	3461205322B	63,812	63,812	63,812	63,812	63,812	63,812	63,812
BRAZOS RIVER RUN-OF-RIVER	00	H	BRAZOS	BRAZORIA	12	020	3461205328B	148,061	148,061	148,061	148,061	148,061	148,061	148,061
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704294WR	573	573	573	573	573	573	573
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704300WR	805	805	805	805	805	805	805
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704304WR	2,663	2,663	2,663	2,663	2,663	2,663	2,663
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704308WR	771	771	771	771	771	771	771
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704309WR	711	711	711	711	711	711	711
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704312WR	691	691	691	691	691	691	691
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	CHAMBERS	07	036	60704449WR	551	551	551	551	551	551	551

Table 3A.1
Current Water Supply Sources

Source Name	Source Type	Source RWPG	Source Basin	Source County	Basin ID	County ID	Source ID	Water Supply (acre-feet/year)						
								2000	2010	2020	2030	2040	2050	2060
NECHES-TRINITY RIVER RUN-OF-RIVER	00	H	NECHES-TRINITY	LIBERTY	07	146	60704460WR	956	956	956	956	956	956	956
LIVINGSTON-WALLISVILLE LAKE/RESERVOIR - TRA	00	H	TRINITY	RESERVOIR	08		60804248WR	403,200	403,200	403,200	403,200	403,200	403,200	403,200
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	LIBERTY	09	146	60903903WR	685	685	685	685	685	685	685
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	60903918WR	1,084	1,084	1,084	1,084	1,084	1,084	1,084
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	HARRIS	09	101	60903922WR	628	628	628	628	628	628	628
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	HARRIS	09	101	60903923WR	626	626	626	626	626	626	626
TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	00	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	60903924WR	1,209	1,209	1,209	1,209	1,209	1,209	1,209
CONROE LAKE/RESERVOIR - COH	00	H	SAN JACINTO	MONTGOMERY	10	170	61004963AWR	53,394	52,668	51,942	51,216	50,490	49,764	49,038
CONROE LAKE/RESERVOIR - SJRA	00	H	SAN JACINTO	MONTGOMERY	10	170	61004963BWR	27,506	27,132	26,758	26,384	26,010	25,636	25,262
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	6115169AWR	2,539	2,539	2,539	2,539	2,539	2,539	2,539
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	6115169BWR	1,303	1,303	1,303	1,303	1,303	1,303	1,303
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	6115170WR	6,890	6,890	6,890	6,890	6,890	6,890	6,890
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	6115343WR	711	711	711	711	711	711	711
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	6115344WR	962	962	962	962	962	962	962
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	6115346WR	1,360	1,360	1,360	1,360	1,360	1,360	1,360
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	6115352WR	3,347	3,347	3,347	3,347	3,347	3,347	3,347
SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	00	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	6115364WR	766	766	766	766	766	766	766
SAN BERNARD RIVER RUN-OF-RIVER	00	H	BRAZOS-COLORADO	BRAZORIA	13	020	61303421WR	8,519	8,519	8,519	8,519	8,519	8,519	8,519
SAN BERNARD RIVER RUN-OF-RIVER	00	H	BRAZOS-COLORADO	BRAZORIA	13	020	61303423WR	3,500	3,500	3,500	3,500	3,500	3,500	3,500
BRAZOS RIVER ALLUVIUM AQUIFER	01	H	BRAZOS	AUSTIN	12	008	00805	8,607	8,607	8,607	8,607	8,607	8,607	8,607
GULF COAST AQUIFER	01	H	BRAZOS	AUSTIN	12	008	00815	9,668	9,668	9,668	9,668	9,668	9,668	9,668
GULF COAST AQUIFER	01	H	BRAZOS-COLORADO	AUSTIN	13	008	00815	11,200	11,200	11,200	11,200	11,200	11,200	11,200
GULF COAST AQUIFER	01	H	COLORADO	AUSTIN	14	008	00815	46	46	46	46	46	46	46
GULF COAST AQUIFER	01	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	02015	35,904	35,904	35,904	35,904	35,904	35,904	35,904
GULF COAST AQUIFER	01	H	BRAZOS	BRAZORIA	12	020	02015	7,192	7,192	7,192	7,192	7,192	7,192	7,192
GULF COAST AQUIFER	01	H	BRAZOS-COLORADO	BRAZORIA	13	020	02015	7,304	7,304	7,304	7,304	7,304	7,304	7,304
UNDIFFERENTIATED AQUIFER	01	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	02022	167	167	167	167	167	167	167
GULF COAST AQUIFER	01	H	NECHES-TRINITY	CHAMBERS	07	036	03615	3,990	3,990	3,990	3,990	3,990	3,990	3,990
GULF COAST AQUIFER	01	H	TRINITY	CHAMBERS	08	036	03615	10,806	10,806	10,806	10,806	10,806	10,806	10,806
GULF COAST AQUIFER	01	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	03615	8,205	8,205	8,205	8,205	8,205	8,205	8,205
BRAZOS RIVER ALLUVIUM AQUIFER	01	H	BRAZOS	FORT BEND	12	079	07905	23,452	23,452	23,452	23,452	23,452	23,452	23,452
GULF COAST AQUIFER	01	H	SAN JACINTO	FORT BEND	10	079	07915	22,240	23,609	22,533	18,605	18,605	18,605	18,605
GULF COAST AQUIFER - UNREGULATED SUPPLY	01	H	SAN JACINTO	FORT BEND	10	079	07915	226	1,378	1,387	1,350	1,350	1,350	1,350
GULF COAST AQUIFER	01	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	07915	30,623	32,976	31,128	24,375	24,375	24,375	24,375
GULF COAST AQUIFER - UNREGULATED SUPPLY	01	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	07915	1,065	1,909	1,438	1,224	1,224	1,224	1,224
GULF COAST AQUIFER	01	H	BRAZOS	FORT BEND	12	079	07915	31,492	33,493	31,921	26,179	26,179	26,179	26,179
GULF COAST AQUIFER - UNREGULATED SUPPLY	01	H	BRAZOS	FORT BEND	12	079	07915	270	336	422	567	682	834	1,011
GULF COAST AQUIFER	01	H	BRAZOS-COLORADO	FORT BEND	13	079	07915	24,955	26,649	25,320	20,459	20,459	20,459	20,459
GULF COAST AQUIFER	01	H	NECHES-TRINITY	GALVESTON	07	084	08415	335	322	355	396	424	450	450
GULF COAST AQUIFER	01	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	08415	4,973	4,784	5,269	5,878	5,850	5,824	5,824
GULF COAST AQUIFER	01	H	TRINITY-SAN JACINTO	HARRIS	09	101	10115	23,250	19,945	16,617	12,894	12,894	12,894	12,894
GULF COAST AQUIFER	01	H	SAN JACINTO	HARRIS	10	101	10115	332,008	287,678	244,635	188,271	188,271	188,271	188,271
GULF COAST AQUIFER - UNREGULATED SUPPLY	01	H	SAN JACINTO	HARRIS	10	101	10115	0	0	0	1,454	1,454	1,454	1,454
GULF COAST AQUIFER	01	H	SAN JACINTO-BRAZOS	HARRIS	11	101	10115	38,817	33,309	27,744	21,535	21,535	21,535	21,535
CARRIZO-WILCOX AQUIFER	01	H	TRINITY	LEON	08	145	14510	5,206	5,402	5,092	4,973	4,921	4,934	4,937
CARRIZO-WILCOX AQUIFER	01	H	BRAZOS	LEON	12	145	14510	1,459	862	636	632	628	624	621
QUEEN CITY AQUIFER	01	H	TRINITY	LEON	08	145	14524	4,860	4,860	4,860	4,860	4,860	4,860	4,860
QUEEN CITY AQUIFER	01	H	BRAZOS	LEON	12	145	14524	201	201	201	201	201	201	201
SPARTA AQUIFER	01	H	TRINITY	LEON	08	145	14527	6,895	6,895	6,895	6,895	6,895	6,895	6,895
SPARTA AQUIFER	01	H	BRAZOS	LEON	12	145	14527	497	497	497	497	497	497	497
GULF COAST AQUIFER	01	H	NECHES	LIBERTY	06	146	14615	4,414	4,414	4,414	4,414	4,414	4,414	4,414
GULF COAST AQUIFER	01	H	NECHES-TRINITY	LIBERTY	07	146	14615	444	444	444	444	444	444	444
GULF COAST AQUIFER	01	H	TRINITY	LIBERTY	08	146	14615	21,857	21,857	21,857	21,857	21,857	21,857	21,857
GULF COAST AQUIFER	01	H	TRINITY-SAN JACINTO	LIBERTY	09	146	14615	9,619	9,619	9,619	9,619	9,619	9,619	9,619
GULF COAST AQUIFER	01	H	SAN JACINTO	LIBERTY	10	146	14615	6,887	6,887	6,887	6,887	6,887	6,887	6,887
CARRIZO-WILCOX AQUIFER	01	H	TRINITY	MADISON	08	157	15710	1,227	1,279	1,361	1,438	1,422	1,389	1,389
CARRIZO-WILCOX AQUIFER	01	H	BRAZOS	MADISON	12	157	15710	506	408	287	171	129	129	129
UNDIFFERENTIATED AQUIFER	01	H	TRINITY	MADISON	08	157	15722	334	334	334	334	334	334	334
QUEEN CITY AQUIFER	01	H	TRINITY	MADISON	08	157	15724	2,625	2,625	2,625	2,625	2,625	2,625	2,625
QUEEN CITY AQUIFER	01	H	BRAZOS	MADISON	12	157	15724	145	145	145	145	145	145	145
SPARTA AQUIFER	01	H	TRINITY	MADISON	08	157	15727	7,576	7,576	7,576	7,576	7,576	7,576	7,576
SPARTA AQUIFER	01	H	BRAZOS	MADISON	12	157	15727	441	441	441	441	441	441	441
GULF COAST AQUIFER	01	H	SAN JACINTO	MONTGOMERY	10	170	17015	64,000	64,000	64,000	64,000	64,000	64,000	64,000

Table 3A.1
Current Water Supply Sources

Source Name	Source Type	Source RWPG	Source Basin	Source County	Basin ID	County ID	Source ID	Water Supply (acre-feet/year)						
								2000	2010	2020	2030	2040	2050	2060
GULF COAST AQUIFER	01	H	TRINITY	POLK	08	187	18715	19,117	19,117	19,117	19,117	19,117	19,117	19,117
GULF COAST AQUIFER	01	H	TRINITY	SAN JACINTO	08	204	20415	9,863	9,863	9,863	9,863	9,863	9,863	9,863
GULF COAST AQUIFER	01	H	SAN JACINTO	SAN JACINTO	10	204	20415	12,006	12,006	12,006	12,006	12,006	12,006	12,006
CARRIZO-WILCOX AQUIFER	01	H	TRINITY	TRINITY	08	228	22810	249	249	249	249	241	241	241
GULF COAST AQUIFER	01	H	TRINITY	TRINITY	08	228	22815	3,714	3,714	3,714	3,714	3,714	3,714	3,714
UNDIFFERENTIATED AQUIFER	01	H	TRINITY	TRINITY	08	228	22822	416	416	416	416	416	416	416
SPARTA AQUIFER	01	H	TRINITY	TRINITY	08	228	22827	245	245	245	245	245	245	245
CARRIZO-WILCOX AQUIFER	01	H	TRINITY	WALKER	08	236	23610	2,293	2,293	2,293	2,293	2,293	2,293	2,293
GULF COAST AQUIFER	01	H	TRINITY	WALKER	08	236	23615	5,845	5,845	5,845	5,845	5,845	5,845	5,845
GULF COAST AQUIFER	01	H	SAN JACINTO	WALKER	10	236	23615	12,434	12,434	12,434	12,434	12,434	12,434	12,434
UNDIFFERENTIATED AQUIFER	01	H	TRINITY	WALKER	08	236	23622	200	200	200	200	200	200	200
QUEEN CITY AQUIFER	01	H	TRINITY	WALKER	08	236	23624	75	75	75	75	75	75	75
SPARTA AQUIFER	01	H	TRINITY	WALKER	08	236	23627	1,760	1,760	1,760	1,760	1,760	1,760	1,760
YEGUA-JACKSON AQUIFER	01	H	TRINITY	WALKER	08	236	236YJ	5,440	5,440	5,440	5,440	5,440	5,440	5,440
YEGUA-JACKSON AQUIFER	01	H	SAN JACINTO	WALKER	10	236	236YJ	960	960	960	960	960	960	960
BRAZOS RIVER ALLUVIUM AQUIFER	01	H	BRAZOS	WALLER	12	237	23705	9,480	9,480	9,480	9,480	9,480	9,480	9,480
GULF COAST AQUIFER	01	H	SAN JACINTO	WALLER	10	237	23715	13,086	13,086	13,086	13,086	13,086	13,086	13,086
GULF COAST AQUIFER	01	H	BRAZOS	WALLER	12	237	23715	15,416	15,416	15,416	15,416	15,416	15,416	15,416
SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	02	I	NECHES	RESERVOIR	06		060A0	820,000	820,000	820,000	820,000	820,000	820,000	820,000
BRAZOS RIVER AUTHORITY SYSTEM	02	G	BRAZOS	RESERVOIR	12		120B0	736,106	727,228	718,350	709,472	700,594	691,717	691,717

Appendix 3B

WRAP Input Files

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Appendix 3B

Water Availability Model Input Files

These input files are used with the Water Rights Analysis Package (WRAP) available from the TCEQ or the Texas Water Resources Institute at Texas A&M University.

Basin	File Name(s)	Notes
Neches-Trinity	NT3.dat .dis .eva .inf	1, 2
Trinity	T3y00ana.dat .dis .eva .inf T3y60ana.dat .dis .eva .inf Liv00rf.dat .dis .eva .inf Liv60rf.dat .dis .eva .inf	3
Trinity-San Jacinto	TSJ3.dat .dis .eva .inf	1, 2
San Jacinto	SJ3y2000.dat .dis .eva .inf SJ3y2060.dat .dis .eva .inf	
San Jacinto-Brazos	B2000CB.dat .dis .eva .inf	4
Brazos	B2000.dat .dis .eva .inf B2060.dat .dis .eva .inf	
Brazos-Colorado	CO3Rev2a.dat .dis .eva .inf	2, 5

1. The original TCEQ WAM file was used without modification.
2. A 2060 condition model was not required for this basin. There are no on-channel reservoirs in the coastal basin to be affected by sedimentation.
3. Firm yield models for Lake Livingston and Lake Anahuac, using updated area-capacity curves. The Lake Livingston model also includes partial return flows from the upper basin (approximately 200,000 ac-ft/yr).
4. The San Jacinto-Brazos basin is included in the Brazos basin WAM. The B2000CB file allows the Chocolate Bayou Water Co. water right to use off-channel reservoirs.
5. The Brazos-Colorado basin is included in the Colorado basin WAM

Model files are provided electronically (attached CD). These files may be viewed using a text editor such as Notepad or Wordpad. All four files are required to run the WRAP simulation. The file extensions indicate the type of data included in the file:

- Root.dat Basic file containing all input data, except the hydrology related data in the following files.
- Root.inf Inflow records with naturalized streamflows
- Root.eva Evaporation records with net evaporation-precipitation rates
- Root.dis Flow distribution and watershed parameter records for transferring flows from the inflow records to other control points

Additional model runs were conducted for the San Jacinto Basin to determine the firm yield of Lakes Conroe and Houston. In these models, the diversion amount for a given reservoir is adjusted downward until a value is determined that can be reliably diverted in every year of the simulation. This is an iterative process that balances available run-of-river supply and stored water with monthly diversion targets. These models are included in subfolders in this appendix.

Appendix 3C

Region H Drought Contingency Plans

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Major Water Provider Drought Triggers

MWP	Drought Type	Trigger Condition			Time requirement	Actions	
BRA		**Local Reservoirs**	**System Reservoirs**			**Local Reservoirs**	**System Reservoirs**
	Watch	Storage <= 50% of capacity and could fall below 40% within 12 months	Storage <= 75% of capacity and could fall below 60% within 12 months		Condition lasts 30 consecutive days	Notify customers, activate conservation plans, activate storage in Federal reservoirs	Redefine system reservoirs as local, modify maint. sched, develop drought contingency plan
	Warning	Storage <= 40% of capacity and could fall below 30% within 12 months	Storage <= 60% of capacity and could fall below 30% within 12 months		Condition lasts 30 consecutive days	Notify customers, activate conservation plans, activate storage in Federal reservoirs	Redefine system reservoirs as local, modify maint. sched, develop drought contingency plan
	Emergency	Storage <= 30% of capacity	Storage <= 30% of capacity		Condition lasts 30 consecutive days	Additional actions as deemed apporopriate	Additional actions as deemed apporopriate
GCWA		**Brazos River - Hempstead Gauge**	**Brazos River - Richmond Gauge**				
	Mild	14.00 ft or 2200 cfs	12.19 ft or 1700 cfs		Condition ceases for 30 consec. days	Notify BRA, monitor situation daily	
	Moderate	13.71 ft or 2000 cfs	11.93 ft or 1500 cfs		Condition ceases for 30 consec. days	Alert customers, increase maintenance	
	Watch	13.41 ft or 1800 cfs	11.65 ft or 1300 cfs		Condition ceases for 30 consec. days	Request stored water releases, if needed	
	Warning	12.93 ft or 1500 cfs	11.23 ft or 1000 cfs		Condition ceases for 30 consec. days	Request stored water releases	
	Emergency	GCWA delivery or storage system outage, or extreme fire flows (industrial) that temporarily interrupts service to customers.			Until condition corrected	Notify customers, minimize service interruptions while making repairs	
Houston		**Lakes Conroe, Houston & Livingston**	**Municipal water demand / production**	**Municipal water distribution system**			
	Mild	Combined storage = 24 months surface water supply	Average production = 80% of combined surface and ground water capacity	Average system pressure is 45 psi	Condition lasts 10 consecutive days	Inform the public and request voluntary reductions	

Major Water Provider Drought Triggers

MWP	Drought Type	Trigger Condition			Time requirement	Actions	
	Serious	Combined storage = 18 months surface water supply	Average production = 85% of combined surface and ground water capacity	Average system pressure is 40 psi	Condition lasts 10 consecutive days	Ban non-essential outdoor use and listed water waste	
	Critical	Combined storage = 12 months surface water supply	Average production = 90% of combined surface and ground water capacity	Average System pressure is 35 psi	Condition lasts 10 consecutive days	Ban all outdoor use and listed water waste	
SJRA		**Lake Conroe**	**Woodlands GW System**			**Lake Conroe**	**GW System**
	Mild	Elev < 194 ft (70% capacity)	Plant operator's call based on usage and weather		Condition ceases for 7 days	Request voluntary conservation	Voluntary conservation, increased leak repair
	Moderate	Elev < 190 ft (55% capacity)	Combined pumpage > 85% of capacity for 3 days, or 90% of capacity for 1 day, or 95% of 1 plant for 3 days, or storage does not recover to 70% capacity overnight		Condition ceases for 7 days	Weekly customer meetings, mandatory conservation	Odd/even watering cycle, cease fountains and non-fire hydrant use
	Severe	Elev < 185 ft (40% capacity)	Combined pumpage > 90% of capacity for 3 days, or 95% of capacity for 1 day, or 95% of 1 plant for 3 days, or storage does not recover to 50% capacity overnight		Condition ceases for 7 days	Additional mandatory or pro-rata use reductions, look for alternate sources	2-day watering cycle, ban other outdoor use, reduce system pressure during peak periods
	Critical	Delivery system failure or supply contamination	Delivery system failure or supply contamination		Until condition corrected	Inform customers, make specific response based on situation	Ban all uses but for health and safety, isolate elevated storage for fire reserve
TRA		**Huntsville RWSS**	**Livingston RWSS**	**Trinity County RWSS**			
	Mild	Demand > 6 MGD for 30 days	Demand > 2 MGD for 15 days	Wellfield or plant capacity <1000 gpm, or use 5% > allocation	Condition ceases to exist for 5 days	Voluntary reductions, monthly updates	
	Moderate	Demand > 7 MGD for 20 days	Demand > 2.25 MGD for 10 days	Wellfield or plant capacity <850 gpm, or use 15% > allocation	Condition ceases to exist for 5 days	Ban non-esential use, prep pro-rata reduction plan	
	Severe	Demand > 7.5 MGD for 10 days	Demand > 2.5 MGD for 5 days	Wellfield or plant capacity <700 gpm, or use 25% > allocation	Condition ceases to exist for 5 days	Initiate pro-rata reduction plan	
	Emergency	Major system failure (>50% of delivery capacity lost) or supply contamination	Major system failure (>50% of delivery capacity lost) or supply contamination	Major system failure (>50% of delivery capacity lost) or supply contamination	Until condition corrected	Inform customers, make specific response based on situation	

Major Water Provider Drought Triggers

MWP	Drought Type	Trigger Condition			Time requirement	Actions	
TRA		**Lake Livingston / Wallisville System**					
	Mild	Lake Livingston elev < 126.50 ft at USGS gage			Condition ceases to exist for 5 days	Modify gate operations, voluntary reductions, monthly updates	
	Moderate	Lake Livingston elev < 124.00 ft at USGS gage			Condition ceases to exist for 5 days	No new contracts, initiate mandatory reductions and pro-rata curtailments	
	Severe	Lake Livingston elev < 121.40 ft at USGS gage			Condition ceases to exist for 5 days	Terminate supply to low-priority customers, additional mandatory reductions	
	Emergency	Major system failure (>50% of delivery capacity lost) or supply contamination			Until condition corrected	Inform customers, make specific response based on situation	

Source-Specific Drought Triggers
Established by Major Water Providers

Water Source	Drought Type	Trigger Condition	Time Requirement		Established By	Actions
			Initiation	Termination		
Trinity River						
Lake Livingston	Mild	Combined storage (Lakes Livingston, Conroe & Houston) is less than 24 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Inform the public and request voluntary reductions
	Serious	Combined storage (Lakes Livingston, Conroe & Houston) is less than 18 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Ban non-essential outdoor use and listed water waste
	Severe	Combined storage (Lakes Livingston, Conroe & Houston) is less than 12 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Ban all outdoor use and listed water waste
Lake Livingston / Wallisville System	Mild	Lake Livingston elev < 126.50 ft at USGS gage	Condition exists for one day	Condition ceases to exist for 5 days	TRA	Modify gate operations, voluntary reductions, monthly updates
	Moderate	Lake Livingston elev < 124.00 ft at USGS gage	Condition exists for one day	Condition ceases to exist for 5 days	TRA	No new contracts, initiate mandatory reductions and pro-rata curtailments
	Severe	Lake Livingston elev < 121.40 ft at USGS gage	Condition exists for one day	Condition ceases to exist for 5 days	TRA	Terminate supply to low-priority customers, additional mandatory reductions

Source-Specific Drought Triggers
Established by Major Water Providers

Water Source	Drought Type	Trigger Condition	Time Requirement		Established By	Actions
			Initiation	Termination		
San Jacinto River						
Lake Conroe	Mild	Elev < 194 ft (70% of storage capacity)	Condition exists for one day	Condition ceases for 7 days	SJRA	Request voluntary conservation
	Moderate	Elev < 190 ft (55% of storage capacity)	Condition exists for one day	Condition ceases for 7 days	SJRA	Weekly customer meetings, mandatory conservation
	Severe	Elev < 185 ft (40% of storage capacity)	Condition exists for one day	Condition ceases for 7 days	SJRA	Additional mandatory or pro-rata use reductions, look for alternate sources
Lake Houston	Mild	Combined storage (Lakes Livingston, Conroe & Houston) is less than 24 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Inform the public and request voluntary reductions
	Serious	Combined storage (Lakes Livingston, Conroe & Houston) is less than 18 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Ban non-essential outdoor use and listed water waste
	Severe	Combined storage (Lakes Livingston, Conroe & Houston) is less than 12 months surface water supply	Condition exists 10 consecutive days	Condition ceases for 30 consecutive days	Houston	Ban all outdoor use and listed water waste

Source-Specific Drought Triggers
Established by Major Water Providers

Water Source	Drought Type	Trigger Condition	Time Requirement		Established By	Actions
			Initiation	Termination		
Brazos River						
Hempstead Gauge	Mild	14.00 ft or 2200 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Notify BRA, monitor situation daily
	Moderate	13.71 ft or 2000 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Alert customers, increase maintenance
	Watch	13.41 ft or 1800 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Request stored water releases, if needed
	Warning	12.93 ft or 1500 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Request stored water releases
Richmond Gauge	Mild	12.19 ft or 1700 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Notify BRA, monitor situation daily
	Moderate	11.93 ft or 1500 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Alert customers, increase maintenance
	Watch	11.65 ft or 1300 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Request stored water releases, if needed
	Warning	11.23 ft or 1000 cfs	Condition exists for one day	Condition ceases for 30 consec. days	GCWA	Request stored water releases
BRA Local Reservoirs	Watch	Storage <= 50% of capacity and could fall below 40% within 12 months	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Notify customers, activate conservation plans, activate storage in Federal reservoirs
	Warning	Storage <= 40% of capacity and could fall below 30% within 12 months	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Notify customers, activate conservation plans, activate storage in Federal reservoirs
	Emergency	Storage <= 30% of capacity	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Additional actions as deemed apporopriate
BRA System Reservoirs	Watch	Storage <= 75% of capacity and could fall below 60% within 12 months	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Redefine system reservoirs as local, modify maint. sched, develop drought contingency plan
	Warning	Storage <= 60% of capacity and could fall below 30% within 12 months	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Redefine system reservoirs as local, modify maint. sched, develop drought contingency plan
	Emergency	Storage <= 30% of capacity	Condition exists for one day	Condition ceases for 30 consecutive days	BRA	Additional actions as deemed apporopriate

Source-Specific Drought Triggers
Established by Major Water Providers

Water Source	Drought Type	Trigger Condition	Time Requirement		Established By	Actions
			Initiation	Termination		
Gulf Coast Aquifer	Local triggers based on pumping/delivery system limits, not aquifer levels.					
Carrizo-Wilcox Aquifer	Local triggers based on pumping/delivery system limits, not aquifer levels.					
Sparta Aquifer	Local triggers based on pumping/delivery system limits, not aquifer levels.					
Queen City Aquifer	Local triggers based on pumping/delivery system limits, not aquifer levels.					
Brazos River Alluvium	Local triggers based on pumping/delivery system limits, not aquifer levels.					

Appendix 3D

Potential Reservoir Sites

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Appendix 3D
Previously Studied Potential Reservoir Sites

LARGE RESERVOIR SITES (OVER 50,000 ACRE-FEET)								
Reservoir / River Basin	Yield, Acre-Feet	Reference	Recommended Project in the 2002 Texas State Water Plan	Recommended Unique Site in the 2002 Texas State Water Plan	Original Cost at Dam, Million $	Reference	Comments	Reference
Allens Creek Brazos Basin	99,650	10	Yes	No (see comments)	$169.0 in 1997	6	This project has been designated as a unique reservoir site by the Texas Legislature. A water right permit has been granted to the BRA and City of Houston. Detailed design and environmental studies are on-going.	
	70,000	7			$143.3 in 1995	5		
Bedias Trinity Basin	90,732	4	Yes	Yes	$50.7 in 1975	12	Some endangered species have been identified. There are 24,675 acres lost of which 7,328 acres of bottomland hardwoods and 15,327 units of wildlife habitats are lost. Included in Region C Water Plan for TRA.	3
	70,705	2			$50.8 in 1975	7		
	84,370	1					Site is listed in the Trinity River Basin Master Plan.	11
Cleveland San Jacinto Basin	65,900		No	No	$76.5 in 1975	7	Some endangered species have been identified. There are 11,485 acres lost of which 2,330 acres of bottomland hardwoods and 4,845 units of wildlife habitats are lost. Alternative site in the 1997 Texas Water Plan.	3
(Lower) Lake Creek San Jacinto Basin	53,767	4	No	No	$65.5 in 1975	7	Some endangered species have been identified. There are 10,904 acres lost of which 2,200 acres of bottomland hardwoods and 6,195 units of wildlife habitats are lost. Site is listed in COH Master Plan.	3, 4
	67,213	12			$275.0 in 1990	12		
	73,012	2						
Little River Brazos Basin	129,000	8	Yes	Yes			Also included in Brazos G Regional Water Plan.	9
Millican/Panther Creek Brazos Basin	252,032	4	No	No	$318.0 in 1971	7	Some endangered species have been identified. There are 63,410 acres lost of which 26,730 acres of bottomland hardwoods and 29,323 units of wildlife habitats are lost. Reservoir site also included in Brazos G Regional Water Plan.	3, 9
	248,600	2						
	252,225	12						
	235,200	8						
Millican/Bundic Crossing Brazos Basin	73,800	8	No	No			Formerly called Millican-Peach Creek. The site contains a large lignite deposit. Also included in Brazos G Regional Water Plan.	9
Tehuacana Trinity Basin	282,500	12	No	Yes	$156.0 in 1995	5	A few endangered species have been identified. There are 14,804 acres lost of which 6,993 acres of bottomland hardwoods and 9,093 units of wildlife habitats are lost. This site contains a lignite deposit. Site is listed in the Trinity River Basin Master Plan and Region C Water Plan.	3, 9, 11
	61,068	1						
	68,300	5						

Appendix 3D
Previously Studied Potential Reservoir Sites

Tennessee Colony Trinity Basin	405,492	4	No	No	$509.0 in 1970	6	This project is large enough to be a regional water source possibility. Some endangered species have been identified. There are 85,053 acres lost of which 34,767 acres of bottomland hardwoods and 43,031 units of wildlife habitats are lost. A large lignite deposit is also on site. Site is listed in the Trinity River Basin Master Plan. The water rights are seior to Livingston rights and would impact current available supply.	3, 11
	405,802	12						
	997,112	5						
SMALLER RESERVOIR SITES (UNDER 50,000 ACRE-FEET)								
Reservoir/ River Basin	Yield, Acre-Feet	Reference	Recommended Project in the 2002 Texas State Water Plan	Recommended Unique Site in the 2002 Texas State Water Plan	Original Cost at Dam, Million $	Reference	Comments	Reference
Big Elkhart Creek Trinity Basin	12,320	11	No	No	N/A		Site is listed in the Trinity River Basin Master Plan.	11
Caney Trinity Basin	15,694	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	25,880	4						
Gail Creek Trinity Basin	19,040	11	No	No	N/A		Site is listed in the Trinity River Basin Master Plan.	11
Harmons Trinity Basin	10,089	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	11,809	1						
Humble San Jacinto Basin	N/A		No	No	N/A		Alternative site in the 1997 Texas Water Plan. There are 35,800 acres of affected area.	7
Hurricane Trinity Basin	17,936	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	16,546	1						
Liberty	N/A	7	No	No	N/A		Capers Ridge site from 1956 TRA Master Plan. Site now permitted for the Luce Bayou Pump station	11
Long King Trinity Basin	20,178	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	34,869	1						
Lower Keechie Trinity Basin	25,783	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	28,513	1						
Mustang Trinity Basin	15,694	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	24,890	1						
Navasota Brazos Basin	N/A				$196 in 1968	7	Original site had 58,180 acres of affected area. This location is now in the tail-water of the proposed Millican-Bundic Crossing Reservoir.	7

Appendix 3D
Previously Studied Potential Reservoir Sites

Nelsons Trinity Basin	17,936	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	8,849	1						
Oak Knoll Brazos Basin	N/A		No	No	N/A		Original site had 4,302 acres of affected area. This location is now in the tail-water of the proposed Millican-Bundic Crossing Reservoir.	7
Spring Creek Lake San Jacinto Basin	7,500		No	No	N/A			7
	26,900	4						
Upper Keechi Trinity Basin	15,694	12	No	No	N/A		Site is listed in the Trinity River Basin Master Plan. Alternative site in the 1997 Texas Water Plan.	11
	16,317	1						
Upper Lake Creek San Jacinto Basin			No	No	N/A		Alternative site in the 1997 Texas Water Plan.	

REFERENCES:

1 1986. Trinity River Yield Study Phase III: Yield Analysis. By Espey, Huston & Associates, Inc.
2 1988. San Jacinto River Authority Water Resources Development Plan-Water Supply Plan, Pate Engineers, Inc.
1990 (Texas Parks & Wildlife Dept.), and (U.S. Fish & Wildlife Service). Texas Water and Wildlife. A Natural Resource Survey for
3 Peoposed Reservoir Sites and Selected Stream Segments in Texas
4 1991. Houston Water Master Plan, Appendix L, Table 2-8, revised by Metcalf & Eddy.
5 1996. Memorandum Report Updated Water Project Opinions of Cost. Freese and Nichols, Inc.
6 1997. Trans-Texas Water Program Southeast Area, Operation Studies and Opinions of Cost for Allens Creek Reservoir Volume I - Text.
7 1997. Water for Texas, A Concensus-Based Update to the State Water Plan, TWDB
8 2001. Brazos G Regional Water Plan
9 2001. Region C Water Plan
10 2001. Region H Water Plan
11 2003. Trinity River Basin Master Plan, Update
12 Additional information collected in 1999 from River Authorities

Appendix 3E

Extracts from TCEQ Report SFR 50/00:

Texas Water Quality Inventory, 2000
Volume 2: Basins 1-11
And Volume 3: Basins 12-25

15th Edition, dated April 2002

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Explanation of Water Quality Indicator Icons Used on the Basin Maps

Basin maps are provided as a quick reference to the general location of classified segments within the basin. Icons are used to indicate the presence of threatened, partially supported, and nonsupported designated uses and water quality concerns.

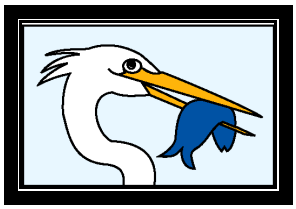
Conceptual Icon

Blue bar identifies segment number

Internal symbol identifies indicator used to assess a use or concern

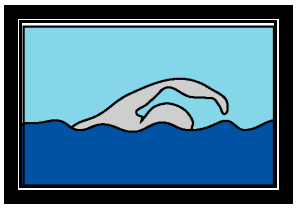
Border color indicates level of use support or presence of water quality concern. Green = threatened use, yellow = partially supported use, red = nonsupported use, and orange = water quality concern.

Icons for Designated Uses



Aquatic Life

A specific subcategory of aquatic life use (exceptional, high, intermediate, limited, or minimal) is assigned to each water body for protection and propagation of desirable fish, benthic macroinvertebrates, and other aquatic biota. Support of the use is determined by four indicators (dissolved oxygen criteria, acute and chronic toxic substances in water criteria, ambient water and sediment toxicity test results, and fish and macrobenthos data).

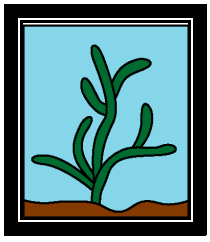


Contact Recreation

The contact recreation use is assigned to water bodies where recreational activities including wading by small children, swimming, water skiing, diving, and surfing commonly occur. Support of the use is determined by bacterial indicators (fecal coliform or *E. coli*).

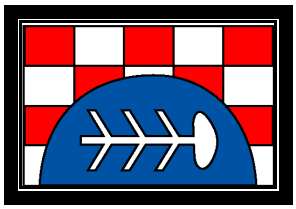
Noncontact Recreation

A noncontact recreation use is primarily assigned to water bodies where ship and barge traffic or other activities make contact recreation unsafe. Recreational activities such as boating that do not involve a significant risk of water ingestion are allowed. Support of the use is determined by bacterial indicators (fecal coliform or *E. coli*).



General Use

Water temperature, pH, chloride, sulfate, total dissolved solids and enterococci bacteria indicators are used to determine support of general water quality, rather than a specific use.

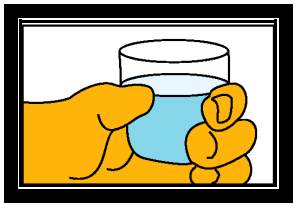


Fish Consumption

The fish consumption use is assigned to all water bodies to ensure that fish and shellfish is safe for human consumption. Support of the use is determined by human health criteria in water (to protect against bioacumulation of toxic substances) and issuance of consumption advisories and aquatic life closures by the Texas Department of Health.

Oyster Waters

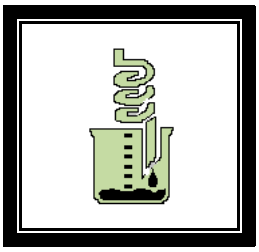
The oyster waters use is assigned to estuarine water bodies that are suitable for harvesting shellfish. Support of the use is determined from maps developed by the Texas Department of Health that depict the classification of shellfish growing areas.



Public Water Supply

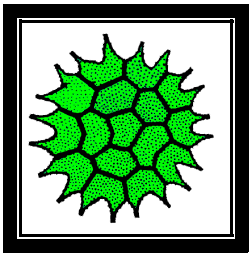
A public water supply use is assigned to all water bodies that are used as a supply for public drinking water. The use is designed to ensure that finished drinking water (after treatment) is safe for consumption. Primary organic substances in finished drinking water is the indicator used to determine support of the use.

Icons for Water Quality Concerns



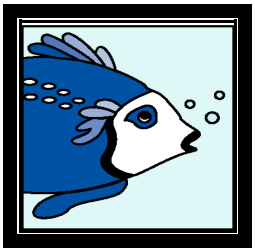
Nutrient Enrichment

Elevated concentrations of nutrients from point and nonpoint sources may contribute to excessive eutrophication in a water body. Nutrient enrichment concerns are determined by four indicators (ammonia and nitrite + nitrate nitrogen, orthophosphorus, and total phosphorus). Statewide 85th percentile concentrations by water body type are used to identify water bodies with nutrient enrichment concerns.



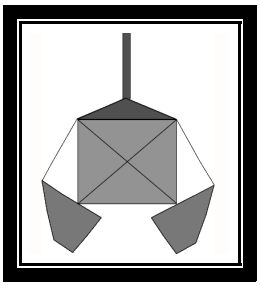
Chlorophyll a

Elevated concentrations of chlorophyll *a* signal potential problems associated with excessive algal growths. Algal blooms may occur in response to elevated nutrient concentrations. Statewide 85th percentile concentrations by water body type are used to identify water bodies with chlorophyll *a* concerns.



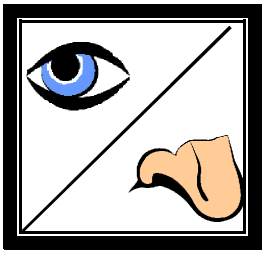
Fish Tissue

Elevated concentrations metals and organic substances in fish tissue signal potential health risks to humans and other organisms that consume fish in their diets. Screening levels slightly below those used by the Texas Department of Health to establish consumption advisories are used to identify fish consumption concerns.



Sediment

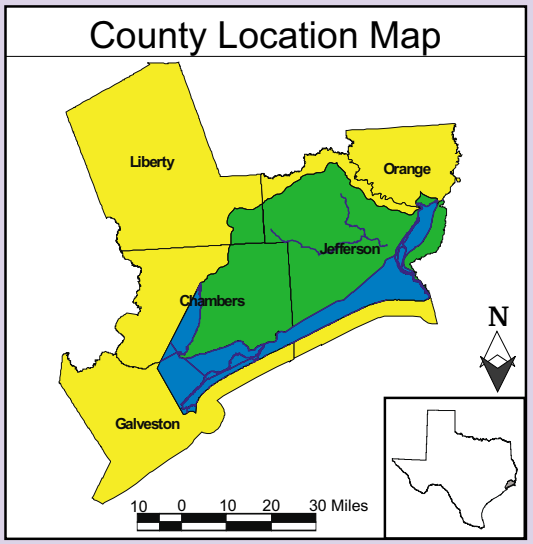
Elevated concentrations of metals and organic substances in sediment may contribute to water quality problems when they are re-suspended by wind activity and spring and fall overturn in deep reservoirs. Metals in sediment may be released into the water column when changes in pH occur near the sediment-water interface. Contaminated sediments may also affect small creatures such as worms, crustaceans, and insect larvae that live directly in the bottoms of water bodies. Statewide 85th percentile concentrations by water body type, threshold effects levels (TELS), and probable effect levels (PELS), are indicators used to identify sediment concerns.

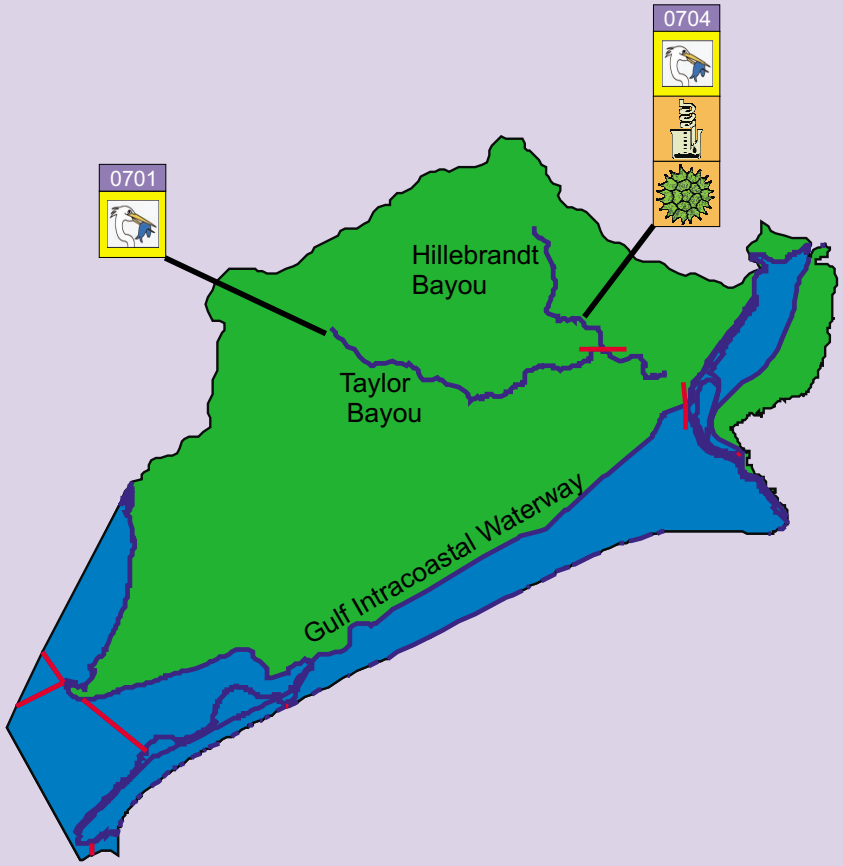


Narrative Criteria

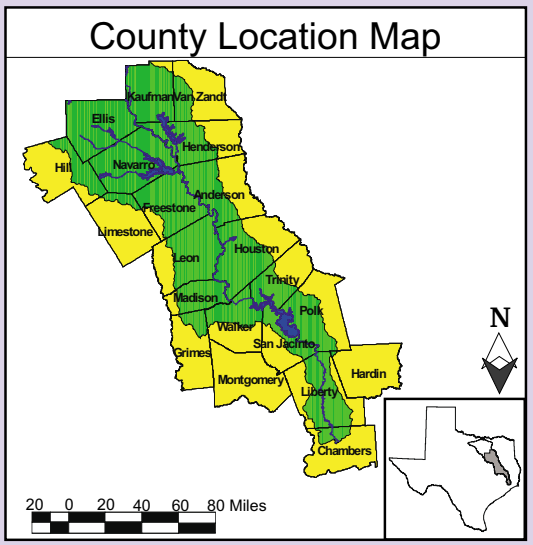
Narrative criteria concerns are identified in water bodies where activities or substances impair taste, odor, color, and other aesthetic qualities.

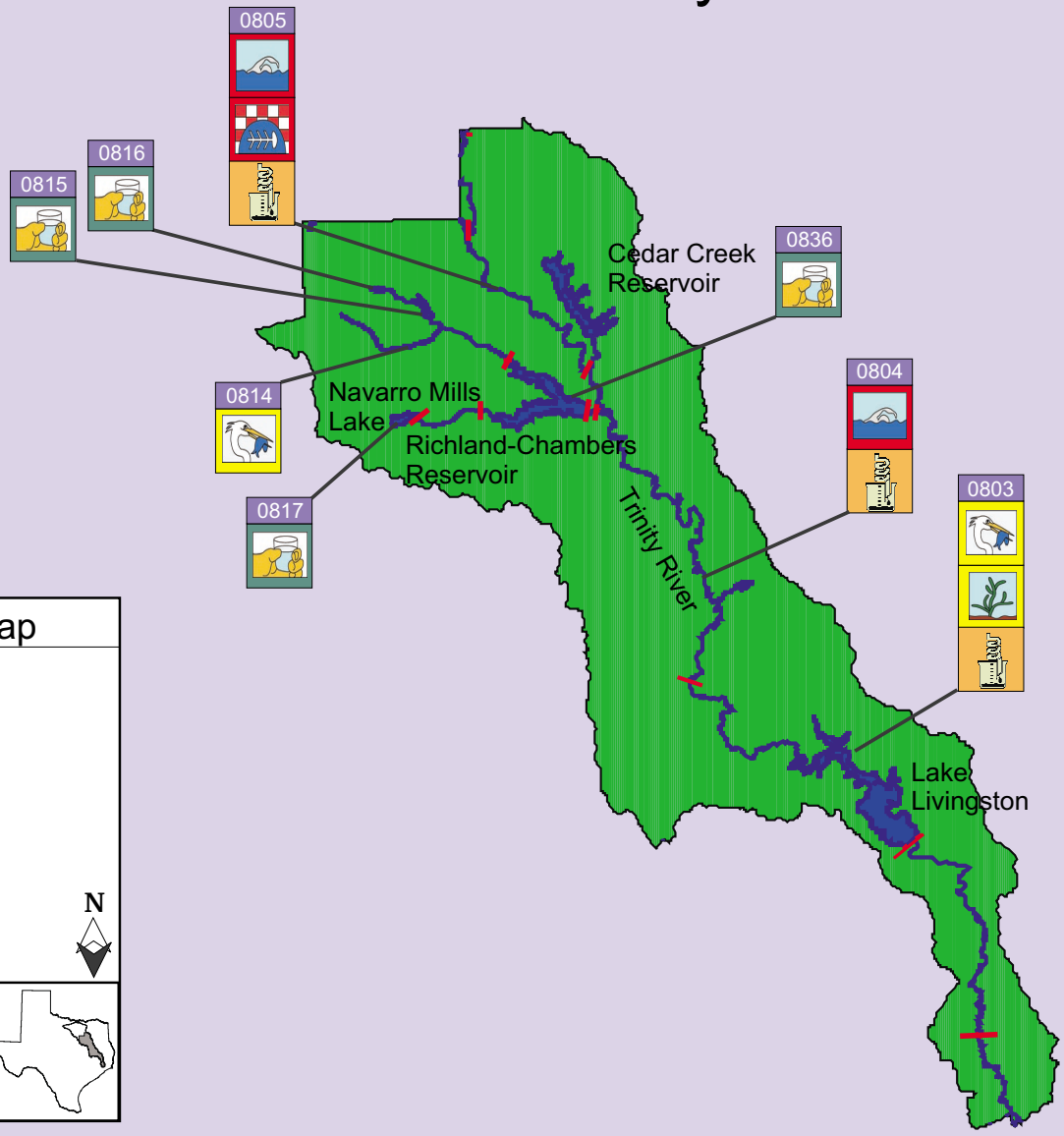
Neches-Trinity Coastal Basin
Identified Water Quality Issues



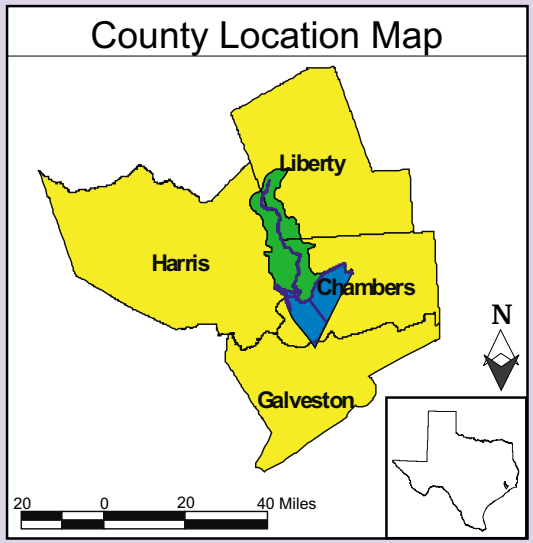


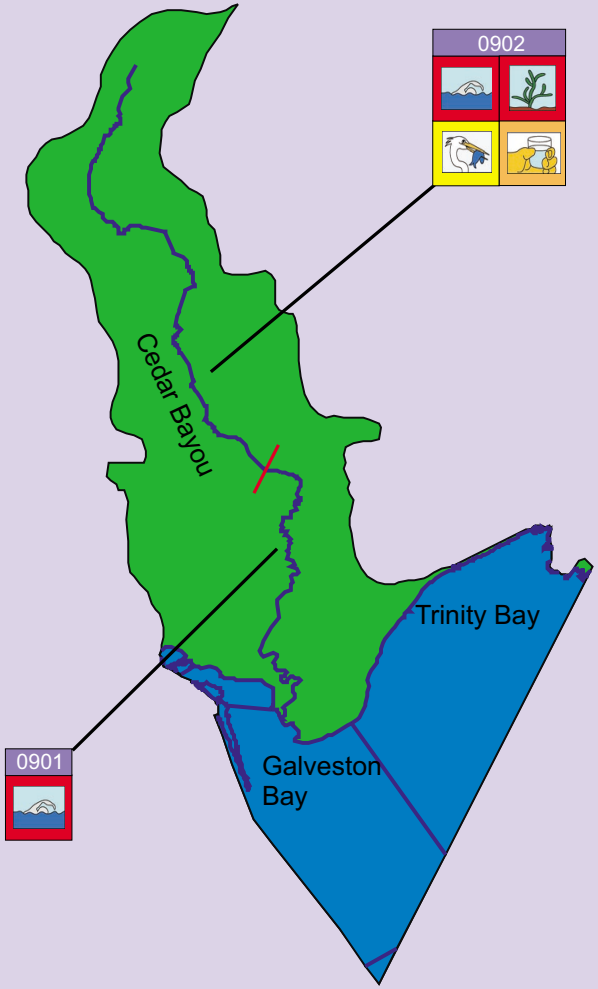
Lower Trinity River Basin
Identified Water Quality Issues



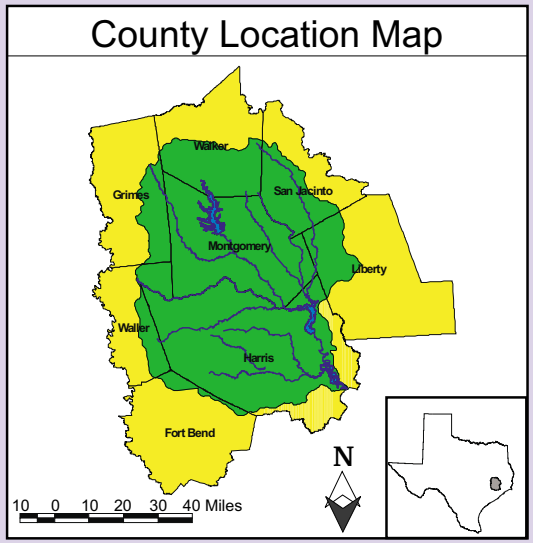


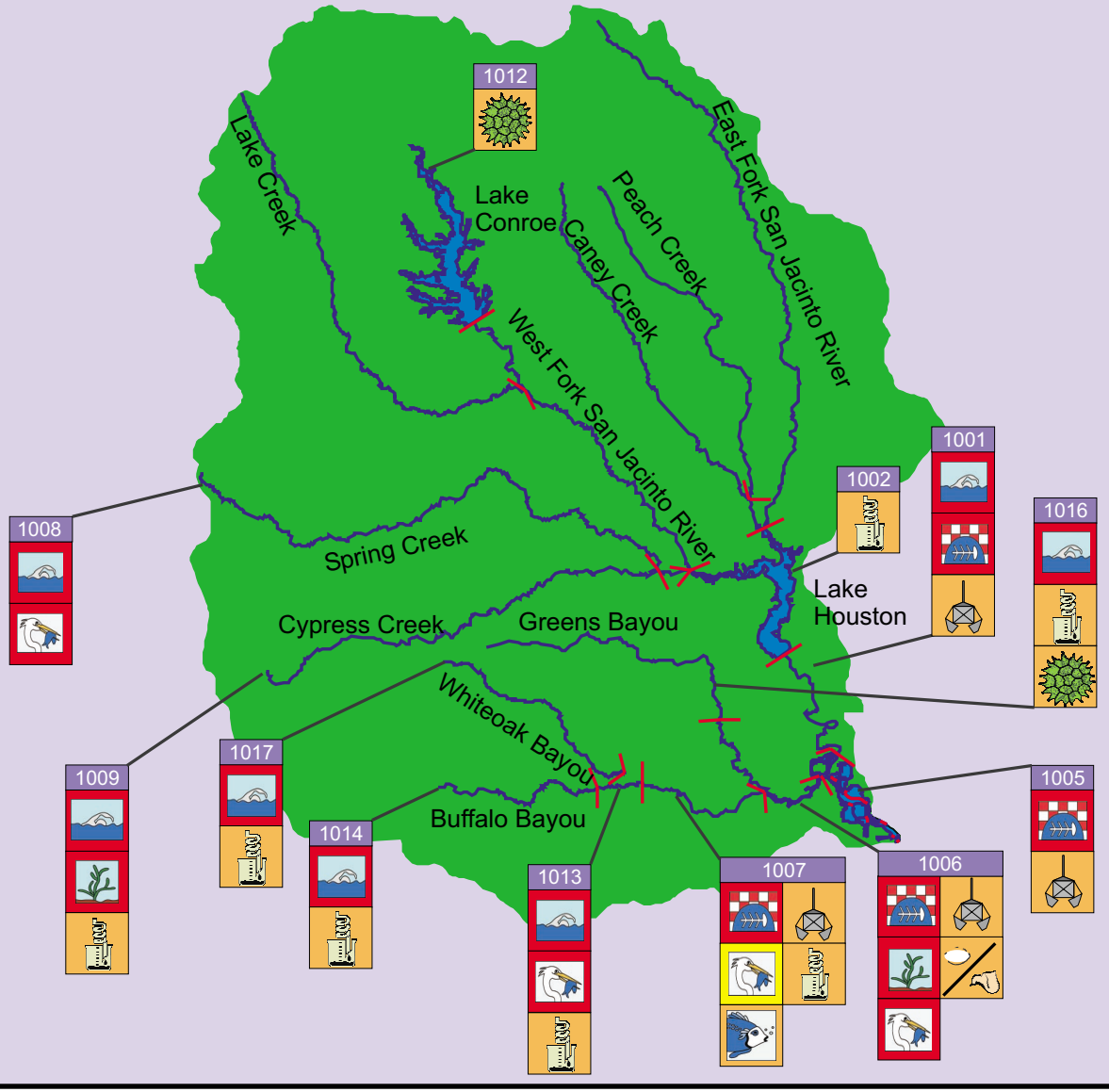
Trinity-San Jacinto Coastal Basin
Identified Water Quality Issues



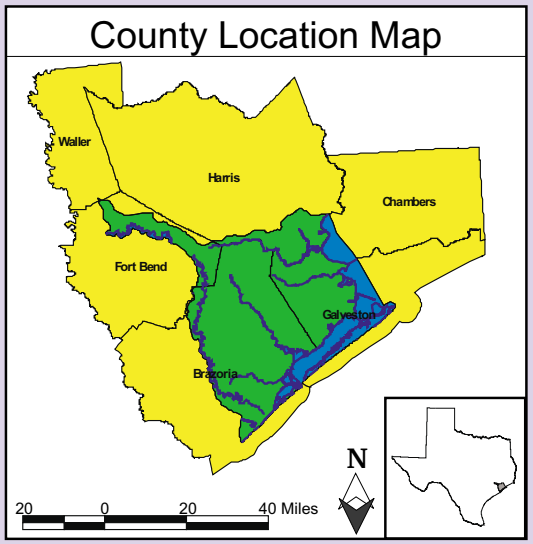


San Jacinto River Basin
Identified Water Quality Issues



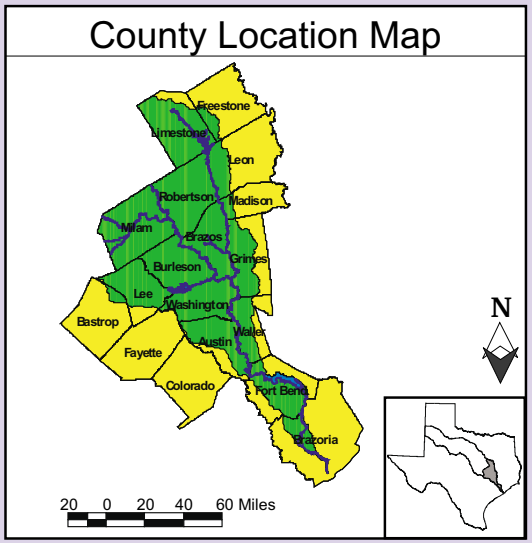


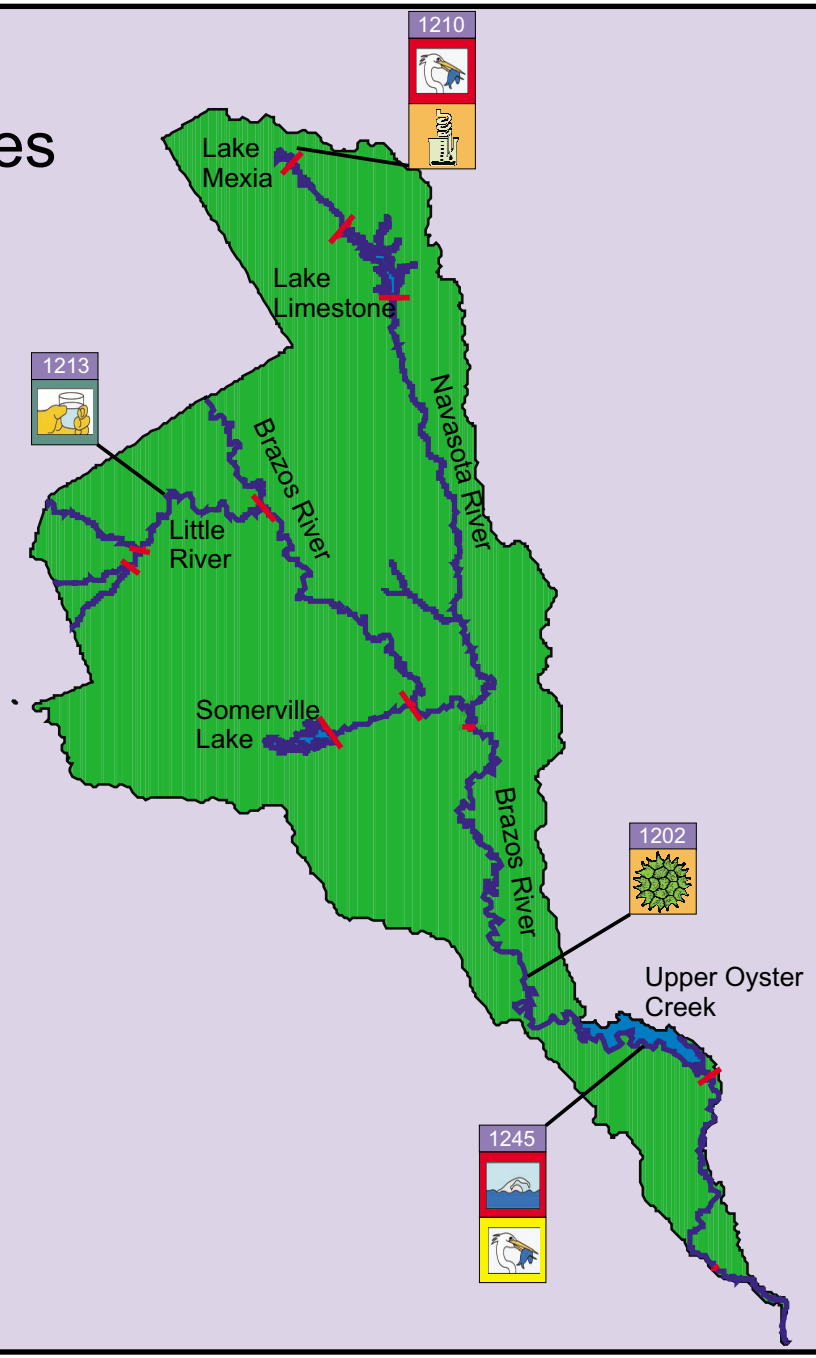
San Jacinto-Brazos Coastal Basin
Identified Water Quality Issues



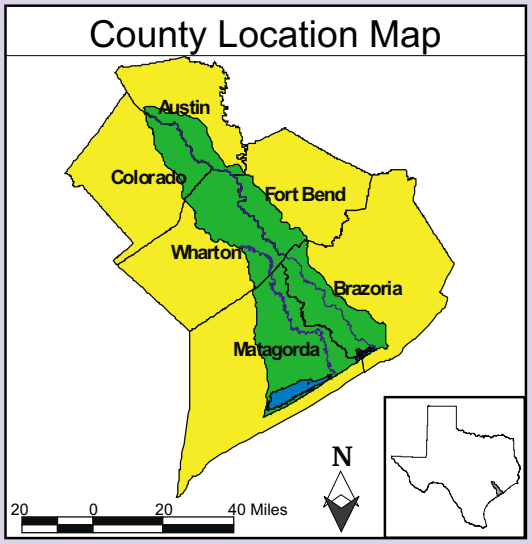
1102
1101
1113
Armand Bayou
Lower GalvestonBay
Clear Creek
1108
1104
Dickinson Bayou
Chocolate Bayou
Oyster Creek
1103
Bastrop Bayou
1110
1111
1109

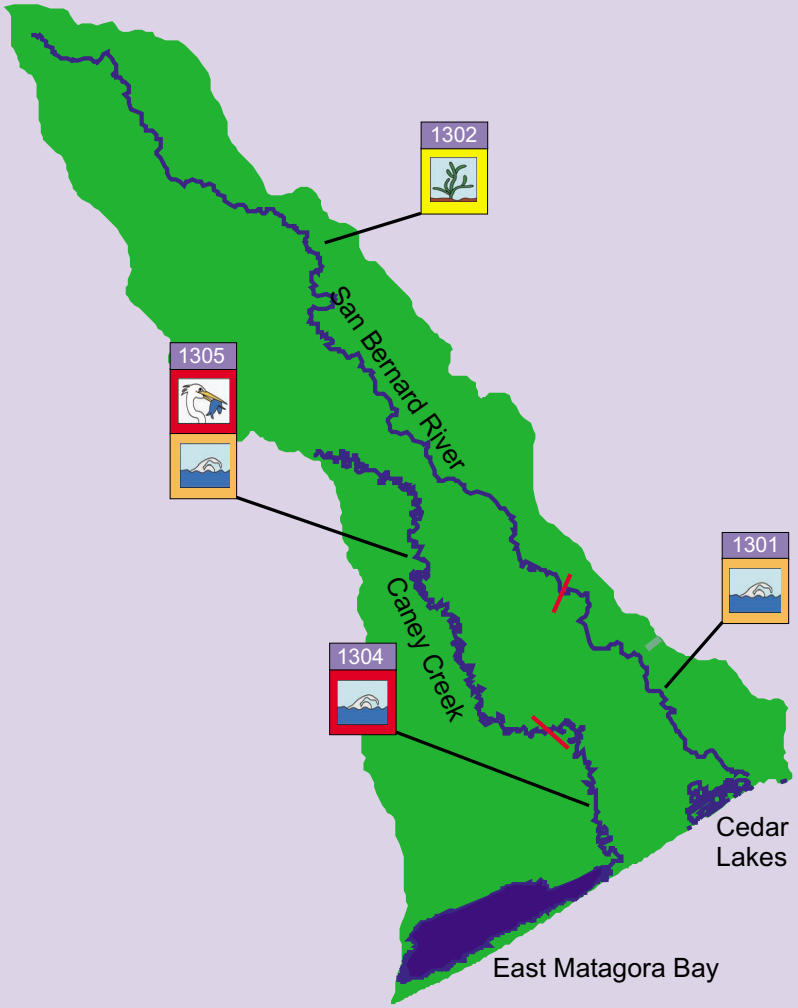
Lower Brazos River Basin
Identified Water Quality Issues





Brazos-Colorado Coastal Basin
Identified Water Quality Issues





Appendix 3F

Region H Recreational Use Information

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Table 3F-1: River Segments, Bays and Estuaries

Segment		Recreation[1]	Aquatic Life	Water Supply	Uses	Boating & Water Sports	Camping & Picnicking	Fishing	Hunting	Nature & Wildlife Viewing	Restrooms & Showers	Campsite Sewage	Visitor Center
Neches-Trinity Coastal Basin													
702	Intracoastal Waterway Tidal	Contact	High		Navigation								
Trinity River Basin													
801	Trinity River Tidal	Contact	High		B	+	+			+			
802	Trinity River below Lake Livingston	Noncontact	High	Public	B, Sp	+	+			+			
803	Lake Livingston	Contact	High	Public	E, Mun, In, Ir, Rec	+	+	+		+	r/s	D	
804	Trinity River above Lake Livingston	Noncontact	High		E, Sp	+	+			+			
Trinity-San Jacinto Coastal Basin													
901	Cedar Bayou Tidal	Noncontact			Sufficient	S/R+		+		+			
902	Cedar Bayou aboveTidal	Noncontact	High	Public	Sufficient	S/R							
San Jacinto River Basin													
1001	San Jacinto River Tidal	Contact	High										
1002	Lake Houston	Contact	High	Public	Mun, In, Ir, Mi, Rec								
1003	East Fork San Jacinto River	Contact	High	Public		S/R+							
1004	West Fork San Jacinto River	Contact	High	Public		+	+						
1005	Houston Ship Channel/San Jacinto River Tidal	Noncontact	High		Sp		d+	-		+	r		+
1006	Houston Ship Channel Tidal	Noncontact		Industrial	Navigation, Sp		d+	-		+	r		+
1007	Houston Ship Channel/ Buffalo Bayou Tidal	Noncontact		Industrial	Navigation			-					
1008	Spring Creek	Noncontact	High	Public		S/R+							
1009	Cypress Creek	Noncontact	High	Public									
1010	Caney Creek	Contact	High	Public									
1011	Peach Creek	Noncontact	High	Public									
1012	Lake Conroe	Contact	High	Public	Mun, In, Mi								
1013	Buffalo Bayou Tidal	Noncontact	Intermediate			S/R+							
1014	Buffalo Bayou above Tidal	Noncontact	Limited			S/R+							
1015	Lake Creek	Contact	High	Public									
1016	Greens Bayou above Tidal	Noncontact	Limited										
1017	White Oak Bayou above Tidal	Noncontact	Limited										
San Jacinto-Brazos Coastal Basin													
1101	Clear Creek Tidal	Noncontact	High		Sufficient	S/R		-		+			
1102	Clear Creek above Tidal	Noncontact	High			S/R		-					
1103	Dickinson Bayou Tidal	Noncontact	High		Virgin Coastal Prairie					+			
1104	Dickinson Bayou above Tidal	Noncontact	Intermediate		Insufficient	S/R							
1105	Bastrop Bayou Tidal	Noncontact	High		Sufficient usually, B, Sp	S/R+		+	+	+			
1107	Chocolate Bayou Tidal	Contact	High			+							
1108	Chocolate Bayou above Tidal	Noncontact	High										
1109	Oyster Creek Tidal	Noncontact	High		Sufficient	S/R							
1110	Oyster Creek above Tidal	Noncontact	High	Public		S/R							

Table 3F-1: River Segments, Bays and Estuaries

Segment		Special Features
Neches-Trinity Coastal Basin		(Anahuac National WMA, Moody National WMA, Candy Abshier WMA)
702	Intracoastal Waterway Tidal	
Trinity River Basin		(Keechi Creek WMA, Menard Creek Unit of Big Thicket National Preserve)
801	Trinity River Tidal	Extensive freshwater wetland habitat, Prime spawning area for striped bass restoration
802	Trinity River below Lake Livingston	Prime spawning area for striped bass restoration, Unique state holdings (Davis Hill State Park), USFWS
803	Lake Livingston	Paddlefish stocking area
804	Trinity River above Lake Livingston	Paddlefish stocking area, Unique state holding (Richland Creek WMA, Big Lake Bottom WMA)
Trinity-San Jacinto Coastal Basin		
901	Cedar Bayou Tidal	
902	Cedar Bayou aboveTidal	
San Jacinto River Basin		(Sheldon WMA)
1001	San Jacinto River Tidal	
1002	Lake Houston	Lake Houston State Park
1003	East Fork San Jacinto River	Sam Houston National Forest, bottomland hardwood habitats
1004	West Fork San Jacinto River	
1005	Houston Ship Channel/San Jacinto River Tidal	Unique state holdings (San Jacinto State Park)
1006	Houston Ship Channel Tidal	Unique state holdings (San Jacinto State Park)
1007	Houston Ship Channel/ Buffalo Bayou Tidal	
1008	Spring Creek	bottomland hardwood habitats
1009	Cypress Creek	bottomland hardwood habitats
1010	Caney Creek	
1011	Peach Creek	bottomland hardwood habitats
1012	Lake Conroe	
1013	Buffalo Bayou Tidal	
1014	Buffalo Bayou above Tidal	
1015	Lake Creek	
1016	Greens Bayou above Tidal	bottomland hardwood habitats 9aobe Hwy 90)
1017	White Oak Bayou above Tidal	
San Jacinto-Brazos Coastal Basin		(Galveston Island State Park, Bryan Beach State Park, Christmas Bay State Park, Atkinson Island WMA, Christmas Bay Coastal Preserve)
1101	Clear Creek Tidal	
1102	Clear Creek above Tidal	
1103	Dickinson Bayou Tidal	
1104	Dickinson Bayou above Tidal	
1105	Bastrop Bayou Tidal	Extensive freshwater wetland habitat, Unique Federal Holdings (Brazoria National Wildlife Refuge
1107	Chocolate Bayou Tidal	
1108	Chocolate Bayou above Tidal	
1109	Oyster Creek Tidal	
1110	Oyster Creek above Tidal	

Table 3F-1: River Segments, Bays and Estuaries

	Segment	Recreation[1]	Aquatic Life	Water Supply	Uses	Boating & Water Sports	Camping & Picnicking	Fishing	Hunting	Nature & Wildlife Viewing	Restrooms & Showers	Campsite Sewage	Visitor Center
1111	Old Brazos River Channel Tidal	Contact	High										
1113	Armand Bayou Tidal	Noncontact	High		Unspoiled Vegetation, B	S/R				+			
Brazos River Basin													
1201	Brazos River Tidal	Contact	High	Public	B, E			-					
1202	Brazos River below Navasota River	Noncontact	High	Public	B, E, Sp		+	+		+	r/s	D	+
1209	Navasota River below Lake Limestone	Contact	High	Public	B	S/R				+			
1245	Upper Oyster Creek	Contact	Intermediate	Public									
1252	Lake Limestone	Contact	High	Public	Mun, In, Ir, Rec	+	+	+					
Brazos-Colorado Coatal Basin													
1301	San Bernard River Tidal	Noncontact	High		E, Rec, Sp			+	+	+			
1302	San Bernard River above Tidal	Contact	High		E, Rec, Sp					+			+
Bays and Estuaries													
2421	Upper Galveston Bay	Contact	High		Oyster Waters	+	+	-	+	+			
2422	Trinity Bay	Contact	High		Oyster Waters	+	+	+		+			
2423	East Bay	Contact	High		Oyster Waters	+		+		+			
2424	West Bay	Contact	High		Oyster Waters	+	+	+		+			
2425	Clear Lake	Noncontact	High			+	+						
2426	Tabbs Bay	Noncontact	High			+	+	-		+			
2427	San Jacinto Bay	Contact	High					-					
2428	Black Duck Bay	Contact	High					-					
2429	Scott Bay	Noncontact	High					-					
2430	Burnett Bay	Contact	High					-					
2431	Moses Lake	Contact	High			+				+			
2432	Chocolate Bay	Contact	High		Oyster Waters	+							
2433	Bastrop Bay/Oyster Lake	Contact	High		Oyster Waters	+							
2434	Christmas Bay	Contact	High		Oyster Waters	+	+	+					
2435	Drum Bay	Contact	High		Oyster Waters								
2436	Barbours Cut	Contact	High			+		-					
2437	Texas City Ship Channel	Noncontact	High			+		+		+			
2438	Bayport Channel	Noncontact	High			+		+					
2439	Lower Galveston Bay	Contact	High		Oyster Waters	+		+		+			
2442	Cedar Lakes	Contact	High		Oyster Waters			+	+	+			

B Biological Function
E Unique Communities
Rec recreation
Sp Acquisition/Mitigation/Governmental Open Space

Mun Municipal
Ir Irrigation
In Industry

Mi Mining
FH fish hatchery
S/R Seasonal and Restrictive

d day use only
r restrooms
s showers
D dump

\+ this recreation activity is available in this area
\- not recommended

For the specific feature refered to by the symbols (B, E, and Sp) above see Sheet "Special Features"

[1] The information used for this column was obtained from the Texas Commission for Environmental Quality “The State of Texas Water Quality Inventory: Surface Water Quality Monitoring Program” Volumes 1-4 published in December 1996, and the Texas Clean Rivers Program & TNRCC “Texas Water Quality: A Summary of River Basin Assessments” published in December 1996.
The complete bibliography is attached after the tables.

Table 3F-1: River Segments, Bays and Estuaries

	Segment	Special Features
1111	Old Brazos River Channel Tidal	
1113	Armand Bayou Tidal	Extensive freshwater wetland habitat, Armand Bayou Nature Center
Brazos River Basin		(Mill Creek-Unique community, rare gamagrass-switchgrass bottomland tallgrass prairie (Austin Co.))
1201	Brazos River Tidal	striped bass spawning migration, unique community, Live oak-Water oak-Pecan bottomlands
1202	Brazos River below Navasota River	striped bass spawning migration, unique community, Live oak-Water oak-Pecan bottomlands, unique state holdings (Brazos Bend State Park)
1209	Navasota River below Lake Limestone	striped bass spawning migration
1245	Upper Oyster Creek	
1252	Lake Limestone	
Brazos-Colorado Coatal Basin		(Peach Point WMA)
1301	San Bernard River Tidal	Unique community, Live Oak-Water Oak-Pecan bottomlands, Recreation, Unique Federal holdings (San Bernard NWR)
1302	San Bernard River above Tidal	Unique community, Live Oak-Water Oak-Pecan bottomlands, Recreation, Unique Federal holdings (Attwater Prairie Chicken NWR)
Bays and Estuaries		
2421	Upper Galveston Bay	
2422	Trinity Bay	
2423	East Bay	Anahuac National Wildlife Refuge
2424	West Bay	Brazoria National Wildlife Refuge
2425	Clear Lake	
2426	Tabbs Bay	
2427	San Jacinto Bay	
2428	Black Duck Bay	
2429	Scott Bay	
2430	Burnett Bay	
2431	Moses Lake	
2432	Chocolate Bay	
2433	Bastrop Bay/Oyster Lake	
2434	Christmas Bay	
2435	Drum Bay	
2436	Barbours Cut	
2437	Texas City Ship Channel	
2438	Bayport Channel	
2439	Lower Galveston Bay	
2442	Cedar Lakes	

B Biological Function
E Unique Communities
Rec recreation
Sp Acquisition/Mitigation/Governmental Open Spac
For the specific feature refered to by the symbols (E

[1] The information used for this column was obtaine
Volumes 1-4 published in December 1996, and the
The complete bibliography is attached after the tabl

Table 3F-2: Recreational Areas

Area	County	Boating & Water Sports	Camping & Picnicking	Fishing	Hunting	Nature & Wildlife Viewing	Restrooms & Showers	Campsite Sewage	Exhibit Center
Wildlife Refuges									
Anahuac NWR	Chambers	+		+	+	+	r		
Attwater Prairie Chicken NWR	in Colorado, but borders Austin					+			+
Brazoria NWR	Brazoria	+		+	+	+			
San Bernard NWR	Brazoria			+	+	+			
Trinity River NWR	Liberty					+			
Big Thicket National Preserve	Liberty, Polk					+	r		+
Lakes & Reservoirs									
Addicks Reservoir	Harris		d+	+		+	r		+
Anahuac Lake	Chambers								
Barker Reservoir	Harris		d+	+		+	r		
Brazoria Reservoir	Brazoria								
Eagle Nest Lake	Brazoria								
Galveston County Industrial Water Res.	Galveston								
HL&P Cooling Lake	Chambers								
Harris Reservoir	Brazoria								
Lake Charlotte	Chambers								
Lake Conroe	Montgomery, Walker	+	+	+					
Lake Houston	Harris								
Lake Limestone	Leon	+		+			r		
Lake Livingston	Polk, San Jacinto, Trinity, Walker	+	+	+		+	r/s	D	
Lewis Creek Reservoir	Montgomery								
Lost Lake	Chambers								
Manor Lake	Brazoria								
Moon Lake	Brazoria								
Mustang Lake East & Mustang Lake West	Brazoria								
Old River Lake	Chambers								
San Bernard Reservoir 1, 2, 3	Brazoria								
Sheldon Reservoir	Harris	+	d+	+					
Smithers Lake	Fort Bend								
Wallisville Reservoir	Chambers, Liberty	+		+	+	+			+
National Forests									
Davy Crockett National Forest	Trinity	+	+	+		+	r	D	+
Sam Houston National Forest	Montgomery, San Jacinto, Walker	+	+	+	+	+	r	D	+

Table 3F-2: Recreational Areas

Area	Uses / Special Features
Wildlife Refuges	
Anahuac NWR	geese, waterfowl, peregrine falcon, bald eagle, alligator, mottled duck, wood stork, least tern
Attwater Prairie Chicken NWR	attwater prairie chicken, bald eagle, white-tailed hawk, wood stork, migrating geese
Brazoria NWR	wintering waterfowl(snow geese, ducks), migratory birds, marsh and water birds(roseate spoonbills, great blue herons, white ibis, sandhill cranes)
San Bernard NWR	migrating waterfowl, snow geese
Trinity River NWR	wintering, migrating, and breeding waterfowl, wetland dependent wildlife
Big Thicket National Preserve	Central and Mississippi Migratory Flyways
Lakes & Reservoirs	
Addicks Reservoir	
Anahuac Lake	Ir, In, Mi
Barker Reservoir	
Brazoria Reservoir	In
Eagle Nest Lake	
Galveston County Industrial Water Res.	In, Mun
HL&P Cooling Lake	In
Harris Reservoir	In
Lake Charlotte	Cypress swamp
Lake Conroe	Mun, In, Mi
Lake Houston	Mun, In, Ir, Mi, Rec, Lake Houston State Park, Eisenhower park, Duessen Park
Lake Limestone	Mun, In, Ir
Lake Livingston	Mun, In, Ir
Lewis Creek Reservoir	In
Lost Lake	
Manor Lake	
Moon Lake	
Mustang Lake East & Mustang Lake West	Ir, In, Rec
Old River Lake	
San Bernard Reservoir 1, 2, 3	In
Sheldon Reservoir	Rec, FH
Smithers Lake	In
Wallisville Reservoir	Mun, In, Ir
National Forests	
Davy Crockett National Forest	endangered species: red-cockaded woodpecker hunting: squirrel, deer, quail, dove, turkey, and waterfowl Big Slough Wilderness Area, Ratcliff Lake Rec Area, Four C Rec Trail, additional riding trails
Sam Houston National Forest	endangered species: red-cockaded woodpecker hunting: white-tailed deer, feral hog, waterfowl, dove, migratory gamebirds, squirrel, quail, rabbits, predators, fur bearers, and frogs

Table 3F-2: Recreational Areas

Area	County	Boating & Water Sports	Camping & Picnicking	Fishing	Hunting	Nature & Wildlife Viewing	Restrooms & Showers	Campsite Sewage	Exhibit Center
Parks & Preserves									
Stephen F. Austin State Park	Austin		+	+	+	+	r/s	D+	+
Bryan Beach State Park	Brazoria	+	+	+					
Christmas Bay Coastal Preserve	Brazoria	+		+	+	+			
Christmas Bay State Park	Brazoria	+	+	+		+			
Peach Point Wildlife Mgmt. Area	Brazoria		+		+	+			
Varner-Hogg State Park	Brazoria		+				r		+
Candy Abshier WMA	Chambers		d			+			
Brazos Bend State Park	Fort Bend		+	+		+	r/s	D	+
Galveston Island State Park	Galveston	+	+	+		+	r/s	D	
Armand Bayou Coastal Preserve	Harris	+	d	+		+	r		+
Atkinson Island WMA	Harris	+	d		?	+			
Lake Houston State Park	Harris, Montgomery		+			+	r/s		
San Jacinto State Historical Park	Harris		d+	+		+	r		+
Sheldon Lake State Park and Wildlife Management Area	Harris	+	d+	+		+			
Keechi Wildlife Management Area	Leon	+	+	+	+	+			
W.G. Jones State Forest	Montgomery					+			
Lake Livingston Sate Park	Polk	+	+	+		+	r/s	D	
Alabama Creek WMA	Trinity		+	+	+	+	r		
Huntsville State Park	Walker	+	+	+		+	r/s	D	+

Rec Recreation
Mun Municipal
Ir Irrigation
In Industry
Mi Mining
FH Fish hatchery
d day use only
r restrooms
s showers
\+ this recreation activity is available in this area
\- not recommended

To see the types of animals that live in certain parks, and which animals can be hunted refer to the sheet "Special Features"

The complete bibliography is attached after the tables.

Table 3F-2: Recreational Areas

Area	Uses / Special Features
Parks & Preserves	
Stephen F. Austin State Park	
Bryan Beach State Park	
Christmas Bay Coastal Preserve	migratory and resident waterfowl, shorebirds, finfish, designated a nursery area by the TPWD, unaltered habitat
Christmas Bay State Park	
Peach Point Wildlife Mgmt. Area	oak/hackberry motte and grassland typical of the Gulf Coast Prairies, hunting: waterfowl, rail, gallinule, snipe, and feral hogs
Varner-Hogg State Park	
Candy Abshier WMA	spring migration- bird "fall out"
Brazos Bend State Park	
Galveston Island State Park	
Armand Bayou Coastal Preserve	migratory and resident waterfowl, American alligator, osprey, bluestem, little bluestem, designated a nursery area by the TPWD, unaltered habitat
Atkinson Island WMA	shore and wading birds, racoons, and rattlesnakes
Lake Houston State Park	
San Jacinto State Historical Park	
Sheldon Lake State Park and Wildlife Management Area	last fresh water marsh within greater Houston city limits, deer, raccoon, mink, opossum, rabbit, alligator, bald eagles, ducks, geese, and other waterfowl, heron/egret rookeries, Florida bass, crappie, sunfish, and catfish
Keechi Wildlife Management Area	hunting: white-tailed deer, feral hog, squirrel, rabbit, hare, waterfowl, woodcock, gallinule and snipe
W.G. Jones State Forest	endangered species: red-cockaded woodpecker
Lake Livingston Sate Park	
Alabama Creek WMA	endangered species: red-cockaded woodpecker hunting: white-tailed deer, feral hog, waterfowl, dove, migratory gamebirds, squirrel, quail, rabbits, predators, fur bearers, and frogs
Huntsville State Park	bottomland hardwood habitats

Rec Recreation
Mun Municipal
Ir Irrigation
To see the types of animals that live in certai

The complete bibliography is attached after t

Appendix 3G

Current Water Supplies Available to Region H by City and Category

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Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
BELLVILLE	080048000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	884	958	1,028	1,071	1,089	1,100	1,122
COUNTY-OTHER	080757000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	1,240	1,396	1,526	1,622	1,662	1,679	1,727
COUNTY-OTHER	080757000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	249	281	307	326	334	338	347
COUNTY-OTHER	080757000	H	COLORADO	AUSTIN	14	008		None	GULF COAST AQUIFER	00815	H	COLORADO	AUSTIN	14	008	23	26	29	31	31	32	33
IRRIGATION	081004000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	743	743	743	743	743	743	743
IRRIGATION	081004000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	9,874	9,874	9,874	9,874	9,874	9,874	9,874
LIVESTOCK	081005000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	1,211	1,211	1,211	1,211	1,211	1,211	1,211
LIVESTOCK	081005000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	339	339	339	339	339	339	339
LIVESTOCK	081005000	H	COLORADO	AUSTIN	14	008		None	GULF COAST AQUIFER	00815	H	COLORADO	AUSTIN	14	008	17	13	9	7	6	5	4
LIVESTOCK	081005000	H	COLORADO	AUSTIN	14	008		None	LIVESTOCK LOCAL SUPPLY	99714008	H	COLORADO	AUSTIN	14	008	48	52	56	58	59	60	61
MANUFACTURING	081001000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	137	172	191	208	223	236	257
MANUFACTURING	081001000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	30	38	42	45	49	52	56
MINING	081003000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	33	40	44	47	49	51	53
MINING	081003000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	3	4	4	4	4	5	5
MINING	081003000	H	COLORADO	AUSTIN	14	008		None	GULF COAST AQUIFER	00815	H	COLORADO	AUSTIN	14	008	6	7	8	8	9	9	9
SAN FELIPE	080954000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	102	124	145	159	167	170	176
SEALY	080549000	H	BRAZOS	AUSTIN	12	008		None	GULF COAST AQUIFER	00815	H	BRAZOS	AUSTIN	12	008	876	955	1,029	1,083	1,100	1,111	1,137
WALLIS	080630000	H	BRAZOS-COLORADO	AUSTIN	13	008		None	GULF COAST AQUIFER	00815	H	BRAZOS-COLORADO	AUSTIN	13	008	161	178	194	202	207	209	214
ALVIN	080013000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2,974	3,123	3,293	3,440	3,557	3,743	3,970
ANGLETON	080018000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	1,815	1,815	1,815	1,815	1,815	1,815	1,815
ANGLETON	080018000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	95	125	140	135	123	125	130
BAILEY'S PRAIRIE	080817000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	14	15	15	15	16	17	17
BAILEY'S PRAIRIE	080817000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	72	75	78	80	82	85	90
BRAZORIA	080072000	H	BRAZOS	BRAZORIA	12	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	82	82	82	82	82	82	82
BRAZORIA	080072000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	0	0	0	0	0	0	0
BRAZORIA	080072000	H	BRAZOS-COLORADO	BRAZORIA	13	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	254	254	254	254	254	254	254
BRAZORIA	080072000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	0	0	0	0	0	0	0
BRAZORIA COUNTY MUD #1	084030000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	479	842	1,214	1,587	1,911	2,271	2,648
BRAZORIA COUNTY MUD #2	084031000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	664	1,115	1,590	2,050	2,462	2,909	3,376
BRAZORIA COUNTY MUD #3	084032000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	345	603	872	1,139	1,372	1,631	1,902
BRAZORIA COUNTY MUD #4	084033000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	593	578	570	562	558	558	558
BRAZORIA COUNTY MUD #5	084034000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	707	680	669	659	653	653	653
BROOKSIDE VILLAGE	080078000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	239	266	296	323	348	378	413
CLUTE	080118000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	1,120	1,120	1,120	1,120	1,120	1,120	1,120
CLUTE	080118000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	5	27	45	63	67	77	88
COUNTY-OTHER	080757000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	30	12	8	6	5	4	3
COUNTY-OTHER	080757000	H	BRAZOS-COLORADO	BRAZORIA	13	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	224	224	224	224	224	224	224
COUNTY-OTHER	080757000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	1,944	2,028	2,142	2,223	2,273	2,313	2,357
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	196	196	196	196	196	196	196
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	4,450	4,588	5,714	5,883	5,793	5,515	5,203
DANBURY	080693000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	202	211	222	231	238	250	265
FREEPORT	080217000	H	BRAZOS	BRAZORIA	12	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	176	141	117	101	90	80	72
FREEPORT	080217000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	0	0	1	1	1	1	1
FREEPORT	080217000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	1,728	1,763	1,787	1,803	1,814	1,824	1,832
FREEPORT	080217000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	0	0	113	230	306	362	406
HILLCREST	080881000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	124	125	126	126	127	130	133
HOLIDAY LAKES	080779000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	93	92	91	90	89	90	94
IOWA COLONY	080885000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	100	108	118	126	135	145	156
IRRIGATION	081004000	H	BRAZOS	BRAZORIA	12	020		None	BRAZOS RIVER RUN-OF-RIVER	3461205492	H	BRAZOS	BRAZORIA	12	020	1,800	1,800	1,800	1,800	1,800	1,800	1,800
IRRIGATION	081004000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	553	174	90	58	40	29	21
IRRIGATION	081004000	H	BRAZOS	BRAZORIA	12	020	260	CHOCOLATE BAYOU WATER CO.	BRAZOS RIVER AUTHORITY SYSTEM	120B0	G	BRAZOS	RESERVOIR	12		500	500	500	500	500	500	500
IRRIGATION	081004000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	3,145	2,794	2,528	2,382	2,276	2,194	2,108
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	23,257	21,778	18,563	15,030	12,465	10,744	9,187
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105343	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	711	711	711	711	711	711	711
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105344	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	962	962	962	962	962	962	962
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105346	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	1,360	1,360	1,360	1,360	1,360	1,360	1,360
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105352	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	3,347	3,347	3,347	3,347	3,347	3,347	3,347
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105364	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	766	766	766	766	766	766	766
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3411104201	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	558	558	558	558	558	558	558
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3411104216	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	1,025	1,025	1,025	1,025	1,025	1,025	1,025
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	260	CHOCOLATE BAYOU WATER CO.	BRAZOS RIVER RUN-OF-RIVER	3461205322B	H	BRAZOS	FORT BEND	12	079	63,812	63,812	63,812	63,812	63,812	63,812	63,812
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	260	CHOCOLATE BAYOU WATER CO.	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105357A	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2,935	2,935	2,935	2,935	2,935	2,935	2,935
JONES CREEK	080308000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	105	98	91	84	76	72	72
LAKE JACKSON	080338000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	2,240	2,240	2,240	2,240	2,240	2,240	2,240
LAKE JACKSON	080338000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	559	776	1,001	1,032	1,030	998	964
LIVESTOCK	081005000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	58	22	14	10	7	6	4
LIVESTOCK	081005000	H	BRAZOS	BRAZORIA	12	020		None	LIVESTOCK LOCAL SUPPLY	99712020	H	BRAZOS	BRAZORIA	12	020	184	220	228	232	235	236	238
LIVESTOCK	081005000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	208	204	202	198	194	187	179
LIVESTOCK	081005000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	LIVESTOCK LOCAL SUPPLY	99713020	H	BRAZOS-COLORADO	BRAZORIA	13	020	196	200	202	206	210	217	225
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	358	423	463	421	377	325	278
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	LIVESTOCK LOCAL SUPPLY	99711020	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	610	545	505	547	591	643	690
MANUFACTURING	081001000	H	BRAZOS	BRAZORIA	12	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	287	288	288	288	287	267	287
MANUFACTURING	081001000	H	BRAZOS	BRAZORIA	12	020	237200	THE DOW CHEMICAL CO.	BRAZOS RIVER RUN-OF-RIVER	3461205328B	H	BRAZOS	BRAZORIA	12	020	148,061	148,061	148,061	148,061	148,061	148,061	148,061
MANUFACTURING	081001000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	4,892	4,846	4,406	3,924	3,477	2,974	2,435
MANUFACTURING	081001000	H	BRAZOS	BRAZORIA	12	020	331	BRAZOS RIVER AUTHORITY	BRAZOS RIVER AUTHORITY SYSTEM	120B0	G	BRAZOS	RESERVOIR	12		16,000	16,000	16,000	16,000	16,000	16,000	16,000
MANUFACTURING	081001000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	0	0	0	0	0	0	0
MANUFACTURING	081001000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	SAN BERNARD RIVER RUN-OF-RIVER	3461303421	H	BRAZOS-COLORADO	BRAZORIA	13	020	8,519	8,519	8,519	8,519	8,519	8,519	8,519
MANUFACTURING	081001000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	SAN BERNARD RIVER RUN-OF-RIVER	3461303423	H	BRAZOS-COLORADO	BRAZORIA	13	020	3,500	3,500	3,500	3,500	3,500	3,500	3,500
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	202	202	202	202	202	202	202
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	49	48	48	48	49	69	49
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	0	0	0	1,587	2,908	3,631	4,282
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	260	CHOCOLATE BAYOU WATER CO.	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105357A	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	14,665	14,665	14,665	14,665	14,665	14,665	14,665
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	260	CHOCOLATE BAYOU WATER CO.	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	13,935	13,935	13,935	13,935	13,935	13,935	13,935
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	17,784	17,784	17,784	17,784	17,784	17,784	17,784
MANVEL	080721000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	365	355	345	334	324	317	317
MINING	081003000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	59	28	20	15	11	9	7
MINING	081003000	H	BRAZOS	BRAZORIA	12	020		None	OTHER LOCAL SUPPLY	99912020	H	BRAZOS	BRAZORIA	12	020	190	190	190	190	190	190	190

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
MINING	081003000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	1,190	1,440	1,567	1,613	1,655	1,671	1,673
MINING	081003000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	OTHER LOCAL SUPPLY	99913020	H	BRAZOS-COLORADO	BRAZORIA	13	020	1,124	1,124	1,124	1,124	1,124	1,124	1,124
MINING	081003000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	462	624	728	685	635	565	498
MINING	081003000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	OTHER LOCAL SUPPLY	99911020	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	305	305	305	305	305	305	305
ORBIT SYSTEMS INC	084294000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	40	47	55	63	71	79	88
ORBIT SYSTEMS INC	084294000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	325	386	451	514	575	638	712
OYSTER CREEK	080730000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	106	106	106	106	106	106	106
OYSTER CREEK	080730000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	15	26	39	45	48	49	49
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	0	0	629	1,430	2,011	2,437	2,710
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	9,440	9,597	9,624	9,636	9,642	9,649	9,656
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		531	540	541	542	542	543	543
RICHWOOD	080501000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	2000	BRAZOSPORT WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205366	H	BRAZOS	BRAZORIA	12	020	263	263	263	263	263	263	263
RICHWOOD	080501000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	15	22	29	30	30	31	32
SOUTHWEST UTILITIES	084343000	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	70	71	73	75	77	79	83
SURFSIDE BEACH	080967000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	148	168	189	209	228	248	271
SWEENY	080590000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	580	606	636	663	684	717	757
VARNER CREEK UD	084370000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	294	359	428	494	556	622	694
WEST COLUMBIA	080640000	H	BRAZOS	BRAZORIA	12	020		None	GULF COAST AQUIFER	02015	H	BRAZOS	BRAZORIA	12	020	480	453	431	410	389	373	363
WEST COLUMBIA	080640000	H	BRAZOS-COLORADO	BRAZORIA	13	020		None	GULF COAST AQUIFER	02015	H	BRAZOS-COLORADO	BRAZORIA	13	020	92	87	83	78	75	71	70
ANAHUAC	080015000	H	NECHES-TRINITY	CHAMBERS	07	036	150	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	TRINITY RIVER RUN-OF-RIVER	3460804279	H	TRINITY	CHAMBERS	08	036	813	814	815	813	814	813	814
ANAHUAC	080015000	H	TRINITY	CHAMBERS	08	036	150	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	TRINITY RIVER RUN-OF-RIVER	3460804279	H	TRINITY	CHAMBERS	08	036	236	235	234	236	235	236	235
BAYTOWN	080042000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	10115	H	TRINITY-SAN JACINTO	HARRIS	09	101	52	57	62	67	71	76	81
BAYTOWN	080042000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	15	BAYTOWN AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		520	565	613	654	685	716	745
BEACH CITY	080822000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	5	7	9	10	11	13	14
BEACH CITY	080822000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	67	82	104	117	126	134	140
COUNTY-OTHER	080757000	H	NECHES-TRINITY	CHAMBERS	07	036		None	GULF COAST AQUIFER	03615	H	NECHES-TRINITY	CHAMBERS	07	036	2	2	2	2	2	2	2
COUNTY-OTHER	080757000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	49	44	40	37	35	33	32
COUNTY-OTHER	080757000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	56	49	45	40	35	32	29
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	GULF COAST AQUIFER	03615	H	NECHES-TRINITY	CHAMBERS	07	036	3,899	3,890	3,884	3,880	3,879	3,876	3,876
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704287	H	NECHES-TRINITY	CHAMBERS	07	036	2,528	2,528	2,528	2,528	2,528	2,528	2,528
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704293	H	NECHES-TRINITY	CHAMBERS	07	036	1,626	1,626	1,626	1,626	1,626	1,626	1,626
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704304B	H	NECHES-TRINITY	CHAMBERS	07	036	1,997	1,997	1,997	1,997	1,997	1,997	1,997
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704290	H	NECHES-TRINITY	CHAMBERS	07	036	1,069	1,069	1,069	1,069	1,069	1,069	1,069
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704291	H	NECHES-TRINITY	CHAMBERS	07	036	1,078	1,078	1,078	1,078	1,078	1,078	1,078
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704295	H	NECHES-TRINITY	CHAMBERS	07	036	1,205	1,205	1,205	1,205	1,205	1,205	1,205
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704299	H	NECHES-TRINITY	CHAMBERS	07	036	1,173	1,173	1,173	1,173	1,173	1,173	1,173
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704306	H	NECHES-TRINITY	CHAMBERS	07	036	1,818	1,818	1,818	1,818	1,818	1,818	1,818
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410704311	H	NECHES-TRINITY	CHAMBERS	07	036	2,093	2,093	2,093	2,093	2,093	2,093	2,093
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704304	H	NECHES-TRINITY	CHAMBERS	07	036	2,663	2,663	2,663	2,663	2,663	2,663	2,663
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3410705016	H	NECHES-TRINITY	CHAMBERS	07	036	901	901	901	901	901	901	901
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704294	H	NECHES-TRINITY	CHAMBERS	07	036	573	573	573	573	573	573	573
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704300	H	NECHES-TRINITY	CHAMBERS	07	036	805	805	805	805	805	805	805
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704308	H	NECHES-TRINITY	CHAMBERS	07	036	771	771	771	771	771	771	771
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704309	H	NECHES-TRINITY	CHAMBERS	07	036	711	711	711	711	711	711	711
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036		None	NECHES-TRINITY RIVER RUN-OF-RIVER	3460704312	H	NECHES-TRINITY	CHAMBERS	07	036	691	691	691	691	691	691	691
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036	150	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	TRINITY RIVER RUN-OF-RIVER	3460804279	H	TRINITY	CHAMBERS	08	036	10,000	10,000	10,000	10,000	10,000	10,000	10,000
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		2,005	2,005	2,005	2,005	2,005	2,005	2,005
IRRIGATION	081004000	H	NECHES-TRINITY	CHAMBERS	07	036	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		17,309	16,818	16,552	16,370	16,170	15,941	15,669
IRRIGATION	081004000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	6,189	5,688	5,464	5,330	5,207	5,089	4,988
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	589	530	509	472	439	409	379
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903918	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	1,084	1,084	1,084	1,084	1,084	1,084	1,084
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903924	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	1,209	1,209	1,209	1,209	1,209	1,209	1,209
LIVESTOCK	081005000	H	NECHES-TRINITY	CHAMBERS	07	036		None	GULF COAST AQUIFER	03615	H	NECHES-TRINITY	CHAMBERS	07	036	16	16	16	16	16	16	15
LIVESTOCK	081005000	H	NECHES-TRINITY	CHAMBERS	07	036		None	LIVESTOCK LOCAL SUPPLY	99707036	H	NECHES-TRINITY	CHAMBERS	07	036	317	317	317	317	317	317	318
LIVESTOCK	081005000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	11	10	10	10	10	9	9
LIVESTOCK	081005000	H	TRINITY	CHAMBERS	08	036		None	LIVESTOCK LOCAL SUPPLY	99708036	H	TRINITY	CHAMBERS	08	036	49	50	50	50	50	51	51
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	23	21	20	18	17	16	15
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	LIVESTOCK LOCAL SUPPLY	99709036	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	46	48	49	51	52	53	54
MANUFACTURING	081001000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	3,251	3,538	3,729	3,735	3,727	3,692	3,677
MINING	081003000	H	NECHES-TRINITY	CHAMBERS	07	036		None	GULF COAST AQUIFER	03615	H	NECHES-TRINITY	CHAMBERS	07	036	25	30	32	34	35	37	38
MINING	081003000	H	NECHES-TRINITY	CHAMBERS	07	036		None	OTHER LOCAL SUPPLY	99907036	H	NECHES-TRINITY	CHAMBERS	07	036	505	505	505	505	505	505	505
MINING	081003000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	4,425	4,907	5,104	5,212	5,315	5,411	5,488
MINING	081003000	H	TRINITY	CHAMBERS	08	036		None	OTHER LOCAL SUPPLY	99908036	H	TRINITY	CHAMBERS	08	036	18,989	18,989	18,989	18,989	18,989	18,989	18,989
MINING	081003000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	2,361	2,561	2,663	2,587	2,511	2,440	2,341
MINING	081003000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	OTHER LOCAL SUPPLY	99909036	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	4,722	4,722	4,722	4,722	4,722	4,722	4,722
MONT BELVIEU	080413000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	92	116	145	172	193	215	237
MONT BELVIEU	080413000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	76	94	117	132	142	150	156
OLD RIVER-WINFREE	080727000	H	TRINITY	CHAMBERS	08	036		None	GULF COAST AQUIFER	03615	H	TRINITY	CHAMBERS	08	036	35	34	34	35	35	36	38
STEAM ELECTRIC POWER	081002000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036		None	GULF COAST AQUIFER	03615	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	1,782	1,330	1,018	1,104	1,208	1,332	1,468
STEAM ELECTRIC POWER	081002000	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	398300	TEXAS GENCO	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903926	H	TRINITY-SAN JACINTO	CHAMBERS	09	036	30,000	30,000	30,000	30,000	30,000	30,000	30,000
TRINITY BAY CONSERVATION DISTRICT	084362000	H	NECHES-TRINITY	CHAMBERS	07	036	150	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	TRINITY RIVER RUN-OF-RIVER	3460804279	H	TRINITY	CHAMBERS	08	036	455	455	455	455	455	455	455
TRINITY BAY CONSERVATION DISTRICT	084362000	H	NECHES-TRINITY	CHAMBERS	07	036	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		1,844	1,845	1,844	1,845	1,845	1,844	1,844
TRINITY BAY CONSERVATION DISTRICT	084362000	H	TRINITY	CHAMBERS	08	036	150	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	TRINITY RIVER RUN-OF-RIVER	3460804279	H	TRINITY	CHAMBERS	08	036	208	208	208	208	208	208	208
TRINITY BAY CONSERVATION DISTRICT	084362000	H	TRINITY	CHAMBERS	08	036	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		844	843	844	843	843	844	844
ARCOLA	080998000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	135	273	221	143	143	143	143
BEASLEY	081012000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	2	3	4	5	5	5	5
BEASLEY	081012000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	74	84	95	108	122	142	166
BIG OAKS MUD	084020000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	283	475	500	409	409	409	409
CINCO MUD #2	084058000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	1,053	1,790	1,899	1,555	1,555	1,555	1,555
CINCO MUD #6	084059000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	198	332	350	286	286	286	286
CINCO MUD #7	084060000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	515	870	920	754	754	754	754
CINCO MUD #8	084061000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	312	372	255	147	147	147	147
CINCO MUD #9	084062000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	670	1,134	1,199	982	982	982	982
CORNERSTONES MUD	084073000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	340	460	445	344	344	344	344
COUNTY-OTHER	080757000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	1,349	2,520	3,740	3,822	3,822	3,822	3,822
COUNTY-OTHER	080757000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	855	786	748	693	628	557	482
COUNTY-OTHER	080757000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	386	330	594	642	642	642	642

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	0	0	0	0	0	0	0
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	0	0	0	0	0	0	0
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	1,088	1,212	2,654	3,086	3,086	3,086	3,086
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	110	110	110	110	110	110	110
FAIRCHILDS	081019000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	107	136	215	325	325	325	325
FIRST COLONY MUD #9	084113000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	386	493	424	288	288	288	288
FORT BEND COUNTY MUD #106	084117000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	272	325	281	192	192	192	192
FORT BEND COUNTY MUD #108	084118000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	189	197	169	115	115	115	115
FORT BEND COUNTY MUD #111	084119000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	284	262	226	155	155	155	155
FORT BEND COUNTY MUD #2	084120000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	278	269	183	103	103	103	103
FORT BEND COUNTY MUD #2	084120000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	795	801	586	340	340	340	340
FORT BEND COUNTY MUD #23	084121000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	260	457	519	434	434	434	434
FORT BEND COUNTY MUD #25	084122000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	750	1,074	1,134	905	905	905	905
FORT BEND COUNTY MUD #30	084123000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	371	403	348	246	246	246	246
FORT BEND COUNTY MUD #37	084124000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	366	523	520	409	409	409	409
FORT BEND COUNTY MUD #41	084125000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	158	257	322	302	302	302	302
FORT BEND COUNTY MUD #67	084126000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	266	245	211	144	144	144	144
FORT BEND COUNTY MUD #68	084127000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	215	203	176	120	120	120	120
FORT BEND COUNTY MUD #69	084128000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	140	131	115	78	78	78	78
FORT BEND COUNTY MUD #81	084129000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	186	260	302	270	270	270	270
FULSHEAR	080869000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	50	57	59	48	48	48	48
FULSHEAR	080869000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	71	75	67	47	47	47	47
GRAND LAKES MUD #4	084142000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	428	725	768	629	629	629	629
HOUSTON	080285000	H	SAN JACINTO	FORT BEND	10	079	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		3,490	4,068	4,667	5,386	6,136	7,166	8,391
HOUSTON	080285000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	396200	CITY OF HOUSTON	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	1,884	1,933	1,670	1,137	1,137	1,137	1,137
HOUSTON	080285000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		567	924	1,607	2,645	3,173	3,896	4,756
IRRIGATION	081004000	H	BRAZOS	FORT BEND	12	079		None	BRAZOS RIVER ALLUVIUM AQUIFER	07905	H	BRAZOS	FORT BEND	12	079	17,907	17,907	17,907	17,907	17,907	17,907	17,907
IRRIGATION	081004000	H	BRAZOS	FORT BEND	12	079	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	3461205320	H	BRAZOS	FORT BEND	12	079	20,944	20,944	20,944	20,944	20,944	20,944	20,944
IRRIGATION	081004000	H	BRAZOS	FORT BEND	12	079	260	CHOCOLATE BAYOU WATER CO.	BRAZOS RIVER AUTHORITY SYSTEM	120B0	G	BRAZOS	RESERVOIR	12		5,625	5,625	5,625	5,625	5,625	5,625	5,625
IRRIGATION	081004000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	18,869	18,869	18,869	18,869	18,869	18,869	18,869
IRRIGATION	081004000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	7,538	7,538	7,538	7,538	7,538	7,538	7,538
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	8,093	8,093	8,093	8,093	8,093	8,093	8,093
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	1,098	1,098	1,098	1,098	1,098	1,098	1,098
KATY	080312000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	169	131	69	42	42	42	42
KINGSBRIDGE MUD	084222000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	699	798	712	516	516	516	516
KINGSBRIDGE MUD	084222000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	22	26	25	18	18	18	18
LIVESTOCK	081005000	H	BRAZOS	FORT BEND	12	079		None	BRAZOS RIVER ALLUVIUM AQUIFER	07905	H	BRAZOS	FORT BEND	12	079	691	691	484	276	276	276	276
LIVESTOCK	081005000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	0	0	0	0	0	0	0
LIVESTOCK	081005000	H	BRAZOS	FORT BEND	12	079		None	LIVESTOCK LOCAL SUPPLY	99712079	H	BRAZOS	FORT BEND	12	079	0	0	207	415	415	415	415
LIVESTOCK	081005000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	211	211	211	211	211	211	211
LIVESTOCK	081005000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	68	57	40	23	23	23	23
LIVESTOCK	081005000	H	SAN JACINTO	FORT BEND	10	079		None	LIVESTOCK LOCAL SUPPLY	99710079	H	SAN JACINTO	FORT BEND	10	079	2	13	30	47	47	47	47
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	153	135	101	60	60	60	60
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	LIVESTOCK LOCAL SUPPLY	99711079	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	46	64	98	139	139	139	139
MANUFACTURING	081001000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	391	415	379	269	269	269	269
MANUFACTURING	081001000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	1,711	1,618	1,185	708	708	708	708
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	2,500	2,468	1,950	1,193	1,193	1,193	1,193
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	380	FORT BEND CO. WCID 1	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105170	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	1,000	1,000	1,000	1,000	1,000	1,000	1,000
MEADOWS	080792000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	1,311	1,089	749	426	426	426	426
MEADOWS	080792000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	103	89	66	39	39	39	39
MINING	081003000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	207	208	263	319	319	319	319
MINING	081003001	H	BRAZOS	FORT BEND	12	079	331	BRAZOS RIVER AUTHORITY	BRAZOS RIVER AUTHORITY SYSTEM	120B0	G	BRAZOS	RESERVOIR	12		1,100	1,100	1,100	1,100	1,100	1,100	1,100
MINING	081003000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	132	140	144	144	146	147	149
MINING	081003000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	256	229	163	95	95	95	95
MINING	081003000	H	SAN JACINTO	FORT BEND	10	079		None	OTHER LOCAL SUPPLY	99910079	H	SAN JACINTO	FORT BEND	10	079	8	8	8	8	8	8	8
MINING	081003000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	1,431	1,334	1,025	612	612	612	612
MINING	081003000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	822	822	822	822	822	822	822
MISSOURI CITY	080409000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	70	106	114	93	93	93	93
MISSOURI CITY	080409000	H	BRAZOS	FORT BEND	12	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	985	566	423	343	336	330	326
MISSOURI CITY	080409000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	1,577	2,106	1,825	1,254	1,254	1,254	1,254
MISSOURI CITY	080409000	H	SAN JACINTO	FORT BEND	10	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	127	96	101	103	103	103	103
MISSOURI CITY	080409000	H	SAN JACINTO	FORT BEND	10	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	369	1,275	2,100	2,359	2,381	2,385	2,417
MISSOURI CITY	080409000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	5,653	7,888	7,371	5,193	5,193	5,193	5,193
MISSOURI CITY	080409000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105169B	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	1,303	1,303	1,303	1,303	1,303	1,303	1,303
MISSOURI CITY	080409000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	4	12	20	22	22	22	22
MISSOURI CITY	080409000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	11,773	8,919	9,567	9,821	9,834	9,805	9,883
NEEDVILLE	080428000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	51	54	75	100	100	100	100
NEEDVILLE	080428000	H	BRAZOS-COLORADO	FORT BEND	13	079		None	GULF COAST AQUIFER	07915	H	BRAZOS-COLORADO	FORT BEND	13	079	174	196	216	242	270	310	359
NORTH MISSION GLEN MUD	084283000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	504	709	707	554	554	554	554
ORBIT SYSTEMS INC	084294000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	11	10	8	5	5	5	5
PECAN GROVE MUD #1	084299000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	815	773	679	468	468	468	468
PECAN GROVE MUD #1	084299000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	468	414	314	187	187	187	187
PLANTATION MUD	084303000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	417	369	269	156	156	156	156
PLEAK	081053000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	419	506	597	709	824	976	1,153
RICHMOND	080500000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	675	683	636	471	471	471	471
ROSENBERG	080518000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	1,215	1,302	1,260	974	974	974	974
SIENNA PLANTATION MUD #2	084334000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	407	717	660	389	389	389	389
SIMONTON	081062000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	113	106	131	156	156	156	156
STAFFORD	080577000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	232	272	248	181	181	181	181
STAFFORD	080577000	H	SAN JACINTO	FORT BEND	10	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	288	1,159	1,682	1,823	1,844	1,857	1,867
STAFFORD	080577000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	770	944	927	696	696	696	696
STAFFORD	080577000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	9,495	8,572	8,075	7,964	7,966	7,963	7,964
STEAM ELECTRIC POWER	081002000	H	BRAZOS	FORT BEND	12	079	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	3461205320	H	BRAZOS	FORT BEND	12	079	8,976	8,976	8,976	8,976	8,976	8,976	8,976
STEAM ELECTRIC POWER	081002000	H	BRAZOS	FORT BEND	12	079	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	3461205325	H	BRAZOS	FORT BEND	12	079	28,711	28,711	28,711	28,711	28,711	28,711	28,711
STEAM ELECTRIC POWER	081002000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	21,944	22,196	19,904	15,926	15,926	15,926	15,926
STEAM ELECTRIC POWER	081002000	H	BRAZOS	FORT BEND	12	079	398300	TEXAS GENCO	BRAZOS RIVER AUTHORITY SYSTEM	120B0	G	BRAZOS	RESERVOIR	12		83,000	83,000	83,000	83,000	83,000	83,000	83,000
SUGAR LAND	080585000	H	BRAZOS	FORT BEND	12	079		None	GULF COAST AQUIFER	07915	H	BRAZOS	FORT BEND	12	079	2,258	2,391	2,061	1,397	1,397	1,397	1,397

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
SUGAR LAND	080585000	H	BRAZOS	FORT BEND	12	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	13,321	11,755	10,981	8,736	8,740	8,740	8,740
SUGAR LAND	080585000	H	SAN JACINTO	FORT BEND	10	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	618	582	403	230	230	230	230
SUGAR LAND	080585000	H	SAN JACINTO	FORT BEND	10	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	62	324	667	734	734	734	734
SUGAR LAND	080585000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079		None	GULF COAST AQUIFER	07915	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	6,677	6,573	4,906	2,866	2,866	2,866	2,866
SUGAR LAND	080585000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	6,524	7,828	8,259	10,437	10,433	10,433	10,433
SUGAR LAND	080585000	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	45	45	45	45	45	45	45
WHCRWA	088002000	H	SAN JACINTO	FORT BEND	10	079		WHCRWA	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	1,731	2,043	1,821	1,331	1,331	1,331	1,331
WHCRWA	088002000	H	SAN JACINTO	FORT BEND	10	079	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	563	673	913	1,069	1,257	1,439
BACLIFF MUD	084012000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	1,185	1,185	1,185	1,185	1,185	1,185	1,185
BAYOU VISTA	080759000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	40	43	46	47	48	48	48
BAYOU VISTA	080759000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	448	448	448	448	448	448	448
BOLIVAR PENINSULAR SUD	084027000	H	NECHES-TRINITY	GALVESTON	07	084	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		5,038	5,038	5,038	5,038	5,038	5,038	5,038
CLEAR LAKE SHORES	080764000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	27	28	29	29	29	29	29
CLEAR LAKE SHORES	080764000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	689	689	689	689	689	689	689
COUNTY-OTHER	080757000	H	NECHES-TRINITY	GALVESTON	07	084	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		1	1	1	1	1	1	1
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	127	110	95	85	80	76	75
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	237	237	237	237	237	237	237
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		18,477	18,477	18,477	18,477	18,477	18,477	18,477
DICKINSON	080165000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316325	GALVESTON COUNTY WCID #1	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	272	309	342	359	362	366	370
DICKINSON	080165000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316325	GALVESTON COUNTY WCID #1	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	3,502	3,502	3,502	3,502	3,502	3,502	3,502
FRIENDSWOOD	080219000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	580	649	706	730	728	733	741
FRIENDSWOOD	080219000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		4,914	5,099	5,231	5,299	5,325	5,343	5,356
GALVESTON	080227000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	1,629	1,610	1,590	1,571	1,552	1,539	1,539
GALVESTON	080227000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316200	CITY OF GALVESTON	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	20,143	19,992	19,859	19,782	19,746	19,720	19,704
GALVESTON COUNTY MUD #1	084135000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	36	43	48	51	53	53	54
GALVESTON COUNTY MUD #1	084135000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316200	CITY OF GALVESTON	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	441	529	604	648	667	682	691
GALVESTON COUNTY WCID #12	084136000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	134	134	134	134	134	134	134
HITCHCOCK	080279000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	92	93	94	93	91	91	92
HITCHCOCK	080279000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	1,493	1,493	1,493	1,493	1,493	1,493	1,493
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	441	90	424	969	972	956	929
IRRIGATION	081004000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	109	109	109	109	109	109	109
JAMAICA BEACH	080886000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	25	30	34	37	38	38	39
JAMAICA BEACH	080886000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316200	CITY OF GALVESTON	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	309	372	430	463	480	491	498
KEMAH	080316000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	23	28	32	35	36	36	37
KEMAH	080316000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	55	55	55	55	55	55	55
LA MARQUE	080342000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	221	216	212	207	202	199	199
LA MARQUE	080342000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	2,767	2,767	2,767	2,767	2,767	2,767	2,767
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	660	748	825	867	875	884	895
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	1,985	1,986	1,986	1,986	1,986	1,986	1,986
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316325	GALVESTON COUNTY WCID #1	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	1,120	1,120	1,120	1,120	1,120	1,120	1,120
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	11	11	11	11	11	11	11
LIVESTOCK	081005000	H	NECHES-TRINITY	GALVESTON	07	084		None	GULF COAST AQUIFER	08415	H	NECHES-TRINITY	GALVESTON	07	084	16	16	16	16	16	16	16
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	13	3	13	29	29	29	28
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	LIVESTOCK LOCAL SUPPLY	99711084	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	296	306	296	280	280	280	281
LIVESTOCK	081005000	H	NECHES-TRINITY	GALVESTON	07	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	11	11	11	11	11	11	11
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	NECHES-TRINITY	GALVESTON	07	084	16	16	16	16	16	16	16
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	13	3	13	29	29	29	28
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	LIVESTOCK LOCAL SUPPLY	99711084	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	296	306	296	280	280	280	281
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105169A	H	SAN JACINTO-BRAZOS	FORT BEND	11	079	2,539	2,539	2,539	2,539	2,539	2,539	2,539
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	4,578	4,427	4,294	4,217	4,181	4,155	4,139
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	22,479	22,630	22,763	22,840	22,876	22,902	22,918
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER AUTHORITY SYSTEM	120B0	H	BRAZOS	RESERVOIR	12		23,333	23,333	23,333	23,333	23,333	23,333	23,333
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER AUTHORITY SYSTEM	120B0	H	BRAZOS	RESERVOIR	12		9,355	9,355	9,355	9,355	9,355	9,355	9,355
MINING	081003000	H	NECHES-TRINITY	GALVESTON	07	084		None	GULF COAST AQUIFER	08415	H	NECHES-TRINITY	GALVESTON	07	084	12	14	14	15	15	15	16
MINING	081003000	H	NECHES-TRINITY	GALVESTON	07	084		None	OTHER LOCAL SUPPLY	99907084	H	NECHES-TRINITY	GALVESTON	07	084	106	106	106	106	106	106	106
MINING	081003000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	11	13	14	14	14	15	15
MINING	081003000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	OTHER LOCAL SUPPLY	99911999	H	SAN JACINTO-BRAZOS	RESERVOIR	11		101	101	101	101	101	101	101
SAN LEON MUD	084329000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	1,777	1,777	1,777	1,777	1,777	1,777	1,777
SANTA FE	080743000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	96	99	99	98	96	95	96
SANTA FE	080743000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	996	996	996	996	996	996	996
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	8,405	8,405	8,405	8,405	8,405	8,405	8,405
TEXAS CITY	080602000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	660	648	638	627	614	605	606
TEXAS CITY	080602000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	10,367	10,367	10,367	10,367	10,367	10,367	10,367
TEXAS CITY	080602000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	316325	GALVESTON COUNTY WCID #1	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	21	21	21	21	21	21	21
TIKI ISLAND	080973000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084		None	GULF COAST AQUIFER	08415	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	20	24	28	30	31	32	32
TIKI ISLAND	080973000	H	SAN JACINTO-BRAZOS	GALVESTON	11	084	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	358	358	358	358	358	358	358
BAYTOWN	080042000	H	SAN JACINTO	HARRIS	10	101	15	BAYTOWN AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		650	646	644	641	639	637	635
BAYTOWN	080042000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	GULF COAST AQUIFER	10115	H	TRINITY-SAN JACINTO	HARRIS	09	101	984	993	994	1,000	1,004	1,023	1,048
BAYTOWN	080042000	H	TRINITY-SAN JACINTO	HARRIS	09	101	15	BAYTOWN AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		9,866	9,825	9,779	9,741	9,712	9,683	9,656
BELLAIRE	080046000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	690	703	799	662	662	662	662
BELLAIRE	080046000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,310	1,310	1,310	1,310	1,310	1,310	1,310
BLUE BELL MANOR UTILITY COMPANY	084026000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	581	377	169	87	87	87	87
BRITMOORE UTILITIES	084036000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	390	311	165	97	97	97	97
BUNKER HILL VILLAGE	080085000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	296	283	298	230	230	230	230
BUNKER HILL VILLAGE	080085000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		635	635	635	635	635	635	635
CANDLELIGHT HILLS SUBDIVISION	084043000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	368	297	159	95	95	95	95
CHIMNEY HILL MUD	084053000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	557	440	194	97	97	97	97
CHIMNEY HILL MUD	084053000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	426	426	426	426	426	426	426
CINCO MUD #6	084059000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	92	112	74	50	50	50	50
CINCO MUD #9	084062000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	123	146	95	63	63	63	63
CLEAR BROOK CITY MUD WOODMEADOWS	084063000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	180	189	218	185	185	185	185
CLEAR BROOK CITY MUD WOODMEADOWS	084063000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,680	1,680	1,680	1,680	1,680	1,680	1,680
CONSUMERS WATER INC	084072000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	269	262	157	102	102	102	102
CORNERSTONES MUD	084073000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	530	510	302	193	193	193	193
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	6,869	4,842	1,883	972	972	972	972
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	2,645	2,645	2,645	2,645	2,645	2,645	2,645
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	281	281	281	281	281	281	281
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	240	SAN JACINTO RIVER AUTHORITY	SAN JACINTO RIVER RUN-OF-RIVER	3461004964	H	SAN JACINTO	HARRIS	10	101	896	896	896	896	896	896	896
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	296	296	296	296	296	296	296
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	1,957	2,675	2,952	3,195	3,266	3,292
COUNTY-OTHER	080757000	H	SAN JACINTO	HARRIS	10	101	1095	LA PORTE AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		308	308	308	308	308	308	308

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	341	202	125	82	57	47	44
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	147	147	147	147	147	147	147
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	1095	LA PORTE AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		308	308	308	308	308	308	308
COUNTY-OTHER	080757000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		3,360	1,403	685	408	165	94	68
COUNTY-OTHER	080757000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	GULF COAST AQUIFER	10115	H	TRINITY-SAN JACINTO	HARRIS	09	101	618	365	217	129	77	46	28
COUNTY-OTHER	080757000	H	TRINITY-SAN JACINTO	HARRIS	09	101	15	BAYTOWN AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		798	798	798	798	798	798	798
COUNTY-OTHER	080757000	H	TRINITY-SAN JACINTO	HARRIS	09	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		2,016	2,016	2,016	2,016	2,016	2,016	2,016
CROSBY MUD	084078000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	123	113	118	90	90	90	90
CROSBY MUD	084078001	H	SAN JACINTO	HARRIS	10	102	240	SAN JACINTO RIVER AUTHORITY	SAN JACINTO RIVER RUN-OF-RIVER	3461004964	H	SAN JACINTO	HARRIS	10	101	1,050	1,050	1,050	1,050	1,050	1,050	1,050
CRYSTAL SPRNGS WATER COMPANY	084081000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	15	14	8	5	5	5	5
DEER PARK	080154000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	170	162	173	135	135	135	135
DEER PARK	080154000	H	SAN JACINTO	HARRIS	10	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,562	1,569	1,562	1,585	1,586	1,587	1,590
DEER PARK	080154000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	261	264	265	266	268	273	281
DEER PARK	080154000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		2,394	2,387	2,394	2,371	2,370	2,369	2,366
EL DORADO UD	084101000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	427	437	507	423	423	423	423
EL LAGO	080695000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	55	53	52	51	50	50	50
EL LAGO	080695000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		244	203	173	151	133	119	108
FALLBROOK UD	084109000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	673	526	274	158	158	158	158
FOUNTAINVIEW SUBDIVISION	084132000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	290	225	117	69	69	69	69
FRIENDSWOOD	080219000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	213	206	201	196	190	189	189
FRIENDSWOOD	080219000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,805	1,620	1,488	1,420	1,394	1,376	1,363
GALENA PARK	080226000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	122	116	123	97	97	97	97
GALENA PARK	080226000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		954	954	954	954	954	954	954
GREEN TRAILS MUD	084143000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	791	604	311	180	180	180	180
HARRIS COUNTY FWSD #47	084149000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	87	80	82	61	61	61	61
HARRIS COUNTY FWSD #47	084149000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	288	288	288	288	288	288	288
HARRIS COUNTY FWSD #51	084150000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	469	477	495	381	381	381	381
HARRIS COUNTY FWSD #51	084150000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,539	1,539	1,539	1,539	1,539	1,539	1,539
HARRIS COUNTY FWSD #6	084151000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	29	33	40	34	34	34	34
HARRIS COUNTY FWSD #6	084151000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	187	187	187	187	187	187	187
HARRIS COUNTY MUD #11	084153000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	364	274	141	82	82	82	82
HARRIS COUNTY MUD #119 INWOOD NORTH	084154000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	750	579	276	140	140	140	140
HARRIS COUNTY MUD #132	084157000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,334	1,157	653	401	401	401	401
HARRIS COUNTY MUD #150	084158000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,123	822	411	230	230	230	230
HARRIS COUNTY MUD #151	084159000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	882	840	380	196	196	196	196
HARRIS COUNTY MUD #152	084160000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	560	519	304	191	191	191	191
HARRIS COUNTY MUD #153	084161000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	769	808	501	328	328	328	328
HARRIS COUNTY MUD #154	084162000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	525	445	249	151	151	151	151
HARRIS COUNTY MUD #158	084165000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	369	320	179	92	92	92	92
HARRIS COUNTY MUD #158	084165000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	411	411	411	411	411	411	411
HARRIS COUNTY MUD #180	084170000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	483	406	222	135	135	135	135
HARRIS COUNTY MUD #189	084174000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	634	530	291	176	176	176	176
HARRIS COUNTY MUD #200	084176000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,119	1,288	832	553	553	553	553
HARRIS COUNTY MUD #261	084179000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	876	573	260	135	135	135	135
HARRIS COUNTY MUD #261	084179000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	70	73	64	65	65	65	65
HARRIS COUNTY MUD #33	084180000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	881	659	333	190	190	190	190
HARRIS COUNTY MUD #345	084182000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,056	933	421	219	219	219	219
HARRIS COUNTY MUD #46	084183000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	566	551	247	126	126	126	126
HARRIS COUNTY MUD #5	084184000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	673	432	193	98	98	98	98
HARRIS COUNTY MUD #5	084184000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	0	0	0	0	0	0	0
HARRIS COUNTY MUD #50	084185000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	116	117	131	108	108	108	108
HARRIS COUNTY MUD #53	084186000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	298	364	477	435	435	435	435
HARRIS COUNTY MUD #53	084186000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	836	836	836	836	836	836	836
HARRIS COUNTY MUD #55	084187000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		3,877	3,877	3,877	3,877	3,877	3,877	3,877
HARRIS COUNTY MUD #8	084189000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	127	131	151	126	126	126	126
HARRIS COUNTY MUD #8	084189000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	420	420	420	420	420	420	420
HARRIS COUNTY UD #14	084190000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	530	383	191	107	107	107	107
HARRIS COUNTY UD #15	084191000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	371	281	145	84	84	84	84
HARRIS COUNTY WCID #1	084193000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	968	735	379	220	220	220	220
HARRIS COUNTY WCID #1	084193000	H	SAN JACINTO	HARRIS	10	101	15	BAYTOWN AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		670	670	670	670	670	670	670
HARRIS COUNTY WCID #133	084195000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	756	496	225	116	116	116	116
HARRIS COUNTY WCID #21	084196000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	137	134	147	118	118	118	118
HARRIS COUNTY WCID #21	084196000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	913	913	913	913	913	913	913
HARRIS COUNTY WCID #36	084197000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	248	253	290	240	240	240	240
HARRIS COUNTY WCID #36	084197001	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	802	802	802	802	802	802	802
HARRIS COUNTY WCID #50	084198000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	55	57	66	56	56	56	56
HARRIS COUNTY WCID #76	084199000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	304	195	87	44	44	44	44
HARRIS COUNTY WCID #84	084200000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	60	56	60	47	47	47	47
HARRIS COUNTY WCID #84	084200000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	310	310	310	310	310	310	310
HEDWIG VILLAGE	080269000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	168	156	165	127	127	127	127
HEDWIG VILLAGE	080269000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		170	161	154	147	139	132	126
HILLSHIRE VILLAGE	081025000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	182	126	56	29	29	29	29
HILLSHIRE VILLAGE	081025000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	117	117	117	117	117	117	117
HOUSTON	080285000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	68,385	71,938	84,204	70,727	70,727	70,727	70,727
HOUSTON	080285000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		255,490	289,866	314,592	362,616	398,224	435,922	476,654
HOUSTON	080285000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		9,973	12,087	14,149	16,074	18,058	20,159	22,429
HOUSTON	080285000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		8,076	8,076	8,076	8,076	8,076	8,076	8,076
HUMBLE	080289000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	3,233	2,414	1,219	693	693	693	693
HUMBLE	080289000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	47	47	47	47	47	47	47
HUNTERS CREEK VILLAGE	080290000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	325	329	373	308	308	308	308
HUNTERS CREEK VILLAGE	080290000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		329	339	348	356	364	372	379
IRRIGATION	081004000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	9,883	9,265	9,883	9,145	9,145	9,145	9,145
IRRIGATION	081004000	H	SAN JACINTO	HARRIS	10	101	240	SAN JACINTO RIVER AUTHORITY	SAN JACINTO RIVER RUN-OF-RIVER	3461004964	H	SAN JACINTO	HARRIS	10	101	738	738	738	738	738	738	738
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	GULF COAST AQUIFER	10115	H	TRINITY-SAN JACINTO	HARRIS	09	101	5,417	5,417	5,417	5,417	5,417	5,417	5,417
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903922	H	TRINITY-SAN JACINTO	HARRIS	09	101	628	628	628	628	628	628	628
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903923	H	TRINITY-SAN JACINTO	HARRIS	09	101	626	626	626	626	626	626	626
JACINTO CITY	080301000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	247	244	269	220	220	220	220

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
JACINTO CITY	080301000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,120	1,120	1,120	1,120	1,120	1,120	1,120
JERSEY VILLAGE	080709000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,279	1,044	564	338	338	338	338
JERSEY VILLAGE	080709000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	840	840	840	840	840	840	840
KATY	080312000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,920	1,628	897	547	547	547	547
KINGSBRIDGE MUD	084222000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	177	142	77	45	45	45	45
LA PORTE	080346000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	27	27	31	25	25	25	25
LA PORTE	080346001	H	SAN JACINTO	HARRIS	10	101	1095	LA PORTE AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		418	421	418	429	431	433	435
LA PORTE	080346000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	466	504	537	575	607	646	690
LA PORTE	080346000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	1095	LA PORTE AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		7,337	7,334	7,337	7,326	7,324	7,322	7,320
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	2	2	2	2	2	2	2
LEAGUE CITY	080350000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205171	H	BRAZOS	FORT BEND	12	079	6	5	5	5	5	5	5
LIVESTOCK	081005000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	951	627	285	148	148	148	148
LIVESTOCK	081005000	H	SAN JACINTO	HARRIS	10	101		None	LIVESTOCK LOCAL SUPPLY	99710101	H	SAN JACINTO	HARRIS	10	101	0	324	666	803	803	803	803
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	9	9	9	9	9	9	9
LIVESTOCK	081005000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	LIVESTOCK LOCAL SUPPLY	99711101	H	SAN JACINTO-BRAZOS	HARRIS	11	101	82	82	82	82	82	82	82
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	GULF COAST AQUIFER	10115	H	TRINITY-SAN JACINTO	HARRIS	09	101	18	18	18	18	18	18	18
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	HARRIS	09	101		None	LIVESTOCK LOCAL SUPPLY	99709101	H	TRINITY-SAN JACINTO	HARRIS	09	101	73	73	73	73	73	73	73
LONGHORN TOWN UD	084235000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	327	561	857	865	865	865	865
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	45,260	48,385	55,019	45,809	45,809	45,809	45,809
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,046	1,046	1,046	1,046	1,046	1,046	1,046
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	240	SAN JACINTO RIVER AUTHORITY	SAN JACINTO RIVER RUN-OF-RIVER	3461004964	H	SAN JACINTO	HARRIS	10	101	70	70	70	70	70	70	70
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	240	SAN JACINTO RIVER AUTHORITY	SAN JACINTO RIVER RUN-OF-RIVER	3461004964	H	SAN JACINTO	HARRIS	10	101	31,674	31,674	31,674	31,674	31,674	31,674	31,674
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	240	SAN JACINTO RIVER AUTHORITY	TRINITY RIVER RUN-OF-RIVER	3410805271B	H	TRINITY	LIBERTY	08	145	31,674	31,674	31,674	31,674	31,674	31,674	31,674
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	10030	H	SAN JACINTO	RESERVOIR	10		54,647	54,647	54,647	54,647	54,647	54,647	54,647
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		3,896	3,896	3,896	3,924	3,933	3,938	3,936
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		54	54	54	54	54	54	54
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	0	0	0	0	0	0
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	HOUSTON LAKE/RESERVOIR	10030	H	SAN JACINTO	RESERVOIR	10		90,000	90,000	90,000	90,000	90,000	90,000	90,000
MANUFACTURING	081001000	H	SAN JACINTO	HARRIS	10	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		152,491	152,491	152,491	152,491	152,491	152,491	152,491
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	5,905	6,692	7,178	7,591	7,957	8,231	8,094
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,144	1,144	1,144	1,116	1,107	1,102	1,104
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		54,455	54,455	54,455	54,455	54,455	54,455	54,455
MANUFACTURING	081001000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,792	1,792	1,792	1,792	1,792	1,792	1,792
MANUFACTURING	081001000	H	TRINITY-SAN JACINTO	HARRIS	09	101	240	SAN JACINTO RIVER AUTHORITY	TRINITY RIVER RUN-OF-RIVER	3410805271B	H	TRINITY	LIBERTY	08	145	0	0	0	0	0	0	0
MANUFACTURING	081001000	H	TRINITY-SAN JACINTO	HARRIS	09	101	240	SAN JACINTO RIVER AUTHORITY	CONROE LAKE/RESERVOIR - SJRA	3461004963B	H	SAN JACINTO	MONTGOMERY	10	170	13,604	13,604	13,604	13,604	13,604	13,604	13,604
MANUFACTURING	081001000	H	TRINITY-SAN JACINTO	HARRIS	09	101	396201	COASTAL WATER AUTHORITY (Included in the COH)	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		29,368	29,368	29,368	29,368	29,368	29,368	29,368
MASON CREEK UD	084247000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	2,273	1,549	696	356	356	356	356
MINING	081003000	H	SAN JACINTO	HARRIS	10	101		None	OTHER LOCAL SUPPLY	99910101	H	SAN JACINTO	HARRIS	10	101	992	992	992	992	992	992	992
MINING	081003000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	OTHER LOCAL SUPPLY	99911999	H	SAN JACINTO-BRAZOS	RESERVOIR	11		19	19	19	19	19	19	19
MISSOURI CITY	080409000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	998	247	537	586	586	586	586
MISSOURI CITY	080409000	H	SAN JACINTO	HARRIS	10	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	500	2,867	1,537	1,104	1,076	1,107	1,001
MISSOURI CITY	080409000	H	SAN JACINTO	HARRIS	10	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	4	27	14	10	10	10	10
NASSAU BAY	080424000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	104	103	101	100	99	98	98
NASSAU BAY	080424000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		2,184	2,184	2,184	2,184	2,184	2,184	2,184
NHCRWA	088000000	H	SAN JACINTO	HARRIS	10	101		NHCRWA	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	81,393	66,543	36,049	21,565	21,565	21,565	21,565
NHCRWA	088000000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	11	0	0	0	0	0	0
NHCRWA	088000000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	34,714	34,714	34,714	34,714	34,714	34,714
NORTH BELT UD	084275000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	317	303	180	114	114	114	114
NORTH GREEN MUD	084279000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	319	229	114	63	63	63	63
NORTHWEST HARRIS COUNTY MUD #23	084286000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	442	387	218	136	136	136	136
NORTHWEST PARK MUD	084287000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	1,216	877	433	240	240	240	240
PARKWAY UD	084298000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	31	28	30	22	22	22	22
PASADENA	080456000	H	SAN JACINTO	HARRIS	10	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		20,415	20,415	20,414	20,415	20,415	20,415	20,415
PASADENA	080456000	H	SAN JACINTO	HARRIS	10	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		7,483	7,483	7,482	7,483	7,483	7,483	7,483
PASADENA	080456000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	1,857	2,047	2,232	2,401	2,579	2,775	2,993
PASADENA	080456000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		3,100	3,100	3,101	3,100	3,100	3,100	3,100
PASADENA	080456000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,136	1,136	1,137	1,136	1,136	1,136	1,136
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	02015	H	SAN JACINTO-BRAZOS	BRAZORIA	11	020	0	0	22	47	65	77	83
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	514	357	330	318	312	305	298
PEARLAND	080457000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		29	20	19	18	18	17	17
PINE TRAILS UTILITY	084302000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	174	177	202	166	166	166	166
PINE TRAILS UTILITY	084302000	H	SAN JACINTO	HARRIS	10	101	607473	NORTH CHANNEL WATER AUTHORITY	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	480	480	480	480	480	480	480
PINEY POINT VILLAGE	080468000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	246	240	263	212	212	212	212
PINEY POINT VILLAGE	080468000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		248	247	245	244	244	243	242
ROLLING FORK PUD	084411000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	682	465	219	118	118	118	118
SEABROOK	080545000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	197	242	287	329	373	417	462
SEABROOK	080545000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	651900	CITY OF PASADENA	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		876	917	947	969	987	1,001	1,012
SHOREACRES	080558000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	19	20	22	23	24	24	24
SHOREACRES	080558000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	1095	LA PORTE AREA WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		364	364	364	364	364	364	364
SOUTH HOUSTON	080569000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	216	214	239	195	195	195	195
SOUTH HOUSTON	080569000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		4,199	4,199	4,199	4,199	4,199	4,199	4,199
SOUTHSIDE PLACE	080572000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	76	76	87	72	72	72	72
SOUTHSIDE PLACE	080572000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		319	319	319	319	319	319	319
SOUTHWEST UTILITIES	084343000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	627	467	239	137	137	137	137
SPRING VALLEY	080575000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	858	585	275	147	147	147	147
STAFFORD	080577000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	07915	H	SAN JACINTO	FORT BEND	10	079	23	16	11	7	7	7	7
STAFFORD	080577000	H	SAN JACINTO	HARRIS	10	101	325	GULF COAST WATER AUTHORITY	BRAZOS RIVER RUN-OF-RIVER	3461205168	H	BRAZOS	FORT BEND	12	079	82	134	108	78	55	45	34
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	10030	H	SAN JACINTO	RESERVOIR	10		14,367	14,367	14,367	14,367	14,367	14,367	14,367
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	44	44	138	161	189	224	266
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	398300	TEXAS GENCO	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	3461105350	H	SAN JACINTO-BRAZOS	HARRIS	11	101	2,120	2,120	2,120	2,120	2,120	2,120	2,120
SUNBELT FWSD	084350000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	3,741	2,956	1,568	921	921	921	921
SUNBELT FWSD	084350000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	187	187	187	187	187	187	187
SUNBELT FWSD	084350000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		299	299	299	299	299	299	299
TAYLOR LAKE VILLAGE	080751000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	63	66	65	64	62	62	62
TAYLOR LAKE VILLAGE	080751000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		1,730	1,730	1,730	1,730	1,730	1,730	1,730
TOMBALL	080608000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	2,016	1,726	990	598	598	598	598
TRAIL OF THE LAKES MUD	084355000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	549	931	413	213	213	213	213

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
WALLER	080629000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	80	78	46	29	29	29	29
WEBSTER	080635000	H	SAN JACINTO-BRAZOS	HARRIS	11	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO-BRAZOS	HARRIS	11	101	172	242	310	377	443	511	579
WEBSTER	080635000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		4,535	4,535	4,535	4,535	4,535	4,535	4,535
WEBSTER	080635000	H	SAN JACINTO-BRAZOS	HARRIS	11	101	159000	CLEAR LAKE CITY WATER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		4,475	4,475	4,475	4,475	4,475	4,475	4,475
WEST HARRIS COUNTY MUD #6	084387000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	301	373	168	87	87	87	87
WEST UNIVERSITY PL.	080643000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	586	584	655	535	535	535	535
WEST UNIVERSITY PL.	080643000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	2,053	2,053	2,053	2,053	2,053	2,053	2,053
WHCRWA	088002000	H	SAN JACINTO	HARRIS	10	101		WHCRWA	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	41,559	30,834	17,182	10,718	10,718	10,718	10,718
WHCRWA	088002000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	19,874	19,764	19,524	19,368	19,180	18,998
WILLOW RUN SUBDIVISION	084398000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	681	438	196	100	100	100	100
WINDFERN FOREST UD	084401000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	573	530	310	158	158	158	158
WINDFERN FOREST UD	084401000	H	SAN JACINTO	HARRIS	10	101	396200	CITY OF HOUSTON	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	70	67	76	75	75	75	75
WOODCREEK MUD	084404000	H	SAN JACINTO	HARRIS	10	101		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	426	409	245	155	155	155	155
BUFFALO	080083000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	311	348	384	401	397	392	395
CENTERVILLE	080105000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	174	189	203	210	207	205	206
COUNTY-OTHER	080757000	H	BRAZOS	LEON	12	145		None	CARRIZO-WILCOX AQUIFER	14510	H	BRAZOS	LEON	12	145	171	195	217	223	214	208	210
COUNTY-OTHER	080757000	H	BRAZOS	LEON	12	145		None	QUEEN CITY AQUIFER	14524	H	BRAZOS	LEON	12	145	201	201	201	201	201	201	201
COUNTY-OTHER	080757000	H	TRINITY	LEON	08	145		None	SPARTA AQUIFER	14527	H	TRINITY	LEON	08	145	135	144	152	154	151	148	149
COUNTY-OTHER	080757000	H	TRINITY	LEON	08	145		None	QUEEN CITY AQUIFER	14524	H	TRINITY	LEON	08	145	135	144	152	154	151	148	149
COUNTY-OTHER	080757000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	136	144	151	154	150	149	150
FLO COMMUNITY WSC	084114000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	318	418	525	578	574	559	567
IRRIGATION	081004000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	261	261	261	261	261	261	261
IRRIGATION	081004000	H	TRINITY	LEON	08	145		None	SPARTA AQUIFER	14527	H	TRINITY	LEON	08	145	281	281	281	281	281	281	281
JEWETT	080887000	H	BRAZOS	LEON	12	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	42	51	60	64	64	63	64
JEWETT	080887000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	125	151	177	192	191	188	190
LIVESTOCK	081005000	H	BRAZOS	LEON	12	145		None	CARRIZO-WILCOX AQUIFER	14510	H	BRAZOS	LEON	12	145	200	200	200	200	200	200	200
LIVESTOCK	081005000	H	BRAZOS	LEON	12	145		None	SPARTA AQUIFER	14527	H	BRAZOS	LEON	12	145	223	223	223	223	223	223	223
LIVESTOCK	081005000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	484	484	484	484	484	484	484
LIVESTOCK	081005000	H	TRINITY	LEON	08	145		None	SPARTA AQUIFER	14527	H	TRINITY	LEON	08	145	784	784	784	784	784	784	784
MANUFACTURING	081001000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	545	714	842	967	1,093	1,207	1,313
MINING	081003000	H	BRAZOS	LEON	12	145		None	CARRIZO-WILCOX AQUIFER	14510	H	BRAZOS	LEON	12	145	253	221	213	209	205	201	198
MINING	081003000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	1,487	1,296	1,251	1,226	1,204	1,183	1,166
NORMANGEE	080927000	H	BRAZOS	LEON	12	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	37	39	40	41	40	39	40
NORMANGEE	080927000	H	TRINITY	LEON	08	145		None	CARRIZO-WILCOX AQUIFER	14510	H	TRINITY	LEON	08	145	95	98	102	103	101	100	101
AMES	080676000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	114	116	118	120	121	126	133
CLEVELAND	080116000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	1,312	1,341	1,365	1,392	1,416	1,464	1,529
COUNTY-OTHER	080757000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	132	154	179	203	228	255	288
COUNTY-OTHER	080757000	H	NECHES-TRINITY	LIBERTY	07	146		None	GULF COAST AQUIFER	14615	H	NECHES-TRINITY	LIBERTY	07	145	9	11	12	14	16	18	20
COUNTY-OTHER	080757000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	1,114	1,294	1,504	1,707	1,918	2,145	2,427
COUNTY-OTHER	080757000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	2,524	2,930	3,408	3,868	4,345	4,859	5,498
COUNTY-OTHER	080757000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	GULF COAST AQUIFER	14615	H	TRINITY-SAN JACINTO	LIBERTY	09	145	161	187	217	247	277	310	350
DAISETTA	080149000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	57	58	59	60	61	62	65
DAISETTA	080149000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	90	91	93	94	95	98	102
DAYTON	080152000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	1,356	1,428	1,521	1,606	1,685	1,789	1,916
HARDIN	080878000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	119	136	155	172	191	211	235
HARDIN WSC	084148000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	478	567	669	767	865	973	1,099
IRRIGATION	081004000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	0	12	24	36	47	59	90
IRRIGATION	081004000	H	NECHES-TRINITY	LIBERTY	07	146		None	GULF COAST AQUIFER	14615	H	NECHES-TRINITY	LIBERTY	07	145	378	375	374	372	369	368	367
IRRIGATION	081004000	H	NECHES-TRINITY	LIBERTY	07	146		None	TRINITY RIVER RUN-OF-RIVER	3410805271A	H	TRINITY	LIBERTY	08	145	423	392	377	367	356	344	330
IRRIGATION	081004000	H	NECHES-TRINITY	LIBERTY	07	146	140	LOWER NECHES VALLEY AUTHORITY	SYSTEM	060A0	I	NECHES	RESERVOIR	06		656	656	656	656	656	656	656
IRRIGATION	081004000	H	NECHES-TRINITY	LIBERTY	07	146	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		1,725	1,677	1,651	1,632	1,614	1,590	1,563
IRRIGATION	081004000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	830	830	830	830	830	830	830
IRRIGATION	081004000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	14,236	10,554	8,467	6,995	5,353	3,406	1,030
IRRIGATION	081004000	H	TRINITY	LIBERTY	08	146	396200	CITY OF HOUSTON	TRINITY RIVER RUN-OF-RIVER	3460804277	H	TRINITY	LIBERTY	08	145	33,000	33,000	33,000	33,000	33,000	33,000	33,000
IRRIGATION	081004000	H	TRINITY	LIBERTY	08	146		None	TRINITY RIVER RUN-OF-RIVER	3410805271A	H	TRINITY	LIBERTY	08	145	2,077	2,108	2,123	2,133	2,144	2,156	2,170
IRRIGATION	081004000	H	TRINITY	LIBERTY	08	146	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		8,466	9,005	9,297	9,498	9,716	9,969	10,268
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	GULF COAST AQUIFER	14615	H	TRINITY-SAN JACINTO	LIBERTY	09	145	5,741	5,683	5,643	5,608	5,573	5,535	5,507
IRRIGATION	081004000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	3460903909	H	TRINITY-SAN JACINTO	LIBERTY	09	145	685	685	685	685	685	685	685
KENEFICK	081033000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	79	94	112	128	144	162	183
SERVICE COMPANY	084226000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	103	108	116	124	130	140	153
LIBERTY	080356000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	1,494	1,509	1,527	1,532	1,543	1,578	1,628
LIVESTOCK	081005000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	59	59	59	59	59	59	34
LIVESTOCK	081005000	H	NECHES	LIBERTY	06	146		None	LIVESTOCK LOCAL SUPPLY	99706146	H	NECHES	LIBERTY	06	145	45	45	45	45	45	45	70
LIVESTOCK	081005000	H	NECHES-TRINITY	LIBERTY	07	146		None	GULF COAST AQUIFER	14615	H	NECHES-TRINITY	LIBERTY	07	145	35	35	35	35	35	35	35
LIVESTOCK	081005000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	140	140	140	140	140	140	140
LIVESTOCK	081005000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	446	446	446	446	446	446	446
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	GULF COAST AQUIFER	14615	H	TRINITY-SAN JACINTO	LIBERTY	09	145	32	32	32	32	32	32	15
LIVESTOCK	081005000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	LIVESTOCK LOCAL SUPPLY	99709146	H	TRINITY-SAN JACINTO	LIBERTY	09	145	0	0	0	0	0	0	17
MANUFACTURING	081001000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	249	331	391	452	514	570	619
MANUFACTURING	081001000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	47	62	74	85	97	108	117
MERCY WSC	084253000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	64	75	88	100	113	126	142
MINING	081003000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	32	32	32	32	32	32	33
MINING	081003000	H	NECHES-TRINITY	LIBERTY	07	146		None	GULF COAST AQUIFER	14615	H	NECHES-TRINITY	LIBERTY	07	145	22	23	23	23	24	23	22
MINING	081003000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	34	34	34	34	34	35	35
MINING	081003000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	4,112	4,070	4,026	3,982	3,940	3,893	3,841
MINING	081003000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	NECHES-TRINITY	LIBERTY	07	145	0	0	0	0	0	0	0
MINING	081003000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	0	0	0	0	0	0	0
MINING	081003000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	771	854	911	963	1,011	1,065	1,122
MINING	081003000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	0	0	0	0	0	0	0
MINING	081003000	H	TRINITY-SAN JACINTO	LIBERTY	09	146		None	GULF COAST AQUIFER	14615	H	TRINITY-SAN JACINTO	LIBERTY	09	145	3,685	3,717	3,727	3,732	3,737	3,742	3,747
PLUM GROVE	081054000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	110	141	176	207	240	277	319
SOUTHWEST UTILITIES	084343000	H	SAN JACINTO	LIBERTY	10	146		None	GULF COAST AQUIFER	14615	H	SAN JACINTO	LIBERTY	10	145	12	14	16	18	20	23	26
STEAM ELECTRIC POWER	081002000	H	TRINITY	LIBERTY	08	146		None	GULF COAST AQUIFER	14615	H	TRINITY	LIBERTY	08	145	0	2,962	4,240	4,957	5,831	6,896	8,195
WEST HARDIN WSC	084383000	H	NECHES	LIBERTY	06	146		None	GULF COAST AQUIFER	14615	H	NECHES	LIBERTY	06	145	22	29	35	42	47	54	63
COUNTY-OTHER	080757000	H	BRAZOS	MADISON	12	157		None	SPARTA AQUIFER	15727	H	BRAZOS	MADISON	12	157	102	106	110	113	115	118	122
COUNTY-OTHER	080757000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	350	347	400	450	407	350	319
COUNTY-OTHER	080757000	H	TRINITY	MADISON	08	157		None	QUEEN CITY AQUIFER	15724	H	TRINITY	MADISON	08	157	96	95	107	103	100	105	105

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
COUNTY-OTHER	080757000	H	TRINITY	MADISON	08	157		None	SPARTA AQUIFER	15727	H	TRINITY	MADISON	08	157	87	123	90	73	133	216	281
COUNTY-OTHER	080757000	H	TRINITY	MADISON	08	157		None	UNDIFFERENTIATED AQUIFER	15722	H	TRINITY	MADISON	08	157	334	332	334	334	333	329	329
IRRIGATION	081004000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	19	19	19	19	19	19	19
LIVESTOCK	081005000	H	BRAZOS	MADISON	12	157		None	CARRIZO-WILCOX AQUIFER	15710	H	BRAZOS	MADISON	12	157	120	120	120	120	120	120	120
LIVESTOCK	081005000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	630	630	630	630	630	630	630
MADISONVILLE	080382000	H	TRINITY	MADISON	08	157		None	SPARTA AQUIFER	15727	H	TRINITY	MADISON	08	157	750	781	815	837	856	881	908
MANUFACTURING	081001000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	205	260	289	316	343	367	398
MINING	081003000	H	BRAZOS	MADISON	12	157		None	CARRIZO-WILCOX AQUIFER	15710	H	BRAZOS	MADISON	12	157	9	9	9	9	9	9	9
MINING	081003000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	14	15	15	15	15	15	15
NORMANGEE	080927000	H	TRINITY	MADISON	08	157		None	CARRIZO-WILCOX AQUIFER	15710	H	TRINITY	MADISON	08	157	9	8	8	8	8	8	8
CONROE	080130000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	7,175	7,769	6,589	6,662	6,849	6,979	7,080
CONSUMERS WATER INC	084072000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	164	175	147	151	154	159	162
COUNTY-OTHER	080757000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	14,307	17,996	16,739	19,369	21,720	24,224	26,047
COUNTY-OTHER	080757000	H	SAN JACINTO	MONTGOMERY	10	170	396200	CITY OF HOUSTON	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	381	381	381	381	381	381	381
CRYSTAL SPRNGS WATER COMPANY	084081000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	368	469	422	461	499	536	563
CUT AND SHOOT	080854000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	169	209	234	283	346	427	526
EAST PLANTATION UD	084098000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	284	366	331	363	394	420	439
H M W SUD	084147000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	1,268	1,353	1,133	1,136	1,149	1,164	1,169
HOUSTON	080285000	H	SAN JACINTO	MONTGOMERY	10	170	396200	CITY OF HOUSTON	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	82	158	157	190	217	241	259
HOUSTON	080285000	H	SAN JACINTO	MONTGOMERY	10	170	396200	CITY OF HOUSTON	LIVINGSTON LAKE/RESERVOIR	08400	H	TRINITY	RESERVOIR	08		0	32	96	185	299	463	667
IRRIGATION	081004000	H	SAN JACINTO	MONTGOMERY	10	170	240	SAN JACINTO RIVER AUTHORITY	CONROE LAKE/RESERVOIR - SJRA	3461004963B	H	SAN JACINTO	MONTGOMERY	10	170	497	497	497	497	497	497	497
LIVESTOCK	081005000	H	SAN JACINTO	MONTGOMERY	10	170		None	LIVESTOCK LOCAL SUPPLY	99710170	H	SAN JACINTO	MONTGOMERY	10	170	510	510	510	510	510	510	510
MAGNOLIA	080907000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	233	273	298	349	410	492	589
MANUFACTURING	081001000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	1,587	1,702	1,448	1,317	1,211	1,070	950
MINING	081003000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	414	400	316	265	228	191	160
MONTGOMERY COUNTY MUD #18	084261000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	720	1,403	1,414	1,733	2,009	2,247	2,421
MONTGOMERY COUNTY MUD #19	084262000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	477	382	280	227	187	152	124
MONTGOMERY COUNTY MUD #8	084263000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	651	765	674	713	750	785	810
MONTGOMERY COUNTY MUD #9	084264000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	522	713	657	735	805	868	912
MONTGOMERY COUNTY UD #2	084265000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	369	437	323	259	213	173	142
MONTGOMERY COUNTY UD #3	084266000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	425	393	308	280	262	247	237
MONTGOMERY COUNTY UD #4	084267000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	645	769	567	456	375	305	250
MONTGOMERY COUNTY WCID #1	084268000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	435	405	318	288	270	256	247
NEW CANEY MUD	084272000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	965	1,142	993	1,069	1,121	1,187	1,232
OAK RIDGE NORTH	080726000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	563	569	464	453	448	443	440
PANORAMA VILLAGE	080732000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	605	639	537	534	484	393	321
PATTON VILLAGE	080734000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	76	86	87	100	114	135	164
POINT AQUARIUS MUD	084305000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	334	557	542	642	728	803	858
PORTER WSC	084307000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	1,391	1,538	1,306	1,340	1,388	1,119	917
RAYFORD ROAD MUD	084312000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	999	1,746	1,289	1,040	865	704	577
RIVER PLANTATION MUD	084322000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	811	689	507	408	334	270	222
ROMAN FOREST	080801000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	168	201	221	264	315	385	468
SHENANDOAH	080745000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	517	426	315	253	209	169	138
SOUTHERN MONTGOMERY COUNTY MUD	084339000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	1,163	1,478	1,334	1,072	885	721	590
SOUTHWEST UTILITIES	084343000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	181	201	170	174	179	183	187
SPLENDORA	080962000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	126	187	223	295	381	499	636
SPRING CREEK UD	084344000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	339	418	368	396	424	451	471
STANLEY LAKE MUD	084347000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	367	568	541	437	361	294	241
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO	MONTGOMERY	10	170	240	SAN JACINTO RIVER AUTHORITY	CONROE LAKE/RESERVOIR - SJRA	3461004963B	H	SAN JACINTO	MONTGOMERY	10	170	4,996	4,996	4,996	4,996	4,996	4,996	4,996
STEAM ELECTRIC POWER	081002000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	2,507	4,201	5,302	5,042	4,930	4,750	4,621
THE WOODLANDS	088001000	H	SAN JACINTO	MONTGOMERY	10	170	240	SAN JACINTO RIVER AUTHORITY	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	13,714	12,212	16,515	14,308	11,837	9,599	7,859
WILLIS	080655000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	424	473	403	413	430	443	455
WOODBRANCH	080807000	H	SAN JACINTO	MONTGOMERY	10	170		None	GULF COAST AQUIFER	17015	H	SAN JACINTO	MONTGOMERY	10	170	156	151	147	142	138	135	135
COUNTY-OTHER	080757000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	1,517	1,780	2,038	2,219	2,358	2,525	2,705
SERVICE COMPANY	084226000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	840	890	944	985	1,004	1,044	1,100
LIVESTOCK	081005000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	134	134	134	134	134	134	134
LIVINGSTON	080362000	H	TRINITY	POLK	08	187	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		5,601	5,601	5,601	5,601	5,601	5,601	5,601
MINING	081003000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	24	29	31	32	33	34	35
ONALASKA	080933000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	146	165	183	196	206	217	231
ONALASKA WSC	084293000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	239	240	244	247	242	246	255
ONALASKA WSC	084293000	H	TRINITY	POLK	08	187	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		672	672	672	672	672	672	672
TRINITY RURAL WSC	084363000	H	TRINITY	POLK	08	187		None	GULF COAST AQUIFER	18715	H	TRINITY	POLK	08	187	6	6	7	8	8	9	9
COLDSPRING	080122000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	38	44	51	56	59	60	61
COLDSPRING	080122000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	138	163	186	205	216	222	225
COUNTY-OTHER	080757000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	768	868	974	1,052	1,091	1,114	1,129
COUNTY-OTHER	080757000	H	TRINITY	SAN JACINTO	08	204	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		560	560	560	560	560	560	560
COUNTY-OTHER	080757000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	496	560	629	679	704	719	729
IRRIGATION	081004000	H	TRINITY	SAN JACINTO	08	204	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		175	175	175	175	175	175	175
SERVICE COMPANY	084226000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	75	95	114	127	133	137	140
SERVICE COMPANY	084226000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	162	206	245	275	288	295	301
LIVESTOCK	081005000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	142	142	142	142	142	142	142
LIVESTOCK	081005000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	142	142	142	142	142	142	142
MANUFACTURING	081001000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	39	48	52	56	60	63	68
MERCY WSC	084253000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	272	338	404	455	487	504	513
MINING	081003000	H	SAN JACINTO	SAN JACINTO	10	204		None	GULF COAST AQUIFER	20415	H	SAN JACINTO	SAN JACINTO	10	204	28	23	23	22	21	20	20
MINING	081003000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	8	7	6	6	6	6	6
POINT BLANK	081056000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	75	85	96	104	108	111	112
RIVERSIDE WSC	084323000	H	TRINITY	SAN JACINTO	08	204	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		0	0	0	0	0	0	0
RIVERSIDE WSC	084323000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	94	140	179	213	232	241	247
SAN JACINTO WSC	084328000	H	TRINITY	SAN JACINTO	08	204	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		280	280	280	280	280	280	280
SAN JACINTO WSC	084328000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	337	406	474	528	561	577	587
SHEPHERD	080746000	H	TRINITY	SAN JACINTO	08	204		None	GULF COAST AQUIFER	20415	H	TRINITY	SAN JACINTO	08	204	243	256	270	278	279	282	285
COUNTY-OTHER	080757000	H	TRINITY	TRINITY	08	228	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		3,171	3,171	3,171	3,171	3,171	3,171	3,171
COUNTY-OTHER	080757000	H	TRINITY	TRINITY	08	228	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		1,056	1,056	1,056	1,056	1,056	1,056	1,056
COUNTY-OTHER	080757000	H	TRINITY	TRINITY	08	228		None	GULF COAST AQUIFER	22815	H	TRINITY	TRINITY	08	228	484	526	558	561	547	522	502
GROVETON	080255000	H	TRINITY	TRINITY	08	228	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		200	200	200	200	200	200	200
GROVETON	080255000	H	TRINITY	TRINITY	08	228		None	UNDIFFERENTIATED AQUIFER	22822	H	TRINITY	TRINITY	08	228	109	119	126	127	123	118	113

Table 3G.1
Current Water Supplies Available to Region H by City and Category

WUG Name	WUG ID	WUG RWPG	WUG Basin	WUG County	WUG Basin ID	WUG County ID	WWP Number	WWP Name	Source Name	Source ID	Source RWPG	Source Basin	Source County	Source Basin ID	Source County ID	Supply (acre-feet/year)						
																2000	2010	2020	2030	2040	2050	2060
IRRIGATION	081004000	H	TRINITY	TRINITY	08	228	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		270	270	270	270	270	270	270
IRRIGATION	081004000	H	TRINITY	TRINITY	08	228		None	GULF COAST AQUIFER	22815	H	TRINITY	TRINITY	08	228	467	467	467	467	467	467	467
SERVICE COMPANY	084226000	H	TRINITY	TRINITY	08	228		None	GULF COAST AQUIFER	22815	H	TRINITY	TRINITY	08	228	104	109	111	110	104	98	95
LIVESTOCK	081005000	H	TRINITY	TRINITY	08	228		None	LIVESTOCK LOCAL SUPPLY	99708228	H	TRINITY	TRINITY	08	228	211	211	211	211	211	211	211
MINING	081003000	H	TRINITY	TRINITY	08	228		None	GULF COAST AQUIFER	22815	H	TRINITY	TRINITY	08	228	8	6	6	6	6	6	6
TRINITY	080610000	H	TRINITY	TRINITY	08	228	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		370	370	370	370	370	370	370
TRINITY	080610000	H	TRINITY	TRINITY	08	228		None	UNDIFFERENTIATED AQUIFER	22822	H	TRINITY	TRINITY	08	228	165	170	172	165	152	142	137
TRINITY RURAL WSC	084363000	H	TRINITY	TRINITY	08	228	187	TRINITY COUNTY REGIONAL WATER SUPPLY SYSTEM	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		0	0	0	0	0	0	0
TRINITY RURAL WSC	084363000	H	TRINITY	TRINITY	08	228		None	GULF COAST AQUIFER	22815	H	TRINITY	TRINITY	08	228	264	279	293	292	280	265	255
CONSOLIDATED WSC	084071000	H	TRINITY	WALKER	08	236		None	YEGUA-JACKSON AQUIFER	236YJ	H	TRINITY	WALKER	08	236	7	8	9	9	8	8	8
COUNTY-OTHER	080757000	H	SAN JACINTO	WALKER	10	236	410000	CITY OF HUNTSVILLE	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		0	0	13	209	145	158	181
COUNTY-OTHER	080757000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	4,976	5,661	6,199	6,258	6,227	6,216	6,193
COUNTY-OTHER	080757000	H	SAN JACINTO	WALKER	10	236		None	YEGUA-JACKSON AQUIFER	236YJ	H	SAN JACINTO	WALKER	10	236	91	91	91	91	91	91	91
COUNTY-OTHER	080757000	H	TRINITY	WALKER	08	236	410000	CITY OF HUNTSVILLE	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		1,681	1,681	1,668	1,472	1,536	1,523	1,500
COUNTY-OTHER	080757000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	1,846	1,287	1,656	2,017	1,892	1,905	1,928
COUNTY-OTHER	080757000	H	TRINITY	WALKER	08	236		None	UNDIFFERENTIATED AQUIFER	23622	H	TRINITY	WALKER	08	236	200	200	200	200	200	200	200
COUNTY-OTHER	080757000	H	TRINITY	WALKER	08	236		None	YEGUA-JACKSON AQUIFER	236YJ	H	TRINITY	WALKER	08	236	546	546	546	546	546	546	546
HUNTSVILLE	080292000	H	SAN JACINTO	WALKER	10	236	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		0	0	339	2,672	1,979	2,121	2,374
HUNTSVILLE	080292000	H	SAN JACINTO	WALKER	10	236	410000	CITY OF HUNTSVILLE	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	4,178	4,597	4,930	4,853	4,777	4,731	4,702
HUNTSVILLE	080292000	H	TRINITY	WALKER	08	236	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		9,522	9,522	9,183	6,850	7,543	7,401	7,148
HUNTSVILLE	080292000	H	TRINITY	WALKER	08	236	410000	CITY OF HUNTSVILLE	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	725	687	668	640	608	586	567
IRRIGATION	081004000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	5	5	5	5	5	5	5
IRRIGATION	081004000	H	TRINITY	WALKER	08	236	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		10	10	10	10	10	10	10
IRRIGATION	081004000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	5	5	4	4	4	4	4
SERVICE COMPANY	084226000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	27	29	30	30	29	28	28
LIVESTOCK	081005000	H	SAN JACINTO	WALKER	10	236		None	LIVESTOCK LOCAL SUPPLY	99710236	H	SAN JACINTO	WALKER	10	236	0	0	1	12	8	9	11
LIVESTOCK	081005000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	310	310	309	298	302	301	299
LIVESTOCK	081005000	H	TRINITY	WALKER	08	236		None	LIVESTOCK LOCAL SUPPLY	99708236	H	TRINITY	WALKER	08	236	71	106	127	138	143	148	154
LIVESTOCK	081005000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	251	216	195	184	179	174	168
MANUFACTURING	081001000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	453	577	669	753	839	914	993
MANUFACTURING	081001000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	2,065	2,631	2,422	2,111	2,312	2,352	2,369
MANUFACTURING	081001000	H	TRINITY	WALKER	08	236		None	YEGUA-JACKSON AQUIFER	236YJ	H	TRINITY	WALKER	08	236	0	0	627	1,324	1,515	1,817	2,155
MINING	081003000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	6	7	7	7	7	7	7
MINING	081003000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	6	6	6	6	6	6	6
NEW WAVERLY	080926000	H	SAN JACINTO	WALKER	10	236		None	GULF COAST AQUIFER	23615	H	SAN JACINTO	WALKER	10	236	195	218	235	243	236	235	235
RIVERSIDE WSC	084323000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	263	289	305	315	306	301	301
RIVERSIDE WSC	084323000	H	TRINITY	WALKER	08	236	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		20	20	20	20	20	20	20
TRINITY RURAL WSC	084363000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	16	15	15	14	13	12	12
TRINITY RURAL WSC	084363000	H	TRINITY	WALKER	08	236	187	TRINITY RIVER AUTHORITY	LIVINGSTON LAKE/RESERVOIR	3460804248	H	TRINITY	RESERVOIR	08		160	160	160	160	160	160	160
WALKER COUNTY RURAL WSC	084372000	H	TRINITY	WALKER	08	236		None	GULF COAST AQUIFER	23615	H	TRINITY	WALKER	08	236	594	563	544	524	496	477	462
WALKER COUNTY RURAL WSC	084372000	H	TRINITY	WALKER	08	236		None	SPARTA AQUIFER	23627	H	TRINITY	WALKER	08	236	168	276	354	395	395	407	422
BROOKSHIRE	080077000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	522	572	635	707	791	878	924
COUNTY-OTHER	080757000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	675	866	1,087	1,354	1,619	1,938	2,160
COUNTY-OTHER	080757000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	695	892	1,119	1,394	1,666	2,040	2,402
HEMPSTEAD	080271000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	946	1,128	1,346	1,582	1,860	2,139	2,320
IRRIGATION	081004000	H	BRAZOS	WALLER	12	237		None	BRAZOS RIVER ALLUVIUM AQUIFER	23705	H	BRAZOS	WALLER	12	237	4,825	4,825	4,825	4,825	4,825	4,825	4,825
IRRIGATION	081004000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	8,100	7,700	7,226	7,701	8,113	8,224	7,752
IRRIGATION	081004000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	10,053	10,453	10,927	10,452	10,040	9,737	9,268
KATY	080312000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	153	97	44	22	22	22	22
LIVESTOCK	081005000	H	BRAZOS	WALLER	12	237		None	LIVESTOCK LOCAL SUPPLY	99712237	H	BRAZOS	WALLER	12	237	232	232	232	232	232	242	277
LIVESTOCK	081005000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	444	444	444	444	444	434	399
LIVESTOCK	081005000	H	SAN JACINTO	WALLER	10	237		None	LIVESTOCK LOCAL SUPPLY	99710237	H	SAN JACINTO	WALLER	10	237	90	90	90	90	90	102	107
LIVESTOCK	081005000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	173	173	173	173	173	161	156
MANUFACTURING	081001000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	13	17	19	21	24	24	25
MANUFACTURING	081001000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	55	72	82	91	99	108	113
MINING	081003000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	9	9	9	9	9	9	9
MINING	081003000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	71	71	71	71	71	71	71
PINE ISLAND	080938000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	95	117	146	177	210	248	274
PRAIRIE VIEW	080485000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	1055	1129	1211	1307	1418	1522	1553
PRAIRIE VIEW	080485000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	116	124	133	144	156	171	185
WALLER	080629000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	353	416	488	572	668	782	891
WALKER COUNTY RURAL WSC	084372000	H	TRINITY	WALKER	08	236		None	SPARTA AQUIFER	23627	H	TRINITY	WALKER	08	236	168	276	354	395	395	407	422
BROOKSHIRE	080077000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	522	572	635	707	791	878	924
COUNTY-OTHER	080757000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	675	866	1,087	1,354	1,619	1,938	2,160
COUNTY-OTHER	080757000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	695	892	1,119	1,394	1,666	2,040	2,402
HEMPSTEAD	080271000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	946	1,128	1,346	1,582	1,860	2,139	2,320
IRRIGATION	081004000	H	BRAZOS	WALLER	12	237		None	BRAZOS RIVER ALLUVIUM AQUIFER	23705	H	BRAZOS	WALLER	12	237	4,825	4,825	4,825	4,825	4,825	4,825	4,825
IRRIGATION	081004000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	8,100	7,700	7,226	7,701	8,113	8,224	7,752
IRRIGATION	081004000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	10,053	10,453	10,927	10,452	10,040	9,737	9,268
KATY	080312000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	10115	H	SAN JACINTO	HARRIS	10	101	153	97	44	22	22	22	22
LIVESTOCK	081005000	H	BRAZOS	WALLER	12	237		None	LIVESTOCK LOCAL SUPPLY	99712237	H	BRAZOS	WALLER	12	237	232	232	232	232	232	242	277
LIVESTOCK	081005000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	444	444	444	444	444	434	399
LIVESTOCK	081005000	H	SAN JACINTO	WALLER	10	237		None	LIVESTOCK LOCAL SUPPLY	99710237	H	SAN JACINTO	WALLER	10	237	90	90	90	90	90	102	107
LIVESTOCK	081005000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	173	173	173	173	173	161	156
MANUFACTURING	081001000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	13	17	19	21	24	24	25
MANUFACTURING	081001000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	55	72	82	91	99	108	113
MINING	081003000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	9	9	9	9	9	9	9
MINING	081003000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	71	71	71	71	71	71	71
PINE ISLAND	080938000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	95	117	146	177	210	248	274
PRAIRIE VIEW	080485000	H	BRAZOS	WALLER	12	237		None	GULF COAST AQUIFER	23715	H	BRAZOS	WALLER	12	237	1055	1129	1211	1307	1418	1522	1553
PRAIRIE VIEW	080485000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	116	124	133	144	156	171	185
WALLER	080629000	H	SAN JACINTO	WALLER	10	237		None	GULF COAST AQUIFER	23715	H	SAN JACINTO	WALLER	10	237	353	416	488	572	668	782	891
WALKER COUNTY RURAL WSC	084372000	H	TRINITY	WALKER	08	236		None	SPARTA AQUIFER	23627	H	TRINITY	WALKER	08	236	168	276	354	395	395	407	422

Appendix 3H

Current Water Supplies Available to Region H by Wholesale Water Provider

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Table 3H.1
Current Water Supplies Available to the RWPG by Wholesale Water Provider

WWP Name	WWP Number	Source Type	Source WWP Number	Source RWPG	Source ID	Source Name	Supply (acre-feet/year)							
							2000	2010	2020	2030	2040	2050	2060	
BAYTOWN AREA WATER AUTHORITY	15	03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	13,326	13,326	13,326	13,326	13,326	13,326	13,326	
BRAZOS RIVER AUTHORITY	331	02		G	120BO	BRAZOS RIVER AUTHORITY SYSTEM	736,106	727,228	718,350	709,472	700,594	691,717	691,717	
BRAZOSPORT WATER AUTHORITY	2000	00		H	3461205366	BRAZOS RIVER RUN-OF-RIVER	23,017	23,017	23,017	23,017	23,017	23,017	23,017	
CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRIC	150	00		H	3460804279	TRINITY RIVER RUN-OF-RIVER	79,020	79,020	79,020	79,020	79,020	79,020	79,020	
CHOCOLATE BAYOU WATER CO.	260	00		H	3461105357A	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	17,600	17,600	17,600	17,600	17,600	17,600	17,600	
CHOCOLATE BAYOU WATER CO.	260	00		H	3461205322B	BRAZOS RIVER RUN-OF-RIVER	63,812	63,812	63,812	63,812	63,812	63,812	63,812	
CHOCOLATE BAYOU WATER CO.	260	03	325	H	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	13,935	13,935	13,935	13,935	13,935	13,935	13,935	1
CHOCOLATE BAYOU WATER CO.	260	03	331	G	120BO	BRAZOS RIVER AUTHORITY SYSTEM	5,625	5,625	5,625	5,625	5,625	5,625	5,625	
CITY OF HOUSTON	396200	01		H	07915	GULF COAST AQUIFER	1,884	1,933	1,670	1,137	1,137	1,137	1,137	
CITY OF HOUSTON	396200	01		H	10115	GULF COAST AQUIFER	82,511	86,053	98,319	84,842	84,842	84,842	84,842	
CITY OF HOUSTON	396200	01		H	17015	GULF COAST AQUIFER	463	539	538	571	598	622	640	
CITY OF HOUSTON	396200	00		H	10030	HOUSTON LAKE/RESERVOIR	168,000	168,000	168,000	168,000	168,000	168,000	168,000	
CITY OF HOUSTON	396200	00		H	08400	LIVINGSTON LAKE/RESERVOIR	940,800	940,800	940,800	940,800	940,800	940,800	940,800	
CITY OF HOUSTON	396200	00		H	61004963AWR	CONROE LAKE/RESERVOIR - COH	53,394	52,668	51,942	51,216	50,490	49,764	49,038	
CITY OF HOUSTON	396200	00		H	3460804277	TRINITY RIVER RUN-OF-RIVER	33,000	33,000	33,000	33,000	33,000	33,000	33,000	
CITY OF HUNTSVILLE	410000	01		H	23615	GULF COAST AQUIFER	4,903	5,284	5,598	5,493	5,385	5,317	5,269	
CITY OF HUNTSVILLE	410000	03	240	H	60804248WR	LIVINGSTON-WALLISVILLE LAKE/RESERVOIR	11,202	11,202	11,202	11,202	11,202	11,202	11,202	
CITY OF PASADENA	651900	01		H	10115	GULF COAST AQUIFER	1,857	2,047	2,232	2,401	2,579	2,775	2,993	
CITY OF PASADENA	651900	03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	33,035	33,035	33,035	33,035	33,035	33,035	33,035	2
CLEAR LAKE CITY WATER AUTHORITY	159000	03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	26,876	26,876	26,876	26,876	26,876	26,876	26,876	
FORT BEND CO. WCID 1	380	00		H	6115170WR	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	6,890	6,890	6,890	6,890	6,890	6,890	6,890	
GALVESTON COUNTY WCID #1	316325	03	325	H	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	4,643	4,643	4,643	4,643	4,643	4,643	4,643	1
GALVESTON COUNTY WCID #1	316325	01		H	08415	GULF COAST AQUIFER	272	309	342	359	362	366	370	
GULF COAST WATER AUTHORITY	325	00		H	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	171,193	171,193	171,193	171,193	171,193	171,193	171,193	
GULF COAST WATER AUTHORITY	325	00		H	6115169A	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	2,539	2,539	2,539	2,539	2,539	2,539	2,539	
GULF COAST WATER AUTHORITY	325	00		H	6115169B	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	1,303	1,303	1,303	1,303	1,303	1,303	1,303	
GULF COAST WATER AUTHORITY	325	03	331	H	120BO	BRAZOS RIVER AUTHORITY SYSTEM	32,668	32,668	32,668	32,668	32,668	32,668	32,668	
LA PORTE AREA WATER AUTHORITY	1095	03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	8,735	8,735	8,735	8,735	8,735	8,735	8,735	
LOWER NECHES VALLEY AUTHORITY	140	02		I	060AO	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	820,000	820,000	820,000	820,000	820,000	820,000	820,000	
LYONDELL-CITGO REFINING		03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	23,404	23,404	23,404	23,404	23,404	23,404	23,404	
NORTH CHANNEL WATER AUTHORITY	607473	01		H	10115	GULF COAST AQUIFER	3,120	3,120	3,120	3,120	3,120	3,120	3,120	3
NORTH CHANNEL WATER AUTHORITY	607473	03	396200	H	10115	GULF COAST AQUIFER	6,682	6,682	6,682	6,682	6,682	6,682	6,682	
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		01		H	10115	GULF COAST AQUIFER	81,393	66,543	36,049	21,565	21,565	21,565	21,565	
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		03	396200	H	10115	GULF COAST AQUIFER	11	0	0	0	0	0	0	
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	0	34,714	34,714	34,714	34,714	34,714	34,714	
SAN JACINTO RIVER AUTHORITY	240	00		H	3460804279	TRINITY RIVER RUN-OF-RIVER	30,000	30,000	30,000	30,000	30,000	30,000	30,000	
SAN JACINTO RIVER AUTHORITY	240	00		H	3461004964	SAN JACINTO RIVER RUN-OF-RIVER	55,000	55,000	55,000	55,000	55,000	55,000	55,000	
SAN JACINTO RIVER AUTHORITY	240	00		H	3410805271B	TRINITY RIVER RUN-OF-RIVER	56,000	56,000	56,000	56,000	56,000	56,000	56,000	
SAN JACINTO RIVER AUTHORITY	240	00		H	61004963B	CONROE LAKE/RESERVOIR - SJRA	27,506	27,132	26,758	26,384	26,010	25,636	25,262	
SAN JACINTO RIVER AUTHORITY	240	01		H	17015	GULF COAST AQUIFER	13,714	12,212	16,515	14,308	11,837	9,599	7,859	
TEXAS GENCO	398300	00		H	3460903926	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	30,000	30,000	30,000	30,000	30,000	30,000	30,000	
TEXAS GENCO	398300	00		H	3461105350	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	2,120	2,120	2,120	2,120	2,120	2,120	2,120	
TEXAS GENCO	398300	00		H	3461205320	BRAZOS RIVER RUN-OF-RIVER	29,920	29,920	29,920	29,920	29,920	29,920	29,920	
TEXAS GENCO	398300	00		H	3461205325	BRAZOS RIVER RUN-OF-RIVER	28,711	28,711	28,711	28,711	28,711	28,711	28,711	
TEXAS GENCO	398300	03	331	H	120BO	BRAZOS RIVER AUTHORITY SYSTEM	83,000	1,839	1,839	1,839	1,839	1,839	1,839	
TEXAS GENCO	398300	03	325	H	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	1,925	1,925	1,925	1,925	1,925	1,925	1,925	1
THE DOW CHEMICAL CO.	237200	00		H	3461205328B	BRAZOS RIVER RUN-OF-RIVER	148,061	148,061	148,061	148,061	148,061	148,061	148,061	
THE DOW CHEMICAL CO.	237200	03	331	H	120BO	BRAZOS RIVER AUTHORITY SYSTEM	16,000	16,000	16,000	16,000	16,000	16,000	16,000	
TRINITY RIVER AUTHORITY	187	00		H	60804248WR	LIVINGSTON-WALLISVILLE LAKE/RESERVOIR	403,200	403,200	403,200	403,200	403,200	403,200	403,200	
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		01		H	07915	GULF COAST AQUIFER	1,731	2,043	1,821	1,331	1,331	1,331	1,331	
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		01		H	10115	GULF COAST AQUIFER	41,559	30,834	17,182	10,718	10,718	10,718	10,718	
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		03	396200	H	08400	LIVINGSTON LAKE/RESERVOIR	20,437	20,437	20,437	20,437	20,437	20,437	20,437	

1. Contract amount has been adjusted to reflect available GCWA supplies.
2. Values do not show supplies from CLCWA, which serves a portion of the City, as tehse sales are made directly from CLCWA to residents.
3. Approximated by 2003-2004 ratio of groundwater to surface water.

Table 3H.2

Current Surface Water Supply by Category of Water Use by Basin by Wholesale Water Provider

WWP Name	WWP Number	Source WWP Number	Source ID	Source Name	County	Basin	Use	Supply (acre-feet/year)							Comments
								2000	2010	2020	2030	2040	2050	2060	
BAYTOWN AREA WATER AUTHORITY	15	396200	08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Municiple	12504	12504	12504	12504	12504	12504	12504	13326 is contracted from the City of Houston. The water is permited for use in Harris County San Jacinto & Trinity-San Jacinto Basins, and in Chambers County, Trinity-San Jacinto Basin.
BRAZOS RIVER AUTORITY	331		120B0	BRAZOS RIVER AUTHORITY SYSTEM	RESERVOIR	BRAZOS	Irrigation	6125	6125	6125	6125	6125	6125	6125	Permitted for use in Brazoria & Fort Bend Counties, Brazos Basin.
							Manufacturing	16000	16000	16000	16000	16000	16000	16000	Permitted for use in Brazoria County, Brazos Basin.
							Mining	1100	1100	1100	1100	1100	1100	1100	
							Municipal	32688	32688	32688	32688	32688	32688	32688	Contracted through GCWA. Permitted for use in Galveston County, San Jacinto-Brazos Basin.
							Steam Electric	83,000	83,000	83,000	83,000	83,000	83,000	83,000	
BRAZOSPORT WATER AUTHORITY	2000		3461205366	BRAZOS RIVER RUN-OF-RIVER	BRAZORIA	BRAZOS	Municipal	8742	8742	8742	8742	8742	8742	8742	Permitted for use in Brazoria County, San Jacinto-Brazos, Brazos-Colorado, & Brazos Basins.
CHAMBERS LIBERTY COUNTY NAVIGATIONAL DISTRICT	150		3460804279	TRINITY RIVER RUN-OF-RIVER	CHAMBERS	TRINITY	Municipal	12375	12375	12375	12375	12375	12375	12375	Permitted for use in Chambers County, Trinity & Neches-Trinity Basins.
CHOCOLATE BAYOU WATER COMPANY	260		3461105357A	SAN JACINTO-BRAZOS RUN-OF-RIVER	BRAZORIA	SAN JACINTO-BRAZOS	Manufacturing	14665	14665	14665	14665	14665	14665	14665	
							Irrigation	2935	2935	2935	2935	2935	2935	2935	
			3461205322B	BRAZOS RIVER RUN-OF-RIVER	FORT BEND	BRAZOS	Irrigation	63812	63812	63812	63812	63812	63812	63812	Permitted for use in Brazoria County, San Jacinto-Brazos Basin.
		325	3461205168	BRAZOS RIVER RUN-OF-RIVER	FORT BEND	BRAZOS	Manufacturing	13935	13935	13935	13935	13935	13935	13935	Permitted for use in Brazoria County, San Jacinto-Brazos Basin.
		331	120B0	BRAZOS RIVER AUTHORITY SYSTEM	RESERVOIR	BRAZOS	Irrigation	5625	5625	5625	5625	5625	5625	5625	
CITY OF HOUSTON	396200		10030	HOUSTON LAKE/RESERVOIR	RESERVOIR	SAN JACINTO	Municipal	55151	55151	55151	55151	55151	55151	55151	Contract with WHCRWA to povide water to Fort Bend County, San Jacinto Basin.
							Manufacturing	89496	89496	89496	89496	89496	89496	89496	
							Steam Electric	14367	14367	14367	14367	14367	14367	14367	
			08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	133375	133375	133375	133375	133375	133375	133375	Permitted for water use in Brazoria County, San Jacinto-Brazos Basin, Harris County, San Jacinto, San Jacinto-Brazos, and Trinity-San Jacinto Basins, Montgomery County, San Jacinto Basin.
							Manufacturing	291465	291465	291465	291465	291465	291465	291465	Permitted for use in Harris County, San Jacinto Basin.
							Irrigation	112	112	112	112	112	112	112	Permitted for use in Harris County, San Jacinto Basin.
			61004963AWR	CONROIE LAKE/RESERVOIR - COH	MONTGOMERY	SAN JACINTO	Municipal	54	54	54	54	54	54	54	
			3460804277	TRINITY RIVER RUN-OF-RIVER	POLK	TRINITY	Irrigation	33000	33000	33000	33000	33000	33000	33000	
CITY OF HUNTSVILLE	410000	240	08400	LIVINGSTON-WALLISVILLE LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	11202	11202	11202	11202	11202	11202	11202	Permitted for use in Walker County, San Jacinto & Trinity Basins.
CITY OF PASADENA	651900	396200	08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	27992	27992	27992	27992	27992	27992	27992	Permitted for use in Harris County, San Jacinto & San Jacinto-Brazos Basins.
							Manufacturing	5040	5040	5040	5040	5040	5040	5040	Permitted for use in Harris County, San Jacinto & San Jacinto-Brazos Basins.
CLEAR LAKE WATER AUTHORITY	159000	396200	08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	25084	25084	25084	25084	25084	25084	25084	Contracted from City of Houston. Permitted for use in Harris County, San Jacinto Basin.
					RESERVOIR	TRINITY	Manufacturing	1,792	1,792	1,792	1,792	1,792	1,792	1,792	Contracted from City of Houston. Permitted for use in Harris County, San Jacinto & San Jacinto-Brazos Basin.
FORT BEND COUNTY WCID 1	380		3461105170	SAN JACINTO-BRAZOS RUN-OF-RIVER	FORT BEND	SAN JACINTO-BRAZOS	Manufacturing	1000	1000	1000	1000	1000	1000	1000	
GALVESTON COUNTY WCID #1	316325	325	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	FORT BEND	BRAZOS	Municipal	4643	4643	4643	4643	4643	4643	4643	Permitted for use in Galveston County, San Jacinto-Brazos Basin.
GULF COAST WATER AUTHORITY	325		3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	FORT BEND	BRAZOS	Municipal	103908	103908	103908	103908	103908	103908	103908	Permitted for use in Fort Bend & Galveston Counties, San Jacinto-Brazos Basin.
							Manufacturing	65265	65265	65265	65265	65265	65265	65265	Permitted for use in Brazoria County, San Jacinjto-Brazos Basin.
							Mining	822	822	822	822	822	822	822	Permitted for use in Fort Bend County, San Jacinjto-Brazos Basin.
							Irrigation	1207	1207	1207	1207	1207	1207	1207	Permitted for use in Galveston County, San Jacinto-Brazos Basin, Fort Bend County, San Jacinto, Brazos, and San Jacinto-Brazos Basin, Harris County, San Jacinto & San Jacinto-Brazos Basins, and Brazoria County, San Jacinto-Brazos Basin.
			6151169A	SAN JACINTO-BRAZOS RUN-OF-RIVER	FORT BEND	SAN JACINTO-BRAZOS	Manufacturing	2539	2539	2539	2539	2539	2539	2539	
			6115169B	SAN JACINTO-BRAZOS RUN-OF-RIVER	FORT BEND	SAN JACINTO-BRAZOS	Municipal	1303	1303	1303	1303	1303	1303	1303	
		331	120B0	BRAZOS RIVER AUTHORITY SYSTEM	RESERVOIR	BRAZOS	Municipal	32668	32668	32668	32668	32668	32668	32668	
LA PORTE AREA WATER AUTHORITY	1095	396200	08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	8735	8735	8735	8735	8735	8735	8735	Permitted for use in Harris County, San Jacinto & San Jacinto-Brazos Basins.
LOWER NECHES VALLEY AUTHORITY	140		060A0	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	RESERVOIR	NECHES	Municipal	7727	7727	7727	7727	7727	7727	7727	Permitted for use in Chambers & Liberty Counties, Neches-Trinity Basin.
							Irrigation	2661	2661	2661	2661	2661	2661	2661	Permitted for use in Chambers County, Trinity & Neches-Trinity Basins, and in Galveston County, Neches-Trinity Basin.
LYONDELL - CITGO REFINNING		396200	08400	LIVINGSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Manufacturing	23404	23404	23404	23404	23404	23404	23404	
							Steam Electric	16,733	16,733	16,733	16,733	16,733	16,733	16,733	
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		396200	10030	HOUSTON LAKE/RESERVOIR	RESERVOIR	TRINITY	Manufacturing	34714	34714	34714	34714	34714	34714	34714	
SAN JACINTO RIVER AUTHORITY	240		3460804279	TRINITY RIVER RUN-OF-RIVER	CHAMBERS	TRINITY	Municipal	24726	24726	24726	24726	24726	24726	24726	Permitted for use in Montgomery County, San Jacinto Basin.
			3461004964	SAN JACINTO RIVER RUN-OF-RIVER	HARRIS	SAN JACINTO	Municipal	2016	2016	2016	2016	2016	2016	2016	
							Manufacturing	31674	31674	31674	31674	31674	31674	31674	
							Irrigation	738	738	738	738	738	738	738	
			3410805271B	TRINITY RIVER RUN-OF-RIVER	LIBERTY	TRINITY	Manufacturing	31674	31674	31674	31674	31674	31674	31674	Permitted for use in Harris County, San Jacinto Basin.
			61004963B	CONROIE LAKE/RESERVOIR - SJRA	MONTGOMERY	SAN JACINTO	Manufacturing	13605	13605	13605	13605	13605	13605	13605	Permitted for use in Harris County, Trinity-San Jacinto Basin.
							Irrigation	4996	4996	4996	4996	4996	4996	4996	
							Steam Electric	497	497	497	497	497	497	497	
TEXAS GENCO	398300		3460903926	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	CHAMBERS	TRINITY-SAN JACINTO	Steam Electric	30000	30000	30000	30000	30000	30000	30000	
			3461105350	SAN JACINTO-BRAZOS RUN-OF-RIVER	HARRIS	SAN JACINTO-BRAZOS	Steam Electric	2120	2120	2120	2120	2120	2120	2120	
			3461205320	BRAZOS RIVER RUN-OF-RIVER	FORT BEND	BRAZOS	Steam Electric	8976	8976	8976	8976	8976	8976	8976	
							Irrigation	20944	20944	20944	20944	20944	20944	20944	
			3461205325	BRAZOS RIVER RUN-OF-RIVER	FORT BEND	BRAZOS	Steam Electric	28711	28711	28711	28711	28711	28711	28711	
		331	120B0	BRAZOS RIVER AUTHORITY SYSTEM	RESERVOIR	BRAZOS	Steam Electric	83000	83000	83000	83000	83000	83000	83000	
		325	3412010	BRAZOS RIVER COMBINED RUN-OF-RIVER	RESERVOIR	BRAZOS	Municipal	1925	1925	1925	1925	1925	1925	1925	Permitted for use in Galveston County, San Jacinto-Brazos Basin.
THE DOW CHEMICAL CO.	237200		3461205328B	BRAZOS RIVER RUN-OF-RIVER	FORT BEND	BRAZORIA	Manufacturing	148061	148061	148061	148061	148061	148061	148061	
		331	120B0	BRAZOS RIVER AUTHORITY SYSTEM	RESERVOIR	BRAZOS	Manufacturing	16000	16000	16000	16000	16000	16000	16000	
TRINITY RIVER AUTHORITY	187		08400	LIVINGSTON-WALLISVILLE LAKE/RESERVOIR	RESERVOIR	TRINITY	Municipal	23292	23292	23292	23292	23292	23292	23292	
							Manufacturing	26721	26721	26721	26721	26721	26721	26721	
							Irrigation	27995	27995	27995	27995	27995	27995	27995	Permitted for use in Chambers County, Neches-Trinity Basin, Liberty County, Neches & Neches-Trinity Basins, San Jacinto, Trinity, and Walker Counties, Trinity Basin.
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		396200	10030	HOUSTON LAKE/RESERVOIR	RESERVOIR	SAN JACINTO	Municipal	20437	20437	20437	20437	20437	20437	20437	Permitted for use in Harris and Fort Bend Counties, San Jacinto Basin.

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

This chapter describes the analysis required within 31 TAC 357.7 (a) (4-7) regarding the identification of water user groups with needs and identification, evaluation and selection of appropriate water management strategies for the Region H water planning area. Water management strategies have been defined for each of the identified future water shortages within Region H 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 Wholesale Water Providers (WWPs) and Water User Groups (WUGs).

In addition to the above, this report contains a description of socioeconomic 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 Region H were identified and allocated to WUGs and WWPs based on current usage and contracts. By matching the supplies and the demands, projected surpluses and shortages were determined. Table 4A-1 in Appendix 4A lists all WUGs within Region H and their respective surplus or shortage. Projected shortages are referred to as needs.

Total water demands in Region H were 2,087,409 acre-feet per year in the year 2000, and are projected to increase to 3,412,457 acre-feet per year in year 2060. The projected 2050 demand is 3,173,614 acre-feet per year, which is approximately equal to the 2050 demand projected in the 2001 Region H Water Plan of 3,188,793 acre-feet per year. As discussed in Chapter 2, the demand projections for municipal and steam-electric power have increased, while those for manufacturing and irrigation have decreased. Total water supplies available to the region were estimated at 3,469,037 acre-feet per year in the year 2000. The estimates of available groundwater supplies included both developed (existing wells) and undeveloped supplies. Available supplies decline to 3,270,675 acre-feet per year in the year 2060 due to reservoir sedimentation and groundwater pumping limits enacted by the Harris-Galveston Coastal Subsidence District and the Fort Bend Subsidence District. This is approximately 200,000 acre-feet lower than the supply availability estimated in the 2001 Region H Water Plan. The decrease in supply is mainly due to the reduced availability reflected for the Carrizo-Wilcox aquifer, based on the estimate adopted by the Mid-East Texas Groundwater Conservation District.

The sum of the projected shortages in Table 4A-1 is 288,560 acre-feet per year in the year 2010, increasing to 1,069,469 acre-feet per year in the year 2060. The 2006 RWP year 2060 shortage is greater than the projected shortage of 790,000 acre-feet per year addressed in the

2001 Region H Plan. However, the increased shortage between the 2001 and 2006 RWPs is consistent with the projected growth rate in the 2001 RWP.

As in the 2001 plan, counties in the northern portion of the region have sufficient supplies to meet demands. Specifically, Austin, Leon, Madison, Polk, Trinity and Walker Counties have no projected shortages, predominantly due to the availability of groundwater. Additionally, the only projected shortages in Liberty and San Jacinto Counties are in irrigation, where some water rights for irrigation are not reliable during drought of record conditions.

Water shortages are projected for 250 WUGs in Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto and Waller Counties (see Table 4-1). The projected shortages are predominantly in Fort Bend, Harris and Montgomery Counties, where the majority of the WUGs are located and the current groundwater supply (from the Gulf Coast aquifer) will be exceeded by demands in the next 20 years. The greatest shortage increases from the 2001 plan are seen in Brazoria County, where manufacturing demand projections are significantly higher than in the 2001 plan (379,000 acre-feet per year in 2060, compared to 344,000 acre-feet per year in 2050 in the 2001 plan). Also, the Fort Bend Subsidence District regulatory plan has accelerated the need to bring surface water into that county. The demand projection for steam electric power also dramatically increased from the 2001 plan, which eliminated the surplus previously shown in that category.

Despite the increase in Brazoria County, the overall demand projection for manufacturing declined by approximately 5% from the previous planning cycle. Also, the projection for overall irrigation demands declined by approximately 10%.

Wholesale water providers (WWP) supplies and contracts were reviewed to determine their respective surplus or shortage during the planning period. These results are shown in Table 4A-2A in Appendix 4A. As discussed in the next section, one of the first water management strategies considered was the increase of existing water supply contracts from WWP sources to meet projected customer demands. This resulted in the full use of some WWP supplies, as shown in Table 4A-2B.

Table 4-1: Projected Shortages by County and Category

Brazoria	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
MUN	-9,280	-10,716	-14,006	-17,417	-21,888	-26,984
IRR	-32,511	-24,158	-23,298	-23,231	-25,045	-26,696
MFR	-47,629	-69,994	-91,937	-114,463	-134,894	-159,815
MIN	-393	-568	-805	-1,049	-1,337	-1,622
TOTAL	-89,813	-105,436	-130,046	-156,160	-183,164	-215,117
Chambers						
MUN	-1,526	-1,844	-2,145	-2,414	-2,703	-3,014
IRR	-27,053	-27,277	-27,411	-27,534	-27,652	-27,753
MFR	-8,264	-9,230	-10,252	-11,284	-12,240	-13,445
MIN	-5,708	-8,517	-10,378	-12,209	-14,026	-15,659
TOTAL	-42,551	-46,868	-50,186	-53,441	-56,621	-59,871
Fort Bend						
MUN	-20,713	-36,027	-63,093	-88,107	-121,713	-161,061
MFR	-1,362	-2,685	-4,298	-4,515	-4,659	-4,240
MIN	-43	-278	-786	-811	-834	-854
TOTAL	-22,118	-38,990	-68,177	-93,433	-127,206	-166,155
Galveston						
MUN	-3,940	-4,708	-5,126	-5,206	-5,294	-5,399
IRR	-10,143	-9,809	-9,264	-9,261	-9,277	-9,304
MIN	-31	-44	-50	-57	-63	-69
TOTAL	-14,114	-14,561	-14,440	-14,524	-14,634	-14,772
Harris						
MUN	-26,951	-120,973	-190,009	-228,382	-269,287	-312,724
MFR	-32,477	-42,126	-50,358	-57,634	-63,078	-60,346
MIN	-271	-423	-518	-613	-709	-794
PWR	0	-8,218	-12,038	-16,695	-22,371	-29,564
TOTAL	-59,699	-171,740	-252,923	-303,324	-355,445	-403,428
Liberty						
IRR	-14,346	-14,543	-15,827	-17,264	-18,972	-21,032
Montgomery						
MUN	-10,909	-33,316	-53,880	-76,064	-106,014	-141,307
MFR	-343	-884	-1,291	-1,672	-2,056	-2,442
MIN	-80	-193	-261	-315	-368	-413
PWR	0	0	0	-1,815	-4,140	-6,885
TOTAL	-11,332	-34,393	-55,432	-79,866	-112,578	-151,047
San Jacinto						
IRR	-492	-492	-492	-492	-492	-492
Waller						
MUN	-52	-101	-121	-120	-276	-1,026
IRR	0	0	0	0	-192	-1,133
MFR	0	0	0	0	-1	-6
TOTAL	-52	-101	-121	-120	-469	-2,165
Region H Total						
MUN	-73,371	-207,685	-328,380	-417,710	-527,175	-651,515
IRR	-84,545	-76,279	-76,292	-77,782	-81,630	-86,410
MFR	-90,075	-124,919	-158,136	-189,568	-216,928	-240,294
MIN	-6,526	-10,023	-12,798	-15,054	-17,337	-19,411
PWR	0	-8,218	-12,038	-18,510	-26,511	-36,449
TOTAL	-254,517	-427,124	-587,644	-718,624	-869,581	-1,034,079

Note: Shortages reflect use of currently developed and future available groundwater.

4.2 Potential Water Management Strategies

Potentially feasible water management strategies were identified in three ways. First, strategies recommended in the 2001 Region H Water Plan for either implementation or additional study were considered potentially feasible. Next, new strategies were solicited during the scope development period for the 2006 Water Plan. Finally, sponsoring agencies that conducted independent strategy studies could bring their reports to the planning group and request they be considered in the plan. As examples, the Brazos Saltwater Barrier was strategy developed during the scoping period, and the two municipal wastewater reclamation strategies were brought to the RHWPG during the planning cycle.

In the 2001 Regional Water Plan, thirteen water management strategies (WMS) were recommended to meet future demands. Of these, two have been implemented: the voluntary redistribution of BRA supplies through contract adjustments and the purchase of Trinity River supplies from CLCND by the SJRA. In Amendment 1 to the 2001 Plan, indirect reuse of wastewater by SJRA was recommended and that permit has since been issued by the TCEQ. The remaining eleven strategies were reassessed during the current round of planning. Two additional strategies were considered, an interbasin transfer of existing supplies from east Texas (i.e., the Lower Neches Valley Authority and the Sabine River Authority) and a saltwater barrier to protect water quality in the lower Brazos River. During the planning period, Governor Perry started a seawater desalination initiative through the TWDB. One of the sites considered is within Region H and specifically located in Freeport. Finally, the 2001 Regional Water Plan was amended to add additional strategies being pursued by Wholesale Water Providers in the region. All of the management strategies discussed above were considered as potential management strategies in this plan.

4.2.1 Studies by the RHWPG

Potential water management strategies were defined based on the above determination of needs. Strategies were updated and configured to address the specific types and nature of identified shortages. As in the 2001 RWP, the strategies were analyzed at the wholesale provider or county level. A number of potential strategies were defined for Montgomery County due to the projected growth in the county. The following potential management strategies were identified:

- Municipal Water Conservation
- Irrigation Conservation
- Industrial Conservation
- Non-Municipal Contractual Transfers
- Allens Creek Reservoir
- Bedias Reservoir
- Bedias Reservoir to Lake Conroe Transfer
- Little River Reservoir
- Wastewater Reclamation for Industry
- City of Houston/Trinity River Authority Contract Agreement

- Luce Bayou Interbasin Conveyance
- Houston To Gulf Coast Water Authority Transfer
- Brazos Saltwater Barrier
- Brazos River Authority System Operations Permit
- Houston Indirect Wastewater Reuse
- NHCRWA Indirect Wastewater Reuse
- New permits in the San Jacinto Basin (Lake Houston yield, San Jacinto run-of-river, and four bayous)
- Redesignation of Existing Water Rights
- San Jacinto River Authority/ Trinity River Authority Contract Agreement
- Expanded use of Groundwater
- Sabine Basin to Region H Interbasin Transfer
- Municipal Irrigation Reuse

For each of these management strategies a detailed technical memorandum is provided in Appendix 4B. Not all of the strategies evaluated are based on developing additional water. Several strategies consist of water transfer facilities only (e.g., Luce Bayou or Bedias Transfer). Expanded use of groundwater addresses the requirements to fully develop existing groundwater supplies. Other strategies only involve the contractual exchange of water supplies between various water suppliers (e.g., the TRA / City of Houston water transfers). These strategies recognize the need to transfer supply from areas of excess to the specific areas of need.

No groundwater transport strategies were investigated since there is projected to be full utilization of the regulated or sustainable yield of all of the aquifers within the counties of highest water demand. The 2001 plan identified Leon and Madison Counties as having surplus groundwater supplies, but did not recommend development and transport of that supply. Since then, the Bluebonnet, Lone Star and Mid-East Texas Groundwater Conservation Districts were formed, and each has published a Groundwater Management Plan. The Region H Water Planning Group has elected to not consider strategies that move groundwater out of its county of origin.

The technical memorandum reviewing 19 potential surface water reservoir projects was updated and included in Appendix 4B. Separate, more detailed technical memoranda are included for the three projects recommended in the 2001 Regional Water Plan (Allens Creek reservoir, Bedias Reservoir and Little River Reservoir).

Assessment of each of the potential management strategies conducted as a part of this study included an evaluation of cost, environmental impacts, impacts on other water resources, and additional factors as applicable. Discussions of necessary implementation activities associated with various strategies are also included in the technical memoranda. In order to assess the strategies on a comparable cost basis, a detailed set of unit costs was developed and applied to each alternative. A description of the costing methodology is contained within Appendix 4C.

4.2.2 Studies by Others

Several of the water management strategies considered by the RHWPG were studied in detail by other agencies. The Freeport Seawater Desalination Project, Brazos River Authority System Operations Permit, and the Little River Off-Channel Reservoir were studied in greater detail by others and incorporated into the current plan as potential management strategies. The technical memoranda included in Appendix 4B contain summaries and/or extracts from the source reports.

Governor Perry directed the TWDB in 2002 to develop a seawater desalination demonstration project. The TWDB selected three potential sites, in the Lower Rio Grande Valley – Brownsville, Corpus Christi and Freeport, this last being within Region H. The Freeport study recommends a 10-mgd demonstration facility be constructed, with the potential for future expansions up to 50-mgd.

The Brazos River Authority submitted a water right application in 2004 for additional yield gained through System Operations. The technical study in support of the application determined that additional firm yield could be realized from the BRA system when their reservoirs are operated as a system instead of as separate sources. The additional yield comes from a combination of reservoir capacity not recognized in the existing permits, efficiencies realized when operated as a system, and the ability to use unreliable river flows, when available, to meet demands and thus increase the amount of stored water for drought periods.

Finally, the Brazos G Water Planning Group studied several new reservoirs in the middle and upper Brazos River Basin, and has modeled these sites using the Watershed Availability Model. The Little River Reservoir was selected as a management strategy by Region H in the 2001 plan. The Little River Off-Channel Reservoir (Beaver Creek Site) was considered by the RHWPG in this round of planning. Excerpts from the Brazos G report are contained in the technical memoranda for Little River Off-Channel Reservoir.

4.2.3 Need for Interbasin Transfers

As can be seen by reviewing the current water supplies and potential water management strategies, Region H is highly dependent upon the interbasin transfer of water. Water is currently imported from Lake Livingston and the Trinity River to meet demands in Harris County, and from the Brazos River to meet demands in Galveston County. Future strategies recommend fully utilizing existing supplies in all basins, which will require transferring additional water from the Trinity Basin to the San Jacinto basin for Harris and Montgomery Counties. Most important of these in the near term is the Luce Bayou Transfer, which will move available water from the Trinity River into Lake Houston where it can be utilized.

Under current law, amending a water right to allow the interbasin transfer of supply makes the water right junior to all other rights in the source basin. Because reliability is partially based on the seniority of a water right, this provision in the water code makes new interbasin transfers difficult to accomplish. However, water transferred from a river basin to the adjoining coastal basin is not considered an interbasin transfer. Therefore, transfers from the Brazos River to Galveston County or from the Trinity River to eastern Harris County are not at risk. However, a significant portion of the growth and demands to be met are in the San Jacinto basin. Some of the water identified to meet this demand is already permitted for

interbasin transfer. These supplies include the TRA portion of Lake Livingston, the City of Houston Trinity River permits and the SJRA Devers Canal permit. Other water rights must be amended to allow this transfer, such as the CLCND supply recently purchased by the SJRA.

4.2.4 Drought Management

The Regional Water Planning Guidelines require that drought management strategies be considered for each identified need. If drought management is not selected as a strategy, the reason must be documented. Drought management strategies may include water demand management.

The supply and demand values used for this plan are based on estimated drought of record conditions. Under non-drought conditions, the region will have an overall surplus of supply, that surplus does not coexist with the growing demand areas. The majority of available supply is in Lake Livingston, which is in the Trinity Basin. The majority of the growth is occurring in Brazoria, Fort Bend, Harris and Montgomery Counties, which are in the Brazos and San Jacinto Basins. To meet the demands where they occur, supply from the Trinity must be transferred into the San Jacinto Basin. Once that infrastructure is constructed, it is not "drought-susceptible", because the permitted yield of the underlying water rights does not exceed the drought yield. Similarly, surface supplies are replacing groundwater due to subsidence regulations, and that supply is also firm yield.

Within the Brazos Basin, there is a significant difference between the permitted and drought yield of the DOW manufacturing water right (almost 60,000 acre-foot/year, or 30% of the permitted yield). Other lower basin water rights also see drought affects, although none so severe. The TCEQ requires that supplies used to meet municipal demands be firm (drought-of-record) yields, so none of this non-reliable supply may be assigned to meet future growth. It is generally more costly to transfer existing supply from the Trinity Basin than to develop new supply in-basin; therefore, the new in-basin projects with firm yields were recommended in the plan as being superior to inter-basin transfers.

The shortages identified in the plan are based on future demands (based on projected growth) exceeding the drought yield of existing supplies. The strategies recommended to meet these shortages also reflect estimated drought yields. Because Region H was able to address all projected shortages through conservation, allocation of existing supplies and development of new supplies, no unmet demands remain to be addressed through drought management strategies.

This does not preclude some WUG's from electing to use drought management in lieu of a recommended strategy. The best example of this is for irrigation. Region H recommends irrigation conservation as a management strategy in those counties with projected irrigation shortages. However, portions of those irrigation demands are met today through the use of water rights which are not fully reliable, backed up by one-year contracts for reliable supply as needed. Irrigators holding interruptible water rights may choose not to implement conservation (at an annual cost), but instead choose to reduce their irrigated acreage during a drought year (for a discrete cost), or enter into long-term contracts for reliable surface water from a wholesale supplier (which will be available in our eastern counties). That is an

individual economic decision and the Region H plan leaves them the flexibility to exercise that option.

Region H has sufficient supply available from existing sources and recommended strategies to meet near-term and long-term needs under projected drought of record conditions. In the counties with greatest projected demands, the groundwater use from the Gulf Coast aquifer is limited through Subsidence District regulations and not by aquifer productivity. While over-drafting of the aquifer is not the recommended drought response, it remains as a short-term safety net while new surface supplies are developed.

Finally, municipalities and water providers throughout the region have published drought contingency plans. In general, these plans are designed to address short-term periods of limited water availability through public notice and outdoor water use restrictions. While these methods are effective over a limited period of time, they are unlikely to overcome the drought of record, which lasted five years. Only the development of reliable supplies to meet projected growth will protect the region from the economic impacts of a prolonged drought.

4.3 Strategy Evaluation and Selection

In evaluating the potential water management strategies, the Region H Water Planning Group made three assumptions. First, water user groups would continue to develop groundwater until it was fully utilized. This is based upon the observed pattern of development in the region, where the Gulf Coast aquifer is available in all of the southern counties. Second, those WUGs currently receiving water from Wholesale Water Providers would be able to increase their contract amounts until the WWP supplies were fully allocated.

Finally, the RHWPG assumed that every municipal WUG with a projected shortage would utilize conservation before seeking out or increasing a WWP contract. Based on these assumptions, the projected shortage in 2060 is reduced from 1,069,500 acre-feet to 941,700 acre-feet (see Table 4-2).

4.3.1 Evaluation of Water Management Strategies

The potential water management strategies were compared using a screening table (See Table 4A-3 in Appendix 4A), with the required environmental assessments summarized in Table 4A-4. The comparison table summarized project yield, capital and unit water costs, impacts on wetlands habitats and B&E flows, and impacts on landform. Evaluation criteria included cost, yield, location, water quality, environmental land and habitats, local preference, institutional constraints or risk of non-implementation, impacts on environmental flows and impacts on other water management strategies. In each of the evaluation categories, the strategy was rated positively (+1), neutral (0) or negatively (-1), using evaluation criteria summarized in Table 4-3, below. As would be expected, water conservation and full use of existing supplies rated the highest of the potential strategies. Direct wastewater reuse for industry also rated highly. Although direct reuse is more costly that using existing supply, it is less expensive than developing a new freshwater source, and with fewer environmental impacts. Seawater desalination ranked below direct reuse due to the higher cost of the supply, but it too carried few environmental impacts. Equal in rank with desalination were the inter-basin transfer of existing Lake Livingston supply, increased yield realized from Lake Houston, the BRA System operations permit and the construction of a saltwater barrier

on the lower Brazos River. All of these strategies would impact flows in the source basins. Next ranked were the indirect reuse strategies for Houston and North Harris County Regional Water Authority, and the transfer of supply from Houston to GCWA. All of the above strategies were rated positively in the cost-benefit-impact analysis. Certain strategies (i.e., the inter-basin transfer of supply from east Texas and all of the potential reservoir sites) were rated negatively due to the significant habitat and flows impacts these projects entail.

Table 4-2: Initial and Net Shortages by County

	2010	2020	2030	2040	2050	2060
Brazoria County						
Initial Shortage*	-89,813	-105,436	-130,046	-156,160	-183,164	-215,117
Municipal Conservation	1,321	2,290	2,713	2,976	3,274	3,600
Contract Expansions (1)	2,350	3,220	4,715	4,835	4,835	4,835
Net Shortage**	-87,719	-102,277	-125,098	-149,903	-175,921	-206,703
Chambers County						
Initial Shortage*	-71,405	-75,994	-79,498	-82,954	-86,366	-89,888
Municipal Conservation	114	137	158	174	196	216
Net Shortage**	-71,291	-75,857	-79,340	-82,780	-86,170	-89,672
Fort Bend County						
Initial Shortage*	-22,118	-38,990	-68,177	-93,433	-127,206	-166,155
Municipal Conservation	2,792	3,998	6,749	8,357	10,418	12,869
Contract Expansions (2)	0	1,178	1,178	1,178	1,178	1,178
Net Shortage**	-19,326	-34,518	-60,609	-83,898	-115,610	-152,108
Galveston County						
Initial Shortage*	-14,114	-14,561	-14,440	-14,524	-14,634	-14,772
Municipal Conservation	548	604	636	643	649	657
Net Shortage**	-13,566	-13,957	-13,804	-13,881	-13,985	-14,115
Harris County						
Initial Shortage*	-59,699	-171,740	-252,923	-302,492	-355,445	-403,428
Municipal Conservation	5,100	18,153	21,179	23,845	26,468	29,296
Contract Expansions (3)	10,334	62,198	62,268	62,313	62,313	62,322
Net Shortage**	-47,592	-93,664	-171,016	-218,193	-267,168	-311,813
Liberty County						
Irrigation Shortage*	-19,535	-19,774	-21,089	-22,558	-24,303	-26,405
Montgomery County						
Initial Shortage*	-11,332	-34,393	-55,432	-79,866	-112,578	-151,047
Municipal Conservation	4,285	5,695	6,971	8,312	10,112	12,230
Net Shortage**	-7,047	-28,698	-48,461	-71,554	-102,466	-138,817
San Jacinto County						
Irrigation Shortage*	-492	-492	-492	-492	-492	-492
Waller County						
Initial Shortage*	-52	-101	-121	-120	-469	-2,165
Municipal Conservation	10	10	10	10	167	602
Net Shortage**	-42	-91	-111	-110	-302	-1,589
Region H Totals						
Initial Shortages	-288,560	-461,481	-622,218	-752,599	-904,657	-1,069,469
Net Shortages	-266,610	-369,328	-520,020	-643,369	-786,417	-941,714

* Shortage values reflect the sum of all WUG shortages without offsets for other WUG surpluses.

** Net Shortage value is not the mathematical difference because conservation and expansions do not align exactly with WUG shortages.

(1) Contract expansions by Brazosport Water Authority

(2) Contract expansion by City of Houston for WHCRWA

(3) Contract expansions by Cities of Houston and Pasadena, and Baytown Area Water Authority

The effects of strategies in combination were considered through the use of the TCEQ Water Availability Model, described in Section 4.5 and Appendix 4D. For this modeling scenario, the recommended water management strategies from the 2001 Regional Water Plans were incorporated into the model. As described in detail in Section 4.5, the cumulative affect of the current State Water Plan on Galveston Bay was a slight increase in freshwater inflows over current conditions, with a shift of inflows west from Trinity Bay into Upper Galveston Bay. A portion of that study was directed at determining the affects of the WMS in combination on lake levels. This is discussed in greater detail in Chapter 5, but is generally discussed below. The lake level study compared current use, full use of water rights with current return flow percentages, full use of water rights with full reuse (no return flows) and future strategies in combination with current return flow percentages unless reuse was specified. The comparison underscored the volume of return flows within the Trinity and San Jacinto basins, and the potential impacts full reuse would have on water availability.

Table 4-3: WMS Rating Criteria

	Rating Criteria		
Category	**-1**	**0**	**1**
Cost	<$100/ac-ft	<$200/ac-ft	>$200/ac-ft
Yield	Size is too small or too large for need	Size is flexible or meets needs	Size can be adjusted to optimum
Location	IBT required, long distance or outside Region H.	No IBT required. Conveyance required.	No IBT required. Relatively near demand.
Water Quality	Quality of supply is reduced.	No known water quality issues.	Existing water quality problems are reduced.
Environmental Land & Habitat	Significant environmental issues and opposition.	Environmental impacts can be mitigated. Limited concerns.	Limited or no known impacts.
Local Preference	No local support. Significant opposition.	Some local support. Limited opposition.	Widespread local support. Multi-use benefits likely.
Institutional Constraints / Risk of Implementability	Permits opposed. Significant property required.	Permits expected with minimal problems. Property available.	Permits issued. Facilities or land owned. Water available.
Impacts on Environmental Flows	Reduces instream or B&E flows.	No impact.	Increases instream or B&E flows.
Impacts on Other Management Strategies	Negative impact.	No impact.	Positive impact.

4.3.2 Water Conservation

The RHWPG advocates water conservation for all water users in the Region, noting that "the least expensive water you can get is the water you already have." Some conservation will be realized through low-flow water fixture laws (embedded in the demand estimates), and from new energy-efficient clothes washers, but more savings can be achieved. Every water user group and provider is encouraged to establish an aggressive water conservation goal. The Water Conservation Implementation Task Force established by the 78th Texas Legislature recommended a goal of reducing demand by 1% each year to achieve an average demand of 140-gpcd. Because the median municipal water demand in this region is 135-gpcd, because

conservation programs are voluntary, and because they require an investment of time and resources to implement, this plan only reflects water conservation as a water management strategy for water user groups with projected shortages and those that specifically asked to reflect their program in the plan tables. These savings are conservatively estimated at 5.5 to 7 percent of total demand, based on current best management practices that are producing results.

4.3.3 Selection of Water Management Strategies

To facilitate the strategy selection process, water needs and potential strategies were grouped and evaluated on a county-by-county basis (see Table 4A-5). Efforts were then made to select the best-rated strategies to meet the needs in those counties. In Chambers, Liberty, San Jacinto and Waller Counties, that was possible because a combination of water conservation and existing supply was sufficient to meet the projected shortages. Several larger strategies, (BRA System Operations, Freeport Desalination, Allens Creek Reservoir and Little River Off-Channel Reservoir) were required to meet the needs of Fort Bend and Brazoria Counties. In Harris County, direct and indirect reuse along with TRA supply purchased from Lake Livingston was sufficient to meet projected demands. In Montgomery County, the ability to transfer Trinity Basin supply via Luce Bayou and Lake Houston facilitated the full use of existing supplies. Once the slate of strategies was selected, the starting decades were adjusted to match the projected demands. A summary is provided in Table 4-4, below, and shown in detail in Table 4A-6.

Two projects from the 2001 Region H Water Plan were replaced under this selection process. Little River (on-channel) Reservoir was replaced with a combination of BRA System Operations and the Little River Off-Channel Reservoir. The System Operations strategy requires no infrastructure other than diversion pump stations, and the off-channel version of Little River Reservoir avoids bottomlands areas. These two strategies have less potential impact on wetlands and aquatic habitats than the original reservoir strategy. Second, Bedias Reservoir and the associated interbasin transfer were replaced with a shared interbasin transfer from the Trinity Basin to Lake Houston.

Several of the recommended strategies produce no yield. The Luce Bayou Transfer is a conveyance project that would be used in conjunction with Expanding Current Contracts, New Contracts from Existing Supply, TRA to Houston Contract, and TRA to SJRA Contract. The Brazos Saltwater Barrier would protect current water right holders in the lower Brazos from saltwater migration during periods of low flows and increased future diversions (i.e., full utilization of authorized diversions). Redesignation of existing water rights to add use types does not increase the yield of that right, but allows the water provider to serve new water users as they change within a given service area.

Table 4-4: Recommended Water Management Strategies

WMS	Yield (ac-ft/yr)	Capital Cost	Starting Decade
Municipal Conservation*	101,200	0	2000
Irrigation Conservation	77,900	$ 573,000	2010
Industrial Conservation	TBD	TBD	2000
Expanded Use of Groundwater**	91,497	at WUG level	2010
Expand/Increase Current Contracts	68,300	at WUG level	2010
New Contracts from Existing Supply	215,400	see Luce Bayou	2010
Luce Bayou IBT Conveyance	N/A	$ 239,000,000	2020
BRA System Operations Permit	120,000	$4,500,000	2010
Allens Creek Reservoir	99,700	$ 170,040,000	2030
Little River Off-Channel Reservoir	32,100	$ 96,512,000	2050
Non-Municipal Contractual Transfers	21,000	at WUG level	2010
Wastewater Reuse for Industry	67,200	$ 234,158,000	2020
TRA to Houston Contract	150,000	see Luce Bayou	2030
TRA to SJRA Contract	50,000	see Luce Bayou	2030
Houston to GCWA Transfer****	42,000	$ 102,382,000	2010
Houston Indirect Wastewater Reuse***	98,000	TBD	2050
NHCRWA Indirect Wastewater Reuse***	31,400	TBD	2060
Lake Houston Additional Yield	13,500	$ 0	2010
Freeport Seawater Desalination	33,600	$ 255,699,000	2020
Brazos Saltwater Barrier	N/A	$ 30,300,000	2030
Redesignation of Existing Water Rights	N/A	N/A	2010
New San Jacinto River Water Rights	0	$ 0	2010
New Harris County Bayous Water Rights	0	$ 9,013,000	2010

* Includes COH voluntary conservation.
** Future development of groundwater shown as available to each WUG
***Indirect reuse recommended at 20% of potential yield
****Two tier plan that includes 14,000 ac-ft/yr in 2010 option or up to 42,000 ac-ft/yr in 2050.

Two of the recommended water rights applications produce no firm yield, specifically the Houston/SJRA joint permit application for interruptible supply from the San Jacinto River and the City of Houston permit application for interruptible supply from four bayous within the city limits. They are included to allow the applicants to develop operational plans for conjunctive use of these local supplies with firm supplies transferred from the Trinity River. While these permits would reduce flows into Upper Galveston Bay, the affects would be mitigated by wastewater return flows back into the source streams. The offset Trinity River supplies would remain in-basin and flow into Trinity Bay, where the historic freshwater inflow demand is the greatest.

There were no water quality concerns with any of the recommended WMS. That is, conventional water treatment would provide supply acceptable for the typical WUG needs, unless the strategy itself recommended a specific water quality improvement. These strategies included direct reuse of wastewater and seawater desalination, both of which required filtration and reverse osmosis treatment, and the Brazos saltwater barrier, which protects the quality of existing supply at current diversion points.

4.3.4 Alternate Water Management Strategies

Although all of the recommended WMS are feasible, it is not a certainty that all will be implemented, and those that are implemented may be of a different capacity or on a different schedule than that reflected in this plan. Several alternative WMS are available to Region H, either through increasing the capacity of recommended strategies or by replacing current strategies with feasible strategies recommended in the 2001 plan. Alternative strategies are potentially feasible strategies that will receive first consideration if additional supply is needed. These alternate strategies are summarized in Table 4-5 and described below.

Table 4-5: Alternate WMS Available to Region H

Strategy	WUG(s)	County	Basin	Yield ac-ft/yr	Could Replace
COH Indirect Reuse (50%)	all	101	10	245,100	TRA to COH Transfer
NHCRWA Indirect Reuse (50%)	all	101	10	78,500	Luce Bayou Transfer
Freeport Desal (Full Use)	all	020, 079	12	28,000	BRA System Operations
COH transfer to Fort Bend	MUN	079	10, 11	30,000	COH to GCWA transfer
COH transfer to GCWA	MUN, MFR	084	11	8,000	Little River Off-Channel Reservoir
GCWA transfer to Fort Bend	MUN	079	11, 12	8,000	Little River Off-Channel Reservoir
Bedias Reservoir and Transfer	all	170	10	90,700	TRA to SJRA Transfer
Little River Reservoir	all	020, 079	11, 12, 13	129,000	BRA System Operations
Contractual realignment of future sources between WUGs	All	079, 101, 170	9, 10, 11, 12	None	None

Indirect wastewater reuse by the City of Houston has a potential yield of 490,200 acre-feet per year (in addition to direct reuse of up to 90,700 acre-feet per year for industry). The RHWPG recommended allocating only 20% of that potential yield as a management strategy, based on the shortage after other WMS were applied to Harris County. This strategy could be increased to 50% of the potential available yield if the Luce Bayou transfer is delayed, or the TRA to Houston contract strategy is reduced in size.

Indirect wastewater reuse by the North Harris County Regional Water Authority has a potential yield of up to 157,000 acre-feet per year (in 2060). The RHWPG recommended allocating only 20% of that potential yield as a management strategy, based on the shortage after other WMS were applied to Harris County. This strategy could be increased to 50% of the potential available yield if the Luce Bayou transfer is delayed, or the TRA to Houston contract strategy is reduced in size. Because the majority of the discharges contributing to this permit are in the Lake Houston watershed, the additional yield could be realized at the Northeast Water Purification Plant which supplies the NHCRWA.

The Seawater Desalination Demonstration Plant in Freeport is initially sized at 10-mgd, and 25-mgd in the later decades. It could be expanded to 50-mgd if growth in mid-Brazoria County continues at its current rate, which will reduce the unit cost of water for the strategy.

A water transfer from Houston to the Gulf Coast Water Authority is recommended as a means of meeting demands in Galveston County. The recommended project is oversized for

Galveston County, which would allow the GCWA to reallocate a portion of its Brazos River supply to customers in Fort Bend County. An alternative to this strategy is for the City of Houston to provide water directly to customers in Fort Bend County, particularly since Houston's city limits extend into Fort Bend. Conversely, the GCWA transfer strategy could also be increased in size to bring more water into Galveston County from the east, and allow the GCWA to further increase sales of Brazos water in Fort Bend County.

Two reservoir projects from the 2001 Region H plan were not recommended in the 2006 plan, because other WMS with similar yields were available as substitutions. If the Luce Bayou conveyance from the Trinity River to Lake Houston becomes unfeasible, or if the supply to be transferred is reallocated elsewhere, an alternate transfer strategy would be Bedias Reservoir and the transfer into Lake Conroe. In the Brazos Basin, if the BRA system operations permit is not approved, or allocated elsewhere in the basin, the Little River main-stem reservoir is the only available alternative of similar yield. The development of the Little River Off-Channel Reservoir would remove the main-stem site from consideration, because they capture the same flows. Both of the reservoir alternatives require significant advance planning and permitting, and cannot be implemented as quickly as the other strategies.

Finally, this plan allocates future supply from WWPs to WUGs based on existing contracts and service areas. Many of these WWPs own multiple sources of supply, some of which are located within other WUG service areas. It would be more efficient for those WUGs to receive supply from the nearest source, either through a new contract with the owning WWP, or a transfer of supply between WWPs. This is likely to occur in Montgomery County, where the City of Houston supply in Lake Conroe is closer to the demand centers than the SJRA supply available in the lower San Jacinto Basin. The contractual exchange of either customers or supplies between these WWPs would reduce the infrastructure required to bring new supply into Montgomery County. In Fort Bend County, both the BRA and the City of Houston are capable of providing supply from Allens Creek Reservoir. The WHCRWA is listed in the plan as receiving supply from the east via the City of Houston. However, the WHCRWA extends into Fort Bend County, and could receive a portion of their future supply from this Brazos Basin supply. The BRA and the City would then reallocate their remaining available supplies between the remaining WUGs. Until contracts are actually entered into for all future supplies, the WWP-WUG associations will fluctuate, particularly in areas where service areas meet or overlap.

4.3.5 Future Water Management Strategies

As in the 2001 plan, some of the strategies considered were not recommended for inclusion in this plan, but should be reconsidered in future plans as the population and water demands of Region H increase in future decades. These future strategies include both new and existing water sources.

The transfer of water from East Texas remains a potential source of water for Region H. Toledo Bend and Sam Rayburn reservoirs have significant amounts of water available, and the cost and impacts of transferring this supply may compare favorably against the cost and impacts of developing the next future supply.

Additional desalination facilities should be considered in the subsequent regional plans. The pilot project at Freeport will provide the region with facilities and operational cost and

impact data (as well as 10-mgd of high-quality water). The western rim of Galveston Bay offers several attractive facility locations, including the P.H. Robinson power plant near Kemah and the industrial complex in Texas City.

4.4 Strategy Allocation

Water management strategies were allocated on a county by county basis. The Conservation strategies and Expanded Use of Groundwater were allocated directly to WUGs prior to the selection of new supply strategies, as shown in Table 4-2. New supply strategies were associated with the sponsoring WWP as discussed in the technical memoranda, then allocated by county, and finally down to individual WUGs. The details of these allocations are shown on Table 4A-6: Recommended WUG Water Management Strategies, and Table 4A-7: Recommended Water Management Strategies by WWP, both in Appendix 4A.

The City of Houston, which exists as both a WUG and a WWP, is not projected to experience a shortage within the planning period. However, the City of Houston has an aggressive water conservation program, and asked that it be reflected in the plan as a WMS. For consistency with the other large municipal WUGs (population 10,000 or greater), conservation savings were projected at 7% of total water demand and entered as a WMS.

Due to the large number of municipalities and water utilities within Region H, the RHWPG did not attempt to create an absolute linkage between every WUG and the wholesale water providers. Instead, this plan reflects a "Water Available for Purchase" concept, with sufficient supply available in each county to meet, and most cases exceed, projected demands. Selection of a provider is an individual WUG option, and in some locations, there may be three or more providers with available supply. In constructing Table 4A-6, new supplies are shown as coming from the existing water owner (if from a surplus) or from a project sponsor (if from a new supply). Intermediate WWPs (those which purchase supply from the water rights holders and then treat and resell the water) are not reflected in the new supply strategies, but will certainly serve as the closest wholesaler for WUGs in certain areas. Similarly, by the time some future strategies are implemented, there will be new wholesale water providers available, due to the growth of current retailers.

One additional factor affecting strategy allocation which is anticipated but not reflected in the plan is the formation of new regional water authorities. Region H currently has two regional water authorities, and the formation of a third in Fort Bend County is being considered during the current (2005) Legislative Session. These authorities are being formed in response to Subsidence District rules, which limit the amount of water demand that can be met from groundwater in Harris, Galveston and Fort Bend Counties. The Authorities manage the transition from groundwater to surface water for their member cities and utilities. By managing at a collective level, they are able to (1) address those WUGs with the most immediate needs earliest, (2) over-serve some members with surface water in order to allow others to remain on groundwater (because groundwater usage can be aggregated at the Authority level), and (3) enter into water supply contracts and construct required infrastructure at lower unit costs due to economies of scale. An additional advantage of forming Regional Water Authorities is that the RWA management team understands the long-term water supply needs of their area, and does not focus solely on the near-term. Both

the North Harris County RWA and the West Harris County RWA have actively participated in the Region H planning process.

Infrastructure costs were estimated for all of the potential and selected WMS, using the cost estimating methods detailed in Appendix 4C. See the respective technical memoranda in Appendix 4B for the costs associated with each management strategy. In addition, infrastructure costs were estimated for treatment and conveyance to each municipal WUG receiving water from a WMS, to include the cost for additional wells if needed to fully develop available groundwater. In Fort Bend and Montgomery Counties, a significant increase in surface water use is projected to meet future demands. In those counties, regional treatment and distribution facilities were sized to provide a basis for cost estimating, but are not considered the only facility alignment considered consistent with this plan. Variations from these groupings are normal and expected to occur.

In Fort Bend County, new surface water supply will come from the Brazos River. It was assumed that there would be three service areas. One would serve the northern portion of the county (above the Brazos River), one would serve the portion of Subsidence Area A west of the Brazos River (including Richmond and Rosenberg), and the third would serve the eastern edge of the County (including Sugarland and Missouri City). A diagram of these areas, the proposed pump stations, treatment plants and distribution systems are shown on Figure 4C-1 in Appendix C.

In Montgomery County, new surface water supply will come from Lake Conroe, the San Jacinto River at Lake Houston, and the Trinity River via the Luce Bayou transfer into Lake Houston. It was assumed that there would be two service areas. One would serve the northern portion of the county (above Highway 105, including all of Conroe), one would serve the southern portion of the County (including the Woodlands). A diagram of these areas, the proposed pump stations, treatment plants and distribution systems are shown on Figure 4C-2 in Appendix C.

The cost estimates for these regional facilities are provided in Table 4C-1 in Appendix 4C. The individual WUG infrastructure costs required to connect into the regional systems were estimated, and are detailed in Table 4C-2. In that table, each WUG is allocated a pro rata share of the regional facility cost in addition to their internal infrastructure cost.

Water savings associated with the new federal energy regulations which start in year 2007 can be seen in technical memorandum for Municipal Conservation in Appendix 4B-1. The water savings realized as a result of the new energy standards is estimated to range from 3,847 to 21,811 acre-feet for the 2010 and 2060 decades, respectively. Table 4A-1A shows the shortages for WUGs. The savings for the clothes washer conversion is calculated for each WUG, shown included in the shortages shown in Table 4A-1B and the supply reduction shown in Table 4A-10.

4.5 Impacts of the 2001 State Water Plan on Galveston Bay Inflows

As part of the 2002 State Water Plan, Region H and Region C identified new management strategies totaling over 2 million acre-feet per year. While the relationship between Region H and Galveston Bay is readily apparent, Region C also impacts Galveston Bay due to its location in the upper extents of the Trinity River Basin. Thus the management strategies from both regions have the potential to impact inflows to Galveston Bay.

The inflows to Galveston Bay are primarily from the Trinity and San Jacinto Rivers. The Neches-Trinity, Trinity-San Jacinto and San Jacinto-Brazos Coastal Basins also contribute inflows to the bay. For purposes of characterizing the location of inflows, the following 5 sub-bay designations will be used: East, Trinity, Upper Galveston, Lower Galveston and West Bays. Table 4-6 summarizes the basins contributing inflows to the various sub-bays. Figure 4D-1 in Appendix 4D shows the sub-bays of Galveston Bay, and Figure 4D-2 shows the basins contributing to Galveston Bay

Table 4-6: Basins and Sub-bays in the Galveston Bay System

Basin	Drainage Area[1]	Sub-bay
Trinity	17,945 sq mi	Trinity Bay
San Jacinto	3,978 sq mi	Upper Galveston Bay
Neches – Trinity[2]	368 sq mi	East Bay & Trinity Bay
Trinity - San Jacinto	250 sq mi	Upper Galveston Bay
San Jacinto-Brazos[3]	610 sq mi	Upper Galveston Bay, Lower Galveston Bay & West Bay
Total	23,151 sq mi	

1. Drainage areas from TCEQ WAMs.
2. The drainage area for the Neches-Trinity Basin does not include areas draining to the Intracoastal Waterway or Sabine Lake.
3. The drainage area for the San Jacinto-Brazos Basin does not include areas draining directly into the Gulf of Mexico.

Several models were run in order to represent a varied set of conditions. Naturalized flows represent the condition in the absence of any human impacts such as reservoirs, diversions or return flows. Naturalized flows are then used in all models as the base hydrology condition from which streamflow depletions for diversions and to fill reservoirs are made and to which return flows are added. Three models which were developed as part of the TCEQ WAMs have been analyzed, Runs 1 and 3 which simulated full authorized diversions with and without return flows, and Run 8 which simulated current conditions including a year 2000 reservoir area-capacity condition. As part of this project, Runs 1 and 3 were also simulated for year 2000 reservoir conditions. Finally, Run 1 was simulated with year 2060 area-capacity conditions. To this model, the proposed management strategies from Region C and Region H were added. Table 4-7 summarizes the various parameters in the individual models.

As part of the TCEQ WAM process, separate models were created for each river and coastal basin. Thus the total inflows into Galveston Bay are made up by aggregating the flows into various parts of the bay from the individual models.

The model results are presented in percentile tables, representing the amount of flow that occurs with various frequencies, for example, the 25th percentile of flow represents a flow value that is not met 25 percent of the time, and is exceeded 75 percent of the time. Similarly the 90th percentile represents an upper end flow value that is only exceeded 10 percent of the time.

The 2001 Regional Plan included the Galveston Bay Freshwater Inflows Group recommended inflows to Galveston Bay. The current plan also includes these inflow targets. This table, shown in Chapter 3.3.6.1, presents the historical frequency and recommended frequency of meeting the freshwater inflow targets, Max-H, Min-Q, and Min-Q Sal.

Table 4-7: Galveston Bay Inflow Model Scenarios

Scenario	Diversions	Return Flows	Reservoir Condition	Other
Naturalized Flows	None	None	N/A	
TCEQ Run1	Full Authorized	Yes	Original ACE	
TCEQ Run3	Full Authorized	No	Original ACE	
TCEQ Run8	Full Authorized	Yes	Year 2000 ACE	Represents "Current Conditions"
Year 2000 Run1	Full Authorized	Yes	Year 2000 ACE	
Year 2000 Run3	Full Authorized	No	Year 2000 ACE	
Year 2060 Run1	Full Authorized	Yes	Year 2060 ACE	
Year 2060 with Reg. C Strategies	Full Authorized	Yes	Year 2060 ACE	Includes Region C Mgmt Strategies
Year 2060 with Reg. C & H Strategies	Full Authorized	Yes	Year 2060 ACE	Includes Region C & H Mgmt Strategies

The specific results reported include monthly percentile tables, including the percentile ranking of the freshwater inflow targets for the total inflows to Galveston Bay. Similar tables are provided for the Trinity and San Jacinto Basins, with the freshwater inflow targets based on the historical, prorated, value from those basins (54 percent from the Trinity and 28 percent from the San Jacinto Basin). Additional *annual* percentile tables have been developed by basin and by sub-bay. These tables reveal the relative contribution of inflows from the various areas.

All model results are included in Appendix 4D. A brief summary of the various scenarios is presented in the following subsections.

4.5.1 Galveston Bay Inflow Estimates from Existing TCEQ WAM

The results show a reduction in inflows from the naturalized condition to current conditions (Run 8), full authorized diversions with return flows (Run 1), and full authorized diversions with no return flows (Run 3). (See Figure 4.1 in Section 4.6.5.) A comparison of the results from models with return flows (Run 8 and Run 1), shows that as diversions increase, more inflows enter Galveston Bay as return flows through the San Jacinto Basin and Upper Galveston Bay. (See Figure 4.2 in Section 4.6.5.) Comparing the percentile tables for Run 1

and Run 3 highlights the reduced ability to meet freshwater inflow targets in models with no return flows, particularly the theoretical inflow target from the Trinity River Basin.

4.5.2 Galveston Bay Inflow Estimates from WAM updated with Year 2000 Area-Capacities

Year 2000 reservoir conditions were simulated to quantify the impact of current levels of sedimentation on freshwater inflows, as well as to allow a comparison of the current diversion amounts to the authorized diversions amounts, with a common reservoir condition. Thus TCEQ WAM Runs 1 & 3 were modified and rerun using year 2000 reservoir area-capacity relationships. The results show a very slight increase in inflows to Galveston Bay as compared to the TCEQ WAM Runs 1 and 3, due to a reduced ability of reservoirs to capture streamflows. This increase is insignificant however, relative to the impact of different diversion and return flow parameters. The trend of reducing levels of inflows from the naturalized to the current, full authorized diversions with return flows and full authorized diversions with no return flows conditions still dominates the results.

4.5.3 Galveston Bay Inflow Estimates from WAM updated with Year 2060 Area-Capacities

Year 2060 area-capacity relationships were developed in order to allow evaluation of the impacts of existing water rights and future management strategies at the end of the planning horizon. The only basins with major on channel reservoirs (capacity greater than 5000 ac-ft) were the Trinity and San Jacinto. As a part of the TCEQ WAM project, year 2000 area-capacity relationships for the current conditions run had been developed. The sedimentation rates were based on historical reservoir surveys and projected sediment loading. The same methodology was used to develop year 2060 area-capacity relationships. As in the year 2000 models, future sedimentation will reduce reservoir storage capacities, and thus their ability to capture inflows is also reduced. A year 2060 Run 1 (full authorized diversions with return flows) was developed to quantify that impact. Comparison to the TCEQ Run 1 and Year 2000 Run 1 shows that reservoirs would tend to spill more frequently, creating a slightly higher level of inflows to Galveston Bay.

4.5.4 Incorporation of Region C and Region H Strategies in the Models

In order to evaluate water management strategies, many of which involve reuse or the transfer of supplies from one area to another, the base model must include expected return flows. Thus the Region C and H management strategies were added to the Year 2060 Run 1 as described in the previous section.

Both Region C and Region H have management strategies outside of the two river and three coastal basins which drain into Galveston Bay. The models developed for quantification of the impacts of the management strategies only include those basins which drain into Galveston Bay. Several reservoir strategies that are located outside of these basins will supply users in the basins. These strategies are thus modeled to the extent that they produce return flows in the basins draining into Galveston Bay.

4.5.4.1 Region C Management Strategies

Table 4-8 summarizes the Region C Water Management Strategies that impact the Trinity River Basin. Out of basin strategies have a combined yield of 830,900 acre-feet per year. The return flows associated with these strategies have been simulated as constant inflow (CI) cards at the wastewater treatment plants where other return flows from the same suppliers are discharged. In-basin management strategies total 120,000 ac-ft/yr. The water rights associated with these strategies were included in the TCEQ WAM models, and thus no changes were necessary. The yield associated with reuse strategies totals 301,172 ac-ft/yr. Most reuse strategies are simulated by reducing the return flows associated with imports and in-basin water. The majority of the reuse strategies produce return flows, thus the strategies are typically simulated to represent the net reduction in return flows. The TRWD Trinity River Reuse is simulated as a new diversion. Appendix 4D provides further details on how each individual strategy was modeled.

Table 4-8: Region C 2001 Management Strategies Impacting the Trinity River Basin

Management Strategy	Yield (ac-ft/yr)	Source Basin	Supplier
Increased use of Lake Texoma	10,000	Red	NTMWD
Oklahoma Transfer (Lake Hugo)	62,000	Oklahoma	NTMWD/TRWD
Lower Bois d'Arc Creek Lake	98,000	Red	NTMWD
Marvin Nichols Lake	431,300	Sulphur	Dallas/NTMWD/TRWD
Lake Fork Connection	120,000	Sabine	Dallas
Lake Palestine Connection	109,600	Neches	Dallas
Extend Elm Fork permit	10,000	Trinity	Dallas
Cedar Creek / Richland-Chambers Pipeline	110,000	Trinity	TRWD
Lake Texoma Reuse	35,872	N/A	NTMWD
Dallas Indirect Reuse	68,300	N/A	Dallas
TRWD Trinity River Reuse	115,500	N/A	TRWD
Las Colinas Reuse	7,000	N/A	TRA
Joe Pool Reuse	28,000	N/A	TRA
Mountain Creek Reuse	3,000	N/A	TRA
Ellis County Reuse	20,000	N/A	TRA
Denton County Reuse	5,000	N/A	TRA
Tarrant County Reuse	2,500	N/A	TRA
Grapevine Lake Reuse	16,000	N/A	TRA

4.5.4.2 Region H Management Strategies

Table 4-9 summarizes the Region H management strategies. Advanced municipal and irrigation conservation totaling 74,144 ac-ft/yr, is not explicitly modeled, but reduces the demand and thus the need for additional management strategies. New reservoir strategies

supplying Region H total 289,350 ac-ft/yr. The reservoir strategies produce return flows in the Trinity, San Jacinto, and San Jacinto-Brazos Basins. Wastewater reclamation reduces the net amount of return flows from wastewater treatment plants along the Houston Ship Channel, while making that water available as an alternate supply. Within Region H, the BRA reallocation strategy represents 35,000 ac-ft/yr of the total strategy of 75,000 ac-ft/yr. Contractual transfers move water within Region H, or represent the reallocation of a water right from industrial to irrigation. Appendix 4D provides additional detail regarding the manner in which these strategies were modeled.

Table 4-9: Region H 2001 Management Strategies

Management Strategy	Yield (ac-ft/yr)	Source Basin	Supplier/Use Location
Municipal Conservation	30,563	N/A	N/A
Irrigation Conservation	43,581	N/A	N/A
Allens Creek Reservoir	99,650	Brazos	COH in SJ-Braz BRA in Brazos
Little River Reservoir	99,000[1]	Brazos	GCWA in SJ-Braz BRA in Brazos
Bedias Reservoir	90,700	Trinity	SJRA in San Jacinto TRA in Trinity
Wastewater Reclamation	90,700	San Jacinto	COH in San Jacinto
BRA Voluntary Redistribution	35,000[2]	Brazos	GCWA in SJ Braz
Contractual Transfers	28,500	San Jac-Braz	San Jac-Braz
Houston/TRA Contract	200,000	Trinity	COH in San Jacinto
Houston/GCWA Transfer	23,000	Trinity	GCWA in SJ-Braz
SJRA/CLCND Contract	30,000	Trinity	SJRA in San Jacinto

1. Total Yield from Little River Reservoir is 129,000 ac-ft/yr of which 99,000 afy is to Region H.
2. Total Yield from BRA Voluntary Redistribution is 75,000 ac-ft/yr of which 35,000 afy is to Region H.

4.5.4.3 Galveston Bay Inflow Estimates with Region C and Region H Management Strategies

The incorporation of Region C Management Strategies has a significant impact on freshwater inflow into Galveston Bay due to the increased return flows into the Trinity River Basin from import strategies. Region H Management Strategies also produce increased total inflows to Galveston Bay. The most significant impact of Region H strategies is a further shifting of the source of inflows from the Trinity to the San Jacinto Basin, primarily due to the City of Houston/TRA Contractual Transfer. This transfer provides 200,000 ac-ft/yr of additional Lake Livingston supplies to the City of Houston distribution system. Additionally, Region H Management Strategies using Brazos River Basin supplies result in increased return flows in the San Jacinto–Brazos Basin.

4.5.5 Results

Evaluation of the TCEQ model runs reveals the significant impact of varying levels of diversions and return flows on total inflows to Galveston Bay. The Year 2000 scenarios revealed that the impacts of the present levels of sedimentation (which result in a slight increase in inflows) are insignificant relative to the diversion and return flow parameters.

The Year 2060 Run 1, with further sedimentation also produces a slight increase in total inflows. The management strategies, which change the diversion and return flow parameters, again have a significant impact, generally increasing inflows to Galveston Bay.

As the sedimentation impacts are minimal, for graphical comparison purposes, only selected models which have distinctions in their results are shown. For example, the differences in the results for TCEQ Run 1 with the original reservoir area-capacity relationships compared with year 2000 or year 2060 area-capacity relationships are minimal and thus not portrayed. The key models from which distinctions in the results can be seen are:

- Naturalized Flows
- Current Conditions (TCEQ Run 8)
- Full Authorized Diversions with Return Flows (TCEQ Run 1 which is similar to Year 2000 Run 1 and Year 2060 Run 1)
- Full Authorized Diversions with NO Return Flows (TCEQ Run 3 which is similar to Year 2000 Run 3)
- Full Authorized Diversions with Region C Strategies and Return Flows (Yr 2060 Reg C)
- Full Authorized Diversions with Region C & H Strategies and Return Flows (Yr 2060 Reg C & H)

4.5.5.1 Annual Inflows

Figure 4-1 shows the total annual inflows to Galveston Bay for the selected models. The Naturalized Flows provide the highest level of inflows, due the absence of any consumptive use from the watershed. The Current Conditions brings a reduction in flow, however the pattern of flow is dominated by hydrologic conditions, such that the Naturalized Flows are essentially shifted down, with the difference between Naturalized Flows and Current Conditions representing the current level of net consumptive use in the watershed. The full authorized diversions with return flows furthers the downward shift in total inflows as there is more net consumptive use. Full authorized diversions with no return flows produces the lowest level of inflows of the models simulated. This scenario is a "worst case" and assumes that all currently permitted diversions are consumed and reused to the extent that there are no net return flows. The addition of management strategies from the Region C plan increases the inflows to Galveston Bay due to the return flows from out-of-basin supplies. The Region H management strategies bring a further, albeit alight, increase in total inflows to Galveston Bay. Due to the closeness of the results for total inflows between the Region C and the Region C & H models, only the Region C & H model results are shown. The distinction between these models is shown in other figures where the variation is significant.

4.5.5.2 Inflows By Basin

Figure 4-2 shows the median annual inflows to Galveston Bay from the Trinity and San Jacinto Basins. The trend for the Trinity Basin is similar to the trend for the total inflows to Galveston Bay, with inflows decreasing from Naturalized to Current Conditions to Full Diversions with Return Flows to Full Diversions with No Return Flows. The addition of Region C Management Strategies increases the inflows to a level between Current

Conditions and Run 1. Region H Management Strategies cause a slight reduction in inflows from the Trinity River Basin as additional water is transferred to the San Jacinto Basin.

Figure 4-1: Annual Inflows to Galveston Bay

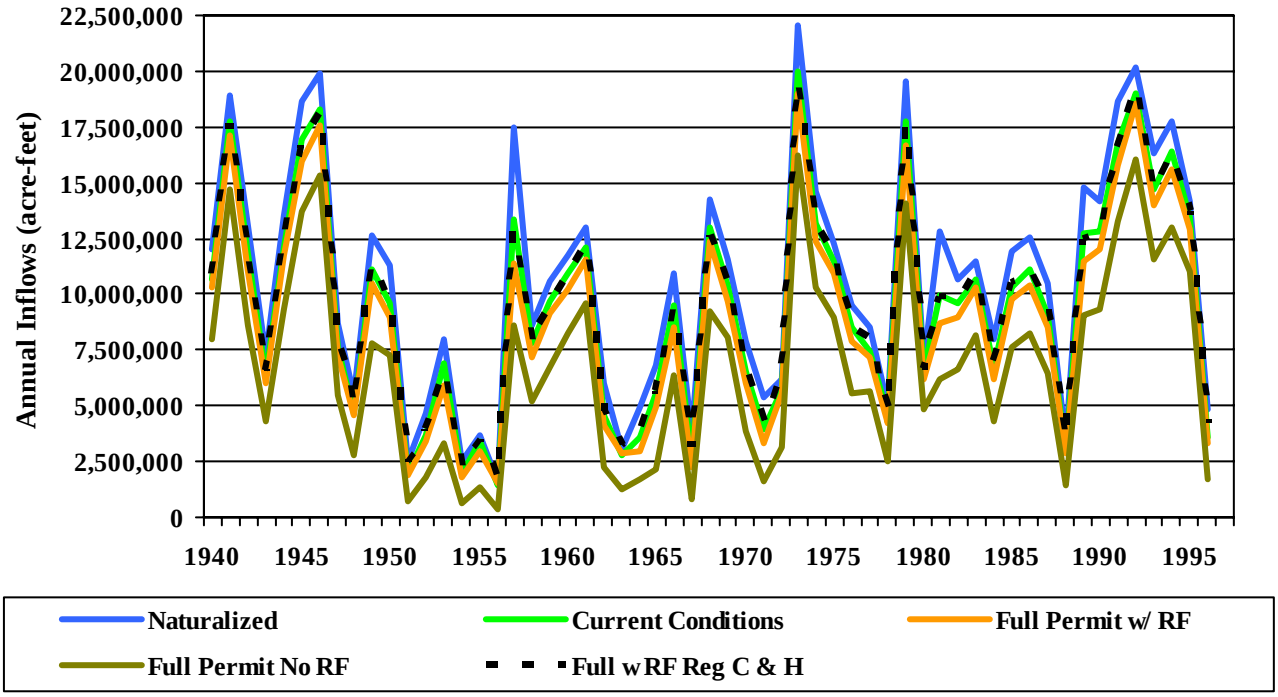
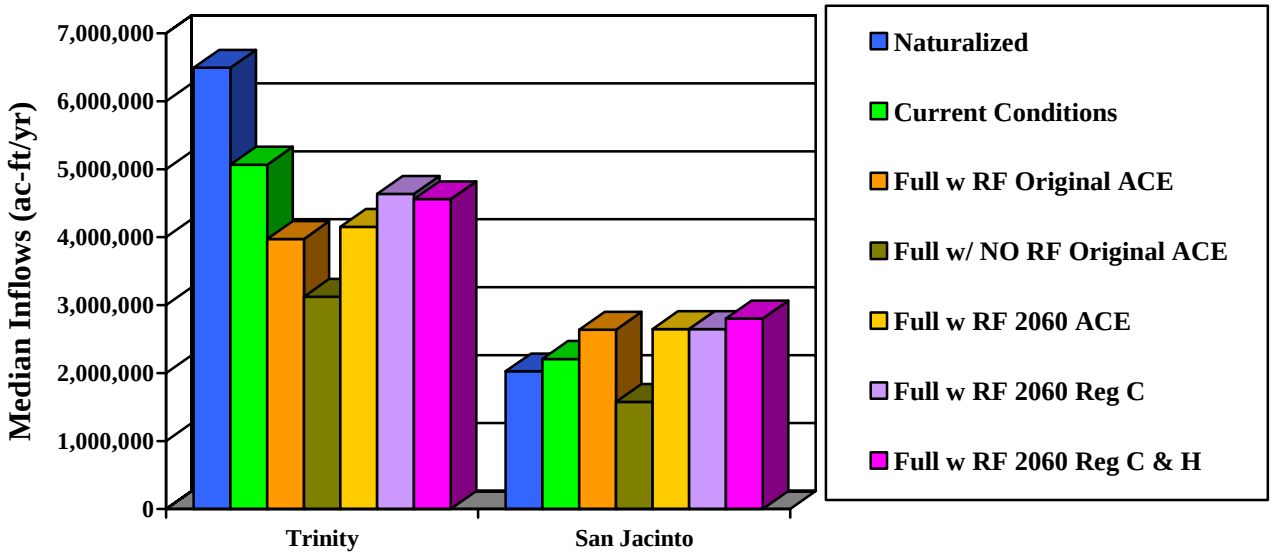


Figure 4-2: Median Inflows by Basin

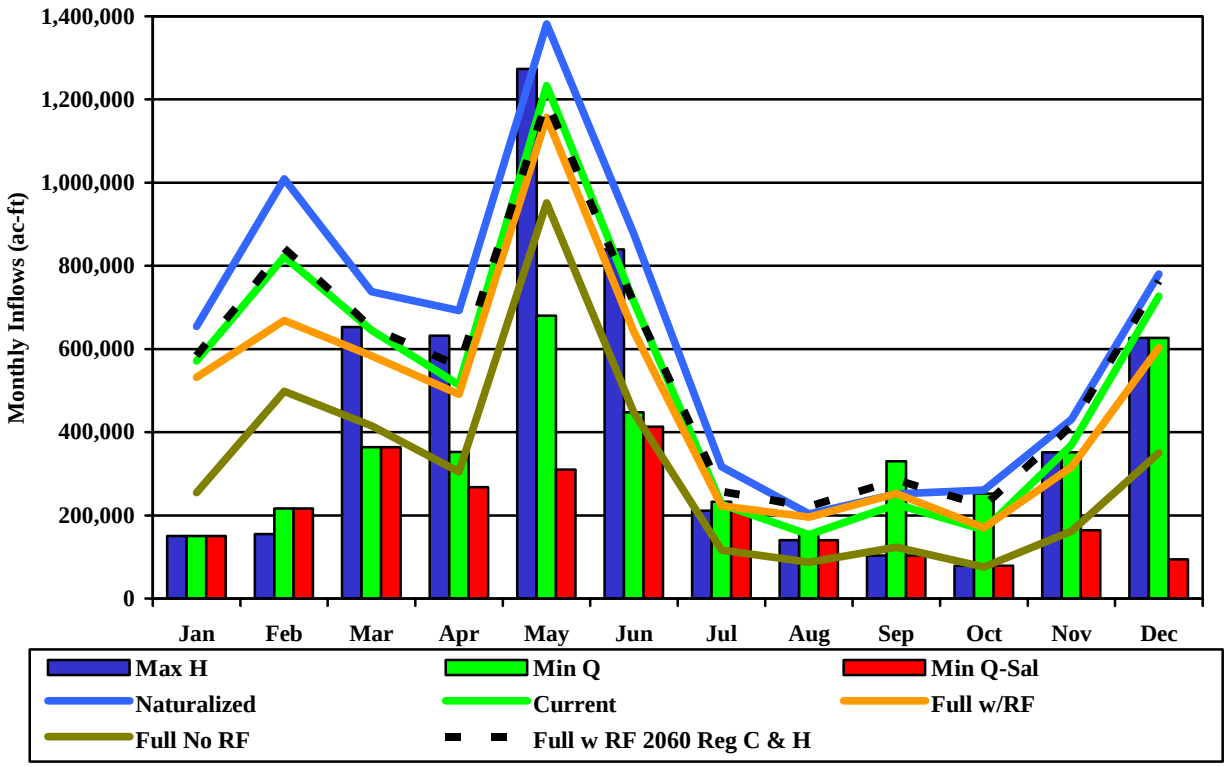


The median inflows to Galveston Bay from the San Jacinto Basin increase from the Naturalized condition due to return flows in the Current Conditions, Full Diversions with Return Flows and Region H Management Strategies. Each of these models represents higher levels of use in the San Jacinto Basin, and thus higher levels of return flows. Due to the significant amount of supplies coming from outside of the basin (primarily from the Trinity), the net impact is increased inflows to Galveston Bay from the San Jacinto Basin. Only Run 3, with no Return Flows yields lesser return flows to Galveston Bay from the San Jacinto Basin than the Naturalized Flows.

4.5.5.3 Inflows versus GBFIG Freshwater Inflow Targets

Figure 4-3 represents the total monthly median inflows as compared to the freshwater inflow targets. When the targets were developed, they were constrained to fall within the 10th and 50th percentile of historical flows. Thus the median inflows in the Naturalized and Current Conditions, as would be expected, meet or exceed almost all monthly inflow targets. Full authorized diversions with return flows produces a reduced ability to meet the Max H inflow targets in several months, and when return flows are excluded, Max H is only met in months with relatively low targets. The Region C & H management strategies bring the median monthly inflows back to levels comparable with the Current Conditions.

Figure 4-3: Median Monthly Inflows vs. Freshwater Inflow Targets



As explained in Section 4.5, percentile tables are included in Appendix 4D which show the monthly and annual percentile rankings of total inflows to Galveston Bay, as well as inflows from the Trinity and San Jacinto River Basins. These tables also include the freshwater inflow targets, and the frequencies with which the targets are achieved on a monthly basis. Table 4-10 summarizes the overall frequencies of meeting these targets.

Table 4-10: Overall Frequencies of Meeting Monthly Inflow Targets

Inflow Target	Max H	Min Q	Min Q-Sal
Historical Frequency	66%	78%	82%
GBFIG Target Frequency	50%	60%	75%
Naturalized	68%	67%	83%
Current Conditions	64%	59%	79%
Full Diversions with Return Flows	65%	59%	81%
Full Diversions with no Return Flows	43%	42%	55%
Full Diversions w RF And Reg C & H Strategies	71%	67%	87%

The GBFIG target frequencies for Max H, Min Q and Min Q-Sal are 50, 60 and 75 percent. Thus Figure 4-3 above, with the median monthly flows is most suitable for comparison to the Max H target. In order to portray how Min Q is being met on a monthly basis, Figure 4-4 has been developed for the 40th percentile, represent the flow which would be met or exceeded 60 percent of the time.

Figure 4-4 shows that the target frequency is consistently met or exceeded for the first 6 months of the year for all but the no return flow scenario. In the last 4 months of the year, the 40th percentile inflows are at levels less than the targets. Thus while the Min Q target frequency is met on a overall basis for all but the no return flow models, there are individual months where inflows targets are met at a consistently lower basis. The impact of future management strategies is, however, not furthering these shortages. As with many of the other measures, the future management strategies bring the 40th percentile inflows to levels very similar to the Current Conditions scenario.

Figure 4-5 has been developed to show the ability to meet MinQ-Sal as compared to the 25th percentile (the value exceeded 75 percent of the time). For all but the no return flow scenario, the 25th percentile flows exceed the MinQ-Sal target in nine months of the year. While the June values for the Current, Full Authorized and Management Strategy runs is significantly lower than the target, the May values for these runs greatly exceeds the target.

Figure 4-4: 40th Percentile Inflows vs. Freshwater Inflow Targets

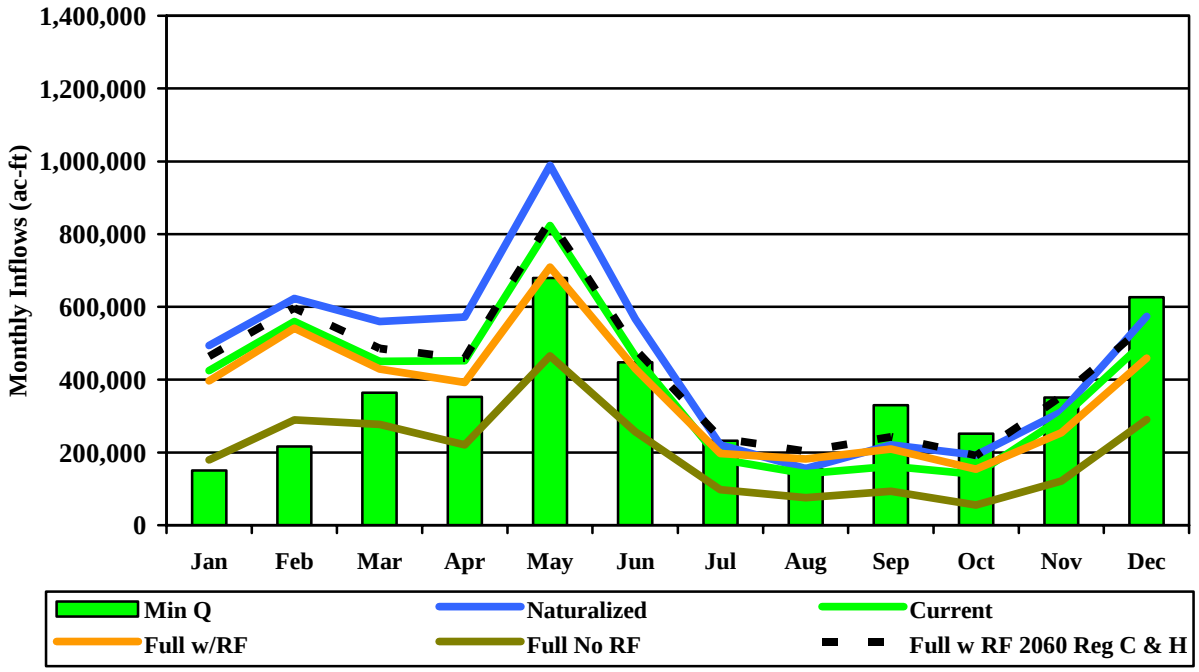
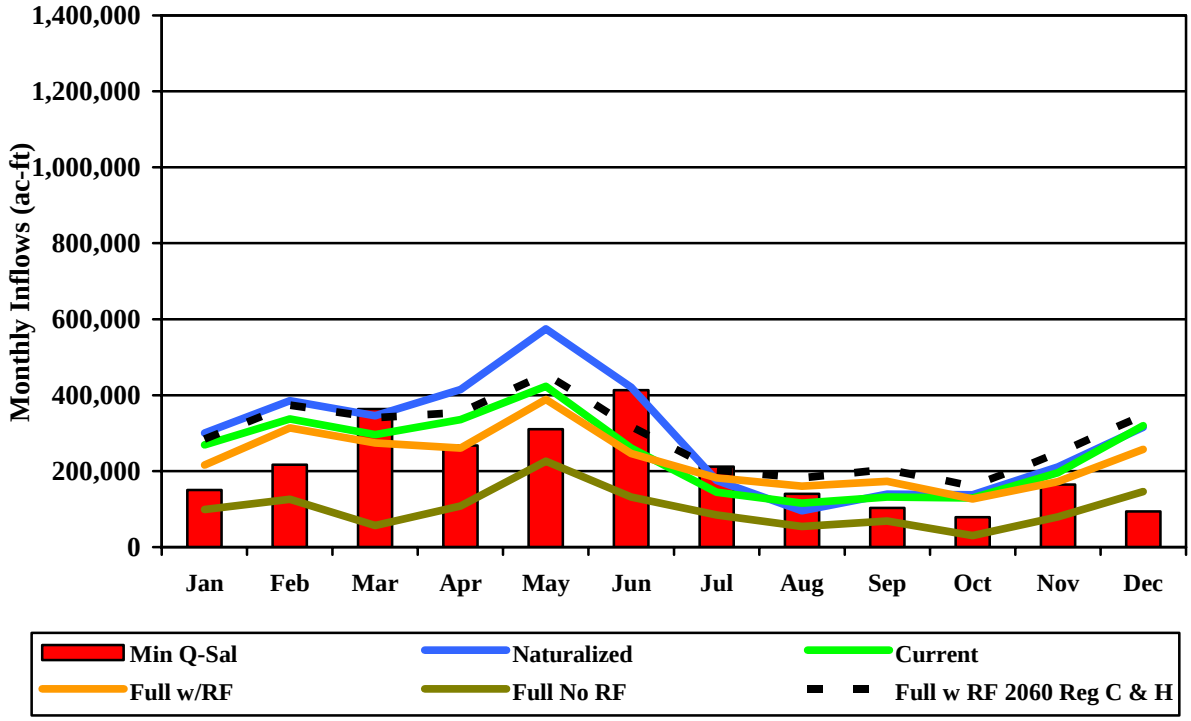


Figure 4-5: 25th Percentile Inflows vs. Freshwater Inflow Targets



4.5.5.4 Summary of Results

- The TCEQ WAM runs reveal a decrease in the freshwater inflows to Galveston Bay as existing water rights are used to their full authorized diversion amounts.
- The full authorized diversion scenario with *no* return flows results in a significant reduction in inflows to Galveston Bay, such that inflows are consistently lower than freshwater inflow targets.
- Sedimentation in reservoirs in the Trinity and San Jacinto Basins has a minimal impact on freshwater inflows.
- The Current Conditions, Full Authorized Diversions with Return Flows and Full Authorized Diversions plus Management Strategies represent models of increasing demand and return flows in Region H. These models show the portion of inflows to Galveston Bay from the San Jacinto Basin will increase while the portion from the Trinity Basin will decrease.
- Region C Management Strategies produce a net increase in flows to Galveston Bay as a result of large amounts of imported water producing return flows in the upper Trinity Basin.
- The incorporation of Management Strategies results in inflow patterns most similar to the Current Conditions.
- When aggregating the monthly statistics, freshwater inflow targets are met at levels approaching or exceeding the GBFIG frequency goals for all but the no return flow scenario.
- The individual monthly statistics for freshwater inflows reveal selected months which are not met at the target frequency, while in other months the target frequency is exceeded.

4.6 Socio-Economic Impacts of Not Meeting Demands

Region H could address every projected water need through a combination of conservation, allocation of existing supply and development of new water supplies. However, the regional planning guidelines in 31 TAC 357 require that the social and economic impacts of not meeting demands be estimated and considered. The TWDB Water Use and Projection Section performed the social and economic impacts modeling for Region H. A description of the impact model assumptions and tabulated model results are presented in Appendix 4E, along with a full discussion of the potential social and economic impacts of not meeting demands.

Appendix 4A

Water Management Strategy Tables

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Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
BELLVILLE	BRAZOS	AUSTIN	080048000		0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	AUSTIN	080757000		0	0	0	0	0	0
COUNTY-OTHER	BRAZOS-COLORADO	AUSTIN	080757000		0	0	0	0	0	0
COUNTY-OTHER	COLORADO	AUSTIN	080757000		0	0	0	0	0	0
IRRIGATION	BRAZOS	AUSTIN	081004000		0	0	0	0	0	0
IRRIGATION	BRAZOS-COLORADO	AUSTIN	081004000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	AUSTIN	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	AUSTIN	081005000		0	0	0	0	0	0
LIVESTOCK	COLORADO	AUSTIN	081005000		0	0	0	0	0	0
MANUFACTURING	BRAZOS	AUSTIN	081001000		0	0	0	0	0	0
MANUFACTURING	BRAZOS-COLORADO	AUSTIN	081001000		0	0	0	0	0	0
MINING	BRAZOS	AUSTIN	081003000		0	0	0	0	0	0
MINING	BRAZOS-COLORADO	AUSTIN	081003000		0	0	0	0	0	0
MINING	COLORADO	AUSTIN	081003000		0	0	0	0	0	0
SAN FELIPE	BRAZOS	AUSTIN	080954000		0	0	0	0	0	0
SEALY	BRAZOS	AUSTIN	080549000		0	0	0	0	0	0
WALLIS	BRAZOS-COLORADO	AUSTIN	080630000		0	0	0	0	0	0
ALVIN	SAN JACINTO-BRAZOS	BRAZORIA	080013000		0	0	0	0	0	0
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000		**-162**	**-153**	**-175**	**-193**	**-246**	**-323**
BAILEY'S PRAIRIE	SAN JACINTO-BRAZOS	BRAZORIA	080817000		0	0	0	0	0	0
BAILEY'S PRAIRIE	BRAZOS	BRAZORIA	080817000		0	0	0	0	0	0
BRAZORIA	BRAZOS	BRAZORIA	080072000		14	15	16	18	17	16
BRAZORIA	BRAZOS-COLORADO	BRAZORIA	080072000		42	45	48	55	53	49
BRAZORIA COUNTY MUD #1	SAN JACINTO-BRAZOS	BRAZORIA	084030000		0	0	0	0	0	0
BRAZORIA COUNTY MUD #2	BRAZOS	BRAZORIA	084031000		0	0	0	0	0	0
BRAZORIA COUNTY MUD #3	SAN JACINTO-BRAZOS	BRAZORIA	084032000		0	0	0	0	0	0
BRAZORIA COUNTY MUD #4	SAN JACINTO-BRAZOS	BRAZORIA	084033000		0	0	0	0	0	0
BRAZORIA COUNTY MUD #5	SAN JACINTO-BRAZOS	BRAZORIA	084034000		0	0	0	0	0	0
BROOKSIDE VILLAGE	SAN JACINTO-BRAZOS	BRAZORIA	080078000		0	0	0	0	0	0
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000		**-34**	**-49**	**-82**	**-104**	**-152**	**-217**
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757000		**-4210**	**-4737**	**-6376**	**-7836**	**-9635**	**-11613**
COUNTY-OTHER	BRAZOS	BRAZORIA	080757000		**-121**	**-133**	**-143**	**-151**	**-160**	**-170**
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757000		**-1990**	**-2134**	**-2312**	**-2468**	**-2692**	**-2948**
DANBURY	SAN JACINTO-BRAZOS	BRAZORIA	080693000		0	0	0	0	0	0
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000		11	**-157**	**-333**	**-513**	**-750**	**-1043**
FREEPORT	BRAZOS	BRAZORIA	080217000		1	**-17**	**-30**	**-39**	**-48**	**-56**
HILLCREST	SAN JACINTO-BRAZOS	BRAZORIA	080881000		0	0	0	0	0	0
HOLIDAY LAKES	SAN JACINTO-BRAZOS	BRAZORIA	080779000		0	0	0	0	0	0
IOWA COLONY	SAN JACINTO-BRAZOS	BRAZORIA	080885000		0	0	0	0	0	0
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004000		**-28057**	**-20212**	**-19503**	**-19511**	**-21232**	**-22789**
IRRIGATION	BRAZOS	BRAZORIA	081004000		**-1712**	**-1426**	**-1317**	**-1249**	**-1260**	**-1268**
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004000		**-2742**	**-2520**	**-2478**	**-2471**	**-2553**	**-2639**
JONES CREEK	BRAZOS-COLORADO	BRAZORIA	080308000		0	0	0	0	0	0
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000		**-2701**	**-2576**	**-2599**	**-2844**	**-3235**	**-3688**
LIVESTOCK	SAN JACINTO-BRAZOS	BRAZORIA	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	BRAZORIA	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	BRAZORIA	081005000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO-BRAZOS	BRAZORIA	081001000		4403	133	**-2059**	**-4551**	**-7175**	**-10624**
MANUFACTURING	BRAZOS	BRAZORIA	081001000		**-47629**	**-69994**	**-89878**	**-109912**	**-127719**	**-149191**
MANUFACTURING	BRAZOS-COLORADO	BRAZORIA	081001000		10835	10715	10609	10502	10408	10293
MANVEL	SAN JACINTO-BRAZOS	BRAZORIA	080721000		0	0	0	0	0	0

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
MINING	SAN JACINTO-BRAZOS	BRAZORIA	081003000		-16	-4	-101	-205	-328	-445
MINING	BRAZOS	BRAZORIA	081003000		-89	-127	-149	-171	-190	-208
MINING	BRAZOS-COLORADO	BRAZORIA	081003000		-288	-437	-555	-673	-819	-969
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	BRAZORIA	084294000		0	0	0	0	0	0
ORBIT SYSTEMS INC	BRAZOS-COLORADO	BRAZORIA	084294000		0	0	0	0	0	0
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000		-34	-43	-59	-75	-96	-122
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000		935	-685	-1857	-3148	-4814	-6725
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000		-28	-32	-40	-46	-60	-79
SOUTHWEST UTILITIES	SAN JACINTO-BRAZOS	BRAZORIA	084343000		0	0	0	0	0	0
SURFSIDE BEACH	BRAZOS	BRAZORIA	080967000		0	0	0	0	0	0
SWEENY	BRAZOS-COLORADO	BRAZORIA	080590000		0	0	0	0	0	0
VARNER CREEK UD	BRAZOS	BRAZORIA	084370000		0	0	0	0	0	0
WEST COLUMBIA	BRAZOS	BRAZORIA	080640000		0	0	0	0	0	0
WEST COLUMBIA	BRAZOS-COLORADO	BRAZORIA	080640000		0	0	0	0	0	0
ANAHUAC	NECHES-TRINITY	CHAMBERS	080015000		540	523	506	496	479	461
ANAHUAC	TRINITY	CHAMBERS	080015000		156	150	147	143	139	133
BAYTOWN	TRINITY-SAN JACINTO	CHAMBERS	080042000		51	52	50	48	36	17
BEACH CITY	TRINITY	CHAMBERS	080822000		-32	-42	-52	-61	-69	-79
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000		-193	-258	-322	-381	-446	-514
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757000		-48	-46	-44	-42	-41	-40
COUNTY-OTHER	TRINITY	CHAMBERS	080757000		-207	-200	-193	-185	-180	-178
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757000		-113	-110	-108	-107	-105	-106
IRRIGATION	NECHES-TRINITY	CHAMBERS	081004000		2441	2169	1983	1782	1550	1278
IRRIGATION	TRINITY	CHAMBERS	081004000		-27053	-27277	-27411	-27534	-27652	-27753
IRRIGATION	TRINITY-SAN JACINTO	CHAMBERS	081004000		1056	1035	998	965	935	905
LIVESTOCK	NECHES-TRINITY	CHAMBERS	081005000		0	0	0	0	0	0
LIVESTOCK	TRINITY	CHAMBERS	081005000		0	0	0	0	0	0
LIVESTOCK	TRINITY-SAN JACINTO	CHAMBERS	081005000		0	0	0	0	0	0
MANUFACTURING	TRINITY-SAN JACINTO	CHAMBERS	081001000		-8264	-9230	-10252	-11284	-12240	-13445
MINING	NECHES-TRINITY	CHAMBERS	081003000		-104	-155	-186	-216	-246	-273
MINING	TRINITY	CHAMBERS	081003000		-4344	-6494	-7816	-9116	-10411	-11550
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003000		-1260	-1868	-2376	-2877	-3369	-3836
MONT BELVIEU	TRINITY	CHAMBERS	080413000		-553	-725	-883	-1022	-1167	-1316
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000		-220	-291	-362	-428	-498	-572
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000		-160	-172	-181	-188	-197	-209
STEAM ELECTRIC POWER	TRINITY-SAN JACINTO	CHAMBERS	081002000		26895	27482	26970	26345	25581	24634
TRINITY BAY CONSERVATION DISTRICT	NECHES-TRINITY	CHAMBERS	084362000		1101	859	637	438	240	19
TRINITY BAY CONSERVATION DISTRICT	TRINITY	CHAMBERS	084362000		503	393	291	200	110	9
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000		-130	-213	-331	-371	-423	-479
BEASLEY	BRAZOS	FORT BEND	081012000		-5	-5	-5	-7	-9	-11
BEASLEY	BRAZOS-COLORADO	FORT BEND	081012000		0	0	0	0	0	0
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000		-106	-375	-837	-1205	-1701	-2268
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000		-400	-1426	-3180	-4603	-6497	-8660
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000		-74	-263	-587	-847	-1195	-1593
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000		-195	-692	-1541	-2226	-3143	-4190
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000		-83	-192	-300	-296	-296	-296
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000		-253	-901	-2009	-2903	-4097	-5462
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000		-103	-334	-704	-978	-1346	-1766
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757000		-74	-446	-1313	-2210	-3745	-5084
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757000		-469	-2443	-7074	-12030	-20177	-27636
COUNTY-OTHER	BRAZOS	FORT BEND	080757000		-4978	-9044	-15272	-21328	-29585	-39234
COUNTY-OTHER	BRAZOS-COLORADO	FORT BEND	080757000		0	0	0	0	0	0

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
FAIRCHILDS	BRAZOS	FORT BEND	081019000		-270	-300	-325	-462	-646	-857
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000		-974	-1024	-1150	-1141	-1141	-1141
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000		-643	-679	-768	-765	-765	-765
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000		-390	-408	-459	-456	-456	-456
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000		-518	-546	-617	-614	-614	-614
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000		-60	-137	-212	-207	-205	-205
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000		-383	-564	-793	-776	-767	-767
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000		-218	-499	-1010	-1449	-2025	-2683
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000		-513	-1090	-2104	-2898	-3972	-5199
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000		-90	-260	-505	-655	-850	-1083
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000		-117	-392	-837	-1178	-1631	-2150
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000		-507	-779	-1205	-1615	-2172	-2807
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000		-485	-511	-574	-571	-571	-571
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000		-401	-424	-480	-480	-480	-480
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000		-260	-276	-311	-311	-311	-311
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000		-513	-731	-1079	-1405	-1838	-2332
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000		-36	-64	-110	-135	-169	-209
FULSHEAR	BRAZOS	FORT BEND	080869000		-113	-142	-192	-231	-283	-344
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000		-162	-577	-1286	-1860	-2626	-3500
HOUSTON	SAN JACINTO	FORT BEND	080285000		0	0	0	0	0	0
HOUSTON	SAN JACINTO-BRAZOS	FORT BEND	080285000		0	0	0	0	0	0
IRRIGATION	SAN JACINTO	FORT BEND	081004000		0	0	0	0	0	0
IRRIGATION	SAN JACINTO-BRAZOS	FORT BEND	081004000		50	50	50	50	50	50
IRRIGATION	BRAZOS	FORT BEND	081004000		26569	26569	26569	26569	26569	26569
IRRIGATION	BRAZOS-COLORADO	FORT BEND	081004000		0	0	0	0	0	0
KATY	SAN JACINTO	FORT BEND	080312000		-68	-161	-228	-270	-324	-389
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000		-178	-535	-1057	-1383	-1841	-2363
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000		-12	-23	-43	-56	-74	-94
LIVESTOCK	SAN JACINTO	FORT BEND	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	FORT BEND	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	FORT BEND	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	FORT BEND	081005000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	FORT BEND	081001000		-361	-891	-1446	-1508	-1550	-1429
MANUFACTURING	SAN JACINTO-BRAZOS	FORT BEND	081001000		-181	-877	-1777	-1893	-1969	-1746
MANUFACTURING	BRAZOS	FORT BEND	081001000		-820	-917	-1075	-1114	-1140	-1065
MEADOWS	SAN JACINTO	FORT BEND	080792000		-243	-563	-871	-856	-850	-850
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000		-43	-64	-90	-88	-88	-88
MINING	SAN JACINTO	FORT BEND	081003000		-43	-114	-186	-189	-192	-194
MINING	SAN JACINTO-BRAZOS	FORT BEND	081003000		184	-164	-600	-622	-642	-660
MINING	BRAZOS	FORT BEND	081003000		690	733	781	775	768	763
MINING	BRAZOS-COLORADO	FORT BEND	081003000		0	0	0	0	0	0
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000		900	831	-101	-722	-1196	-2230
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000		6458	3797	-941	-3834	-6028	-10774
MISSOURI CITY	BRAZOS	FORT BEND	080409000		357	147	-30	-116	-180	-314
NEEDVILLE	BRAZOS	FORT BEND	080428000		-108	-104	-100	-124	-157	-197
NEEDVILLE	BRAZOS-COLORADO	FORT BEND	080428000		0	0	0	0	0	0
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000		-158	-532	-1134	-1586	-2201	-2904
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000		-5	-8	-13	-15	-17	-20
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000		-198	-303	-435	-442	-462	-488
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000		-1528	-1642	-1871	-1900	-1973	-2071
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000		-177	-258	-362	-353	-348	-348
PLEAK	BRAZOS	FORT BEND	081053000		0	0	0	0	0	0

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
RICHMOND	BRAZOS	FORT BEND	080500000		-1349	-1540	-1882	-2056	-2328	-2660
ROSENBERG	BRAZOS	FORT BEND	080518000		-2570	-3046	-3892	-4483	-5312	-6315
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000		-343	-634	-905	-897	-897	-897
SIMONTON	BRAZOS	FORT BEND	081062000		-210	-183	-156	-154	-153	-154
STAFFORD	SAN JACINTO	FORT BEND	080577000		1098	1496	1452	1348	1186	996
STAFFORD	SAN JACINTO-BRAZOS	FORT BEND	080577000		8121	7182	6343	5823	5086	4249
STEAM ELECTRIC POWER	BRAZOS	FORT BEND	081002000		76857	72545	57060	43031	25931	5086
SUGAR LAND	SAN JACINTO	FORT BEND	080585000		194	364	265	268	268	268
SUGAR LAND	SAN JACINTO-BRAZOS	FORT BEND	080585000		4729	3583	3811	3852	3852	3852
SUGAR LAND	BRAZOS	FORT BEND	080585000		7034	5995	3152	3189	3189	3189
WHCRWA	SAN JACINTO	FORT BEND	088002000		106	-694	-1812	-2559	-3548	-4752
BACLIFF MUD	SAN JACINTO-BRAZOS	GALVESTON	084012000		633	613	616	625	628	623
BAYOU VISTA	SAN JACINTO-BRAZOS	GALVESTON	080759000		62	36	24	21	18	14
BOLIVAR PENINSULAR SUD	NECHES-TRINITY	GALVESTON	084027000		3915	3837	3798	3787	3777	3766
CLEAR LAKE SHORES	SAN JACINTO-BRAZOS	GALVESTON	080764000		435	431	429	431	431	429
COUNTY-OTHER	NECHES-TRINITY	GALVESTON	080757000		1	1	0	1	1	0
COUNTY-OTHER	SAN JACINTO-BRAZOS	GALVESTON	080757000		17726	17861	17949	17999	18026	18040
DICKINSON	SAN JACINTO-BRAZOS	GALVESTON	080165000		726	428	275	244	211	173
FRIENDSWOOD	SAN JACINTO-BRAZOS	GALVESTON	080219000		2503	2405	2377	2415	2410	2390
GALVESTON	SAN JACINTO-BRAZOS	GALVESTON	080227000		5507	5546	5642	5780	5869	5853
GALVESTON COUNTY MUD #1	SAN JACINTO-BRAZOS	GALVESTON	084135000		146	169	185	195	203	205
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000		-133	-162	-178	-182	-186	-190
HITCHCOCK	SAN JACINTO-BRAZOS	GALVESTON	080279000		653	652	656	670	673	670
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004000		-10143	-9809	-9264	-9261	-9277	-9304
JAMAICA BEACH	SAN JACINTO-BRAZOS	GALVESTON	080886000		102	120	132	141	146	148
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000		-195	-235	-258	-265	-269	-274
LA MARQUE	SAN JACINTO-BRAZOS	GALVESTON	080342000		822	864	905	946	974	974
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000		-3612	-4311	-4690	-4759	-4839	-4935
LIVESTOCK	NECHES-TRINITY	GALVESTON	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	GALVESTON	081005000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO-BRAZOS	GALVESTON	081001000		21279	17954	15238	12592	10317	6793
MINING	NECHES-TRINITY	GALVESTON	081003000		-16	-23	-26	-29	-33	-36
MINING	SAN JACINTO-BRAZOS	GALVESTON	081003000		-15	-21	-24	-28	-30	-33
SAN LEON MUD	SAN JACINTO-BRAZOS	GALVESTON	084329000		1145	1107	1097	1101	1100	1093
SANTA FE	SAN JACINTO-BRAZOS	GALVESTON	080743000		107	105	112	136	140	136
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	GALVESTON	081002000		3371	4392	3713	2886	1877	648
TEXAS CITY	SAN JACINTO-BRAZOS	GALVESTON	080602000		4560	4643	4746	4864	4942	4938
TIKI ISLAND	SAN JACINTO-BRAZOS	GALVESTON	080973000		139	104	85	78	74	69
BAYTOWN	TRINITY-SAN JACINTO	HARRIS	080042000		885	834	743	675	481	220
BAYTOWN	SAN JACINTO	HARRIS	080042000		58	55	49	44	31	14
BELLAIRE	SAN JACINTO	HARRIS	080046000		-1721	-1884	-2282	-2555	-2845	-3159
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000		-195	-394	-468	-459	-453	-453
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000		-160	-385	-529	-608	-686	-767
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000		-586	-558	-614	-601	-597	-597
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000		-154	-371	-515	-596	-675	-758
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000		198	-26	-102	-95	-88	-88
CINCO MUD #6	SAN JACINTO	HARRIS	084059000		-58	-172	-273	-346	-421	-496
CINCO MUD #9	SAN JACINTO	HARRIS	084062000		-75	-220	-347	-438	-531	-624
CLEAR BROOK CITY MUD WOODMEADOW	SAN JACINTO	HARRIS	084063000		866	809	676	584	481	362
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000		-137	-367	-551	-665	-795	-924
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000		-264	-706	-1051	-1282	-1518	-1754

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
COUNTY-OTHER	TRINITY-SAN JACINTO	HARRIS	080757000		1353	1945	2297	2507	2629	2702
COUNTY-OTHER	SAN JACINTO	HARRIS	080757000		3875	2709	2096	-2263	-6950	-11464
COUNTY-OTHER	SAN JACINTO-BRAZOS	HARRIS	080757000		43	14	132	108	127	128
CROSBY MUD	SAN JACINTO	HARRIS	084078000		564	580	563	573	580	580
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000		-7	-19	-28	-34	-40	-46
DEER PARK	SAN JACINTO	HARRIS	080154000		8	10	-17	-25	-60	-107
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	080154000		10	14	-27	-40	-90	-162
EL DORADO UD	SAN JACINTO	HARRIS	084101000		-28	0	-121	-161	-204	-252
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000		-278	-299	-311	-320	-327	-338
FALLBROOK UD	SAN JACINTO	HARRIS	084109000		-271	-640	-862	-984	-1101	-1231
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000		-116	-272	-369	-414	-463	-516
FRIENDSWOOD	SAN JACINTO-BRAZOS	HARRIS	080219000		795	684	637	632	621	608
GALENA PARK	SAN JACINTO	HARRIS	080226000		-161	-157	-194	-201	-234	-281
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000		-313	-725	-978	-1096	-1216	-1340
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000		-55	-38	-45	-31	-21	-21
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000		-520	-439	-531	-489	-489	-489
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000		-126	-169	-220	-273	-323	-380
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000		-143	-329	-441	-492	-545	-604
HARRIS COUNTY MUD #119 INWOOD NOR	SAN JACINTO	HARRIS	084154000		-299	-643	-759	-740	-730	-730
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000		-598	-1523	-2178	-2585	-2984	-3400
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000		-426	-959	-1252	-1369	-1496	-1637
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000		-435	-887	-1063	-1054	-1054	-1054
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000		-268	-710	-1037	-1253	-1479	-1704
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000		-419	-1168	-1778	-2205	-2643	-3078
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000		-231	-581	-823	-971	-1114	-1270
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000		245	-7	-86	-71	-71	-71
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000		-210	-519	-729	-855	-978	-1110
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000		-274	-679	-957	-1123	-1286	-1460
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000		-668	-1942	-3009	-3816	-4617	-5416
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000		-224	-543	-667	-665	-665	-665
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000		-342	-776	-1035	-1146	-1263	-1388
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000		-482	-982	-1184	-1178	-1178	-1178
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000		-285	-575	-682	-675	-675	-675
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000		-223	-449	-530	-516	-507	-507
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000		-503	-524	-588	-623	-665	-712
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000		-733	-1071	-1535	-1967	-2387	-2840
HARRIS COUNTY MUD #55	SAN JACINTO-BRAZOS	HARRIS	084187000		2375	2414	2453	2492	2518	2518
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000		-146	-185	-263	-320	-383	-455
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000		-199	-444	-579	-630	-683	-738
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000		-146	-339	-457	-512	-569	-632
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000		290	-215	-523	-664	-814	-980
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000		-258	-525	-631	-621	-627	-627
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000		-370	-406	-478	-516	-578	-653
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197000		-291	-360	-505	-608	-721	-849
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000		-548	-597	-659	-714	-774	-841
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000		-101	-203	-240	-234	-230	-230
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000		-236	-234	-249	-247	-254	-264
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000		-514	-505	-542	-542	-544	-550
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000		52	-15	-39	-37	-36	-36
HOUSTON	SAN JACINTO	HARRIS	080285000		0	0	0	0	0	0
HOUSTON	SAN JACINTO-BRAZOS	HARRIS	080285000		0	0	0	0	0	0
HUMBLE	SAN JACINTO	HARRIS	080289000		-1203	-2796	-3716	-4117	-4534	-4975

Note: Balances reflect use of currently developed and future available groundwater.

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000		-1079	-1145	-1317	-1419	-1532	-1653
IRRIGATION	TRINITY-SAN JACINTO	HARRIS	081004000		1254	1254	1254	1254	1254	1254
IRRIGATION	SAN JACINTO	HARRIS	081004000		120	738	0	0	0	0
JACINTO CITY	SAN JACINTO	HARRIS	080301000		63	43	-70	-115	-186	-272
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000		298	-476	-992	-1286	-1575	-1878
KATY	SAN JACINTO	HARRIS	080312000		-843	-2092	-2966	-3496	-4016	-4559
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000		-73	-178	-247	-284	-324	-364
LA PORTE	SAN JACINTO	HARRIS	080346000		161	143	126	110	89	66
LA PORTE	SAN JACINTO-BRAZOS	HARRIS	080346000		2802	2507	2151	1865	1507	1106
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000		-13	-13	-13	-13	-14	-14
LIVESTOCK	TRINITY-SAN JACINTO	HARRIS	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	HARRIS	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	HARRIS	081005000		0	0	0	0	0	0
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000		-35	0	-247	-503	-757	-1010
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001000		-29642	-34916	-39401	-43373	-46346	-44854
MANUFACTURING	SAN JACINTO	HARRIS	081001000		157472	145477	120455	106434	95939	101207
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001000		-2835	-7210	-10957	-14261	-16732	-15492
MASON CREEK UD	SAN JACINTO	HARRIS	084247000		-803	-1625	-1935	-1915	-1905	-1905
MINING	SAN JACINTO	HARRIS	081003000		-266	-415	-508	-601	-696	-779
MINING	SAN JACINTO-BRAZOS	HARRIS	081003000		-5	-8	-10	-12	-13	-15
MISSOURI CITY	SAN JACINTO	HARRIS	080409000		1835	548	-86	-363	-593	-957
NASSAU BAY	SAN JACINTO-BRAZOS	HARRIS	080424000		1259	1271	1284	1297	1306	1306
NHCRWA	SAN JACINTO	HARRIS	088000000		242	-49401	-82367	-101111	-119499	-138761
NORTH BELT UD	SAN JACINTO	HARRIS	084275000		-158	-420	-617	-749	-888	-1026
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000		-120	-265	-342	-371	-403	-440
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000		-200	-510	-737	-869	-1016	-1162
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000		-454	-1010	-1305	-1413	-1533	-1669
PARKWAY UD	SAN JACINTO	HARRIS	084298000		-275	-266	-266	-258	-253	-255
PASADENA	SAN JACINTO	HARRIS	080456000		11908	10456	9139	7747	6224	4515
PASADENA	SAN JACINTO-BRAZOS	HARRIS	080456000		1808	1589	1387	1176	945	685
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000		35	-23	-62	-101	-152	-208
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000		-282	-326	-424	-491	-564	-646
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000		-788	-809	-904	-946	-996	-1052
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000		-241	-510	-635	-659	-688	-721
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000		-1262	-1633	-1990	-2371	-2748	-3146
SHOREACRES	SAN JACINTO-BRAZOS	HARRIS	080558000		180	169	158	149	151	151
SOUTH HOUSTON	SAN JACINTO	HARRIS	080569000		2125	2045	1866	1763	1619	1452
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000		-11	-27	-67	-91	-119	-149
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000		-243	-556	-745	-825	-913	-1010
SPRING VALLEY	SAN JACINTO	HARRIS	080575000		-303	-640	-797	-825	-861	-902
STAFFORD	SAN JACINTO	HARRIS	080577000		127	96	62	40	29	18
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002000		7083	-8218	-12038	-16695	-22371	-29289
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	HARRIS	081002000		1720	881	671	416	105	-275
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000		-1047	-3173	-4515	-5256	-5982	-6747
TAYLOR LAKE VILLAGE	SAN JACINTO-BRAZOS	HARRIS	080751000		1132	1145	1157	1169	1173	1173
TOMBALL	SAN JACINTO	HARRIS	080608000		-895	-2311	-3244	-4236	-4964	-6032
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000		-482	-963	-1151	-1126	-1126	-1126
WALLER	SAN JACINTO	HARRIS	080629000		-41	-108	-161	-196	-231	-267
WEBSTER	SAN JACINTO-BRAZOS	HARRIS	080635000		6835	6223	5615	5021	4411	3803
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000		-192	-393	-474	-462	-454	-454
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000		-464	-567	-850	-1003	-1192	-1401
WHCRWA	SAN JACINTO	HARRIS	088002000		3899	-20328	-38669	-46259	-54082	-62662

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000		-227	-456	-540	-528	-520	-520
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000		-207	-647	-781	-771	-771	-771
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000		-213	-570	-844	-1029	-1219	-1409
BUFFALO	TRINITY	LEON	080083000		0	0	0	0	0	0
CENTERVILLE	TRINITY	LEON	080105000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	LEON	080757000		0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	LEON	080757000		0	0	0	0	0	0
FLO COMMUNITY WSC	TRINITY	LEON	084114000		0	0	0	0	0	0
IRRIGATION	TRINITY	LEON	081004000		0	0	0	0	0	0
JEWETT	TRINITY	LEON	080887000		0	0	0	0	0	0
JEWETT	BRAZOS	LEON	080887000		0	0	0	0	0	0
LIVESTOCK	TRINITY	LEON	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	LEON	081005000		0	0	0	0	0	0
MANUFACTURING	TRINITY	LEON	081001000		0	0	0	0	0	0
MINING	TRINITY	LEON	081003000		0	0	0	0	0	0
MINING	BRAZOS	LEON	081003000		0	0	0	0	0	0
NORMANGEE	TRINITY	LEON	080927000		0	0	0	0	0	0
NORMANGEE	BRAZOS	LEON	080927000		0	0	0	0	0	0
AMES	TRINITY	LIBERTY	080676000		0	0	0	0	0	0
CLEVELAND	SAN JACINTO	LIBERTY	080116000		0	0	0	0	0	0
COUNTY-OTHER	NECHES	LIBERTY	080757000		0	0	0	0	0	0
COUNTY-OTHER	NECHES-TRINITY	LIBERTY	080757000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	LIBERTY	080757000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY-SAN JACINTO	LIBERTY	080757000		0	0	0	0	0	0
COUNTY-OTHER	SAN JACINTO	LIBERTY	080757000		0	0	0	0	0	0
DAISETTA	NECHES	LIBERTY	080149000		0	0	0	0	0	0
DAISETTA	TRINITY	LIBERTY	080149000		0	0	0	0	0	0
DAYTON	TRINITY	LIBERTY	080152000		0	0	0	0	0	0
HARDIN	TRINITY	LIBERTY	080878000		0	0	0	0	0	0
HARDIN WSC	TRINITY	LIBERTY	084148000		0	0	0	0	0	0
IRRIGATION	NECHES	LIBERTY	081004000		-3305	-3293	-3281	-3270	-3258	-3227
IRRIGATION	NECHES-TRINITY	LIBERTY	081004000		13855	13813	13782	13750	13713	13671
IRRIGATION	TRINITY	LIBERTY	081004000		1611	-169	-1430	-2843	-4525	-6588
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004000		-11041	-11081	-11116	-11151	-11189	-11217
IRRIGATION	SAN JACINTO	LIBERTY	081004000		0	0	0	0	0	0
KENEFICK	TRINITY	LIBERTY	081033000		0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEW	TRINITY	LIBERTY	084226000		0	0	0	0	0	0
LIBERTY	TRINITY	LIBERTY	080356000		0	0	0	0	0	0
LIVESTOCK	NECHES	LIBERTY	081005000		0	0	0	0	0	0
LIVESTOCK	NECHES-TRINITY	LIBERTY	081005000		0	0	0	0	0	0
LIVESTOCK	TRINITY	LIBERTY	081005000		0	0	0	0	0	0
LIVESTOCK	TRINITY-SAN JACINTO	LIBERTY	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	LIBERTY	081005000		0	0	0	0	0	0
MANUFACTURING	TRINITY	LIBERTY	081001000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	LIBERTY	081001000		0	0	0	0	0	0
MERCY WSC	SAN JACINTO	LIBERTY	084253000		0	0	0	0	0	0

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
MINING	NECHES	LIBERTY	081003000		0	0	0	0	0	0
MINING	NECHES-TRINITY	LIBERTY	081003000		0	0	0	0	0	0
MINING	TRINITY	LIBERTY	081003000		0	0	0	0	0	0
MINING	TRINITY-SAN JACINTO	LIBERTY	081003000		0	0	0	0	0	0
MINING	SAN JACINTO	LIBERTY	081003000		0	0	0	0	0	0
PLUM GROVE	SAN JACINTO	LIBERTY	081054000		0	0	0	0	0	0
SOUTHWEST UTILITIES	SAN JACINTO	LIBERTY	084343000		0	0	0	0	0	0
STEAM ELECTRIC POWER	TRINITY	LIBERTY	081002000		0	0	0	0	0	0
WEST HARDIN WSC	NECHES	LIBERTY	084383000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	MADISON	080757000		0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	MADISON	080757000		0	0	0	0	0	0
IRRIGATION	TRINITY	MADISON	081004000		0	0	0	0	0	0
LIVESTOCK	TRINITY	MADISON	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	MADISON	081005000		0	0	0	0	0	0
MADISONVILLE	TRINITY	MADISON	080382000		0	0	0	0	0	0
MANUFACTURING	TRINITY	MADISON	081001000		0	0	0	0	0	0
MINING	TRINITY	MADISON	081003000		0	0	0	0	0	0
MINING	BRAZOS	MADISON	081003000		0	0	0	0	0	0
NORMANGEE	TRINITY	MADISON	080927000		0	0	0	0	0	0
CONROE	SAN JACINTO	MONTGOMERY	080130000		-1565	-4022	-6528	-9461	-13427	-18201
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000		-35	-90	-148	-212	-305	-416
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757000		-3242	-9834	-18594	-29625	-46222	-66583
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000		-95	-259	-453	-690	-1032	-1445
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	080854000		-1	-1	-2	-2	-3	-3
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000		-73	-202	-356	-543	-810	-1131
H M W SUD	SAN JACINTO	MONTGOMERY	084147000		-272	-692	-1113	-1588	-2239	-3007
HOUSTON	SAN JACINTO	MONTGOMERY	080285000		0	0	0	0	0	0
IRRIGATION	SAN JACINTO	MONTGOMERY	081004000		431	431	431	431	431	431
LIVESTOCK	SAN JACINTO	MONTGOMERY	081005000		0	0	0	0	0	0
MAGNOLIA	SAN JACINTO	MONTGOMERY	080907000		-2	-2	-2	-2	-3	-4
MANUFACTURING	SAN JACINTO	MONTGOMERY	081001000		-343	-884	-1291	-1672	-2056	-2442
MINING	SAN JACINTO	MONTGOMERY	081003000		-80	-193	-261	-315	-368	-413
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000		-282	-862	-1698	-2775	-4322	-6221
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000		-77	-172	-221	-257	-292	-320
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000		-155	-411	-698	-1035	-1512	-2083
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000		-143	-401	-720	-1112	-1668	-2342
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000		-89	-197	-254	-294	-334	-365
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000		-79	-189	-274	-362	-475	-607
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000		-155	-346	-447	-517	-587	-642
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000		-81	-194	-283	-375	-494	-632
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000		-229	-607	-1047	-1549	-2283	-3166
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000		-114	-284	-444	-619	-854	-1133
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000		-129	-327	-522	-669	-755	-827
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	080734000		-1	-1	-1	-1	-1	-1
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000		-112	-331	-630	-1004	-1545	-2205
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000		-309	-798	-1313	-1917	-2155	-2357
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000		-350	-788	-1019	-1194	-1355	-1482
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000		-139	-310	-398	-461	-521	-569
ROMAN FOREST	SAN JACINTO	MONTGOMERY	080801000		-1	-1	-2	-2	-2	-3
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000		-86	-192	-249	-288	-324	-355
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000		-298	-815	-1049	-1222	-1386	-1517
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000		-40	-104	-171	-247	-353	-482

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
SPLENDORA	SAN JACINTO	MONTGOMERY	080962000		-1	-1	-2	-2	-3	-4
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000		-85	-225	-388	-586	-869	-1210
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000		-114	-330	-428	-498	-565	-618
STEAM ELECTRIC POWER	SAN JACINTO	MONTGOMERY	081002000		4151	1761	57	-1815	-4140	-6885
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000		-2459	-10081	-14022	-16360	-18464	-20204
WILLIS	SAN JACINTO	MONTGOMERY	080655000		-95	-246	-403	-594	-853	-1171
WOODBRANCH	SAN JACINTO	MONTGOMERY	080807000		-1	-1	-1	-1	-1	-1
COUNTY-OTHER	TRINITY	POLK	080757000		0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEW	TRINITY	POLK	084226000		0	0	0	0	0	0
LIVESTOCK	TRINITY	POLK	081005000		0	0	0	0	0	0
LIVINGSTON	TRINITY	POLK	080362000		3823	3787	3770	3757	3729	3696
MINING	TRINITY	POLK	081003000		0	0	0	0	0	0
ONALASKA	TRINITY	POLK	080933000		0	0	0	0	0	0
ONALASKA WSC	TRINITY	POLK	084293000		672	672	672	672	672	672
TRINITY RURAL WSC	TRINITY	POLK	084363000		0	0	0	0	0	0
COLDSPRING	TRINITY	SAN JACINTO	080122000		0	0	0	0	0	0
COLDSPRING	SAN JACINTO	SAN JACINTO	080122000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	SAN JACINTO	080757000		560	560	560	560	560	560
COUNTY-OTHER	SAN JACINTO	SAN JACINTO	080757000		0	0	0	0	0	0
IRRIGATION	TRINITY	SAN JACINTO	081004000		-492	-492	-492	-492	-492	-492
LAKE LIVINGSTON WATER SUPPLY & SEW	TRINITY	SAN JACINTO	084226000		0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEW	SAN JACINTO	SAN JACINTO	084226000		0	0	0	0	0	0
LIVESTOCK	TRINITY	SAN JACINTO	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	SAN JACINTO	081005000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	SAN JACINTO	081001000		0	0	0	0	0	0
MERCY WSC	SAN JACINTO	SAN JACINTO	084253000		0	0	0	0	0	0
MINING	TRINITY	SAN JACINTO	081003000		0	0	0	0	0	0
MINING	SAN JACINTO	SAN JACINTO	081003000		0	0	0	0	0	0
POINT BLANK	TRINITY	SAN JACINTO	081056000		0	0	0	0	0	0
RIVERSIDE WSC	TRINITY	SAN JACINTO	084323000		0	0	0	0	0	0
SAN JACINTO WSC	TRINITY	SAN JACINTO	084328000		280	280	280	280	280	280
SHEPHERD	TRINITY	SAN JACINTO	080746000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	TRINITY	080757000		3257	3730	3691	3715	3745	3763
GROVETON	TRINITY	TRINITY	080255000		0	0	0	0	0	0
IRRIGATION	TRINITY	TRINITY	081004000		270	270	270	270	270	270
LAKE LIVINGSTON WATER SUPPLY & SEW	TRINITY	TRINITY	084226000		0	0	0	0	0	0
LIVESTOCK	TRINITY	TRINITY	081005000		0	0	0	0	0	0
MINING	TRINITY	TRINITY	081003000		0	0	0	0	0	0
TRINITY	TRINITY	TRINITY	080610000		0	0	0	0	0	0
TRINITY RURAL WSC	TRINITY	TRINITY	084363000		0	0	0	0	0	0
CONSOLIDATED WSC	TRINITY	WALKER	084071000		0	0	0	0	0	0
COUNTY-OTHER	TRINITY	WALKER	080757000		0	0	0	0	0	0
COUNTY-OTHER	SAN JACINTO	WALKER	080757000		0	0	0	0	0	0
HUNTSVILLE	TRINITY	WALKER	080292000		9184	8749	6367	7058	6901	6629
HUNTSVILLE	SAN JACINTO	WALKER	080292000		0	323	2484	1852	1978	2202
IRRIGATION	TRINITY	WALKER	081004000		9	8	8	8	8	8
IRRIGATION	SAN JACINTO	WALKER	081004000		0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEW	TRINITY	WALKER	084226000		0	0	0	0	0	0

Region H
Table 4A-1: WUG Surplus or Shortage

wug_name	wug_basin	wug_county	wug_id		SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
LIVESTOCK	TRINITY	WALKER	081005000		0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	WALKER	081005000		0	0	0	0	0	0
MANUFACTURING	TRINITY	WALKER	081001000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	WALKER	081001000		0	0	0	0	0	0
MINING	TRINITY	WALKER	081003000		0	0	0	0	0	0
MINING	SAN JACINTO	WALKER	081003000		0	0	0	0	0	0
NEW WAVERLY	SAN JACINTO	WALKER	080926000		0	0	0	0	0	0
RIVERSIDE WSC	TRINITY	WALKER	084323000		0	0	0	0	0	0
TRINITY RURAL WSC	TRINITY	WALKER	084363000		0	0	0	0	0	0
WALKER COUNTY RURAL WSC	TRINITY	WALKER	084372000		0	0	0	0	0	0
BROOKSHIRE	BRAZOS	WALLER	080077000		0	0	0	0	**-20**	**-103**
COUNTY-OTHER	SAN JACINTO	WALLER	080757000		0	0	0	0	0	**-69**
COUNTY-OTHER	BRAZOS	WALLER	080757000		0	0	0	0	**-45**	**-241**
HEMPSTEAD	BRAZOS	WALLER	080271000		0	0	0	0	**-50**	**-259**
IRRIGATION	SAN JACINTO	WALLER	081004000		0	0	0	0	**-192**	**-1133**
IRRIGATION	BRAZOS	WALLER	081004000		0	0	0	0	0	0
KATY	SAN JACINTO	WALLER	080312000		**-52**	**-101**	**-121**	**-120**	**-119**	**-119**
LIVESTOCK	SAN JACINTO	WALLER	081005000		0	0	0	0	0	0
LIVESTOCK	BRAZOS	WALLER	081005000		0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	WALLER	081001000		0	0	0	0	0	**-3**
MANUFACTURING	BRAZOS	WALLER	081001000		0	0	0	0	**-1**	**-3**
MINING	SAN JACINTO	WALLER	081003000		0	0	0	0	0	0
MINING	BRAZOS	WALLER	081003000		0	0	0	0	0	0
PINE ISLAND	BRAZOS	WALLER	080938000		0	0	0	0	**-6**	**-31**
PRAIRIE VIEW	SAN JACINTO	WALLER	080485000		0	0	0	0	0	**-5**
PRAIRIE VIEW	BRAZOS	WALLER	080485000		0	0	0	0	**-36**	**-173**
WALLER	SAN JACINTO	WALLER	080629000		0	0	0	0	0	**-26**

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
BELLVILLE	BRAZOS	AUSTIN	080048000	0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	AUSTIN	080757000	0	0	0	0	0	0
COUNTY-OTHER	BRAZOS-COLORADO	AUSTIN	080757000	0	0	0	0	0	0
COUNTY-OTHER	COLORADO	AUSTIN	080757000	0	0	0	0	0	0
IRRIGATION	BRAZOS	AUSTIN	081004000	0	0	0	0	0	0
IRRIGATION	BRAZOS-COLORADO	AUSTIN	081004000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	AUSTIN	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	AUSTIN	081005000	0	0	0	0	0	0
LIVESTOCK	COLORADO	AUSTIN	081005000	0	0	0	0	0	0
MANUFACTURING	BRAZOS	AUSTIN	081001000	0	0	0	0	0	0
MANUFACTURING	BRAZOS-COLORADO	AUSTIN	081001000	0	0	0	0	0	0
MINING	BRAZOS	AUSTIN	081003000	0	0	0	0	0	0
MINING	BRAZOS-COLORADO	AUSTIN	081003000	0	0	0	0	0	0
MINING	COLORADO	AUSTIN	081003000	0	0	0	0	0	0
SAN FELIPE	BRAZOS	AUSTIN	080954000	0	0	0	0	0	0
SEALY	BRAZOS	AUSTIN	080549000	0	0	0	0	0	0
WALLIS	BRAZOS-COLORADO	AUSTIN	080630000	0	0	0	0	0	0
ALVIN	SAN JACINTO-BRAZOS	BRAZORIA	080013000	0	0	0	0	0	0
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000	-142	-73	-97	-113	-163	-236
BAILEY'S PRAIRIE	SAN JACINTO-BRAZOS	BRAZORIA	080817000	0	0	0	0	0	0
BAILEY'S PRAIRIE	BRAZOS	BRAZORIA	080817000	0	0	0	0	0	0
BRAZORIA	BRAZOS	BRAZORIA	080072000	14	15	16	18	17	16
BRAZORIA	BRAZOS-COLORADO	BRAZORIA	080072000	42	45	48	55	53	49
BRAZORIA COUNTY MUD #1	SAN JACINTO-BRAZOS	BRAZORIA	084030000	0	0	0	0	0	0
BRAZORIA COUNTY MUD #2	BRAZOS	BRAZORIA	084031000	0	0	0	0	0	0
BRAZORIA COUNTY MUD #3	SAN JACINTO-BRAZOS	BRAZORIA	084032000	0	0	0	0	0	0
BRAZORIA COUNTY MUD #4	SAN JACINTO-BRAZOS	BRAZORIA	084033000	0	0	0	0	0	0
BRAZORIA COUNTY MUD #5	SAN JACINTO-BRAZOS	BRAZORIA	084034000	0	0	0	0	0	0
BROOKSIDE VILLAGE	SAN JACINTO-BRAZOS	BRAZORIA	080078000	0	0	0	0	0	0
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000	-21	0	-34	-53	-98	-160
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757000	-7396	-7480	-8863	-10296	-12158	-14204
COUNTY-OTHER	BRAZOS	BRAZORIA	080757000	-101	-58	-69	-72	-77	-82
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757000	-1964	-1931	-2098	-2229	-2428	-2656
DANBURY	SAN JACINTO-BRAZOS	BRAZORIA	080693000	0	0	0	0	0	0
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000	33	-86	-252	-424	-649	-931
FREEPORT	BRAZOS	BRAZORIA	080217000	2	-12	-26	-35	-44	-52
HILLCREST	SAN JACINTO-BRAZOS	BRAZORIA	080881000	0	0	0	0	0	0
HOLIDAY LAKES	SAN JACINTO-BRAZOS	BRAZORIA	080779000	0	0	0	0	0	0
IOWA COLONY	SAN JACINTO-BRAZOS	BRAZORIA	080885000	0	0	0	0	0	0
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004000	-28057	-20212	-19503	-19511	-21232	-22789
IRRIGATION	BRAZOS	BRAZORIA	081004000	-1712	-1426	-1317	-1249	-1260	-1268
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004000	-2742	-2520	-2478	-2471	-2553	-2639
JONES CREEK	BRAZOS-COLORADO	BRAZORIA	080308000	0	0	0	0	0	0
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000	522	300	24	-238	-554	-928
LIVESTOCK	SAN JACINTO-BRAZOS	BRAZORIA	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	BRAZORIA	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	BRAZORIA	081005000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO-BRAZOS	BRAZORIA	081001000	4403	133	-2059	-4551	-7175	-10624
MANUFACTURING	BRAZOS	BRAZORIA	081001000	-47629	-69994	-89878	-109912	-127719	-149191
MANUFACTURING	BRAZOS-COLORADO	BRAZORIA	081001000	10835	10715	10609	10502	10408	10293
MANVEL	SAN JACINTO-BRAZOS	BRAZORIA	080721000	0	0	0	0	0	0

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
MINING	SAN JACINTO-BRAZOS	BRAZORIA	081003000	-16	-4	-101	-205	-328	-445
MINING	BRAZOS	BRAZORIA	081003000	-89	-127	-149	-171	-190	-208
MINING	BRAZOS-COLORADO	BRAZORIA	081003000	-288	-437	-555	-673	-819	-969
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	BRAZORIA	084294000	0	0	0	0	0	0
ORBIT SYSTEMS INC	BRAZOS-COLORADO	BRAZORIA	084294000	0	0	0	0	0	0
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000	-32	-36	-52	-67	-87	-112
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	1074	-370	-1495	-2732	-4341	-6193
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000	-24	-18	-26	-31	-44	-62
SOUTHWEST UTILITIES	SAN JACINTO-BRAZOS	BRAZORIA	084343000	0	0	0	0	0	0
SURFSIDE BEACH	BRAZOS	BRAZORIA	080967000	0	0	0	0	0	0
SWEENY	BRAZOS-COLORADO	BRAZORIA	080590000	0	0	0	0	0	0
VARNER CREEK UD	BRAZOS	BRAZORIA	084370000	0	0	0	0	0	0
WEST COLUMBIA	BRAZOS	BRAZORIA	080640000	0	0	0	0	0	0
WEST COLUMBIA	BRAZOS-COLORADO	BRAZORIA	080640000	0	0	0	0	0	0
ANAHUAC	NECHES-TRINITY	CHAMBERS	080015000	540	523	506	496	479	461
ANAHUAC	TRINITY	CHAMBERS	080015000	156	150	147	143	139	133
BAYTOWN	TRINITY-SAN JACINTO	CHAMBERS	080042000	51	52	50	48	36	17
BEACH CITY	TRINITY	CHAMBERS	080822000	-31	-40	-50	-59	-67	-76
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000	-189	-247	-309	-366	-429	-495
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757000	-48	-44	-43	-41	-40	-39
COUNTY-OTHER	TRINITY	CHAMBERS	080757000	-205	-192	-185	-178	-173	-171
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757000	-112	-105	-103	-102	-100	-101
IRRIGATION	NECHES-TRINITY	CHAMBERS	081004000	2441	2169	1983	1782	1550	1278
IRRIGATION	TRINITY	CHAMBERS	081004000	-27053	-27277	-27411	-27534	-27652	-27753
IRRIGATION	TRINITY-SAN JACINTO	CHAMBERS	081004000	1056	1035	998	965	935	905
LIVESTOCK	NECHES-TRINITY	CHAMBERS	081005000	0	0	0	0	0	0
LIVESTOCK	TRINITY	CHAMBERS	081005000	0	0	0	0	0	0
LIVESTOCK	TRINITY-SAN JACINTO	CHAMBERS	081005000	0	0	0	0	0	0
MANUFACTURING	TRINITY-SAN JACINTO	CHAMBERS	081001000	-8264	-9230	-10252	-11284	-12240	-13445
MINING	NECHES-TRINITY	CHAMBERS	081003000	-104	-155	-186	-216	-246	-273
MINING	TRINITY	CHAMBERS	081003000	-4344	-6494	-7816	-9116	-10411	-11550
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003000	-1260	-1868	-2376	-2877	-3369	-3836
MONT BELVIEU	TRINITY	CHAMBERS	080413000	-549	-714	-870	-1007	-1150	-1296
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000	-218	-286	-356	-421	-490	-563
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000	-158	-166	-174	-181	-190	-201
STEAM ELECTRIC POWER	TRINITY-SAN JACINTO	CHAMBERS	081002000	26895	27482	26970	26345	25581	24634
TRINITY BAY CONSERVATION DISTRICT	NECHES-TRINITY	CHAMBERS	084362000	1101	859	637	438	240	19
TRINITY BAY CONSERVATION DISTRICT	TRINITY	CHAMBERS	084362000	503	393	291	200	110	9
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	-124	-202	-320	-358	-409	-464
BEASLEY	BRAZOS	FORT BEND	081012000	-5	-5	-5	-7	-9	-10
BEASLEY	BRAZOS-COLORADO	FORT BEND	081012000	0	0	0	0	0	0
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	-96	-350	-802	-1160	-1642	-2193
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	-381	-1378	-3113	-4516	-6383	-8515
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	-68	-249	-568	-822	-1162	-1551
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	-182	-659	-1495	-2166	-3065	-4091
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	-77	-178	-287	-283	-283	-283
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	-236	-860	-1952	-2829	-4000	-5339
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	-97	-318	-683	-952	-1313	-1724

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757000	-71	-421	-1268	-2143	-3641	-4949
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757000	-451	-2321	-6837	-11672	-19623	-26907
COUNTY-OTHER	BRAZOS	FORT BEND	080757000	-4869	-8744	-14832	-20736	-28794	-38216
COUNTY-OTHER	BRAZOS-COLORADO	FORT BEND	080757000	0	0	0	0	0	0
FAIRCHILDS	BRAZOS	FORT BEND	081019000	-268	-295	-319	-455	-637	-847
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	-959	-990	-1118	-1109	-1109	-1109
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	-638	-666	-756	-753	-753	-753
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	-386	-397	-448	-445	-445	-445
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	-515	-532	-605	-602	-602	-602
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	-57	-128	-204	-199	-197	-197
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	-373	-533	-764	-747	-738	-738
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	-204	-464	-961	-1386	-1942	-2578
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	-489	-1027	-2021	-2792	-3837	-5030
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	-83	-240	-481	-626	-815	-1040
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	-112	-379	-819	-1156	-1602	-2114
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	-494	-744	-1159	-1555	-2095	-2710
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	-482	-498	-562	-559	-559	-559
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	-397	-409	-466	-466	-466	-466
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	-258	-269	-305	-305	-305	-305
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	-509	-720	-1065	-1388	-1817	-2306
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	-35	-61	-107	-132	-165	-204
FULSHEAR	BRAZOS	FORT BEND	080869000	-112	-140	-190	-229	-280	-341
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	-153	-554	-1254	-1819	-2572	-3432
HOUSTON	SAN JACINTO	FORT BEND	080285000	0	0	0	0	0	0
HOUSTON	SAN JACINTO-BRAZOS	FORT BEND	080285000	0	0	0	0	0	0
IRRIGATION	SAN JACINTO	FORT BEND	081004000	0	0	0	0	0	0
IRRIGATION	SAN JACINTO-BRAZOS	FORT BEND	081004000	50	50	50	50	50	50
IRRIGATION	BRAZOS	FORT BEND	081004000	26569	26569	26569	26569	26569	26569
IRRIGATION	BRAZOS-COLORADO	FORT BEND	081004000	0	0	0	0	0	0
KATY	SAN JACINTO	FORT BEND	080312000	-66	-156	-222	-263	-316	-380
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	-167	-504	-1019	-1336	-1783	-2292
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000	-12	-22	-42	-54	-72	-91
LIVESTOCK	SAN JACINTO	FORT BEND	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	FORT BEND	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	FORT BEND	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS-COLORADO	FORT BEND	081005000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	FORT BEND	081001000	-361	-891	-1446	-1508	-1550	-1429
MANUFACTURING	SAN JACINTO-BRAZOS	FORT BEND	081001000	-181	-877	-1777	-1893	-1969	-1746
MANUFACTURING	BRAZOS	FORT BEND	081001000	-820	-917	-1075	-1114	-1140	-1065
MEADOWS	SAN JACINTO	FORT BEND	080792000	-239	-545	-854	-839	-833	-833
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000	-43	-62	-88	-86	-86	-86
MINING	SAN JACINTO	FORT BEND	081003000	-43	-114	-186	-189	-192	-194
MINING	SAN JACINTO-BRAZOS	FORT BEND	081003000	184	-164	-600	-622	-642	-660
MINING	BRAZOS	FORT BEND	081003000	690	733	781	775	768	763
MINING	BRAZOS-COLORADO	FORT BEND	081003000	0	0	0	0	0	0
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	903	839	-92	-711	-1184	-2215
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	6485	3864	-864	-3744	-5929	-10654
MISSOURI CITY	BRAZOS	FORT BEND	080409000	481	450	319	291	267	227
NEEDVILLE	BRAZOS	FORT BEND	080428000	-106	-98	-93	-116	-148	-186
NEEDVILLE	BRAZOS-COLORADO	FORT BEND	080428000	0	0	0	0	0	0
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	-142	-489	-1077	-1513	-2107	-2787

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000	-5	-7	-12	-14	-16	-19
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000	-188	-260	-394	-400	-419	-443
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	-1525	-1631	-1860	-1889	-1962	-2059
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	-173	-241	-346	-337	-332	-332
PLEAK	BRAZOS	FORT BEND	081053000	0	0	0	0	0	0
RICHMOND	BRAZOS	FORT BEND	080500000	-1334	-1486	-1827	-1995	-2260	-2584
ROSENBERG	BRAZOS	FORT BEND	080518000	-2532	-2917	-3751	-4322	-5125	-6098
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	-329	-607	-879	-871	-871	-871
SIMONTON	BRAZOS	FORT BEND	081062000	-209	-180	-153	-151	-150	-151
STAFFORD	SAN JACINTO	FORT BEND	080577000	1098	1496	1452	1348	1186	996
STAFFORD	SAN JACINTO-BRAZOS	FORT BEND	080577000	8121	7182	6343	5823	5086	4249
STEAM ELECTRIC POWER	BRAZOS	FORT BEND	081002000	76857	72545	57060	43031	25931	5086
SUGAR LAND	SAN JACINTO	FORT BEND	080585000	194	364	265	268	268	268
SUGAR LAND	SAN JACINTO-BRAZOS	FORT BEND	080585000	4729	3583	3811	3852	3852	3852
SUGAR LAND	BRAZOS	FORT BEND	080585000	7034	5995	3152	3189	3189	3189
WHCRWA	SAN JACINTO	FORT BEND	088002000	133	-616	-1716	-2441	-3401	-4571
BACLIFF MUD	SAN JACINTO-BRAZOS	GALVESTON	084012000	633	613	616	625	628	623
BAYOU VISTA	SAN JACINTO-BRAZOS	GALVESTON	080759000	62	36	24	21	18	14
BOLIVAR PENINSULAR SUD	NECHES-TRINITY	GALVESTON	084027000	3915	3837	3798	3787	3777	3766
CLEAR LAKE SHORES	SAN JACINTO-BRAZOS	GALVESTON	080764000	435	431	429	431	431	429
COUNTY-OTHER	NECHES-TRINITY	GALVESTON	080757000	1	1	0	1	1	0
COUNTY-OTHER	SAN JACINTO-BRAZOS	GALVESTON	080757000	17726	17861	17949	17999	18026	18040
DICKINSON	SAN JACINTO-BRAZOS	GALVESTON	080165000	726	428	275	244	211	173
FRIENDSWOOD	SAN JACINTO-BRAZOS	GALVESTON	080219000	2503	2405	2377	2415	2410	2390
GALVESTON	SAN JACINTO-BRAZOS	GALVESTON	080227000	5507	5546	5642	5780	5869	5853
GALVESTON COUNTY MUD #1	SAN JACINTO-BRAZOS	GALVESTON	084135000	146	169	185	195	203	205
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000	-131	-155	-170	-174	-178	-182
HITCHCOCK	SAN JACINTO-BRAZOS	GALVESTON	080279000	653	652	656	670	673	670
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004000	-10143	-9809	-9264	-9261	-9277	-9304
JAMAICA BEACH	SAN JACINTO-BRAZOS	GALVESTON	080886000	102	120	132	141	146	148
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000	-190	-221	-243	-250	-253	-258
LA MARQUE	SAN JACINTO-BRAZOS	GALVESTON	080342000	822	864	905	946	974	974
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	-3539	-4069	-4447	-4510	-4585	-4678
LIVESTOCK	NECHES-TRINITY	GALVESTON	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	GALVESTON	081005000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO-BRAZOS	GALVESTON	081001000	21279	17954	15238	12592	10317	6793
MINING	NECHES-TRINITY	GALVESTON	081003000	-16	-23	-26	-29	-33	-36
MINING	SAN JACINTO-BRAZOS	GALVESTON	081003000	-15	-21	-24	-28	-30	-33
SAN LEON MUD	SAN JACINTO-BRAZOS	GALVESTON	084329000	1145	1107	1097	1101	1100	1093
SANTA FE	SAN JACINTO-BRAZOS	GALVESTON	080743000	107	105	112	136	140	136
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	GALVESTON	081002000	3371	4392	3713	2886	1877	648
TEXAS CITY	SAN JACINTO-BRAZOS	GALVESTON	080602000	4560	4643	4746	4864	4942	4938
TIKI ISLAND	SAN JACINTO-BRAZOS	GALVESTON	080973000	139	104	85	78	74	69
BAYTOWN	TRINITY-SAN JACINTO	HARRIS	080042000	885	834	743	675	481	220
BAYTOWN	SAN JACINTO	HARRIS	080042000	58	55	49	44	31	14
BELLAIRE	SAN JACINTO	HARRIS	080046000	-1700	-1808	-2205	-2472	-2757	-3065
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	-193	-383	-458	-449	-443	-443
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	-157	-375	-518	-596	-673	-752
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	-582	-543	-600	-587	-583	-583
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	-151	-360	-503	-583	-660	-742
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	208	0	-78	-71	-64	-64

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	-56	-166	-266	-337	-411	-484
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	-73	-214	-339	-428	-520	-611
CLEAR BROOK CITY MUD WOODMEADOV	SAN JACINTO	HARRIS	084063000	866	809	676	584	481	362
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	-129	-344	-524	-632	-756	-880
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	-257	-685	-1027	-1253	-1484	-1716
COUNTY-OTHER	TRINITY-SAN JACINTO	HARRIS	080757000	1353	1945	2297	2507	2629	2702
COUNTY-OTHER	SAN JACINTO	HARRIS	080757000	3926	2862	2239	-2010	-6583	-10990
COUNTY-OTHER	SAN JACINTO-BRAZOS	HARRIS	080757000	43	14	132	108	127	128
CROSBY MUD	SAN JACINTO	HARRIS	084078000	564	580	563	573	580	580
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000	-7	-18	-27	-32	-38	-44
DEER PARK	SAN JACINTO	HARRIS	080154000	20	59	30	23	-11	-56
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	080154000	29	89	45	34	-14	-84
EL DORADO UD	SAN JACINTO	HARRIS	084101000	-24	15	-105	-144	-186	-232
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000	-275	-286	-299	-308	-315	-326
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	-260	-605	-823	-940	-1052	-1177
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	-112	-258	-354	-397	-444	-495
FRIENDSWOOD	SAN JACINTO-BRAZOS	HARRIS	080219000	795	684	637	632	621	608
GALENA PARK	SAN JACINTO	HARRIS	080226000	-149	-110	-149	-154	-185	-230
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	-309	-713	-965	-1082	-1200	-1323
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000	-51	-21	-29	-15	-5	-5
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	-497	-363	-460	-418	-418	-418
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	-120	-151	-201	-251	-299	-353
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	-139	-316	-427	-476	-527	-585
HARRIS COUNTY MUD #119 INWOOD NOF	SAN JACINTO	HARRIS	084154000	-287	-608	-726	-707	-697	-697
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	-582	-1476	-2125	-2523	-2913	-3320
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	-413	-916	-1207	-1319	-1442	-1578
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	-421	-858	-1035	-1026	-1026	-1026
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	-257	-679	-1001	-1210	-1429	-1648
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	-405	-1131	-1733	-2150	-2579	-3004
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	-220	-549	-786	-928	-1065	-1215
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	255	21	-60	-45	-45	-45
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	-201	-493	-699	-821	-939	-1066
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	-263	-647	-920	-1081	-1238	-1406
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	-631	-1849	-2892	-3672	-4447	-5219
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	-223	-537	-662	-660	-660	-660
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	-334	-750	-1007	-1115	-1229	-1351
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	-473	-961	-1164	-1158	-1158	-1158
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	-273	-550	-658	-651	-651	-651
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	-219	-432	-515	-501	-492	-492
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	-499	-509	-573	-607	-648	-694
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	-703	-982	-1433	-1847	-2250	-2687
HARRIS COUNTY MUD #55	SAN JACINTO-BRAZOS	HARRIS	084187000	2375	2414	2453	2492	2518	2518
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	-138	-157	-234	-288	-349	-418
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	-197	-436	-571	-622	-674	-728
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	-141	-324	-441	-494	-549	-610
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	304	-170	-475	-610	-754	-914
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	-253	-506	-613	-603	-609	-609
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	-359	-363	-435	-471	-531	-604
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197000	-278	-314	-457	-556	-665	-789
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	-542	-576	-637	-690	-748	-813
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	-99	-196	-233	-227	-223	-223

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	-234	-224	-239	-237	-244	-254
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	-512	-495	-533	-533	-535	-541
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	53	-12	-36	-34	-33	-33
HOUSTON	SAN JACINTO	HARRIS	080285000	0	0	0	0	0	0
HOUSTON	SAN JACINTO-BRAZOS	HARRIS	080285000	0	0	0	0	0	0
HUMBLE	SAN JACINTO	HARRIS	080289000	-1181	-2720	-3636	-4029	-4438	-4871
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	-1073	-1124	-1296	-1397	-1509	-1628
IRRIGATION	TRINITY-SAN JACINTO	HARRIS	081004000	1254	1254	1254	1254	1254	1254
IRRIGATION	SAN JACINTO	HARRIS	081004000	120	738	0	0	0	0
JACINTO CITY	SAN JACINTO	HARRIS	080301000	76	91	-22	-64	-131	-214
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	311	-434	-946	-1233	-1515	-1812
KATY	SAN JACINTO	HARRIS	080312000	-821	-2026	-2892	-3410	-3918	-4450
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	-71	-172	-240	-276	-315	-354
LA PORTE	SAN JACINTO	HARRIS	080346000	161	143	126	110	89	66
LA PORTE	SAN JACINTO-BRAZOS	HARRIS	080346000	2802	2507	2151	1865	1507	1106
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000	-13	-12	-12	-12	-13	-13
LIVESTOCK	TRINITY-SAN JACINTO	HARRIS	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	HARRIS	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO-BRAZOS	HARRIS	081005000	0	0	0	0	0	0
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000	-31	11	-234	-486	-737	-987
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001000	-29642	-34916	-39401	-43373	-46346	-44854
MANUFACTURING	SAN JACINTO	HARRIS	081001000	157472	145477	120455	106434	95939	101207
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001000	-2835	-7210	-10957	-14261	-16732	-15492
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	-793	-1588	-1901	-1881	-1871	-1871
MINING	SAN JACINTO	HARRIS	081003000	-266	-415	-508	-601	-696	-779
MINING	SAN JACINTO-BRAZOS	HARRIS	081003000	-5	-8	-10	-12	-13	-15
MISSOURI CITY	SAN JACINTO	HARRIS	080409000	1845	581	-50	-322	-547	-906
NASSAU BAY	SAN JACINTO-BRAZOS	HARRIS	080424000	1259	1271	1284	1297	1306	1306
NHCRWA	SAN JACINTO	HARRIS	088000000	1057	-46883	-79577	-97925	-115920	-134789
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	-151	-400	-593	-720	-854	-988
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	-115	-249	-326	-353	-383	-419
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	-192	-488	-711	-839	-981	-1123
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	-440	-961	-1254	-1357	-1473	-1604
PARKWAY UD	SAN JACINTO	HARRIS	084298000	-272	-254	-255	-247	-242	-244
PASADENA	SAN JACINTO	HARRIS	080456000	11908	10456	9139	7747	6224	4515
PASADENA	SAN JACINTO-BRAZOS	HARRIS	080456000	1808	1589	1387	1176	945	685
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	38	-12	-50	-88	-137	-192
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	-274	-299	-396	-461	-532	-612
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	-784	-794	-889	-931	-980	-1036
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	-238	-500	-625	-648	-677	-710
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000	-1244	-1576	-1927	-2299	-2667	-3056
SHOREACRES	SAN JACINTO-BRAZOS	HARRIS	080558000	180	169	158	149	151	151
SOUTH HOUSTON	SAN JACINTO	HARRIS	080569000	2125	2045	1866	1763	1619	1452
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	-9	-20	-60	-83	-111	-140
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	-234	-527	-714	-790	-875	-968
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	-299	-624	-781	-809	-844	-884
STAFFORD	SAN JACINTO	HARRIS	080577000	127	96	62	40	29	18
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002000	7083	-8218	-12038	-16695	-22371	-29289
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	HARRIS	081002000	1720	881	671	416	105	-275
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	-1011	-3059	-4391	-5115	-5825	-6574
TAYLOR LAKE VILLAGE	SAN JACINTO-BRAZOS	HARRIS	080751000	1132	1145	1157	1169	1173	1173

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
TOMBALL	SAN JACINTO	HARRIS	080608000	-875	-2250	-3176	-4150	-4864	-5913
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	-452	-920	-1110	-1085	-1085	-1085
WALLER	SAN JACINTO	HARRIS	080629000	-40	-105	-157	-192	-226	-261
WEBSTER	SAN JACINTO-BRAZOS	HARRIS	080635000	6835	6223	5615	5021	4411	3803
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	-184	-379	-461	-449	-441	-441
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	-446	-500	-784	-932	-1117	-1322
WHCRWA	SAN JACINTO	HARRIS	088002000	4268	-18915	-37038	-44440	-52066	-60445
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	-224	-441	-526	-514	-506	-506
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	-195	-613	-749	-739	-739	-739
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	-206	-551	-822	-1002	-1188	-1374
BUFFALO	TRINITY	LEON	080083000	0	0	0	0	0	0
CENTERVILLE	TRINITY	LEON	080105000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	LEON	080757000	0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	LEON	080757000	0	0	0	0	0	0
FLO COMMUNITY WSC	TRINITY	LEON	084114000	0	0	0	0	0	0
IRRIGATION	TRINITY	LEON	081004000	0	0	0	0	0	0
JEWETT	TRINITY	LEON	080887000	0	0	0	0	0	0
JEWETT	BRAZOS	LEON	080887000	0	0	0	0	0	0
LIVESTOCK	TRINITY	LEON	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	LEON	081005000	0	0	0	0	0	0
MANUFACTURING	TRINITY	LEON	081001000	0	0	0	0	0	0
MINING	TRINITY	LEON	081003000	0	0	0	0	0	0
MINING	BRAZOS	LEON	081003000	0	0	0	0	0	0
NORMANGEE	TRINITY	LEON	080927000	0	0	0	0	0	0
NORMANGEE	BRAZOS	LEON	080927000	0	0	0	0	0	0
AMES	TRINITY	LIBERTY	080676000	0	0	0	0	0	0
CLEVELAND	SAN JACINTO	LIBERTY	080116000	0	0	0	0	0	0
COUNTY-OTHER	NECHES	LIBERTY	080757000	0	0	0	0	0	0
COUNTY-OTHER	NECHES-TRINITY	LIBERTY	080757000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	LIBERTY	080757000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY-SAN JACINTO	LIBERTY	080757000	0	0	0	0	0	0
COUNTY-OTHER	SAN JACINTO	LIBERTY	080757000	0	0	0	0	0	0
DAISETTA	NECHES	LIBERTY	080149000	0	0	0	0	0	0
DAISETTA	TRINITY	LIBERTY	080149000	0	0	0	0	0	0
DAYTON	TRINITY	LIBERTY	080152000	0	0	0	0	0	0
HARDIN	TRINITY	LIBERTY	080878000	0	0	0	0	0	0
HARDIN WSC	TRINITY	LIBERTY	084148000	0	0	0	0	0	0
IRRIGATION	NECHES	LIBERTY	081004000	-3305	-3293	-3281	-3270	-3258	-3227
IRRIGATION	NECHES-TRINITY	LIBERTY	081004000	13855	13813	13782	13750	13713	13671
IRRIGATION	TRINITY	LIBERTY	081004000	1611	-169	-1430	-2843	-4525	-6588
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004000	-11041	-11081	-11116	-11151	-11189	-11217
IRRIGATION	SAN JACINTO	LIBERTY	081004000	0	0	0	0	0	0
KENEFICK	TRINITY	LIBERTY	081033000	0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SE	TRINITY	LIBERTY	084226000	0	0	0	0	0	0
LIBERTY	TRINITY	LIBERTY	080356000	0	0	0	0	0	0
LIVESTOCK	NECHES	LIBERTY	081005000	0	0	0	0	0	0
LIVESTOCK	NECHES-TRINITY	LIBERTY	081005000	0	0	0	0	0	0
LIVESTOCK	TRINITY	LIBERTY	081005000	0	0	0	0	0	0
LIVESTOCK	TRINITY-SAN JACINTO	LIBERTY	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	LIBERTY	081005000	0	0	0	0	0	0

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
MANUFACTURING	TRINITY	LIBERTY	081001000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	LIBERTY	081001000	0	0	0	0	0	0
MERCY WSC	SAN JACINTO	LIBERTY	084253000	0	0	0	0	0	0
MINING	NECHES	LIBERTY	081003000	0	0	0	0	0	0
MINING	NECHES-TRINITY	LIBERTY	081003000	0	0	0	0	0	0
MINING	TRINITY	LIBERTY	081003000	0	0	0	0	0	0
MINING	TRINITY-SAN JACINTO	LIBERTY	081003000	0	0	0	0	0	0
MINING	SAN JACINTO	LIBERTY	081003000	0	0	0	0	0	0
PLUM GROVE	SAN JACINTO	LIBERTY	081054000	0	0	0	0	0	0
SOUTHWEST UTILITIES	SAN JACINTO	LIBERTY	084343000	0	0	0	0	0	0
STEAM ELECTRIC POWER	TRINITY	LIBERTY	081002000	0	0	0	0	0	0
WEST HARDIN WSC	NECHES	LIBERTY	084383000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	MADISON	080757000	0	0	0	0	0	0
COUNTY-OTHER	BRAZOS	MADISON	080757000	0	0	0	0	0	0
IRRIGATION	TRINITY	MADISON	081004000	0	0	0	0	0	0
LIVESTOCK	TRINITY	MADISON	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	MADISON	081005000	0	0	0	0	0	0
MADISONVILLE	TRINITY	MADISON	080382000	0	0	0	0	0	0
MANUFACTURING	TRINITY	MADISON	081001000	0	0	0	0	0	0
MINING	TRINITY	MADISON	081003000	0	0	0	0	0	0
MINING	BRAZOS	MADISON	081003000	0	0	0	0	0	0
NORMANGEE	TRINITY	MADISON	080927000	0	0	0	0	0	0
CONROE	SAN JACINTO	MONTGOMERY	080130000	-1482	-3794	-6254	-9121	-12998	-17670
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	-31	-80	-135	-196	-285	-391
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757000	-2933	-9054	-17511	-28152	-44205	-63935
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000	-82	-229	-413	-637	-963	-1356
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	080854000	1	6	6	8	9	12
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	-69	-191	-342	-524	-786	-1100
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	-254	-642	-1054	-1516	-2150	-2897
HOUSTON	SAN JACINTO	MONTGOMERY	080285000	0	0	0	0	0	0
IRRIGATION	SAN JACINTO	MONTGOMERY	081004000	431	431	431	431	431	431
LIVESTOCK	SAN JACINTO	MONTGOMERY	081005000	0	0	0	0	0	0
MAGNOLIA	SAN JACINTO	MONTGOMERY	080907000	0	4	5	6	7	8
MANUFACTURING	SAN JACINTO	MONTGOMERY	081001000	-343	-884	-1291	-1672	-2056	-2442
MINING	SAN JACINTO	MONTGOMERY	081003000	-80	-193	-261	-315	-368	-413
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	-266	-829	-1650	-2708	-4230	-6099
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	-74	-159	-209	-245	-280	-308
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	-147	-390	-672	-1002	-1469	-2029
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	-137	-386	-700	-1086	-1633	-2297
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	-84	-185	-243	-283	-323	-354
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	-74	-173	-257	-343	-452	-581
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	-146	-327	-429	-499	-569	-624
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	-76	-176	-264	-353	-468	-602
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	-202	-539	-960	-1437	-2137	-2981
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	-108	-267	-425	-596	-826	-1099
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	-125	-316	-509	-654	-740	-812
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	080734000	2	7	8	9	12	14
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	-104	-314	-607	-972	-1501	-2148
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	-284	-732	-1232	-1815	-2053	-2255
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	-309	-723	-957	-1132	-1293	-1420
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000	-136	-297	-386	-449	-509	-557

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
ROMAN FOREST	SAN JACINTO	MONTGOMERY	080801000	2	6	6	8	11	12
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000	-85	-186	-243	-282	-318	-349
SOUTHERN MONTGOMERY COUNTY MUI	SAN JACINTO	MONTGOMERY	084339000	-277	-765	-1001	-1174	-1338	-1469
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000	-36	-94	-159	-232	-333	-458
SPLENDORA	SAN JACINTO	MONTGOMERY	080962000	3	9	11	15	19	24
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	-75	-201	-357	-546	-816	-1143
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000	-105	-310	-409	-479	-546	-599
STEAM ELECTRIC POWER	SAN JACINTO	MONTGOMERY	081002000	4151	1761	57	-1815	-4140	-6885
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	-2390	-9644	-13573	-15911	-18015	-19755
WILLIS	SAN JACINTO	MONTGOMERY	080655000	-85	-219	-370	-552	-799	-1104
WOODBRANCH	SAN JACINTO	MONTGOMERY	080807000	0	4	4	4	4	4
COUNTY-OTHER	TRINITY	POLK	080757000	0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEV	TRINITY	POLK	084226000	0	0	0	0	0	0
LIVESTOCK	TRINITY	POLK	081005000	0	0	0	0	0	0
LIVINGSTON	TRINITY	POLK	080362000	3823	3787	3770	3757	3729	3696
MINING	TRINITY	POLK	081003000	0	0	0	0	0	0
ONALASKA	TRINITY	POLK	080933000	0	0	0	0	0	0
ONALASKA WSC	TRINITY	POLK	084293000	672	672	672	672	672	672
TRINITY RURAL WSC	TRINITY	POLK	084363000	0	0	0	0	0	0
COLDSPRING	TRINITY	SAN JACINTO	080122000	0	0	0	0	0	0
COLDSPRING	SAN JACINTO	SAN JACINTO	080122000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	SAN JACINTO	080757000	560	560	560	560	560	560
COUNTY-OTHER	SAN JACINTO	SAN JACINTO	080757000	0	0	0	0	0	0
IRRIGATION	TRINITY	SAN JACINTO	081004000	-492	-492	-492	-492	-492	-492
LAKE LIVINGSTON WATER SUPPLY & SEV	TRINITY	SAN JACINTO	084226000	0	0	0	0	0	0
LAKE LIVINGSTON WATER SUPPLY & SEV	SAN JACINTO	SAN JACINTO	084226000	0	0	0	0	0	0
LIVESTOCK	TRINITY	SAN JACINTO	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	SAN JACINTO	081005000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	SAN JACINTO	081001000	0	0	0	0	0	0
MERCY WSC	SAN JACINTO	SAN JACINTO	084253000	0	0	0	0	0	0
MINING	TRINITY	SAN JACINTO	081003000	0	0	0	0	0	0
MINING	SAN JACINTO	SAN JACINTO	081003000	0	0	0	0	0	0
POINT BLANK	TRINITY	SAN JACINTO	081056000	0	0	0	0	0	0
RIVERSIDE WSC	TRINITY	SAN JACINTO	084323000	0	0	0	0	0	0
SAN JACINTO WSC	TRINITY	SAN JACINTO	084328000	280	280	280	280	280	280
SHEPHERD	TRINITY	SAN JACINTO	080746000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	TRINITY	080757000	3257	3730	3691	3715	3745	3763
GROVETON	TRINITY	TRINITY	080255000	0	0	0	0	0	0
IRRIGATION	TRINITY	TRINITY	081004000	270	270	270	270	270	270
LAKE LIVINGSTON WATER SUPPLY & SEV	TRINITY	TRINITY	084226000	0	0	0	0	0	0
LIVESTOCK	TRINITY	TRINITY	081005000	0	0	0	0	0	0
MINING	TRINITY	TRINITY	081003000	0	0	0	0	0	0
TRINITY	TRINITY	TRINITY	080610000	0	0	0	0	0	0
TRINITY RURAL WSC	TRINITY	TRINITY	084363000	0	0	0	0	0	0
CONSOLIDATED WSC	TRINITY	WALKER	084071000	0	0	0	0	0	0
COUNTY-OTHER	TRINITY	WALKER	080757000	0	0	0	0	0	0
COUNTY-OTHER	SAN JACINTO	WALKER	080757000	0	0	0	0	0	0
HUNTSVILLE	TRINITY	WALKER	080292000	9184	8749	6367	7058	6901	6629
HUNTSVILLE	SAN JACINTO	WALKER	080292000	0	323	2484	1852	1978	2202
IRRIGATION	TRINITY	WALKER	081004000	9	8	8	8	8	8
IRRIGATION	SAN JACINTO	WALKER	081004000	0	0	0	0	0	0

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Region H
Table 4A-1B: WUG Surplus or Shortage
with Clothes Washer Savings Applied

wug_name	wug_basin	wug_county	wug_id	SHORT2010	SHORT2020	SHORT2030	SHORT2040	SHORT2050	SHORT2060
LAKE LIVINGSTON WATER SUPPLY & SEV	TRINITY	WALKER	084226000	0	0	0	0	0	0
LIVESTOCK	TRINITY	WALKER	081005000	0	0	0	0	0	0
LIVESTOCK	SAN JACINTO	WALKER	081005000	0	0	0	0	0	0
MANUFACTURING	TRINITY	WALKER	081001000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	WALKER	081001000	0	0	0	0	0	0
MINING	TRINITY	WALKER	081003000	0	0	0	0	0	0
MINING	SAN JACINTO	WALKER	081003000	0	0	0	0	0	0
NEW WAVERLY	SAN JACINTO	WALKER	080926000	0	0	0	0	0	0
RIVERSIDE WSC	TRINITY	WALKER	084323000	0	0	0	0	0	0
TRINITY RURAL WSC	TRINITY	WALKER	084363000	0	0	0	0	0	0
WALKER COUNTY RURAL WSC	TRINITY	WALKER	084372000	0	0	0	0	0	0
BROOKSHIRE	BRAZOS	WALLER	080077000	5	18	19	22	5	**-74**
COUNTY-OTHER	SAN JACINTO	WALLER	080757000	19	58	70	86	106	59
COUNTY-OTHER	BRAZOS	WALLER	080757000	19	60	72	89	64	**-109**
HEMPSTEAD	BRAZOS	WALLER	080271000	8	28	31	37	**-6**	**-207**
IRRIGATION	SAN JACINTO	WALLER	081004000	0	0	0	0	**-192**	**-1133**
IRRIGATION	BRAZOS	WALLER	081004000	0	0	0	0	0	0
KATY	SAN JACINTO	WALLER	080312000	**-51**	**-98**	**-118**	**-117**	**-116**	**-116**
LIVESTOCK	SAN JACINTO	WALLER	081005000	0	0	0	0	0	0
LIVESTOCK	BRAZOS	WALLER	081005000	0	0	0	0	0	0
MANUFACTURING	SAN JACINTO	WALLER	081001000	0	0	0	0	0	**-3**
MANUFACTURING	BRAZOS	WALLER	081001000	0	0	0	0	**-1**	**-3**
MINING	SAN JACINTO	WALLER	081003000	0	0	0	0	0	0
MINING	BRAZOS	WALLER	081003000	0	0	0	0	0	0
PINE ISLAND	BRAZOS	WALLER	080938000	2	6	7	8	4	**-19**
PRAIRIE VIEW	SAN JACINTO	WALLER	080485000	5	19	19	21	23	21
PRAIRIE VIEW	BRAZOS	WALLER	080485000	1	2	2	2	**-33**	**-170**
WALLER	SAN JACINTO	WALLER	080629000	3	10	11	13	15	**-8**

Note: Balances reflect use of currently developed and future available groundwater.

Note: Shortages are reduced by Clothes Washer Savings Detailed in Technical Memo 4B1 Municipal Water Conservation.

Table 4A-2A: Wholesale Water Providers
Available Supplies and Demands for the Year 2060

Wholesale Water Provider	Available Supplies (Acre-Feet)			Demands (Acre-Feet)	Surplus (Acre-Feet)	Notes
	Contracts*	Groundwater	Surface Rights			
Brazos River Authority			138,913	138,913	0	1
Dow Chemical Company	16,000		148,061	195,083	-31,022	
Gulf Coast Water Authority	32,668		175,035	233,670	-25,967	2
Chocolate Bayou Water Company	19,560		81,412	106,225	-5,253	3
Galveston County WCID 1	4,643	370		4,840	173	4
Texas Genco	84,925		90,751	34,339	141,337	5
Brazosport Water Authority			23,017	8,743	14,274	
Chambers-Liberty Counties Navigation District			79,020	12,375	66,645	6
Fort Bend County WCID 1			6,890	1,000	5,890	
City of Houston		86,619	1,217,348	1,183,536	120,431	7
Baytown Area Water Authority	13,326			12,506	820	
Clear Lake City Water Authority	26,876			26,876	0	8
LaPorte Area Water Authority	8,735			8,735	0	
Lyondell-Citgo Refining	23,404			16,733	6,671	
North Channel Water Authority	6,682	3,120		9,802	0	9
North Harris County Regional Water Authority	34,714	21,565		195,040	-138,761	
City of Pasadena	33,035	2,993		30,913	5,115	10
West Harris County Regional Water Authority	20,437	12,049		99,900	-67,414	
Lower Neches Valley Authority			60,763	60,763	0	11
San Jacinto River Authority		7,859	181,206	93,058	96,007	12
Trinity River Authority			403,200	78,008	325,192	
City of Huntsville	11,202	5,269		7,639	8,832	
				Total Shortage	**-268,417**	
				Total Surplus	**791,387**	

* Water received under contract from another WWP.

1. Demands represent contractual agreements to Region H customers only. Supply quantities are for the amount of water currently contracted to Region H customers by BRA.
2. GCWA contracts exceed available firm yield supplies. For the purpose of the shortage analysis, contracts were prorated in order to not exceed supplies.
3. CBWC manufacturing and average irrigation sales exceed firm supplies. For the purpose of the shortage analysis, it was assumed that irrigation contracts would be reduced.
4. Supplies include GCWA contract and maximum amount of groundwater allowed for Dickinson per HGCSD regulations.
5. Demands include contractual demands to Richmond Irrigation and Brazos Valley Energy, as well as the entire portion of the GCWA contract, which is assumed to be used by Texas Genco. Actual demands may be greater, but overall split among supply sources is unavailable.
6. CLCND Supply includes rights from Lake Anahuac, less 30,000 acre-feet sold to SJRA.
7. Groundwater supply includes the portion of groundwater provided to Houston after prorating available, restricted supplies to WUGs, plus groundwater contracted to other WWPs. Demands include contracts to BAWA, CLCWA, LPAWA, Lyondell-Citgo, NCWA, NHCRWA, Pasadena, and WHCRWA WWPs.
8. Assumes all water remaining after contracts is provided to Clear Lake (Houston WUG).
9. NCWA groundwater supply estimated from 2003-2004 ratio of groundwater to contract water. Demands were assumed to equal supplies.
10. Includes total Pasadena demands, less the portion met by CLCWA.
11. Demands represent contractual agreements to Region H customers only. Supply quantities are for entire Rayburn-Steinhagen system and do not represent the portion available to Region H.
12. Includes water demands and available groundwater supplied to the Woodlands. The 2060 groundwater supply shown above is the least amount of groundwater available throughout the planning periods.

Table 4A-2B: Wholesale Water Providers
Available Supplies and Demands for the Year 2060 Following Contract Expansions

Wholesale Water Provider	Available Supplies (Acre-Feet)				Demands (Acre-Feet)		Surplus (Acre-Feet)	Notes
	Contracts*	Expanded Contracts*	Groundwater	Surface Rights	Unadjusted	Expanded		
Brazos River Authority				138,913	138,913	138,913	0	1
Dow Chemical Company	16,000	16,000		148,061	195,083	195,083	-31,022	
Gulf Coast Water Authority	32,668	32,668		175,035	233,670	233,670	-25,967	2
Chocolate Bayou Water Company	19,560	19,560		81,412	106,225	106,225	-5,253	3
Galveston County WCID 1	4,643	4,643	370		4,840	4,840	173	4
Texas Genco	84,925	84,925		90,751	34,339	34,339	141,337	5
Brazosport Water Authority				23,017	8,743	13,059	9,958	
Chambers-Liberty Counties Navigation District				79,020	12,375	12,375	66,645	6
Fort Bend County WCID 1				6,890	1,000	1,000	5,890	
City of Houston			86,619	1,217,348	1,183,536	1,277,457	26,510	7
Baytown Area Water Authority	13,326	13,537			12,506	13,537	0	
Clear Lake City Water Authority	26,876	26,876			26,876	26,876	0	8
LaPorte Area Water Authority	8,735	8,735			8,735	8,735	0	
Lyondell-Citgo Refining	23,404	23,404			16,733	16,733	6,671	
North Channel Water Authority	6,682	8,121	3,120		9,802	11,241	0	9
North Harris County Regional Water Authority	34,714	67,207	21,565		195,040	195,040	-106,268	
City of Pasadena	33,035	33,035	2,993		30,913	34,493	1,535	10
West Harris County Regional Water Authority	20,437	36,222	12,049		99,900	99,900	-51,629	
Lower Neches Valley Authority				60,763	60,763	60,763	0	11
San Jacinto River Authority			7,859	181,206	93,058	93,058	96,007	12
Trinity River Authority				403,200	78,008	78,008	325,192	
City of Huntsville	11,202	11,202	5,269		7,639	7,639	8,832	
						Total Shortage	**-220,139**	
						Total Surplus	**688,750**	

* Water received under contract from another WWP.

1. Demands represent contractual agreements to Region H customers only. Supply quantities are for the amount of water currently contracted to Region H customers by BRA.
2. GCWA contracts exceed available firm yield supplies. For the purpose of the shortage analysis, contracts were prorated in order to not exceed supplies.
3. CBWC manufacturing and average irrigation sales exceed firm supplies. For the purpose of the shortage analysis, it was assumed that irrigation contracts would be reduced.
4. Supplies include GCWA contract and maximum amount of groundwater allowed for Dickinson per HGCSD regulations.
5. Demands include contractual demands to Richmond Irrigation and Brazos Valley Energy, as well as the entire portion of the GCWA contract, which is assumed to be used by Texas Genco. Actual demands may be greater, but overall split among supply sources is unavailable.
6. CLCND Supply includes rights from Lake Anahuac, less 30,000 acre-feet sold to SJRA.
7. Groundwater supply includes the portion of groundwater provided to Houston after prorating available, restricted supplies to WUGs, plus groundwater contracted to other WWPs. Demands include contracts to BAWA, CLCWA, LPAWA, Lyondell-Citgo, NCWA, NHCRWA, Pasadena, and WHCRWA WWPs.
8. Assumes all water remaining after contracts is provided to Clear Lake (Houston WUG).
9. NCWA groundwater supply estimated from 2003-2004 ratio of groundwater to contract water. Demands were assumed to equal supplies.
10. Includes total Pasadena demands, less the portion met by CLCWA.
11. Demands represent contractual agreements to Region H customers and only the supply available to Region H.
12. Includes water demands and available groundwater supplied to the Woodlands. The 2060 groundwater supply shown above is the least amount of groundwater available throughout the planning periods.

Region H
Table 4A-3: Water Management Strategy Screening

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Strategy Cost ($)	Cost of Water ($/ac-ft)	Firm Yield (ac-ft/yr)	Starting Decade	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Decision Matrix Factors (High, Medium, Low)									Total of Screening Factors	Selected as Part of 2001 Plan	Selected as Part of 2006 Plan
											Cost	Yield	Location	Water Quality	Environment Wetlands & Habitat	Local Preference	Institutional Constraints / Risk of Implementability	Impacts on Env Flows	Impacts on Other Management Strategies			
Screening Factor Weight:											1	1	1	1	1	1	1	1	1			
2001 Plan (Original Strategies)																						
Potential Reservoirs	Various				NA															0	Yes	
Allens Creek Reservoir	BRA / Houston	New reservoir in Austin County	$170,040,000	$131	99,650	2020	Brazos	No	Wetlands and bottomland hardwoods impacted	Innundates 7,000 acres	0	0	1	1	-1	1	0	-1	1	2	Yes	
Bedias Reservoir	SJRA	New Reservoir in Madison/Grimes Counties	$142,690,000	$120	90,700	2030	Trinity	No	7,300 acres of bottomland hardwoods	Innundates 27,400 acres	0	0	0	0	-1	0	-1	-1	-1	-4	Yes	
Little River Reservoir	BRA / GCWA	New reservoir in Milam County	$383,755,000	$228	129,000	2040	Brazos	No	Listed and endangered species habitat	Innundates 35,000 acres	-1	0	0	0	-1	-1	-1	-1	0	-5	Yes	
Bedias to SJRA Transfer (90,700 AFY)	SJRA	Transfer from Bedias Reservoir to Lake Conroe	$209,650,000	$201	NA	2030	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Conveyance requires modifying stream channel	-1	1	0	0	0	-1	-1	-1	0	-3	Yes	
Municipal Conservation****	Multiple	Reduce demand through various methods	From $4,734,481 to $16,154,066	$154 (Sm Sys) $156 (Med Sys) $161 (Lg Sys)	From 29,505 to 100,987	2000	All	No	No impact	None	0	1	1	0	0	1	1	0	1	5	Yes	
Brazoria County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$1,564,000	$75	18,792	2000	Brazos, Brazos-Colorado	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	
Chambers County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$1,997,000	$74	24,018	2000	Trinity	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	
Galveston County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$198,000	$73	2,392	2000	San Jacinto - Brazos	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	
Liberty County	Irrigation	Reduce irrigation losses through land leveling, point irrigation and canal lining	$1,740,000	$76	20,877	2000	Trinity	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	
Waller County	Irrigation	Reduce irrigation losses through land leveling, point irrigation	$555,000	$84	6,606	2050	San Jacinto	No	Reduces losses that feed small streams	None	1	1	1	0	0	0	1	0	1	5	Yes	
Industrial Conservation	Manufacturing	Reduce water demand through selected BMPs	TBD	TBD	TBD	2010	All	No	No impact	None	0	0	1	0	0	0	1	0	1	3	NA	
Contractual Transfers	CBWC, GCWA, Richmond Irr. Irrigation, Mining	Transfer over-committed supplies to uses with shortages	$0	TBD - Contract Rate	21,000	2000	Brazos, San Jacinto-Brazos	No	Potential reduction of Brazos run-of-river flows	None	1	1	1	0	0	0	1	-1	0	3	Yes	
Wastewater Reclamation for Industry	Houston, Manufacturing	Deliver treated waterwater to industry for use in lieu of Trinity River supply.	$234,158,000	$743	67,200	2010	San Jacinto	No	Minimal change in habitat	None	-1	1	1	1	0	1	0	1	1	5	Yes	
TRA to Houston Contract	TRA / Houston	Sell uncommitted supply to Houston	None - Existing Infrastructure	TBD - Contract Rate	200,000	2010	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Unknown	1	1	0	0	0	1	1	-1	0	3	Yes	
Luce Bayou Transfer (540,000 AFY)	Houston	Transfer supply from Lake Livingston to Lake Houston	$126,000,000	$30	NA	2020	Trinity to San Jacinto	Yes (previously permitted)	Potential introduction of invasive species	Conveyance requires modifying stream channel	1	0	1	0	-1	1	-1	-1	0	0	Yes	
BRA Voluntary Redistribution	BRA	Reallocate supply committed to long-term contracts	TBD - New pump stations may be req'd	System Rate	50,000	2000	Brazos	No	Reduced streamflows due to use of currently unused supplies	None	1	1	1	0	0	1	1	0	0	5	Yes	
Houston to GCWA Transfer	GCWA / Houston	Move water from CWA-Bayport facility to Texas City Reservoir	$42,700,000 $102,382,000	$311 $303	14,000 42,000	2010	San Jacinto - Brazos	No	Potential introduction of invasive species	Unknown	-1	1	1	0	0	0	-1	0	1	1	Yes	
Increase Current Contracts	Multiple	Increase existing contracts to meet customer demands	NA	System Rate	68,300	2010	Multiple	Yes	Reduced streamflows due to use of currently unused supplies	None	1	0	1	0	0	1	1	0	1	5	Yes	
2001 Amendment																						
Houston Indirect Wastewater Reuse	Houston	Reuse wastewater from all city WWTP's in lieu of Trinity Supply.	TBD	System rate	490,223	2010	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	0	1	1	0	0	0	-1	-1	1	1	Yes	
NHCRWA Indirect Wastewater Reuse	NHCRWA	Reuse wastewater from member WWTP's in lieu of purchasing additional supply.	TBD	TBD	157,000	2010	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	0	1	1	0	0	0	-1	-1	1	1	Yes	
Houston/SJRA Lake Houston Permit*	Houston / SJRA	Use existing additional yield from Lake Houston in lieu of Trinity Supply	NA	System rate	32,500	2010	San Jacinto	No	Reduces flows below Lake Houston (tidal portion) and Upper Galveston Bay, offset by reduced diversions from the Trinity Basin	None (existing diversion points)	1	0	1	0	0	1	0	0	0	3	Yes	
Houston/SJRA RoR Permit**	Houston / SJRA	Use peak flows, when available, to reduce the use of water stored under other permits.	NA	System rate	0	NA	San Jacinto	No	Reduces flows below Lake Houston (tidal portion) and Upper Galveston Bay, offset by reduced diversions from the Trinity Basin	None (existing diversion points)	1	-1	1	0	0	1	0	0	0	2	Yes	
Houston Bayous Permit**	Houston	Use peak flows, when available, to reduce the use of water stored under other permits.	$9,013,000	$8	0	NA	San Jacinto	No	Reduces return flows to Upper Galveston Bay, offset by reduced diversions from the Trinity Basin.	Size and location of diversion pump stations still TBD.	1	-1	1	0	-1	1	-1	-1	0	-1	Yes	

Region H
Table 4A-3: Water Management Strategy Screening

Water Management Strategy	Water User Group or Wholesale Provider	Strategy Description	Strategy Cost ($)	Cost of Water ($/ac-ft)	Firm Yield (ac-ft/yr)	Starting Decade	Basin	Interbasin Transfer (Yes/No)	Impacts on Habitat / Stream / B&E Flows	Impacts on Landform	Decision Matrix Factors (High, Medium, Low)									Total of Screening Factors	Selected as Part of 2001 Plan	Selected as Part of 2006 Plan
											Cost	Yield	Location	Water Quality	Environment Wetlands & Habitat	Local Preference	Institutional Constraints / Risk of Implementability	Impacts on Env Flows	Impacts on Other Management Strategies			
Redesignation of Existing Permits	Multiple	Add usage types to existing permits to meet local demands	None	System rate	0	2010	Trinity	No	Reduced streamflows due to use of currently unused supplies	New pump stations may be required.	1	0	1	0	0	1	0	0	0	3	Yes	
BRA System Operations Permit	BRA	Use peak flows, when available, and systems management to reduce the use of water stored under other permits.	$4,500,000	System rate	311,499 plus reuse	2000	Brazos	No	Harvests peak flows through system management, positive affect on below-median flows	New pump stations may be required.	1	1	1	0	0	1	-1	0	0	3	Yes	
Expanded Use of Groundwater	Multiple	Increase groundwater use, to the sustainable or permitted yield.	$400,000 per 1 mgd well	$141	1,108,800	2000	Multiple	No	Uses existing supply, return flows remain in basin of origin.	New wells may require some land clearing.	0	1	1	1	0	1	0	0	0	4	Yes	
2006 Plan Additions																						
Freeport Desalination	BRA / DOW	Desalinate seawater for industrial and municipal use.	$745,765,000 to $959,710,000	$1,300 to $1,814	11,200 to 33,600	2010	Brazos, San Jacinto-Brazos	No	Offsets some use of Brazos basin flows.	New facility may require some land clearing.	-1	1	1	1	0	0	0	0	1	3	NA	
Brazos Salt Water Barrier	BRA / DOW	Prevent the seasonal migration of the saltwater wedge upstream to protect existing diversion points	$30,300,000	NA	NA	2030	Brazos	No	Will influence flood plain response to major storms.	New structure in river channel	0	-1	1	1	0	0	0	1	1	3	NA	
Sabine to Region H Transfer	Harris / Montgomery Counties	Transfer existing supply from Toledo Bend Reservoir to Region H.	$568,428,000	$114	From 26,762 (2020) to 486,500 (2060)	2030	Sabine to San Jacinto	Yes	Potential introduction of invasive species / Reduction of freshwater inflows to Sabine Lake	1398-acres	0	1	-1	0	-1	-1	-1	-1	1	-3	NA	
TRA to SJRA contract (via Lake Houston)	SJRA	Sell uncommitted supply to SJRA.	None - Existing Infrastructure	TBD - Contract Rate plus conveyance	59,000	2050	Trinity to San Jacinto	Yes	Potential introduction of invasive species	Requires use of Luce Bayou transfer	0	1	0	0	0	0	0	-1	0	0	NA	
Little River Off-Channel Reservoir	BRA	New reservoir in Milam County	$96,512,000	$250	32,110	2040	Brazos	No	Potential impact on terrestrial species habitats	Innundates 4400 acres	-1	-1	0	0	0	0	0	-1	1	-2	Yes	
2006 Supplemental Items																						
P.H. Robinson Desal							San Jacinto-Brazos													0		
Municipal Irrigation Reuse***	Multiple	Use of reclaimed wastewater for municipal irrigation of green spaces and golf courses.	NA	$431	27,841	2060	multiple	No	Overall reduction in instream flow not expected to be significant	Size and location of diversion pump stations still TBD.	0	1	1	0	0	0	-1	-1	1	1	No	
Private Water Sales																						

Strategy Cost - cost includes capital costs, other costs such as engineering, financial & legal service, land and easements, environmental studies and mitigation, interest during construction, annual costs such as debt service, O & M , energy costs, purchase or water (if applicable.
Water Cost - strategy cost divided by the amount of water gained by strategy
* Lake Houston permit based on original ACE. 2000 and 2060 ACE reduced yield.
** These permits are for supplies not 100% reliable.
*** Municipal Irrigation Resuse strategy was added after the strategy screening process so that it could not be recommended. It augments COH and NHCRWA reuse strategies.
**** Expected clothes water conservation savings was added after the strategy screening process, and reduces the shortages for all municipal WUGs, see Table A-1 for details.

Rating Criteria			
Category	-1	0	1
Cost	<$100/ac-ft	<$200/ac-ft	>$200/ac-ft
Yield	Size is too small or too large for need	Size is flexible or meets needs	Size can be adjusted to optimum
Location	IBT required, long distance or outside Region H.	No IBT required. Conveyance required.	No IBT required. Relatively near demand.
Water Quality	Quality of supply is reduced.	No known water quality issues.	Existing water quality problems are reduced.
Environmental Land & Habitat	Significant environmental issues and opposition.	Environmental impacts can be mitigated. Limited concerns.	Limited or no known impacts.
Local Preferrence	No local support. Significant opposition.	Some local support. Limited opposition.	Widespread local support. Multi-use benefits likely.
Institutional Constraints / Risk of Implementability	Permits opposed. Significant property required.	Permits expected with minimal problems. Property available.	Permits issued. Facilities or land owned. Water available.
Impacts on Environmental Flows	Reduces instream or B&E flows.	No impact.	Increases instream or B&E flows.
Impacts on Other Management Strategies	Negative impact.	No impact.	Positive impact.

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
2001 Plan (Original)									
Potential Reservoirs									
Allens Creek Reservoir	Diverts peak flows. When base flow is above median, diversions cannot reduce it below media. When base flow is above 25th percentile, diversions cannot reduce it below 25th percentile. Below 25th percentile, diversions cannot reduce it below a 7Q2.	Divert peak flows, reducing magnitude of storm flush.	Innundates 7,000 acres	Sire specific study ongoing. Potential impact from 700 to 1700 wetland acres, based upon initial studies.	Austin County is habitat for White-faced Ibis, Wood Stork and Houston Toad.	Site located near the town of Wallis. A detailed site survey must be conducted.			Reservoir modeled using minimum in-stream flow requirement.
Bedias Reservoir	Required pass-through reduces the flows to the current median.	Reservoir impact will be dampened by Lake Livingston downstream, but will cause a net reduction of flows to Trinity Bay.	Innundates 27,400 acres, including 7300 acres of bottomland hardwoods, 7000 acres of grassland and 7000 acres of forest	Sire specific study is required. Estimate 600 acres of potential impact based upon assumed 200-ft wetland width times 25 innundated stream miles	Potential impacts on Houston Toad, Wood Stork and Alligator Snapping Turtle habitat. Innundating Bedias Creek may impact Creek Chubsucker and Paddlefish habitat.	Privately-owned ranches within the area.			Reservoir modeled using consensus criteria
Little River Reservoir	Diverts 10% of historic average flow in Little River.	Brazos River has a small estuary system. Diversion may influence upstream migration of salt wedge.	Innundates 35,000 acres	Sire specific study is required. Estimate 730 acres of potential impact based upon assumed 200-ft wetland width times 30 innundated stream miles	Potential impacts on Houston Toad and Interior Least Tern habitats.	City of Cameron bounds the site. Numerous privately-owned ranches within the area.			
Bedias to SJRA Transfer (90,700 AFY)	Transfer relocates 90,700 ac-ft/yr to the San Jacinto Basin. Return flows will be realized in that watershed.	Transfer reduces inflows through Trinity Bay. Return flows to Upper Galveston Bay will be through the San Jacinto River.	Pump station will impact approx 5 acres of woodlands. Conveyance requires modifying 2-miles of stream channel	Sire specific study is required. Estimate 170 acres of potential impact based upon assumed 200-ft wetland width times 7-mile segment of Mock Branch	Potential impacts on White-fac Ibis, Wood Stork and Alligator Snapping Turtle habitat. Innundating Mock Branch may impact Creek Chubsucker and Paddlefish habitat.	Conveyance follows existing road right-of-way. Privately owned ranches and farms within the area.			Reservoir modeled using consensus criteria
Municipal Conservation*	Strategy reduces the demand for additional water supply, but also reduces per-capita return flows from existing groundwater use.	Reduces per capita return flows from groundwater, but the rate of savings does not compenstae for the rate of population growth.	NA - does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure. Reductions in return flows off-set by increase in population and total demand.	NA - does not require the construction of new infrastructure.	Reducing per capita water demand provides a positive affect. Although instream flows potentially could be reduced due to less return flows.		NA - strategy does not require a new reservoir or water right.
Irrigation Conservation	Strategy reduces the demand for additional water supply, but also reduces run-off and seepage losses from existing irrigation.	No significant effect on bay and estuary flows.	NA - does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	NA - Does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	Reducing water demand provides a positive affect. Although instream flows potentially could be reduced due to less return flows off fields, as well as reducing water fowl habitat.		NA - strategy does not require a new reservoir or water right.

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
Industrial Conservation	Strategy reduces the demand for additional water supply, but also reduces return flows from existing sources.	Reducesreturn flows from current sources, but the rate of savings does not compenstae for the rate of growth in the largest counties.	NA - does not require the construction of new infrastructure.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure. Reductions in return flows off-set by increase in overall demand.	NA - does not require the construction of new infrastructure.	Reducing water demand provides a positive affect on existing supply sources.		NA - strategy does not require a new reservoir or water right.
Contractual Transfers	Potential reduction of Brazos River flows by 27 cfs	Diversion of unused supplies will reduce flows through the Brazos estuary by an average of 27 cfs.	Meeting rice irrigation demands maintains seasonal wetlands for migratory birds	New diversion facility may be required for Brazoria irrigation.	Potential impact from reduced flows through bottomland hardwoods areas and diamondback terrapin habitat.	None were identified in the areas studied.			NA - strategy does not require a new reservoir or water right.
Wastewater Reclamation for Industry	Reduces municipal return flows into Sims and Buffalo Bayous. Manufacturign return flows into the ship channel will not be affected.	Reuse water is intended to off-set supply transferred from Lake Livingston, leaving the inflows for Trinity Bay vice Upper Galveston Bay	Sims and Buffalo Bayous will realize reduced freshwater flows due to reuse. Central treatment facility may impact up to 15 acres of undeveloped land.	4 new pipeline crossings may impact 6 acres (assumed 1.5 acres each).	Potential impact to Wood Stork and Alligator Snapping Turtle habitat through reduced wastewtaer return flows.	Project is within an industrial area, but site studies must still be conducted for new facilities.			NA - strategy does not require a new reservoir or water right.
TRA to Houston Contract	Transfers unused supply from the Trinity to the San Jacinto River basin, resulting in decreased flows below Lake Livingston.	Return flows (typically equal to 60% of diversion) will return to Upper Galveston Bay vice Trinity Bay.	Increased diversion from Lake Livingston will increase lake-level fluctuations and reduce flows in the lower Trinity. No new construction impacts are associated with this strategy.	No new construction impacts are associated with this strategy. Lake level fluctuations will affect wetlands along the shoreline and tributaries.	Potential impact to Wood Stork and Alligator Snapping Turtle habitat through reduced flows in lower Trinity River.	NA - does not require the construction of new infrastructure.			NA - strategy does not require a new reservoir or water right.
Luce Bayou Transfer (302,500 AFY)	Increases flow in Luce Bayou. Reduces flow in the Trinity River below Liberty.	Return flows (typically equal to 60% of diversion) will return to Upper Galveston Bay vice Trinity Bay.	Conveyance requires 7.5 mile pipeline, 2.3 mile canal and modifying 8.2 miles of stream channel. Total estimated impact of 340 acres. Blending supply in Lake Houston may affect lake habitat.	Estimated 2-acre impact due to diversion structure and 100 acres of potential impact based upon assumed 100-ft wetland width times 8.2 rectified stream miles	Potential impact to White-faced Ibis, Wood Stork and Alligator Snapping Turtle habitat through reduced flows in lower Trinity River. Increased flow in Luce Bayou may impact Creek Chubsucker habitat.	Privately owned ranches and farms along Luce Bayou. Pump station study identified historic homestead, which was studied and cataloged at the time of the original permit.			NA - strategy does not require a new reservoir or water right.
BRA Voluntary Redistribution	Reduced flows through use of exisitng water rights. Return flows rmain in-basin.	Reduced flows through use of exisitng water rights. Return flows rmain in-basin.	Minimal impacts due to construction of new diversion structures.	New diversions must be sited to avoid wetlands, or include wetlands off-sets.	New diversion points must be sited to avoid habitat areas.	Unknown without final diversion sites.			NA - strategy does not require a new reservoir or water right.

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
Houston to GCWA Transfer	Transfers existing supply from Harris to Galveston County, resulting in decreased flows below Lake Livingston (source of supply). Alternative to this strategy is increased diversions from the Brazos River.	Return flows (typically equal to 60% of diversion) will return to Lower Galveston Bay vice the Upper Bay (if used in Harris County) or Trinity Bay (if left unused).	Pipeline between Bayport and Texas City will follow the Hwy 146 right-of-way. No new habitat impacts are anticipated.	3 new pipeline crossings may impact 6 acres (assumed 2 acres each).	No new habitat impacts are anticipated.	No new impacts are anticipated if existing right-of-way is used.			NA - strategy does not require a new reservoir or water right.
Increase Current Contracts	Reduces in-stream flows in all basins due to full use of existing water supplies.	Return flows (typically equal to 60% of diversion) will off-set increased diversions. Houston and SJRA use will result in return flows to Upper Galveston Bay vice Trinity Bay (if left unused).	NA - does not require the construction of new infrastructure beyond expansion of existing plants.	NA - does not require the construction of new infrastructure.	Does not require the construction of new infrastructure, but full use of permits will affect riparian habitat.	NA - does not require the development of new infrastructure sites.			NA - strategy does not require a new reservoir or water right.
2001 Amendment									
Houston Indirect Wastewater Reuse	Instream flows potentially decreased due to wastewater reuse. However, indirect reuse potentially has less negative impacts on instream flows than direct reuse.	All return flows remain in Galveston Bay watershed. Reuse of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Permit applications point out the urbanized watershed	Permit applications state that potential diversion points will have minimal impacts on wetlands adjacent to streams.	Permit applications are silent on this issue	NA	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
NHCRWA Indirect Wastewater Reuse	Instream flows potentially decreased due to wastewater reuse. However, indirect reuse potentially has less negative impacts on instream flows than direct reuse.	All return flows remain in Galveston Bay watershed. Reuse of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wildlife habitat will be limited.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wetlands will be limited.	Potential impact to Creek Chubsucker and Alligator Snapping Turtle habitat through reduced wastewtaer return flows.	NA	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
Houston/SJRA Lake Houston Permit**	Diverting additional yield from Lake Houston will reduce flows below the dam in the tidal poriton of the river.	All return flows remain in Galveston Bay watershed. Use of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Permit applications point out the urbanized watershed in the lower basin.	Strategy uses existing diversion facilities. No new construction impacts are anticipated.	Strategy uses existing diversion facilities. No new construction impacts are anticipated.	N/A - Does not recommend new diversion point	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
Houston/SJRA RoR Permit**	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications point out the urbanized watershed	Permit applications state that potential diversion points will have minimal impacts on wetlands adjacent to streams.	Permit applications are silent on this issue	N/A - Does not recommend new diversion point	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
Houston Bayous Permit***	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications refer to capturing peak flows. Model includes current Lake Houston instream flow requirement	Permit applications point out the urbanized watershed	Permit applications state that potential diversion points will have minimal impacts on wetlands adjacent to streams.	Permit applications are silent on this issue	N/A - Does not recommend new diversion point	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
Redesignation of Existing Permits	CLCND option discussed in Technical Memo. Change of use type distributes diversions more evenly than current irrigation use.	CLCND option discussed in Technical Memo. Change of use type distributes diversions more evenly than current irrigation use.	NA - strategy does not identify new infrastructure requirements	NA - strategy does not identify new infrastructure requirements	NA - strategy does not identify new infrastructure requirements	N/A - Does not recommend new diversion point	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
BRA System Operations Permit	Diverts from streamflows when above median flow, reducing peaks. Releases from storage when below median flows, increasing the flows above diversion points.	Reduces peak flushing effects due to diversions above median flows. Flows below median are minimally affected.	Application points to the deferred or eliminated need for Little River Reservoir	Application points to the deferred or eliminated need for Little River Reservoir. New diversion points must be assessed as needed.	None discussed in permit application. Deferring Little River Reservoir reduces overall basin impact.	Application points to the deferred or eliminated need for Little River Reservoir	N/A		SJRA permit addresses flows using existing downstream diversion point. Other applications are silent on this issue.
Expanded Use of Groundwater	Groundwater return flows contribute to streams in all basins.	Full utilization of groundwater reduces potential for transfer from Trinity Basin, leaving flows into Trinity Bay.	Site surveys must be conducted for each individual well site.	Groundwater wells can usually be located outside of wetlands, near the point of use.	Groundwater wells should be sited to avoid or minimize impact on habitats.	Site surveys must be conducted for each individual well site.	N/A - uses supply allocated for this use in the 2001 plan		N/A – does not divert surface water

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
2006 Plan Additions									
Freeport Desalination	Displacement of water that is currently diverted to meet municipal demands.	Saline water release is made into Dow discharge canal that empties directly into the Gulf of Mexico.	As many as 530 acres of property impacted by the installation of delivery lines, some of which follow existing easements.	Same as wildlife impact potential.	Unknown. Will require assessment before implementation of the strategy.	Will require study before implementation of the strategy.			
Brazos Salt Water Barrier	Structure will create a pool during low-flow periods, but river flows should spill at the same rate as before the structure.	The structure will be designed not to impound seasonal low flows.	The structure will fill [TBD] acreas. Access road will require [TBD] acres. The introduction of the barrier may impact migratory fish species.	The structure will affect [TBD] acres of river bottomlands.	Potential habitat impacts to Black Rail, White-faced Ibis, Wood Stork, Diamondback Terrapin and Corkwood.	Siting study is required to identify any cultural resources being impacted. Site will be above Sea Center Texas hatchery.	Strategy reduces the influence of saltwater migration upstream to protect freshwater diversion points. This reduces the need for replacement supplies.		NA - strategy will not impound water
Sabine to Region H Transfer	Displacement of water from Lake Livingston and reduced use of Livingston water in lower basin will result in reduced flow between the lake and the IBT discharge point on the Trinity.	Inflows to Sabine Lake could potentially be impacted.	Nearly entire Neches-Trinity segment is within Priority 3, 5, and 6 designated bottomland hardwood.	Wetlands would be affected in the majority of areas crossed by new canal segments.	Route would potentially impact the Bald Eagle, Brown Pelican, Houston Toad, Interior Least Tern, Louisians Pike Snake, Navasota Ladies'-tresses, Northern Scarlet Snake, Red-cockaded Woodpecker, and Smooth Green Snake.	Private proerty along the transfer route, especially in sections of entirely new canal or pipeline. The segment between Lake Livingston and the San Jacinto River passes through the Sam Houston National Forest.			
TRA to SJRA contract (via Lk Houston)	Transfers unused supply from the Trinity to the San Jacinto River basin, resulting in decreased flows below Lake Livingston.	Return flows (typically equal to 60% of diversion) will return to Upper Galveston Bay vice Trinity Bay.	Increased diversion from Lake Livingston will increase lake-level fluctuations and reduce flows in the lower Trinity. Blending supply in Lake Houston may affect that habitat.	Construction impacts detailed under Luce Bayou strategy.	Potential impact to Wood Stork and Alligator Snapping Turtle habitat through reduced flows in lower Trinity River.	Construction impacts detailed under Luce Bayou strategy.			NA - strategy does not require a new reservoir or water right.
Little River Off-Channel Reservoir	Diverts peak flows. When base flow is above median, diversions cannot reduce it below media. When base flow is above 25th percentile, diversions cannot reduce it below 25th percentile. Below 25th percentile, diversions cannot reduce it below a 7Q2.	Divert peak flows, reducing magnitude of storm flush.	Innundates 4400 acres	Sire specific study required. Potential wetland impact at the diversion pump station location.	Potential impacts on Houston Toad and Interior Least Tern habitats.	City of Cameron bounds the site. Numerous privately-owned ranches within the area.			Reservoir modeled using minimum in-stream flow requirement.

Region H
4A-4: Required Environmental Assessments

	Evaluation of Alternative Management Strategies for Effects on:								
Management Strategy	Instream Flows	Bay and Estuary Inflows	Wildlife Habitat	Wetlands	Threatened and Endangered Species	Cultural Resources	Evaluation of Impacts of Water Management Strategies on **Threats** to Natural Resources	Provide Specific Recommendations for Water Management Strategies so that Strategies which are Environmentally Sensitive are Considered and Pursued	Use of Environmental Planning Criteria or Site-Specific Information on Environmental Flow Needs
2006 Supplemental Items									
P.H. Robinson Desal									
Municipal Irrigation Reuse****					Instream flows potentially decreased due to wastewater reuse. However, indirect reuse potentially has less negative impacts on instream flows than direct reuse.	All return flows remain in Galveston Bay watershed. Reuse of supplies in San Jacinto Basin reduces potential need for transfer from Trinity Basin.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wildlife habitat will be limited.	Majority of the needed infrastructure will be constructed in urbanized areas. Therefore, the impact to wetlands will be limited.	Potential impact to Creek Chubsucker and Alligator Snapping Turtle habitat through reduced wastewtaer return flows.
Private Water Sales									
*									
**									
***									
**** Municipal Irrigation Reuse strategy was added after the strategy screening process to augment other reuse strategies.									

Table 4A-5: Available Water Management Strategies by County

County Group / Management Strategy	2010	2020	2030	2040	2050	2060	Comments
Brazoria, Fort Bend & Waller Co's							**Brazos River Basin**
Municipal Conservation	4,123	6,298	9,472	11,343	13,859	17,071	
Contract Expansions	2,350	4,398	5,893	6,013	6,013	6,013	BWA municipal supply
Irrigation Conservation	25,398	25,398	25,398	25,398	25,398	25,398	
New Contracts (BRA)	50,000	50,000	50,000	50,000	50,000	50,000	
Contractual Transfers (MIN, IRR)	27,500	27,500	27,500	27,500	27,500	27,500	
BRA System Operations	120,000	120,000	120,000	120,000	120,000	120,000	Region H allocation
Freeport Desal (Demo)	11,200	11,200	11,200	11,200	22,400	33,600	Pilot plant is 10 mgd
GCWA - Fort Bend	28,000	28,000	28,000	28,000	28,000	28,000	Houston to GCWA off-set
Allens Creek Reservoir (30% BRA)	0	99,650	99,650	99,650	99,650	99,650	30% BRA, 70% COH
Little River Off-Channel Reservoir	0	0	0	32,110	32,110	32,110	
Little River Reservoir	0	0	0	75,000	75,000	75,000	50% of updated yield
Brazos Saltwater Barrier	0	0	Earliest	Moderate	Latest	0	
New Contracts (COH)	0	0	0	0	0	30,000	Treated water sales
Municipal Irrigation Reuse	0	0	0	0	0	8,648	Brazoria and Fortbend

Galveston County							**San Jacinto-Brazos Basin**
Municipal Conservation	548	604	636	643	649	657	
Irrigation Conservation	2,392	2,392	2,392	2,392	2,392	2,392	
New Contracts (BRA, COH)	12,000	12,000	12,000	12,000	12,000	12,000	10,000 BRA, 2,000 COH
Contractual Transfers (MIN)	33	33	33	33	33	33	
BRA System Operations	12,000	12,000	12,000	12,000	12,000	12,000	Max required allocation
Houston - GCWA Transfer	42,000	42,000	42,000	42,000	42,000	42,000	Includes Ft Bend offset
Allens Creek Reservoir	0	99,650	99,650	99,650	99,650	99,650	30% BRA, 70% COH
Little River Off-Channel Reservoir	0	0	0	32,110	32,110	32,110	
Little River Reservoir	0	0	0	75,000	75,000	75,000	

Table 4A-5: Available Water Management Strategies by County

County Group / Management Strategy	2010	2020	2030	2040	2050	2060	Comments
Harris & Montgomery Counties							**San Jacinto River Basin**
Municipal Conservation	9,385	23,848	28,150	32,157	36,580	41,526	
Contract Expansions	10,334	62,198	62,268	62,313	62,313	62,322	
Houston Add'l Mun. Conservation (7%)	27,236	30,045	32,693	35,423	38,345	41,517	
New Contracts (COH)***	26,510	26,510	26,510	26,510	26,510	26,510	Trinity Basin Supply
New Contracts (SJRA)***	96,000	96,000	96,000	96,000	96,000	96,000	54,300 ac-ft from Trinity Basin
Lake Houston Additional Yield	27,000	22,000	17,000	12,000	7,000	2,000	
Wastewater Reuse - Houston	490,223	490,223	490,223	490,223	490,223	490,223	
Wastewater Reuse - NHCRWA	78,000	94,000	110,000	126,000	141,000	157,000	
Houston - GCWA Transfer	-42,000	-42,000	-42,000	-42,000	-42,000	-42,000	
Wastewater Reuse for Manufacturing	0	67,200	67,200	67,200	67,200	67,200	
TRA - Houston Contract	0	200,000	200,000	200,000	200,000	200,000	
Luce Bayou Transfer	0	Earliest	Moderate	Latest	0	0	
Toledo Bend to Lake Houston Transfer	0	486,500	486,500	486,500	486,500	486,500	
Allens Creek Reservoir	0	99,650	99,650	99,650	99,650	99,650	30% BRA, 70% COH
TRA - SJRA Contract	0	0	0	0	59,000	59,000	
Municipal Irrigation Reuse	0	0	0	0	0	19,193	
Bedias Reservoir	0	0	90,700	90,700	90,700	90,700	100% SJRA

*** Values after contract expansions

Chambers, Liberty & San Jacinto Co's							**Trinity River Basin**
Municipal Conservation	114	137	158	174	196	216	
Irrigation Conservation	24,018	24,018	24,018	24,018	24,018	24,018	
New Contracts (TRA)	325,000	57,800	57,800	57,800	57,800	57,800	
New Contracts (CLCND)	67,000	67,000	67,000	67,000	67,000	67,000	

Region H
Table 4A-6: Recommended Water Management Strategies by County

	2010	2020	2030	2040	2050	2060
Brazoria County						
Initial Shortage*	-89,813	-105,436	-130,046	-156,160	-183,164	-215,117
Municipal Conservation	1,321	2,290	2,713	2,976	3,274	3,600
Contract Expansions	2,350	3,220	4,715	4,835	4,835	4,835
Net Shortage**	-87,719	-102,277	-125,098	-149,903	-175,921	-206,703
Irrigation Conservation	18,792	18,792	18,792	18,792	18,792	18,792
New Contracts (BRA)	10,500	10,500	10,500	10,500	10,500	10,500
Contractual Transfers (MIN, IRR)	21,000	21,000	21,000	21,000	21,000	21,000
BRA System Operations	70,000	70,000	70,000	70,000	70,000	70,000
Allens Creek Reservoir (BRA, COH)	0	0	44,650	44,650	44,650	44,650
Little River Off-Channel Reservoir	0	0	0	0	24,114	24,114
Freeport Desal (Demo)	11,200	11,200	11,200	11,200	22,400	33,600
Brazos Saltwater Barrier		Earliest	Moderate	Latest		
Municipal Irrigation Reuse	0	75	241	394	556	726
Total as Recommended	43,773	29,290	51,285	26,633	36,091	16,679
Contract expansions by Brazosport Water Authority						

Chambers County						
Initial Shortage*	-42,551	-46,868	-50,186	-53,441	-56,621	-59,871
Municipal Conservation	114	137	158	174	196	216
Net Shortage	-42,437	-46,731	-50,028	-53,267	-56,425	-59,655
Irrigation Conservation	24,018	24,018	24,018	24,018	24,018	24,018
New Contracts (TRA)	20,000	20,000	20,000	25,000	25,000	25,000
New Contracts (CLCND)	20,000	20,000	20,000	25,000	25,000	25,000
Total as Recommended	21,581	17,287	13,990	20,751	17,593	14,363

Fort Bend County						
Initial Shortage*	-22,118	-38,990	-68,177	-93,433	-127,206	-166,155
Municipal Conservation	2,792	3,998	6,749	8,357	10,418	12,869
Contract Expansions	0	1,178	1,178	1,178	1,178	1,178
Net Shortage**	-19,326	-34,518	-60,609	-83,898	-115,610	-152,108
New Contracts (BRA)	12,000	12,000	12,000	12,000	12,000	12,000
BRA System Operations	50,000	50,000	50,000	50,000	50,000	50,000
Allens Creek Reservoir (BRA, COH)	0	0	55,000	55,000	55,000	55,000
Little River Off-Channel Reservoir	0	0	0	0	7,996	7,996
GCWA - Fort Bend	0	0	0	0	28,000	28,000
Municipal Irrigation Reuse	517	1,641	3,154	4,713	6,998	9,292
Total as Recommended	42,674	27,482	56,391	33,102	37,386	888
Contract expansion by City of Houston for WHCRWA						

Galveston County						
Initial Shortage*	-14,114	-14,561	-14,440	-14,524	-14,634	-14,772
Municipal Conservation	548	604	636	643	649	657
Net Shortage	-13,566	-13,957	-13,804	-13,881	-13,985	-14,115
Irrigation Conservation	2,392	2,392	2,392	2,392	2,392	2,392
New Contracts (BRA, COH)	12,000	12,000	12,000	12,000	12,000	12,000
Contractual Transfers (MIN)	33	33	33	33	33	33
Houston - GCWA Transfer	0	0	0	0	28,000	28,000
GCWA - Fort Bend	0	0	0	0	-28,000	-28,000
Total as Recommended	859	468	621	544	440	310

Region H
Table 4A-6: Recommended Water Management Strategies by County

	2010	2020	2030	2040	2050	2060
Harris County						
Initial Shortage*	-59,699	-171,740	-252,923	-302,492	-355,445	-403,428
Municipal Conservation	5,100	18,153	21,179	23,845	26,468	29,296
Contract Expansions	10,334	62,198	62,268	62,313	62,313	62,322
Net Shortage**	-47,592	-93,664	-171,016	-218,193	-267,168	-311,813
Houston Add'l Mun. Conservation (7%)	27,236	30,045	32,693	35,423	38,345	41,517
New Contracts (COH)***	24,510	24,510	24,510	24,510	24,510	24,510
Lake Houston Additional Yield	13,500	11,000	8,500	6,000	3,500	1,000
Wastewater Reuse for Manufacturing	0	67,200	67,200	67,200	67,200	67,200
TRA - Houston Contract	0	150,000	150,000	150,000	150,000	150,000
Wastewater Reuse - Houston (20%)	0	0	0	0	98,045	98,045
Wastewater Reuse - NHCRWA (20%)	0	0	0	0	0	31,400
Houston - GCWA Transfer	0	0	0	0	-28,000	-28,000
Luce Bayou Transfer	0	Earliest	Moderate	Latest	0	0
Municipal Irrigation Reuse	2,060	3,986	6,024	8,654	11,316	13,950
Total as Recommended	19,714	193,077	117,911	73,594	97,748	87,809

Contract expansions by Cities of Houston and Pasadena, and Baytown Area Water Authority
*** Values after contract expansions

Liberty County						
Irrigation Shortage*	-19,535	-19,774	-21,089	-22,558	-24,303	-26,405
Irrigation Conservation	20,877	20,877	20,877	20,877	20,877	20,877
New Contracts (TRA)	4,500	4,500	9,500	9,500	9,500	9,500
New Contracts (CLCND)	5,000	5,000	10,000	10,000	10,000	10,000
Total as Recommended	10,842	10,603	19,288	17,819	16,074	13,972

Montgomery County						
Initial Shortage*	-11,332	-34,393	-55,432	-79,866	-112,578	-151,047
Municipal Conservation	4,285	5,695	6,971	8,312	10,112	12,230
Net Shortage	-7,047	-28,698	-48,461	-71,554	-102,466	-138,817
New Contracts (SJRA)***	96,000	96,000	96,000	96,000	96,000	96,000
Lake Houston Additional Yield	13,500	11,000	8,500	6,000	3,500	1,000
TRA - Houston Contract	0	50,000	50,000	50,000	50,000	50,000
Luce Bayou Transfer	0	Earliest	Moderate	Latest	0	0
Municipal Irrigation Reuse	1,141	1,980	3,754	5,825	8,713	12,066
Total as Recommended	103,594	130,282	109,793	86,271	55,747	20,249

*** Values after contract expansions

San Jacinto County						
Irrigation Shortage*	-492	-492	-492	-492	-492	-492
New Contracts (TRA)	500	500	500	500	500	500
Total as Recommended	8	8	8	8	8	8

Waller County						
Initial Shortage*	-52	-101	-121	-120	-469	-2,165
Municipal Conservation	10	10	10	10	167	602
Net Shortage	-42	-91	-111	-110	-302	-1,589
Irrigation Conservation	6,606	6,606	6,606	6,606	6,606	6,606
Total as Recommended	6,564	6,515	6,495	6,496	6,304	5,017

Region H Totals						
Initial Shortages	-259,706	-432,355	-592,906	-723,086	-874,912	-1,039,452
Net Shortages	-237,756	-340,202	-490,708	-613,856	-756,672	-911,697
Total as Recommended	249,609	415,012	375,782	265,218	267,391	159,295

* Shortage values reflect the sum of all WUG shortages without offsets for other WUG surpluses.
** Net Shortage value is not the mathematical difference because conservation and expansions do not align exactly with WUG shortages.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000		None	CONSERVATION	H	3811020	11	145	145	147	147	151	156	H01-MNCON3
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	170	170	170	170	170	170	H02-INCR
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000		None	CONSERVATION	H	3811020	11	34	49	82	89	93	98	H01-MNCON3
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	0	0	0	120	120	120	H02-INCR
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020		None	CONSERVATION	H	3811020	11	594	674	761	836	922	1,017	H01-MNCON3
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020	2000	BWA	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	2,240	2,240	2,240	2,240	2,240	2,240	H27-NWCUST
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020	331	BRA	FREEPORT DESAL	H	H20-DESAL1	12	11,150	11,150	11,150	11,150	11,150	11,150	H20-DESAL1
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020		None	CONSERVATION	H	3812020	12	7	8	8	9	9	10	H01-MNCON1
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020	2000	BWA	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	160	160	160	160	160	160	H27-NWCUST
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020	331	BRA	FREEPORT DESAL	H	H20-DESAL1	12	50	50	50	50	50	50	H20-DESAL1
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757020		None	CONSERVATION	H	3813020	13	236	250	264	276	290	307	H01-MNCON3
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757020	2000	BWA	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	2,641	2,641	2,641	2,641	2,641	2,641	H27-NWCUST
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000		None	CONSERVATION	H	3811020	11	0	142	163	182	203	226	H01-MNCON3
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	0	820	820	820	820	820	H02-INCR
FREEPORT	BRAZOS	BRAZORIA	080217000		None	CONSERVATION	H	3812020	12	0	9	9	9	9	9	H01-MNCON3
FREEPORT	BRAZOS	BRAZORIA	080217000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	0	50	50	50	50	50	H02-INCR
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004020	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	H	3461205320	12	10,618	10,618	10,618	10,618	10,618	10,618	H08-CONXFR
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004020		None	CONSERVATION	H	3811020	11	17,439	17,439	17,439	17,439	17,439	17,439	H03-IRRCON
IRRIGATION	BRAZOS	BRAZORIA	081004020	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	H	3461205320	12	1,130	1,130	1,130	1,130	1,130	1,130	H08-CONXFR
IRRIGATION	BRAZOS	BRAZORIA	081004020		None	CONSERVATION	H	3812020	12	582	582	582	582	582	582	H03-IRRCON
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004020	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	H	3461205320	12	1,971	1,971	1,971	1,971	1,971	1,971	H08-CONXFR
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004020		None	CONSERVATION	H	3813020	13	771	771	771	771	771	771	H03-IRRCON
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000		None	CONSERVATION	H	3811020	11	277	299	318	337	359	386	H01-MNCON3
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	2,010	2,010	2,010	2,010	2,010	2,010	H02-INCR
MANUFACTURING	SAN JACINTO-BRAZOS	BRAZORIA	081001020	331	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	10,650	10,650	10,650	10,650	H05-ALLENS
MANUFACTURING	BRAZOS	BRAZORIA	081001020	331	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	30,000	30,000	30,000	30,000	H05-ALLENS
MANUFACTURING	BRAZOS	BRAZORIA	081001020	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	70,000	70,000	70,000	70,000	70,000	70,000	HG01BRASYS
MANUFACTURING	BRAZOS	BRAZORIA	081001020	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	9,847	9,847	5,847	5,847	5,847	5,847	H27-NWCUST
MANUFACTURING	BRAZOS	BRAZORIA	081001020	398300	TEXAS GENCO	BRAZOS RIVER RUN-OF-RIVER	H	3461205320	12	6,281	6,281	6,281	6,281	6,281	6,281	H08-CONXFR
MANUFACTURING	BRAZOS	BRAZORIA	081001020	331	BRA	FREEPORT DESAL	H	H20-DESAL1	12	0	0	0	0	11,200	16,800	H20-DESAL1
MANUFACTURING	BRAZOS	BRAZORIA	081001020	331	BRA	LITTLE RIVER OFF-CHANNEL RESERVOIR	G	HG03LRIV2	12	0	0	0	0	24,114	24,114	HG03LRIV2
MINING	SAN JACINTO-BRAZOS	BRAZORIA	081003020	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	445	445	445	445	445	445	H27-NWCUST
MINING	BRAZOS	BRAZORIA	081003020	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	208	208	208	208	208	208	H27-NWCUST
MINING	BRAZOS-COLORADO	BRAZORIA	081003020		Phillips	SAN BERNARD RIVER RUN-OF-RIVER	H	3461303421	13	288	437	555	673	819	969	H08-CONXFR
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000		None	CONSERVATION	H	3811020	11	9	10	12	13	14	15	H01-MNCON1
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	110	110	110	110	110	110	H02-INCR
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000		None	CONSERVATION	H	3811020	11	0	685	929	1,058	1,203	1,354	H01-MNCON3
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	0	0	311	311	311	311	H02-INCR
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	0	1,184	1,184	1,184	1,184	H02-INCR
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	325	GCWA	ALLENS CREEK RESERVOIR	H	12900	12	0	0	4,000	4,000	4,000	4,000	H05-ALLENS
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000		None	CONSERVATION	H	3811020	11	19	19	20	20	21	22	H01-MNCON2
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000	2000	BRAZOSPORT WATER AUTHOR	BRAZOS RIVER RUN-OF-RIVER	H	3461205366	12	60	60	60	60	60	60	H02-INCR
BEACH CITY	TRINITY	CHAMBERS	080822000		None	CONSERVATION	H	3808036	8	2	3	4	4	5	6	H01-MNCON2
BEACH CITY	TRINITY	CHAMBERS	080822000	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	73	73	73	73	73	73	H27-NWCUST
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000		None	CONSERVATION	H	3809036	9	16	22	26	30	35	39	H01-MNCON2
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	475	475	475	475	475	475	H27-NWCUST
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757036		None	CONSERVATION	H	3807036	7	3	3	3	2	2	2	H01-MNCON1
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	45	45	45	45	45	45	H27-NWCUST
COUNTY-OTHER	TRINITY	CHAMBERS	080757036		None	CONSERVATION	H	3808036	8	14	13	13	12	12	12	H01-MNCON1
COUNTY-OTHER	TRINITY	CHAMBERS	080757036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	193	193	193	193	193	193	H27-NWCUST
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757036		None	CONSERVATION	H	3809036	9	9	9	8	8	8	7	H01-MNCON1
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757036	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	104	104	104	104	104	104	H27-NWCUST
IRRIGATION	NECHES-TRINITY	CHAMBERS	081004036		None	CONSERVATION	H	3807036	07	16,981	16,981	16,981	16,981	16,981	16,981	H03-IRRCON
IRRIGATION	TRINITY	CHAMBERS	081004036		None	CONSERVATION	H	3808036	08	6,677	6,677	6,677	6,677	6,677	6,677	H03-IRRCON
IRRIGATION	TRINITY	CHAMBERS	081004036	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	3,120	3,120	3,120	3,120	3,120	3,120	H27-NWCUST
IRRIGATION	TRINITY	CHAMBERS	081004036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	18,939	18,939	18,939	18,939	18,939	18,939	H27-NWCUST
IRRIGATION	TRINITY-SAN JACINTO	CHAMBERS	081004036		None	CONSERVATION	H	3809036	09	360	360	360	360	360	360	H03-IRRCON
MANUFACTURING	TRINITY-SAN JACINTO	CHAMBERS	081001036	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	13,445	13,445	13,445	13,445	13,445	13,445	H27-NWCUST
MINING	NECHES-TRINITY	CHAMBERS	081003036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	273	273	273	273	273	273	H27-NWCUST
MINING	TRINITY	CHAMBERS	081003036	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	6,000	6,000	6,000	6,000	6,000	6,000	H27-NWCUST
MINING	TRINITY	CHAMBERS	081003036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	5,550	5,550	5,550	5,550	5,550	5,550	H27-NWCUST
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003036	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	1,836	1,836	1,836	1,836	1,836	1,836	H27-NWCUST
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003036	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	2,000	2,000	2,000	2,000	2,000	2,000	H27-NWCUST
MONT BELVIEU	TRINITY	CHAMBERS	080413000		None	CONSERVATION	H	3808036	8	40	52	63	72	82	93	H01-MNCON2
MONT BELVIEU	TRINITY	CHAMBERS	080413000	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	1,223	1,223	1,223	1,223	1,223	1,223	H27-NWCUST
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000		None	CONSERVATION	H	3809036	9	19	24	29	34	39	43	H01-MNCON2
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	529	529	529	529	529	529	H27-NWCUST
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000		None	CONSERVATION	H	3808036	8	11	11	12	12	13	14	H01-MNCON1
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000	15	BAWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	195	195	195	195	195	195	H27-NWCUST
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000		None	CONSERVATION	H	3811079	11	24	26	28	31	34	37	H01-MNCON2
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	336	336	336	336	336	336	HG01BRASYS
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	106	106	106	106	106	106	H27-NWCUST
BEASLEY	BRAZOS	FORT BEND	081012000		None	CONSERVATION	H	3812079	12	0	0	1	1	1	1	H01-MNCON1

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000	MUNICIPAL CONSERVATION	$0	$23,345	$23,345	$23,667	$23,667	$24,311	$25,116
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	080018000	INCREASE EXIST CONTRACT	$0	$20,400	$20,400	$20,400	$20,400	$20,400	$20,400
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000	MUNICIPAL CONSERVATION	$0	$5,474	$7,889	$13,202	$14,329	$14,973	$15,778
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	080118000	INCREASE EXIST CONTRACT	$0	$0	$0	$0	$14,400	$14,400	$14,400
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020	MUNICIPAL CONSERVATION	$0	$95,634	$108,514	$122,521	$134,596	$148,442	$163,737
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020	New Contracts	$0	$100,800	$100,800	$100,800	$100,800	$100,800	$100,800
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	080757020	Freeport Desal	$247,478,564	$14,495,000	$14,495,000	$14,495,000	$14,495,000	$14,495,000	$14,495,000
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020	MUNICIPAL CONSERVATION	$0	$1,078	$1,232	$1,232	$1,386	$1,386	$1,540
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020	New Contracts	$0	$7,200	$7,200	$7,200	$7,200	$7,200	$7,200
COUNTY-OTHER	BRAZOS	BRAZORIA	080757020	Freeport Desal	$1,109,769	$65,000	$65,000	$65,000	$65,000	$65,000	$65,000
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757020	MUNICIPAL CONSERVATION	$0	$37,996	$40,250	$42,504	$44,436	$46,690	$49,427
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	080757020	New Contracts	$0	$118,845	$118,845	$118,845	$118,845	$118,845	$118,845
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000	MUNICIPAL CONSERVATION	$0	$0	$22,862	$26,243	$29,302	$32,683	$36,386
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	080217000	INCREASE EXIST CONTRACT	$0	$0	$98,400	$98,400	$98,400	$98,400	$98,400
FREEPORT	BRAZOS	BRAZORIA	080217000	MUNICIPAL CONSERVATION	$0	$0	$1,449	$1,449	$1,449	$1,449	$1,449
FREEPORT	BRAZOS	BRAZORIA	080217000	INCREASE EXIST CONTRACT	$0	$0	$6,000	$6,000	$6,000	$6,000	$6,000
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004020	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
IRRIGATION	SAN JACINTO-BRAZOS	BRAZORIA	081004020	IRRIGATION CONSERVATION	$139,512	$1,307,925	$1,307,925	$1,307,925	$1,307,925	$1,307,925	$1,307,925
IRRIGATION	BRAZOS	BRAZORIA	081004020	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
IRRIGATION	BRAZOS	BRAZORIA	081004020	IRRIGATION CONSERVATION	$4,656	$43,650	$43,650	$43,650	$43,650	$43,650	$43,650
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004020	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
IRRIGATION	BRAZOS-COLORADO	BRAZORIA	081004020	IRRIGATION CONSERVATION	$6,168	$57,825	$57,825	$57,825	$57,825	$57,825	$57,825
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000	MUNICIPAL CONSERVATION	$0	$44,597	$48,139	$51,198	$54,257	$57,799	$62,146
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	080338000	INCREASE EXIST CONTRACT	$0	$241,200	$241,200	$241,200	$241,200	$241,200	$241,200
MANUFACTURING	SAN JACINTO-BRAZOS	BRAZORIA	081001020	Allens Creek Reservoir	$18,172,865	$0	$0	$1,395,150	$1,395,150	$1,395,150	$1,395,150
MANUFACTURING	BRAZOS	BRAZORIA	081001020	Allens Creek Reservoir	$51,191,169	$0	$0	$3,930,000	$3,930,000	$3,930,000	$3,930,000
MANUFACTURING	BRAZOS	BRAZORIA	081001020	BRA System Operations	$0	$3,150,000	$3,150,000	$3,150,000	$3,150,000	$3,150,000	$3,150,000
MANUFACTURING	BRAZOS	BRAZORIA	081001020	New Contracts	$0	$443,115	$443,115	$263,115	$263,115	$263,115	$263,115
MANUFACTURING	BRAZOS	BRAZORIA	081001020	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
MANUFACTURING	BRAZOS	BRAZORIA	081001020	Freeport Desal	$372,882,500	$0	$0	$0	$0	$14,560,000	$21,840,000
MANUFACTURING	BRAZOS	BRAZORIA	081001020	Little River Off-Channel Reservoir	$72,477,883	$0	$0	$0	$0	$6,031,250	$6,031,250
MINING	SAN JACINTO-BRAZOS	BRAZORIA	081003020	New Contracts	$0	$20,025	$20,025	$20,025	$20,025	$20,025	$20,025
MINING	BRAZOS	BRAZORIA	081003020	New Contracts	$0	$9,360	$9,360	$9,360	$9,360	$9,360	$9,360
MINING	BRAZOS-COLORADO	BRAZORIA	081003020	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000	MUNICIPAL CONSERVATION	$0	$1,386	$1,540	$1,848	$2,002	$2,156	$2,310
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	080730000	INCREASE EXIST CONTRACT	$0	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	MUNICIPAL CONSERVATION	$0	$0	$110,285	$149,569	$170,338	$193,683	$217,994
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	INCREASE EXIST CONTRACT	$0	$0	$0	$37,320	$37,320	$37,320	$37,320
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	INCREASE EXIST CONTRACT	$0	$0	$0	$142,080	$142,080	$142,080	$142,080
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	080457000	Allens Creek Reservoir	$6,825,489	$0	$0	$524,000	$524,000	$524,000	$524,000
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000	MUNICIPAL CONSERVATION	$0	$2,964	$2,964	$3,120	$3,120	$3,276	$3,432
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	080501000	INCREASE EXIST CONTRACT	$0	$7,200	$7,200	$7,200	$7,200	$7,200	$7,200
BEACH CITY	TRINITY	CHAMBERS	080822000	MUNICIPAL CONSERVATION	$0	$312	$468	$624	$624	$780	$936
BEACH CITY	TRINITY	CHAMBERS	080822000	NEW CONTRACTS	$0	$3,285	$3,285	$3,285	$3,285	$3,285	$3,285
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000	MUNICIPAL CONSERVATION	$0	$2,496	$3,432	$4,056	$4,680	$5,460	$6,084
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	080822000	NEW CONTRACTS	$0	$21,375	$21,375	$21,375	$21,375	$21,375	$21,375
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757036	MUNICIPAL CONSERVATION	$0	$462	$462	$462	$308	$308	$308
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	080757036	NEW CONTRACTS	$0	$2,025	$2,025	$2,025	$2,025	$2,025	$2,025
COUNTY-OTHER	TRINITY	CHAMBERS	080757036	MUNICIPAL CONSERVATION	$0	$2,156	$2,002	$2,002	$1,848	$1,848	$1,848
COUNTY-OTHER	TRINITY	CHAMBERS	080757036	NEW CONTRACTS	$0	$8,685	$8,685	$8,685	$8,685	$8,685	$8,685
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757036	MUNICIPAL CONSERVATION	$0	$1,386	$1,386	$1,232	$1,232	$1,232	$1,078
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	080757036	NEW CONTRACTS	$0	$4,680	$4,680	$4,680	$4,680	$4,680	$4,680
IRRIGATION	NECHES-TRINITY	CHAMBERS	081004036	IRRIGATION CONSERVATION	$152,829	$1,256,594	$1,256,594	$1,256,594	$1,256,594	$1,256,594	$1,256,594
IRRIGATION	TRINITY	CHAMBERS	081004036	IRRIGATION CONSERVATION	$60,093	$494,098	$494,098	$494,098	$494,098	$494,098	$494,098
IRRIGATION	TRINITY	CHAMBERS	081004036	NEW CONTRACTS	$0	$140,400	$140,400	$140,400	$140,400	$140,400	$140,400
IRRIGATION	TRINITY	CHAMBERS	081004036	NEW CONTRACTS	$0	$852,255	$852,255	$852,255	$852,255	$852,255	$852,255
IRRIGATION	TRINITY-SAN JACINTO	CHAMBERS	081004036	IRRIGATION CONSERVATION	$3,240	$26,640	$26,640	$26,640	$26,640	$26,640	$26,640
MANUFACTURING	TRINITY-SAN JACINTO	CHAMBERS	081001036	NEW CONTRACTS	$0	$605,025	$605,025	$605,025	$605,025	$605,025	$605,025
MINING	NECHES-TRINITY	CHAMBERS	081003036	NEW CONTRACTS	$0	$12,285	$12,285	$12,285	$12,285	$12,285	$12,285
MINING	TRINITY	CHAMBERS	081003036	NEW CONTRACTS	$0	$270,000	$270,000	$270,000	$270,000	$270,000	$270,000
MINING	TRINITY	CHAMBERS	081003036	NEW CONTRACTS	$0	$249,750	$249,750	$249,750	$249,750	$249,750	$249,750
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003036	NEW CONTRACTS	$0	$82,620	$82,620	$82,620	$82,620	$82,620	$82,620
MINING	TRINITY-SAN JACINTO	CHAMBERS	081003036	NEW CONTRACTS	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
MONT BELVIEU	TRINITY	CHAMBERS	080413000	MUNICIPAL CONSERVATION	$0	$6,240	$8,112	$9,828	$11,232	$12,792	$14,508
MONT BELVIEU	TRINITY	CHAMBERS	080413000	NEW CONTRACTS	$0	$55,035	$55,035	$55,035	$55,035	$55,035	$55,035
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000	MUNICIPAL CONSERVATION	$0	$2,964	$3,744	$4,524	$5,304	$6,084	$6,708
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	080413000	NEW CONTRACTS	$0	$23,805	$23,805	$23,805	$23,805	$23,805	$23,805
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000	MUNICIPAL CONSERVATION	$0	$1,694	$1,694	$1,848	$1,848	$2,002	$2,156
OLD RIVER-WINFREE	TRINITY	CHAMBERS	080727000	NEW CONTRACTS	$0	$8,775	$8,775	$8,775	$8,775	$8,775	$8,775
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	MUNICIPAL CONSERVATION	$0	$3,744	$4,056	$4,368	$4,836	$5,304	$5,772
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	BRA System Operations	$0	$15,120	$15,120	$15,120	$15,120	$15,120	$15,120
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	080998000	New Contracts	$0	$4,770	$4,770	$4,770	$4,770	$4,770	$4,770
BEASLEY	BRAZOS	FORT BEND	081012000	MUNICIPAL CONSERVATION	$0	$0	$0	$154	$154	$154	$154

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
BEASLEY	BRAZOS	FORT BEND	081012000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	10	10	10	10	10	10	H27-NWCUST
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000		None	CONSERVATION	H	3810079	10	40	60	86	111	146	185	H01-MNCON3
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,332	1,332	1,332	1,332	H05-ALLENS
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	685	685	685	685	685	685	HG01BRASYS
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	66	66	66	66	66	66	H27-NWCUST
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000		None	CONSERVATION	H	3810079	10	151	229	327	425	555	705	H01-MNCON3
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	5,102	5,102	5,102	5,102	H05-ALLENS
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	2,604	2,604	2,604	2,604	2,604	2,604	HG01BRASYS
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	249	249	249	249	249	249	H27-NWCUST
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000		None	CONSERVATION	H	3810079	10	28	42	60	78	102	130	H01-MNCON3
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	936	936	936	936	H05-ALLENS
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	481	481	481	481	481	481	HG01BRASYS
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	46	46	46	46	46	46	H27-NWCUST
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000		None	CONSERVATION	H	3810079	10	73	111	158	206	269	341	H01-MNCON3
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	2,466	2,466	2,466	2,466	H05-ALLENS
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,261	1,261	1,261	1,261	1,261	1,261	HG01BRASYS
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	122	122	122	122	122	122	H27-NWCUST
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000		None	CONSERVATION	H	3810079	10	27	27	27	26	26	26	H01-MNCON2
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	217	217	217	217	217	217	HG01BRASYS
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	56	56	56	56	56	56	H27-NWCUST
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000		None	CONSERVATION	H	3810079	10	96	145	206	268	350	445	H01-MNCON3
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	3,214	3,214	3,214	3,214	H05-ALLENS
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,646	1,646	1,646	1,646	1,646	1,646	HG01BRASYS
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	157	157	157	157	157	157	H27-NWCUST
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000		None	CONSERVATION	H	3810079	10	14	16	21	25	32	40	H01-MNCON2
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,043	1,043	1,043	1,043	H05-ALLENS
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	594	594	594	594	594	594	HG01BRASYS
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	89	89	89	89	89	89	H27-NWCUST
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079		None	CONSERVATION	H	3810079	10	22	58	109	158	244	318	H01-MNCON3
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	3,766	3,766	3,766	3,766	H05-ALLENS
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,000	1,000	1,000	1,000	1,000	1,000	HG01BRASYS
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079		None	CONSERVATION	H	3811079	11	99	289	570	845	1,298	1,712	H01-MNCON3
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	5,924	5,924	5,924	5,924	H05-ALLENS
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	6,000	6,000	6,000	6,000	6,000	6,000	HG01BRASYS
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	331	BRA	LITTLE RIVER OFF-CHANNEL RESERVOIR	G	HG03LRIV2	12	0	0	0	0	7,996	7,996	HG03LRIV2
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	325	GCWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	0	0	6,000	6,000	H12-COHXFR
COUNTY-OTHER	BRAZOS	FORT BEND	080757079		None	CONSERVATION	H	3812079	12	416	710	1,060	1,396	1,855	2,390	H01-MNCON3
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	10,844	10,844	10,844	10,844	H05-ALLENS
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	12,000	12,000	12,000	12,000	12,000	12,000	HG01BRASYS
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	325	GCWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	0	0	14,000	14,000	H12-COHXFR
FAIRCHILDS	BRAZOS	FORT BEND	081019000		None	CONSERVATION	H	3812079	12	23	29	36	44	54	66	H01-MNCON1
FAIRCHILDS	BRAZOS	FORT BEND	081019000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	544	544	544	544	544	544	HG01BRASYS
FAIRCHILDS	BRAZOS	FORT BEND	081019000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	247	247	247	247	247	247	H27-NWCUST
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000		None	CONSERVATION	H	3812079	12	87	86	86	85	85	85	H01-MNCON2
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	177	177	177	177	177	177	HG01BRASYS
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	887	887	887	887	887	887	H27-NWCUST
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000		None	CONSERVATION	H	3812079	12	54	53	53	53	53	53	H01-MNCON1
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	126	126	126	126	126	126	HG01BRASYS
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	589	589	589	589	589	589	H27-NWCUST
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000		None	CONSERVATION	H	3812079	12	33	32	32	32	32	32	H01-MNCON1
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	70	70	70	70	70	70	HG01BRASYS
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	357	357	357	357	357	357	H27-NWCUST
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000		None	CONSERVATION	H	3812079	12	46	46	46	46	46	46	H01-MNCON2
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	99	99	99	99	99	99	HG01BRASYS
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	472	472	472	472	472	472	H27-NWCUST
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000		None	CONSERVATION	H	3810079	10	20	19	19	18	18	18	H01-MNCON2
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	153	153	153	153	153	153	HG01BRASYS
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	40	40	40	40	40	40	H27-NWCUST
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000		None	CONSERVATION	H	3811079	11	71	69	68	67	66	66	H01-MNCON2
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	413	413	413	413	413	413	HG01BRASYS
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	312	312	312	312	312	312	H27-NWCUST
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000		None	CONSERVATION	H	3811079	11	47	70	100	130	170	215	H01-MNCON3
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,558	1,558	1,558	1,558	H05-ALLENS
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	739	739	739	739	739	739	HG01BRASYS
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	171	171	171	171	171	171	H27-NWCUST
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000		None	CONSERVATION	H	3811079	11	109	153	208	262	336	421	H01-MNCON3
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	2,882	2,882	2,882	2,882	H05-ALLENS
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,492	1,492	1,492	1,492	1,492	1,492	HG01BRASYS
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	404	404	404	404	404	404	H27-NWCUST
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000		None	CONSERVATION	H	3810079	10	34	42	52	62	76	92	H01-MNCON3
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	935	935	935	935	935	935	HG01BRASYS
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	56	56	56	56	56	56	H27-NWCUST
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000		None	CONSERVATION	H	3810079	10	38	54	74	95	122	153	H01-MNCON2

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
BEASLEY	BRAZOS	FORT BEND	081012000	New Contracts	$0	$450	$450	$450	$450	$450	$450
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	MUNICIPAL CONSERVATION	$0	$6,440	$9,660	$13,846	$17,871	$23,506	$29,785
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	Allens Creek Reservoir	$2,272,888	$0	$0	$174,492	$174,492	$174,492	$174,492
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	BRA System Operations	$0	$30,825	$30,825	$30,825	$30,825	$30,825	$30,825
BIG OAKS MUD	SAN JACINTO	FORT BEND	084020000	New Contracts	$0	$2,970	$2,970	$2,970	$2,970	$2,970	$2,970
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	MUNICIPAL CONSERVATION	$0	$24,311	$36,869	$52,647	$68,425	$89,355	$113,505
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	Allens Creek Reservoir	$8,705,911	$0	$0	$668,362	$668,362	$668,362	$668,362
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	BRA System Operations	$0	$117,180	$117,180	$117,180	$117,180	$117,180	$117,180
CINCO MUD #2	SAN JACINTO	FORT BEND	084058000	New Contracts	$0	$11,205	$11,205	$11,205	$11,205	$11,205	$11,205
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	MUNICIPAL CONSERVATION	$0	$4,508	$6,762	$9,660	$12,558	$16,422	$20,930
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	Allens Creek Reservoir	$1,597,164	$0	$0	$122,616	$122,616	$122,616	$122,616
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	BRA System Operations	$0	$21,645	$21,645	$21,645	$21,645	$21,645	$21,645
CINCO MUD #6	SAN JACINTO	FORT BEND	084059000	New Contracts	$0	$2,070	$2,070	$2,070	$2,070	$2,070	$2,070
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	MUNICIPAL CONSERVATION	$0	$11,753	$17,871	$25,438	$33,166	$43,309	$54,901
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	Allens Creek Reservoir	$4,207,914	$0	$0	$323,046	$323,046	$323,046	$323,046
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	BRA System Operations	$0	$56,745	$56,745	$56,745	$56,745	$56,745	$56,745
CINCO MUD #7	SAN JACINTO	FORT BEND	084060000	New Contracts	$0	$5,490	$5,490	$5,490	$5,490	$5,490	$5,490
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	MUNICIPAL CONSERVATION	$0	$4,212	$4,212	$4,212	$4,056	$4,056	$4,056
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	BRA System Operations	$0	$9,765	$9,765	$9,765	$9,765	$9,765	$9,765
CINCO MUD #8	SAN JACINTO	FORT BEND	084061000	New Contracts	$0	$2,520	$2,520	$2,520	$2,520	$2,520	$2,520
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	MUNICIPAL CONSERVATION	$0	$15,456	$23,345	$33,166	$43,148	$56,350	$71,645
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	Allens Creek Reservoir	$5,484,281	$0	$0	$421,034	$421,034	$421,034	$421,034
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	BRA System Operations	$0	$74,070	$74,070	$74,070	$74,070	$74,070	$74,070
CINCO MUD #9	SAN JACINTO	FORT BEND	084062000	New Contracts	$0	$7,065	$7,065	$7,065	$7,065	$7,065	$7,065
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	MUNICIPAL CONSERVATION	$0	$2,184	$2,496	$3,276	$3,900	$4,992	$6,240
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	Allens Creek Reservoir	$1,779,746	$0	$0	$136,633	$136,633	$136,633	$136,633
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	BRA System Operations	$0	$26,730	$26,730	$26,730	$26,730	$26,730	$26,730
CORNERSTONES MUD	SAN JACINTO	FORT BEND	084073000	New Contracts	$0	$4,005	$4,005	$4,005	$4,005	$4,005	$4,005
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079	MUNICIPAL CONSERVATION	$0	$3,542	$9,338	$17,549	$25,438	$39,284	$51,198
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079	Allens Creek Reservoir	$6,426,198	$0	$0	$493,346	$493,346	$493,346	$493,346
COUNTY-OTHER	SAN JACINTO	FORT BEND	080757079	BRA System Operations	$0	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	MUNICIPAL CONSERVATION	$0	$15,939	$46,529	$91,770	$136,045	$208,978	$275,632
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	Allens Creek Reservoir	$10,108,550	$0	$0	$776,044	$776,044	$776,044	$776,044
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	BRA System Operations	$0	$270,000	$270,000	$270,000	$270,000	$270,000	$270,000
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	Little River Off-Channel Reservoir	$24,034,117	$0	$0	$0	$0	$2,000,000	$2,000,000
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	080757079	COH-GCWA Transfer	$0	$0	$0	$0	$0	$0	$0
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	MUNICIPAL CONSERVATION	$0	$66,976	$114,310	$170,660	$224,756	$298,655	$384,790
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	Allens Creek Reservoir	$18,503,901	$0	$0	$1,420,564	$1,420,564	$1,420,564	$1,420,564
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	BRA System Operations	$0	$540,000	$540,000	$540,000	$540,000	$540,000	$540,000
COUNTY-OTHER	BRAZOS	FORT BEND	080757079	COH-GCWA Transfer	$0	$0	$0	$0	$0	$0	$0
FAIRCHILDS	BRAZOS	FORT BEND	081019000	MUNICIPAL CONSERVATION	$0	$3,542	$4,466	$5,544	$6,776	$8,316	$10,164
FAIRCHILDS	BRAZOS	FORT BEND	081019000	BRA System Operations	$0	$24,480	$24,480	$24,480	$24,480	$24,480	$24,480
FAIRCHILDS	BRAZOS	FORT BEND	081019000	New Contracts	$0	$11,115	$11,115	$11,115	$11,115	$11,115	$11,115
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	MUNICIPAL CONSERVATION	$0	$13,572	$13,416	$13,416	$13,260	$13,260	$13,260
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	BRA System Operations	$0	$7,965	$7,965	$7,965	$7,965	$7,965	$7,965
FIRST COLONY MUD #9	BRAZOS	FORT BEND	084113000	New Contracts	$0	$39,915	$39,915	$39,915	$39,915	$39,915	$39,915
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	MUNICIPAL CONSERVATION	$0	$8,316	$8,162	$8,162	$8,162	$8,162	$8,162
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	BRA System Operations	$0	$5,670	$5,670	$5,670	$5,670	$5,670	$5,670
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	084117000	New Contracts	$0	$26,505	$26,505	$26,505	$26,505	$26,505	$26,505
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	MUNICIPAL CONSERVATION	$0	$5,082	$4,928	$4,928	$4,928	$4,928	$4,928
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	BRA System Operations	$0	$3,150	$3,150	$3,150	$3,150	$3,150	$3,150
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	084118000	New Contracts	$0	$16,065	$16,065	$16,065	$16,065	$16,065	$16,065
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	MUNICIPAL CONSERVATION	$0	$7,176	$7,176	$7,176	$7,176	$7,176	$7,176
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	BRA System Operations	$0	$4,455	$4,455	$4,455	$4,455	$4,455	$4,455
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	084119000	New Contracts	$0	$21,240	$21,240	$21,240	$21,240	$21,240	$21,240
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	MUNICIPAL CONSERVATION	$0	$3,120	$2,964	$2,964	$2,808	$2,808	$2,808
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	BRA System Operations	$0	$6,885	$6,885	$6,885	$6,885	$6,885	$6,885
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	084120000	New Contracts	$0	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	MUNICIPAL CONSERVATION	$0	$11,076	$10,764	$10,608	$10,452	$10,296	$10,296
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	BRA System Operations	$0	$18,585	$18,585	$18,585	$18,585	$18,585	$18,585
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084120000	New Contracts	$0	$14,040	$14,040	$14,040	$14,040	$14,040	$14,040
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	MUNICIPAL CONSERVATION	$0	$7,567	$11,270	$16,100	$20,930	$27,370	$34,615
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	Allens Creek Reservoir	$2,658,528	$0	$0	$204,098	$204,098	$204,098	$204,098
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	BRA System Operations	$0	$33,255	$33,255	$33,255	$33,255	$33,255	$33,255
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	084121000	New Contracts	$0	$7,695	$7,695	$7,695	$7,695	$7,695	$7,695
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	MUNICIPAL CONSERVATION	$0	$17,549	$24,633	$33,488	$42,182	$54,096	$67,781
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	Allens Creek Reservoir	$4,917,765	$0	$0	$377,542	$377,542	$377,542	$377,542
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	BRA System Operations	$0	$67,140	$67,140	$67,140	$67,140	$67,140	$67,140
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	084122000	New Contracts	$0	$18,180	$18,180	$18,180	$18,180	$18,180	$18,180
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	MUNICIPAL CONSERVATION	$0	$5,474	$6,762	$8,372	$9,982	$12,236	$14,812
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	BRA System Operations	$0	$42,075	$42,075	$42,075	$42,075	$42,075	$42,075
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	084123000	New Contracts	$0	$2,520	$2,520	$2,520	$2,520	$2,520	$2,520
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	MUNICIPAL CONSERVATION	$0	$5,928	$8,424	$11,544	$14,820	$19,032	$23,868

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,918	1,918	1,918	1,918	1,918	1,918	HG01BRASYS
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	79	79	79	79	79	79	H27-NWCUST
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000		None	CONSERVATION	H	3812079	12	53	76	104	132	171	214	H01-MNCON3
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,492	1,492	1,492	1,492	H05-ALLENS
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	647	647	647	647	647	647	HG01BRASYS
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	454	454	454	454	454	454	H27-NWCUST
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000		None	CONSERVATION	H	3812079	12	44	43	43	43	43	43	H01-MNCON2
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	90	90	90	90	90	90	HG01BRASYS
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	441	441	441	441	441	441	H27-NWCUST
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000		None	CONSERVATION	H	3812079	12	36	36	36	36	36	36	H01-MNCON2
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	79	79	79	79	79	79	HG01BRASYS
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	365	365	365	365	365	365	H27-NWCUST
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000		None	CONSERVATION	H	3812079	12	22	22	22	22	22	22	H01-MNCON1
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	51	51	51	51	51	51	HG01BRASYS
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	238	238	238	238	238	238	H27-NWCUST
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000		None	CONSERVATION	H	3812079	12	46	62	80	100	126	155	H01-MNCON2
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,178	1,178	1,178	1,178	H05-ALLENS
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	532	532	532	532	532	532	HG01BRASYS
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	467	467	467	467	467	467	H27-NWCUST
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000		None	CONSERVATION	H	3811079	11	6	7	9	10	12	14	H01-MNCON1
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	165	165	165	165	165	165	HG01BRASYS
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	30	30	30	30	30	30	H27-NWCUST
FULSHEAR	BRAZOS	FORT BEND	080869000		None	CONSERVATION	H	3812079	12	9	11	13	15	18	22	H01-MNCON1
FULSHEAR	BRAZOS	FORT BEND	080869000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	218	218	218	218	218	218	HG01BRASYS
FULSHEAR	BRAZOS	FORT BEND	080869000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	104	104	104	104	104	104	H27-NWCUST
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000		None	CONSERVATION	H	3810079	10	61	93	132	172	225	285	H01-MNCON3
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	2,061	2,061	2,061	2,061	H05-ALLENS
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,053	1,053	1,053	1,053	1,053	1,053	HG01BRASYS
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	101	101	101	101	101	101	H27-NWCUST
HOUSTON	SAN JACINTO	FORT BEND	080285000		None	CONSERVATION	H	3810079	10	285	327	377	430	502	587	H01-MNCON3
HOUSTON	SAN JACINTO-BRAZOS	FORT BEND	080285000		None	CONSERVATION	H	3811079	11	200	229	265	302	352	413	H01-MNCON3
IRRIGATION	SAN JACINTO-BRAZOS	FORT BEND	081004079		None	CONSERVATION	H	3812079	12	3,440	3,440	3,440	3,440	3,440	3,440	H03-IRRCON
IRRIGATION	BRAZOS	FORT BEND	081004079		None	CONSERVATION	H	3811079	11	1,757	1,757	1,757	1,757	1,757	1,757	H03-IRRCON
KATY	SAN JACINTO	FORT BEND	080312000		None	CONSERVATION	H	3810079	10	14	16	19	22	25	30	H01-MNCON3
KATY	SAN JACINTO	FORT BEND	080312000		WHCRWA	LAKE HOUSTON ADDITIONAL YIELD	H	H15-HOUYLD	10	359	359	359	359	359	359	H15-HOUYLD
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000		None	CONSERVATION	H	3810079	10	67	86	109	131	163	199	H01-MNCON3
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,216	1,216	1,216	1,216	H05-ALLENS
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	837	837	837	837	837	837	HG01BRASYS
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	111	111	111	111	111	111	H27-NWCUST
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000		None	CONSERVATION	H	3811079	11	3	3	4	5	6	8	H01-MNCON3
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	86	86	86	86	86	86	H27-NWCUST
MANUFACTURING	SAN JACINTO	FORT BEND	081001079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,550	1,550	1,550	1,550	1,550	1,550	HG01BRASYS
MANUFACTURING	SAN JACINTO-BRAZOS	FORT BEND	081001079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,969	1,969	1,969	1,969	1,969	1,969	HG01BRASYS
MANUFACTURING	BRAZOS	FORT BEND	081001079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,140	1,140	1,140	1,140	1,140	1,140	HG01BRASYS
MEADOWS	SAN JACINTO	FORT BEND	080792000		None	CONSERVATION	H	3810079	10	79	78	77	76	76	76	H01-MNCON2
MEADOWS	SAN JACINTO	FORT BEND	080792000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	630	630	630	630	630	630	HG01BRASYS
MEADOWS	SAN JACINTO	FORT BEND	080792000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	164	164	164	164	164	164	H27-NWCUST
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000		None	CONSERVATION	H	3811079	11	8	8	8	8	8	8	H01-MNCON2
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	82	82	82	82	82	82	H27-NWCUST
MINING	SAN JACINTO	FORT BEND	081003079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	194	194	194	194	194	194	HG01BRASYS
MINING	SAN JACINTO-BRAZOS	FORT BEND	081003079	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	660	660	660	660	660	660	HG01BRASYS
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000		None	CONSERVATION	H	3810079	10	0	0	207	308	341	414	H01-MNCON3
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	414	414	414	414	H05-ALLENS
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	325	GCWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	0	0	1,500	1,500	H12-COHXFR
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000		None	CONSERVATION	H	3811079	11	0	0	1,192	1,392	1,542	1,875	H01-MNCON3
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	2,442	2,442	2,442	2,442	H05-ALLENS
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	325	GCWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	0	0	6,500	6,500	H12-COHXFR
MISSOURI CITY	BRAZOS	FORT BEND	080409000		None	CONSERVATION	H	3812079	12	0	0	32	38	42	51	H01-MNCON3
MISSOURI CITY	BRAZOS	FORT BEND	080409000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	263	263	263	263	H05-ALLENS
NEEDVILLE	BRAZOS	FORT BEND	080428000		None	CONSERVATION	H	3812079	12	9	10	11	12	14	16	H01-MNCON1
NEEDVILLE	BRAZOS	FORT BEND	080428000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	82	82	82	82	82	82	HG01BRASYS
NEEDVILLE	BRAZOS	FORT BEND	080428000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	99	99	99	99	99	99	H27-NWCUST
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000		None	CONSERVATION	H	3810079	10	60	85	116	148	190	239	H01-MNCON3
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	1,647	1,647	1,647	1,647	H05-ALLENS
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	920	920	920	920	920	920	HG01BRASYS
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	98	98	98	98	98	98	H27-NWCUST
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000		None	CONSERVATION	H	3811079	11	1	1	1	1	1	1	H01-MNCON1
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	19	19	19	19	19	19	H27-NWCUST
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000		None	CONSERVATION	H	3811079	11	42	43	43	43	45	47	H01-MNCON3
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	441	441	441	441	441	441	H27-NWCUST
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000		None	CONSERVATION	H	3812079	12	159	160	161	163	168	175	H01-MNCON3
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,396	1,396	1,396	1,396	1,396	1,396	HG01BRASYS
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	500	500	500	500	500	500	H27-NWCUST

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	BRA System Operations	$0	$86,310	$86,310	$86,310	$86,310	$86,310	$86,310
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	084124000	New Contracts	$0	$3,555	$3,555	$3,555	$3,555	$3,555	$3,555
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	MUNICIPAL CONSERVATION	$0	$8,533	$12,236	$16,744	$21,252	$27,531	$34,454
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	Allens Creek Reservoir	$2,545,907	$0	$0	$195,452	$195,452	$195,452	$195,452
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	BRA System Operations	$0	$29,115	$29,115	$29,115	$29,115	$29,115	$29,115
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	084125000	New Contracts	$0	$20,430	$20,430	$20,430	$20,430	$20,430	$20,430
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	MUNICIPAL CONSERVATION	$0	$6,864	$6,708	$6,708	$6,708	$6,708	$6,708
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	BRA System Operations	$0	$4,050	$4,050	$4,050	$4,050	$4,050	$4,050
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	084126000	New Contracts	$0	$19,845	$19,845	$19,845	$19,845	$19,845	$19,845
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	MUNICIPAL CONSERVATION	$0	$5,616	$5,616	$5,616	$5,616	$5,616	$5,616
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	BRA System Operations	$0	$3,555	$3,555	$3,555	$3,555	$3,555	$3,555
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	084127000	New Contracts	$0	$16,425	$16,425	$16,425	$16,425	$16,425	$16,425
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	MUNICIPAL CONSERVATION	$0	$3,388	$3,388	$3,388	$3,388	$3,388	$3,388
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	BRA System Operations	$0	$2,295	$2,295	$2,295	$2,295	$2,295	$2,295
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	084128000	New Contracts	$0	$10,710	$10,710	$10,710	$10,710	$10,710	$10,710
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	MUNICIPAL CONSERVATION	$0	$7,176	$9,672	$12,480	$15,600	$19,656	$24,180
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	Allens Creek Reservoir	$2,010,107	$0	$0	$154,318	$154,318	$154,318	$154,318
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	BRA System Operations	$0	$23,940	$23,940	$23,940	$23,940	$23,940	$23,940
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	084129000	New Contracts	$0	$21,015	$21,015	$21,015	$21,015	$21,015	$21,015
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	MUNICIPAL CONSERVATION	$0	$924	$1,078	$1,386	$1,540	$1,848	$2,156
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	BRA System Operations	$0	$7,425	$7,425	$7,425	$7,425	$7,425	$7,425
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	080869000	New Contracts	$0	$1,350	$1,350	$1,350	$1,350	$1,350	$1,350
FULSHEAR	BRAZOS	FORT BEND	080869000	MUNICIPAL CONSERVATION	$0	$1,386	$1,694	$2,002	$2,310	$2,772	$3,388
FULSHEAR	BRAZOS	FORT BEND	080869000	BRA System Operations	$0	$9,810	$9,810	$9,810	$9,810	$9,810	$9,810
FULSHEAR	BRAZOS	FORT BEND	080869000	New Contracts	$0	$4,680	$4,680	$4,680	$4,680	$4,680	$4,680
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	MUNICIPAL CONSERVATION	$0	$9,821	$14,973	$21,252	$27,692	$36,225	$45,885
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	Allens Creek Reservoir	$3,516,833	$0	$0	$269,991	$269,991	$269,991	$269,991
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	BRA System Operations	$0	$47,385	$47,385	$47,385	$47,385	$47,385	$47,385
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	084142000	New Contracts	$0	$4,545	$4,545	$4,545	$4,545	$4,545	$4,545
HOUSTON	SAN JACINTO	FORT BEND	080285000	MUN CONSERVATION	$0	$45,885	$52,647	$60,697	$69,230	$80,822	$94,507
HOUSTON	SAN JACINTO-BRAZOS	FORT BEND	080285000	MUN CONSERVATION	$0	$32,200	$36,869	$42,665	$48,622	$56,672	$66,493
IRRIGATION	SAN JACINTO-BRAZOS	FORT BEND	081004079	IRRIGATION CONSERVATION	$27,520	$258,000	$258,000	$258,000	$258,000	$258,000	$258,000
IRRIGATION	BRAZOS	FORT BEND	081004079	IRRIGATION CONSERVATION	$14,056	$131,775	$131,775	$131,775	$131,775	$131,775	$131,775
KATY	SAN JACINTO	FORT BEND	080312000	MUNICIPAL CONSERVATION	$0	$2,254	$2,576	$3,059	$3,542	$4,025	$4,830
KATY	SAN JACINTO	FORT BEND	080312000	Lake Houston Additional Yield	$0	$43,080	$43,080	$43,080	$43,080	$43,080	$43,080
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	MUNICIPAL CONSERVATION	$0	$10,787	$13,846	$17,549	$21,091	$26,243	$32,039
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	Allens Creek Reservoir	$2,074,949	$0	$0	$159,296	$159,296	$159,296	$159,296
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	BRA System Operations	$0	$37,665	$37,665	$37,665	$37,665	$37,665	$37,665
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	084222000	New Contracts	$0	$4,995	$4,995	$4,995	$4,995	$4,995	$4,995
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000	MUNICIPAL CONSERVATION	$0	$483	$483	$644	$805	$966	$1,288
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	084222000	New Contracts	$0	$3,870	$3,870	$3,870	$3,870	$3,870	$3,870
MANUFACTURING	SAN JACINTO	FORT BEND	081001079	BRA System Operations	$0	$69,750	$69,750	$69,750	$69,750	$69,750	$69,750
MANUFACTURING	SAN JACINTO-BRAZOS	FORT BEND	081001079	BRA System Operations	$0	$88,605	$88,605	$88,605	$88,605	$88,605	$88,605
MANUFACTURING	BRAZOS	FORT BEND	081001079	BRA System Operations	$0	$51,300	$51,300	$51,300	$51,300	$51,300	$51,300
MEADOWS	SAN JACINTO	FORT BEND	080792000	MUNICIPAL CONSERVATION	$0	$12,324	$12,168	$12,012	$11,856	$11,856	$11,856
MEADOWS	SAN JACINTO	FORT BEND	080792000	BRA System Operations	$0	$28,350	$28,350	$28,350	$28,350	$28,350	$28,350
MEADOWS	SAN JACINTO	FORT BEND	080792000	New Contracts	$0	$7,380	$7,380	$7,380	$7,380	$7,380	$7,380
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000	MUNICIPAL CONSERVATION	$0	$1,248	$1,248	$1,248	$1,248	$1,248	$1,248
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	080792000	New Contracts	$0	$3,690	$3,690	$3,690	$3,690	$3,690	$3,690
MINING	SAN JACINTO	FORT BEND	081003079	BRA System Operations	$0	$8,730	$8,730	$8,730	$8,730	$8,730	$8,730
MINING	SAN JACINTO-BRAZOS	FORT BEND	081003079	BRA System Operations	$0	$29,700	$29,700	$29,700	$29,700	$29,700	$29,700
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	MUNICIPAL CONSERVATION	$0	$0	$0	$33,327	$49,588	$54,901	$66,654
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	Allens Creek Reservoir	$706,438	$0	$0	$54,234	$54,234	$54,234	$54,234
MISSOURI CITY	SAN JACINTO	FORT BEND	080409000	COH-GCWA Transfer	$0	$0	$0	$0	$0	$0	$0
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	MUNICIPAL CONSERVATION	$0	$0	$0	$191,912	$224,112	$248,262	$301,875
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	Allens Creek Reservoir	$4,166,961	$0	$0	$319,902	$319,902	$319,902	$319,902
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	080409000	COH-GCWA Transfer	$0	$0	$0	$0	$0	$0	$0
MISSOURI CITY	BRAZOS	FORT BEND	080409000	MUNICIPAL CONSERVATION	$0	$0	$0	$5,152	$6,118	$6,762	$8,211
MISSOURI CITY	BRAZOS	FORT BEND	080409000	Allens Creek Reservoir	$448,776	$0	$0	$34,453	$34,453	$34,453	$34,453
NEEDVILLE	BRAZOS	FORT BEND	080428000	MUNICIPAL CONSERVATION	$0	$1,386	$1,540	$1,694	$1,848	$2,156	$2,464
NEEDVILLE	BRAZOS	FORT BEND	080428000	BRA System Operations	$0	$3,690	$3,690	$3,690	$3,690	$3,690	$3,690
NEEDVILLE	BRAZOS	FORT BEND	080428000	New Contracts	$0	$4,455	$4,455	$4,455	$4,455	$4,455	$4,455
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	MUNICIPAL CONSERVATION	$0	$9,660	$13,685	$18,676	$23,828	$30,590	$38,479
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	Allens Creek Reservoir	$2,810,395	$0	$0	$215,757	$215,757	$215,757	$215,757
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	BRA System Operations	$0	$41,400	$41,400	$41,400	$41,400	$41,400	$41,400
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	084283000	New Contracts	$0	$4,410	$4,410	$4,410	$4,410	$4,410	$4,410
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000	MUNICIPAL CONSERVATION	$0	$154	$154	$154	$154	$154	$154
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	084294000	New Contracts	$0	$855	$855	$855	$855	$855	$855
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000	MUNICIPAL CONSERVATION	$0	$6,762	$6,923	$6,923	$6,923	$7,245	$7,567
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	084299000	New Contracts	$0	$19,845	$19,845	$19,845	$19,845	$19,845	$19,845
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	MUNICIPAL CONSERVATION	$0	$25,599	$25,760	$25,921	$26,243	$27,048	$28,175
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	BRA System Operations	$0	$62,820	$62,820	$62,820	$62,820	$62,820	$62,820
PECAN GROVE MUD #1	BRAZOS	FORT BEND	084299000	New Contracts	$0	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000		None	CONSERVATION	H	3811079	11	33	31	31	30	30	30	H01-MNCON2
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	187	187	187	187	187	187	HG01BRASYS
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	144	144	144	144	144	144	H27-NWCUST
RICHMOND	BRAZOS	FORT BEND	080500000		None	CONSERVATION	H	3812079	12	140	150	162	174	193	216	H01-MNCON3
RICHMOND	BRAZOS	FORT BEND	080500000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	724	724	724	724	H05-ALLENS
RICHMOND	BRAZOS	FORT BEND	080500000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	720	720	720	720	720	720	HG01BRASYS
RICHMOND	BRAZOS	FORT BEND	080500000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	1,000	1,000	1,000	1,000	1,000	1,000	H27-NWCUST
ROSENBERG	BRAZOS	FORT BEND	080518000		None	CONSERVATION	H	3812079	12	267	297	336	376	434	503	H01-MNCON3
ROSENBERG	BRAZOS	FORT BEND	080518000	396200	BRA, COH	ALLENS CREEK RESERVOIR	H	12900	12	0	0	2,256	2,256	2,256	2,256	H05-ALLENS
ROSENBERG	BRAZOS	FORT BEND	080518000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	1,556	1,556	1,556	1,556	1,556	1,556	HG01BRASYS
ROSENBERG	BRAZOS	FORT BEND	080518000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	2,000	2,000	2,000	2,000	2,000	2,000	H27-NWCUST
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000		None	CONSERVATION	H	3811079	11	63	77	77	77	77	77	H01-MNCON3
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	331	BRA	BRA SYSTEM OPERATIONS	G	HG01BRASYS	12	548	548	548	548	548	548	HG01BRASYS
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	280	280	280	280	280	280	H27-NWCUST
SIMONTON	BRAZOS	FORT BEND	081062000		None	CONSERVATION	H	3812079	12	18	17	17	17	17	17	H01-MNCON1
SIMONTON	BRAZOS	FORT BEND	081062000	331	BRA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	192	192	192	192	192	192	H27-NWCUST
WHCRWA	SAN JACINTO	FORT BEND	088002000		None	CONSERVATION	H	3810079	10	0	220	280	342	423	519	H01-MNCON3
WHCRWA	SAN JACINTO	FORT BEND	088002000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	1,178	1,178	1,178	1,178	1,178	H02-INCR
WHCRWA	SAN JACINTO	FORT BEND	088002000		WHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	3,055	3,055	3,055	3,055	H10-TRAXFR
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000		None	CONSERVATION	H	3811084	11	15	16	17	18	18	18	H01-MNCON1
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000	325	GCWA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	172	172	172	172	172	172	H27-NWCUST
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004084	325	GCWA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	7,751	7,417	6,872	6,869	6,885	6,912	H27-NWCUST
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004084		None	CONSERVATION	H	3811084	11	2,392	2,392	2,392	2,392	2,392	2,392	H03-IRRCON
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000		None	CONSERVATION	H	3811084	11	17	19	21	21	21	22	H01-MNCON2
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000	325	GCWA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	252	252	252	252	252	252	H27-NWCUST
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000		None	CONSERVATION	H	3811084	11	516	569	598	604	610	617	H01-MNCON3
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	325	GCWA	BRAZOS RIVER AUTHORITY SYSTEM	G	120B0	12	1,825	2,159	2,704	2,707	2,691	2,664	H27-NWCUST
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	2,000	2,000	2,000	2,000	2,000	2,000	H27-NWCUST
MANUFACTURING	SAN JACINTO-BRAZOS	GALVESTON	081001084	396200	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	0	0	28,000	28,000	H12-COHXFR
MINING	NECHES-TRINITY	GALVESTON	081003084	140	LNVA	SAM RAYBURN-STEINHAGEN	I	060A0	06	16	23	26	29	33	36	H27-NWCUST
MINING	SAN JACINTO-BRAZOS	GALVESTON	081003084	325	GCWA	BRAZOS RIVER RUN-OF-RIVER	H	3461205171	12	33	33	33	33	33	33	H08-CONXFR
BELLAIRE	SAN JACINTO	HARRIS	080046000		None	CONSERVATION	H	3810101	10	258	275	293	312	332	354	H01-MNCON3
BELLAIRE	SAN JACINTO	HARRIS	080046000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	781	781	781	781	781	781	H02-INCR
BELLAIRE	SAN JACINTO	HARRIS	080046000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	780	780	1,342	1,342	1,342	H10-TRAXFR
BELLAIRE	SAN JACINTO	HARRIS	080046000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	682	682	682	682	682	682	H27-NWCUST
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000		None	CONSERVATION	H	3810101	10	32	31	31	30	30	30	H01-MNCON1
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	274	274	274	274	274	H10-TRAXFR
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	163	163	163	163	163	163	H27-NWCUST
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000		None	CONSERVATION	H	3810101	10	28	33	37	42	47	51	H01-MNCON2
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	434	434	584	584	584	H10-TRAXFR
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	132	132	132	132	132	132	H27-NWCUST
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000		None	CONSERVATION	H	3810101	10	90	89	88	87	87	87	H01-MNCON2
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	142	142	142	142	142	142	H02-INCR
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	384	384	384	384	384	384	H27-NWCUST
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000		None	CONSERVATION	H	3810101	10	27	32	36	41	46	51	H01-MNCON2
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	428	428	580	580	580	H10-TRAXFR
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	127	127	127	127	127	127	H27-NWCUST
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000		None	CONSERVATION	H	3810101	10	0	26	37	37	36	36	H01-MNCON2
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	0	14	14	14	14	H02-INCR
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	51	51	51	51	51	H10-TRAXFR
CINCO MUD #6	SAN JACINTO	HARRIS	084059000		None	CONSERVATION	H	3810101	10	12	17	22	27	32	38	H01-MNCON3
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	273	273	412	412	412	H10-TRAXFR
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	46	46	46	46	46	46	H27-NWCUST
CINCO MUD #9	SAN JACINTO	HARRIS	084062000		None	CONSERVATION	H	3810101	10	15	22	28	35	41	47	H01-MNCON3
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	343	343	517	517	517	H10-TRAXFR
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	60	60	60	60	60	60	H27-NWCUST
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000		None	CONSERVATION	H	3810101	10	28	36	45	53	62	71	H01-MNCON3
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	503	503	744	744	744	H10-TRAXFR
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	109	109	109	109	109	109	H27-NWCUST
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000		None	CONSERVATION	H	3810101	10	81	84	87	89	93	98	H01-MNCON3
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	1,010	1,010	1,473	1,473	1,473	H10-TRAXFR
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	183	183	183	183	183	183	H27-NWCUST
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101		None	CONSERVATION	H	3810101	10	0	0	0	158	244	318	H01-MNCON3
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101	396201	COH	COH INDIRECT REUSE	H	3510101COH	10	0	0	0	0	9,041	9,041	H13-REUHOU
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	2,105	2,105	2,105	2,105	2,105	H10-TRAXFR
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000		None	CONSERVATION	H	3810101	10	1	2	2	3	3	4	H01-MNCON1
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	42	42	42	42	42	42	H27-NWCUST
DEER PARK	SAN JACINTO	HARRIS	080154000		None	CONSERVATION	H	3810101	10	0	0	17	25	60	107	H01-MNCON3
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	080154000		None	CONSERVATION	H	3811101	11	0	0	27	40	90	162	H01-MNCON3
EL DORADO UD	SAN JACINTO	HARRIS	084101000		None	CONSERVATION	H	3810101	10	28	0	32	35	37	40	H01-MNCON2
EL DORADO UD	SAN JACINTO	HARRIS	084101000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	212	212	212	212	212	H10-TRAXFR
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000		None	CONSERVATION	H	3811101	11	30	29	28	28	28	28	H01-MNCON1
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000	651900	CITY OF PASADENA	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	310	310	310	310	310	310	H02-INCR

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	MUNICIPAL CONSERVATION	$0	$5,148	$4,836	$4,836	$4,680	$4,680	$4,680
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	BRA System Operations	$0	$8,415	$8,415	$8,415	$8,415	$8,415	$8,415
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	084303000	New Contracts	$0	$6,480	$6,480	$6,480	$6,480	$6,480	$6,480
RICHMOND	BRAZOS	FORT BEND	080500000	MUNICIPAL CONSERVATION	$0	$22,540	$24,150	$26,082	$28,014	$31,073	$34,776
RICHMOND	BRAZOS	FORT BEND	080500000	Allens Creek Reservoir	$1,235,414	$0	$0	$94,844	$94,844	$94,844	$94,844
RICHMOND	BRAZOS	FORT BEND	080500000	BRA System Operations	$0	$32,400	$32,400	$32,400	$32,400	$32,400	$32,400
RICHMOND	BRAZOS	FORT BEND	080500000	New Contracts	$0	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000
ROSENBERG	BRAZOS	FORT BEND	080518000	MUNICIPAL CONSERVATION	$0	$42,987	$47,817	$54,096	$60,536	$69,874	$80,983
ROSENBERG	BRAZOS	FORT BEND	080518000	Allens Creek Reservoir	$3,849,576	$0	$0	$295,536	$295,536	$295,536	$295,536
ROSENBERG	BRAZOS	FORT BEND	080518000	BRA System Operations	$0	$70,020	$70,020	$70,020	$70,020	$70,020	$70,020
ROSENBERG	BRAZOS	FORT BEND	080518000	New Contracts	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	MUNICIPAL CONSERVATION	$0	$10,143	$12,397	$12,397	$12,397	$12,397	$12,397
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	BRA System Operations	$0	$24,660	$24,660	$24,660	$24,660	$24,660	$24,660
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	084334000	New Contracts	$0	$12,600	$12,600	$12,600	$12,600	$12,600	$12,600
SIMONTON	BRAZOS	FORT BEND	081062000	MUNICIPAL CONSERVATION	$0	$2,772	$2,618	$2,618	$2,618	$2,618	$2,618
SIMONTON	BRAZOS	FORT BEND	081062000	New Contracts	$0	$8,640	$8,640	$8,640	$8,640	$8,640	$8,640
WHCRWA	SAN JACINTO	FORT BEND	088002000	MUNICIPAL CONSERVATION	$0	$0	$35,420	$45,080	$55,062	$68,103	$83,559
WHCRWA	SAN JACINTO	FORT BEND	088002000	INCREASE EXIST CONTRACT	$0	$0	$141,360	$141,360	$141,360	$141,360	$141,360
WHCRWA	SAN JACINTO	FORT BEND	088002000	TRA-Houston	$711,815	$0	$0	$381,875	$381,875	$381,875	$381,875
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000	MUNICIPAL CONSERVATION	$0	$2,310	$2,464	$2,618	$2,772	$2,772	$2,772
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	084136000	New Contracts	$0	$7,740	$7,740	$7,740	$7,740	$7,740	$7,740
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004084	New Contracts	$0	$348,795	$333,765	$309,240	$309,105	$309,825	$311,040
IRRIGATION	SAN JACINTO-BRAZOS	GALVESTON	081004084	IRRIGATION CONSERVATION	$21,528	$177,008	$177,008	$177,008	$177,008	$177,008	$177,008
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000	MUNICIPAL CONSERVATION	$0	$2,652	$2,964	$3,276	$3,276	$3,276	$3,432
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	080316000	New Contracts	$0	$11,340	$11,340	$11,340	$11,340	$11,340	$11,340
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	MUNICIPAL CONSERVATION	$0	$83,076	$91,609	$96,278	$97,244	$98,210	$99,337
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	New Contracts	$0	$82,125	$97,155	$121,680	$121,815	$121,095	$119,880
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	080350000	New Contracts	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
MANUFACTURING	SAN JACINTO-BRAZOS	GALVESTON	081001084	COH-GCWA Transfer	$0	$0	$0	$0	$0	$0	$0
MINING	NECHES-TRINITY	GALVESTON	081003084	New Contracts	$0	$720	$1,035	$1,170	$1,305	$1,485	$1,620
MINING	SAN JACINTO-BRAZOS	GALVESTON	081003084	Contractual Transfer	$0	$0	$0	$0	$0	$0	$0
BELLAIRE	SAN JACINTO	HARRIS	080046000	MUNICIPAL CONSERVATION	$0	$41,538	$44,275	$47,173	$50,232	$53,452	$56,994
BELLAIRE	SAN JACINTO	HARRIS	080046000	INCREASE EXIST CONTRACT	$0	$93,720	$93,720	$93,720	$93,720	$93,720	$93,720
BELLAIRE	SAN JACINTO	HARRIS	080046000	TRA-Houston	$312,686	$0	$97,500	$97,500	$167,750	$167,750	$167,750
BELLAIRE	SAN JACINTO	HARRIS	080046000	New Contracts	$0	$30,690	$30,690	$30,690	$30,690	$30,690	$30,690
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	MUNICIPAL CONSERVATION	$0	$4,928	$4,774	$4,774	$4,620	$4,620	$4,620
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	TRA-Houston	$63,842	$0	$34,250	$34,250	$34,250	$34,250	$34,250
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	084026000	New Contracts	$0	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	MUNICIPAL CONSERVATION	$0	$4,368	$5,148	$5,772	$6,552	$7,332	$7,956
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	TRA-Houston	$136,072	$0	$54,250	$54,250	$73,000	$73,000	$73,000
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	084036000	New Contracts	$0	$5,940	$5,940	$5,940	$5,940	$5,940	$5,940
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	MUNICIPAL CONSERVATION	$0	$14,040	$13,884	$13,728	$13,572	$13,572	$13,572
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	INCREASE EXIST CONTRACT	$0	$17,040	$17,040	$17,040	$17,040	$17,040	$17,040
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	080085000	New Contracts	$0	$17,280	$17,280	$17,280	$17,280	$17,280	$17,280
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	MUNICIPAL CONSERVATION	$0	$4,212	$4,992	$5,616	$6,396	$7,176	$7,956
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	TRA-Houston	$135,140	$0	$53,500	$53,500	$72,500	$72,500	$72,500
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	084043000	New Contracts	$0	$5,715	$5,715	$5,715	$5,715	$5,715	$5,715
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	MUNICIPAL CONSERVATION	$0	$0	$4,056	$5,772	$5,772	$5,616	$5,616
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	INCREASE EXIST CONTRACT	$0	$0	$0	$1,680	$1,680	$1,680	$1,680
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	084053000	TRA-Houston	$11,883	$0	$6,375	$6,375	$6,375	$6,375	$6,375
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	MUNICIPAL CONSERVATION	$0	$1,932	$2,737	$3,542	$4,347	$5,152	$6,118
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	TRA-Houston	$95,996	$0	$34,125	$34,125	$51,500	$51,500	$51,500
CINCO MUD #6	SAN JACINTO	HARRIS	084059000	New Contracts	$0	$2,070	$2,070	$2,070	$2,070	$2,070	$2,070
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	MUNICIPAL CONSERVATION	$0	$2,415	$3,542	$4,508	$5,635	$6,601	$7,567
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	TRA-Houston	$120,461	$0	$42,875	$42,875	$64,625	$64,625	$64,625
CINCO MUD #9	SAN JACINTO	HARRIS	084062000	New Contracts	$0	$2,700	$2,700	$2,700	$2,700	$2,700	$2,700
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	MUNICIPAL CONSERVATION	$0	$4,508	$5,796	$7,245	$8,533	$9,982	$11,431
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	TRA-Houston	$173,352	$0	$62,875	$62,875	$93,000	$93,000	$93,000
CONSUMERS WATER INC	SAN JACINTO	HARRIS	084072000	New Contracts	$0	$4,905	$4,905	$4,905	$4,905	$4,905	$4,905
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	MUNICIPAL CONSERVATION	$0	$13,041	$13,524	$14,007	$14,329	$14,973	$15,778
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	TRA-Houston	$343,209	$0	$126,250	$126,250	$184,125	$184,125	$184,125
CORNERSTONES MUD	SAN JACINTO	HARRIS	084073000	New Contracts	$0	$8,235	$8,235	$8,235	$8,235	$8,235	$8,235
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$25,438	$39,284	$51,198
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101	COH Reuse	$0	$0	$0	$0	$0	$1,084,920	$1,084,920
COUNTY-OTHER	SAN JACINTO	HARRIS	080757101	TRA-Houston	$490,465	$0	$263,125	$263,125	$263,125	$263,125	$263,125
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000	MUNICIPAL CONSERVATION	$0	$154	$308	$308	$462	$462	$616
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	084081000	New Contracts	$0	$1,890	$1,890	$1,890	$1,890	$1,890	$1,890
DEER PARK	SAN JACINTO	HARRIS	080154000	MUNICIPAL CONSERVATION	$0	$0	$0	$2,737	$4,025	$9,660	$17,227
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	080154000	MUNICIPAL CONSERVATION	$0	$0	$0	$4,347	$6,440	$14,490	$26,082
EL DORADO UD	SAN JACINTO	HARRIS	084101000	MUNICIPAL CONSERVATION	$0	$4,368	$0	$4,992	$5,460	$5,772	$6,240
EL DORADO UD	SAN JACINTO	HARRIS	084101000	TRA-Houston	$49,396	$0	$26,500	$26,500	$26,500	$26,500	$26,500
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000	MUNICIPAL CONSERVATION	$0	$4,620	$4,466	$4,312	$4,312	$4,312	$4,312
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	080695000	INCREASE EXIST CONTRACT	$0	$37,200	$37,200	$37,200	$37,200	$37,200	$37,200

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
FALLBROOK UD	SAN JACINTO	HARRIS	084109000		None	CONSERVATION	H	3810101	10	55	63	70	79	87	96	H01-MNCON3
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	689	689	919	919	919	H10-TRAXFR
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	216	216	216	216	216	216	H27-NWCUST
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000		None	CONSERVATION	H	3810101	10	20	23	26	29	32	35	H01-MNCON2
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	289	289	385	385	385	H10-TRAXFR
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	96	96	96	96	96	96	H27-NWCUST
GALENA PARK	SAN JACINTO	HARRIS	080226000		None	CONSERVATION	H	3810101	10	85	85	86	86	89	92	H01-MNCON3
GALENA PARK	SAN JACINTO	HARRIS	080226000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	53	53	53	53	53	53	H02-INCR
GALENA PARK	SAN JACINTO	HARRIS	080226000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	39	39	113	113	113	H10-TRAXFR
GALENA PARK	SAN JACINTO	HARRIS	080226000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	23	23	23	23	23	23	H27-NWCUST
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000		None	CONSERVATION	H	3810101	10	55	62	69	76	83	91	H01-MNCON2
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	762	762	991	991	991	H10-TRAXFR
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	258	258	258	258	258	258	H27-NWCUST
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000		None	CONSERVATION	H	3810101	10	25	24	23	23	21	21	H01-MNCON2
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	30	30	30	30	30	30	H27-NWCUST
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000		None	CONSERVATION	H	3810101	10	175	171	169	166	166	166	H01-MNCON3
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10	90	90	90	90	90	90	H02-INCR
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	272	272	272	272	272	272	H27-NWCUST
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000		None	CONSERVATION	H	3810101	10	21	24	26	29	32	36	H01-MNCON2
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10	96	96	96	96	96	96	H02-INCR
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	139	139	239	239	239	H10-TRAXFR
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	9	9	9	9	9	9	H27-NWCUST
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000		None	CONSERVATION	H	3810101	10	25	28	31	34	37	41	H01-MNCON2
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	340	340	445	445	445	H10-TRAXFR
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	118	118	118	118	118	118	H27-NWCUST
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000		None	CONSERVATION	H	3810101	10	52	55	54	52	52	52	H01-MNCON2
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	458	458	458	458	458	H10-TRAXFR
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	247	247	247	247	247	247	H27-NWCUST
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000		None	CONSERVATION	H	3810101	10	121	150	178	206	234	262	H01-MNCON3
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	1,902	1,902	2,661	2,661	2,661	H10-TRAXFR
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	477	477	477	477	477	477	H27-NWCUST
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000		None	CONSERVATION	H	3810101	10	86	95	102	110	119	129	H01-MNCON3
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	919	919	1,168	1,168	1,168	H10-TRAXFR
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	340	340	340	340	340	340	H27-NWCUST
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000		None	CONSERVATION	H	3810101	10	76	76	75	75	75	75	H01-MNCON2
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	629	629	629	629	629	H10-TRAXFR
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	359	359	359	359	359	359	H27-NWCUST
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000		None	CONSERVATION	H	3810101	10	54	70	85	100	115	131	H01-MNCON3
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	939	939	1,359	1,359	1,359	H10-TRAXFR
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	214	214	214	214	214	214	H27-NWCUST
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000		None	CONSERVATION	H	3810101	10	85	115	145	175	205	235	H01-MNCON3
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	1,696	1,696	2,509	2,509	2,509	H10-TRAXFR
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	334	334	334	334	334	334	H27-NWCUST
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000		None	CONSERVATION	H	3810101	10	47	57	67	77	87	98	H01-MNCON3
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	710	710	988	988	988	H10-TRAXFR
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	184	184	184	184	184	184	H27-NWCUST
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000		None	CONSERVATION	H	3810101	10	0	7	35	34	34	34	H01-MNCON2
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	0	10	10	10	10	H02-INCR
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	41	41	41	41	41	H10-TRAXFR
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000		None	CONSERVATION	H	3810101	10	42	51	60	68	77	86	H01-MNCON3
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	619	619	856	856	856	H10-TRAXFR
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	168	168	168	168	168	168	H27-NWCUST
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000		None	CONSERVATION	H	3810101	10	55	67	78	90	101	113	H01-MNCON3
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	814	814	1,128	1,128	1,128	H10-TRAXFR
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	219	219	219	219	219	219	H27-NWCUST
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000		None	CONSERVATION	H	3810101	10	135	191	246	301	357	412	H01-MNCON3
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	2,982	2,982	4,471	4,471	4,471	H10-TRAXFR
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	533	533	533	533	533	533	H27-NWCUST
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000		None	CONSERVATION	H	3810101	10	48	48	48	48	48	48	H01-MNCON1
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	172	172	172	172	172	172	H02-INCR
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	443	443	443	443	443	H10-TRAXFR
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	4	4	4	4	4	4	H27-NWCUST
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000		None	CONSERVATION	H	3810101	10	60	66	73	80	87	94	H01-MNCON2
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	784	784	1,012	1,012	1,012	H10-TRAXFR
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	282	282	282	282	282	282	H27-NWCUST
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000		None	CONSERVATION	H	3810101	10	84	84	84	83	83	83	H01-MNCON2
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	702	702	702	702	702	H10-TRAXFR
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	398	398	398	398	398	398	H27-NWCUST
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000		None	CONSERVATION	H	3810101	10	50	49	48	48	48	48	H01-MNCON2
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	399	399	399	399	399	H10-TRAXFR
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	235	235	235	235	235	235	H27-NWCUST
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000		None	CONSERVATION	H	3810101	10	39	38	37	37	36	36	H01-MNCON2
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	131	131	131	131	131	131	H02-INCR

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	MUNICIPAL CONSERVATION	$0	$8,855	$10,143	$11,270	$12,719	$14,007	$15,456
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	TRA-Houston	$214,127	$0	$86,125	$86,125	$114,875	$114,875	$114,875
FALLBROOK UD	SAN JACINTO	HARRIS	084109000	New Contracts	$0	$9,720	$9,720	$9,720	$9,720	$9,720	$9,720
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	MUNICIPAL CONSERVATION	$0	$3,120	$3,588	$4,056	$4,524	$4,992	$5,460
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	TRA-Houston	$89,705	$0	$36,125	$36,125	$48,125	$48,125	$48,125
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	084132000	New Contracts	$0	$4,320	$4,320	$4,320	$4,320	$4,320	$4,320
GALENA PARK	SAN JACINTO	HARRIS	080226000	MUNICIPAL CONSERVATION	$0	$13,685	$13,685	$13,846	$13,846	$14,329	$14,812
GALENA PARK	SAN JACINTO	HARRIS	080226000	INCREASE EXIST CONTRACT	$0	$6,360	$6,360	$6,360	$6,360	$6,360	$6,360
GALENA PARK	SAN JACINTO	HARRIS	080226000	TRA-Houston	$26,329	$0	$4,875	$4,875	$14,125	$14,125	$14,125
GALENA PARK	SAN JACINTO	HARRIS	080226000	New Contracts	$0	$1,035	$1,035	$1,035	$1,035	$1,035	$1,035
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	MUNICIPAL CONSERVATION	$0	$8,580	$9,672	$10,764	$11,856	$12,948	$14,196
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	TRA-Houston	$230,903	$0	$95,250	$95,250	$123,875	$123,875	$123,875
GREEN TRAILS MUD	SAN JACINTO	HARRIS	084143000	New Contracts	$0	$11,610	$11,610	$11,610	$11,610	$11,610	$11,610
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000	MUNICIPAL CONSERVATION	$0	$3,900	$3,744	$3,588	$3,588	$3,276	$3,276
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	084149000	New Contracts	$0	$1,350	$1,350	$1,350	$1,350	$1,350	$1,350
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	MUNICIPAL CONSERVATION	$0	$28,175	$27,531	$27,209	$26,726	$26,726	$26,726
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	INCREASE EXIST CONTRACT	$0	$10,800	$10,800	$10,800	$10,800	$10,800	$10,800
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	084150000	New Contracts	$0	$12,240	$12,240	$12,240	$12,240	$12,240	$12,240
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	MUNICIPAL CONSERVATION	$0	$3,276	$3,744	$4,056	$4,524	$4,992	$5,616
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	INCREASE EXIST CONTRACT	$0	$11,520	$11,520	$11,520	$11,520	$11,520	$11,520
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	TRA-Houston	$55,687	$0	$17,375	$17,375	$29,875	$29,875	$29,875
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	084151000	New Contracts	$0	$405	$405	$405	$405	$405	$405
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	MUNICIPAL CONSERVATION	$0	$3,900	$4,368	$4,836	$5,304	$5,772	$6,396
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	TRA-Houston	$103,685	$0	$42,500	$42,500	$55,625	$55,625	$55,625
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	084153000	New Contracts	$0	$5,310	$5,310	$5,310	$5,310	$5,310	$5,310
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	MUNICIPAL CONSERVATION	$0	$8,112	$8,580	$8,424	$8,112	$8,112	$8,112
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	TRA-Houston	$106,714	$0	$57,250	$57,250	$57,250	$57,250	$57,250
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	084154000	New Contracts	$0	$11,115	$11,115	$11,115	$11,115	$11,115	$11,115
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	MUNICIPAL CONSERVATION	$0	$19,481	$24,150	$28,658	$33,166	$37,674	$42,182
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	TRA-Houston	$620,013	$0	$237,750	$237,750	$332,625	$332,625	$332,625
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	084157000	New Contracts	$0	$21,465	$21,465	$21,465	$21,465	$21,465	$21,465
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	MUNICIPAL CONSERVATION	$0	$13,846	$15,295	$16,422	$17,710	$19,159	$20,769
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	TRA-Houston	$272,144	$0	$114,875	$114,875	$146,000	$146,000	$146,000
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	084158000	New Contracts	$0	$15,300	$15,300	$15,300	$15,300	$15,300	$15,300
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	MUNICIPAL CONSERVATION	$0	$11,856	$11,856	$11,700	$11,700	$11,700	$11,700
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	TRA-Houston	$146,557	$0	$78,625	$78,625	$78,625	$78,625	$78,625
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	084159000	New Contracts	$0	$16,155	$16,155	$16,155	$16,155	$16,155	$16,155
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	MUNICIPAL CONSERVATION	$0	$8,694	$11,270	$13,685	$16,100	$18,515	$21,091
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	TRA-Houston	$316,647	$0	$117,375	$117,375	$169,875	$169,875	$169,875
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	084160000	New Contracts	$0	$9,630	$9,630	$9,630	$9,630	$9,630	$9,630
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	MUNICIPAL CONSERVATION	$0	$13,685	$18,515	$23,345	$28,175	$33,005	$37,835
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	TRA-Houston	$584,597	$0	$212,000	$212,000	$313,625	$313,625	$313,625
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	084161000	New Contracts	$0	$15,030	$15,030	$15,030	$15,030	$15,030	$15,030
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	MUNICIPAL CONSERVATION	$0	$7,567	$9,177	$10,787	$12,397	$14,007	$15,778
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	TRA-Houston	$230,204	$0	$88,750	$88,750	$123,500	$123,500	$123,500
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	084162000	New Contracts	$0	$8,280	$8,280	$8,280	$8,280	$8,280	$8,280
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	MUNICIPAL CONSERVATION	$0	$0	$1,092	$5,460	$5,304	$5,304	$5,304
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	INCREASE EXIST CONTRACT	$0	$0	$0	$1,200	$1,200	$1,200	$1,200
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	084165000	TRA-Houston	$9,553	$0	$5,125	$5,125	$5,125	$5,125	$5,125
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	MUNICIPAL CONSERVATION	$0	$6,762	$8,211	$9,660	$10,948	$12,397	$13,846
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	TRA-Houston	$199,448	$0	$77,375	$77,375	$107,000	$107,000	$107,000
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	084170000	New Contracts	$0	$7,560	$7,560	$7,560	$7,560	$7,560	$7,560
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	MUNICIPAL CONSERVATION	$0	$8,855	$10,787	$12,558	$14,490	$16,261	$18,193
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	TRA-Houston	$262,824	$0	$101,750	$101,750	$141,000	$141,000	$141,000
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	084174000	New Contracts	$0	$9,855	$9,855	$9,855	$9,855	$9,855	$9,855
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	MUNICIPAL CONSERVATION	$0	$21,735	$30,751	$39,606	$48,461	$57,477	$66,332
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	TRA-Houston	$1,041,743	$0	$372,750	$372,750	$558,875	$558,875	$558,875
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	084176000	New Contracts	$0	$23,985	$23,985	$23,985	$23,985	$23,985	$23,985
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	MUNICIPAL CONSERVATION	$0	$7,392	$7,392	$7,392	$7,392	$7,392	$7,392
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	INCREASE EXIST CONTRACT	$0	$20,640	$20,640	$20,640	$20,640	$20,640	$20,640
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	TRA-Houston	$103,219	$0	$55,375	$55,375	$55,375	$55,375	$55,375
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	084179000	New Contracts	$0	$180	$180	$180	$180	$180	$180
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	MUNICIPAL CONSERVATION	$0	$9,360	$10,296	$11,388	$12,480	$13,572	$14,664
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	TRA-Houston	$235,796	$0	$98,000	$98,000	$126,500	$126,500	$126,500
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	084180000	New Contracts	$0	$12,690	$12,690	$12,690	$12,690	$12,690	$12,690
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	MUNICIPAL CONSERVATION	$0	$13,104	$13,104	$13,104	$12,948	$12,948	$12,948
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	TRA-Houston	$163,566	$0	$87,750	$87,750	$87,750	$87,750	$87,750
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	084182000	New Contracts	$0	$17,910	$17,910	$17,910	$17,910	$17,910	$17,910
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	MUNICIPAL CONSERVATION	$0	$7,800	$7,644	$7,488	$7,488	$7,488	$7,488
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	TRA-Houston	$92,967	$0	$49,875	$49,875	$49,875	$49,875	$49,875
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	084183000	New Contracts	$0	$10,575	$10,575	$10,575	$10,575	$10,575	$10,575
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	MUNICIPAL CONSERVATION	$0	$6,084	$5,928	$5,772	$5,772	$5,616	$5,616
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	INCREASE EXIST CONTRACT	$0	$15,720	$15,720	$15,720	$15,720	$15,720	$15,720

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id		WS2010	WS2020	WS2030	WS2040	WS2050	WS2060		WMS_PROJECT_ID
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	309	309	309	309	309		H10-TRAXFR
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		53	53	53	53	53	53		H27-NWCUST
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000		None	CONSERVATION	H	3810101	10		37	39	41	44	46	49		H01-MNCON2
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	113	113	197	197	197		H10-TRAXFR
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		466	466	466	466	466	466		H27-NWCUST
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000		None	CONSERVATION	H	3810101	10		133	164	194	223	252	284		H01-MNCON3
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10		711	711	711	711	711	711		H02-INCR
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	1,033	1,033	1,845	1,845	1,845		H10-TRAXFR
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000		None	CONSERVATION	H	3810101	10		42	45	48	52	55	60		H01-MNCON2
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		110	110	110	110	110	110		H02-INCR
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	158	158	285	285	285		H10-TRAXFR
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000		None	CONSERVATION	H	3810101	10		32	35	38	41	44	47		H01-MNCON1
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	422	422	524	524	524		H10-TRAXFR
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		167	167	167	167	167	167		H27-NWCUST
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000		None	CONSERVATION	H	3810101	10		25	29	32	36	39	43		H01-MNCON2
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	355	355	468	468	468		H10-TRAXFR
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		121	121	121	121	121	121		H27-NWCUST
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000		None	CONSERVATION	H	3810101	10		0	87	97	107	118	129		H01-MNCON3
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	15	BAYTOWN AREA WATER AUTH	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08		0	820	820	820	820	820		H02-INCR
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08		0	0	0	0	0	9		H02-INCR
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	396201	COH	COH INDIRECT REUSE	H	3510101COH	10		0	0	0	0	22	22		H13-REUHOU
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000		None	CONSERVATION	H	3810101	10		45	45	45	44	44	44		H01-MNCON2
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	373	373	373	373	373		H10-TRAXFR
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		213	213	213	213	213	213		H27-NWCUST
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000		None	CONSERVATION	H	3810101	10		98	101	104	107	111	116		H01-MNCON3
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10		149	149	149	149	149	149		H02-INCR
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	137	137	265	265	265		H10-TRAXFR
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		123	123	123	123	123	123		H27-NWCUST
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197001		None	CONSERVATION	H	3810101	10		93	100	107	114	122	130		H01-MNCON3
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197001	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10		200	200	200	200	200	200		H02-INCR
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	294	294	519	519	519		H10-TRAXFR
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000		None	CONSERVATION	H	3810101	10		36	40	43	46	49	53		H01-MNCON2
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	156	156	276	276	276		H10-TRAXFR
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		512	512	512	512	512	512		H27-NWCUST
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000		None	CONSERVATION	H	3810101	10		16	16	16	15	15	15		H01-MNCON1
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	139	139	139	139	139		H10-TRAXFR
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		85	85	85	85	85	85		H27-NWCUST
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000		None	CONSERVATION	H	3810101	10		33	34	34	34	34	34		H01-MNCON2
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10		64	64	64	64	64	64		H02-INCR
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		166	166	166	166	166	166		H27-NWCUST
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000		None	CONSERVATION	H	3810101	10		46	46	45	45	45	45		H01-MNCON2
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		141	141	141	141	141	141		H02-INCR
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		364	364	364	364	364	364		H27-NWCUST
HILLSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000		None	CONSERVATION	H	3810101	10		0	7	7	7	7	7		H01-MNCON2
HILLSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		0	8	8	8	8	8		H02-INCR
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	24	24	24	24	24		H10-TRAXFR
HOUSTON	SAN JACINTO	HARRIS	080285000	396201	COH	COH INDIRECT REUSE	H	3510101COH	10		0	0	0	0	20,000	20,000		H13-REUHOU
HOUSTON	SAN JACINTO	HARRIS	080285000		None	CONSERVATION	H	3810101	10		25,326	27,916	30,334	32,827	35,465	38,317		H01-MNCON3
HOUSTON	SAN JACINTO-BRAZOS	HARRIS	080285000		None	CONSERVATION	H	3811101	11		1,411	1,556	1,691	1,829	1,976	2,135		H01-MNCON3
HUMBLE	SAN JACINTO	HARRIS	080289000		None	CONSERVATION	H	3810101	10		253	280	307	335	364	394		H01-MNCON3
HUMBLE	SAN JACINTO	HARRIS	080289000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		1,275	1,275	1,275	1,275	1,275	1,275		H02-INCR
HUMBLE	SAN JACINTO	HARRIS	080289000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	2,134	2,134	3,306	3,306	3,306		H10-TRAXFR
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000		None	CONSERVATION	H	3810101	10		104	111	118	125	132	139		H01-MNCON2
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		421	421	421	421	421	421		H02-INCR
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	319	319	539	539	539		H10-TRAXFR
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		554	554	554	554	554	554		H27-NWCUST
JACINTO CITY	SAN JACINTO	HARRIS	080301000		None	CONSERVATION	H	3810101	10		0	0	70	100	105	111		H01-MNCON3
JACINTO CITY	SAN JACINTO	HARRIS	080301000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		0	0	0	45	45	45		H02-INCR
JACINTO CITY	SAN JACINTO	HARRIS	080301000	396201	COH	COH INDIRECT REUSE	H	3510101COH	10		0	0	0	0	116	116		H13-REUHOU
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000		None	CONSERVATION	H	3810101	10		0	130	150	170	190	211		H01-MNCON3
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10		0	464	464	464	464	464		H02-INCR
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000		NHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	1,203	1,203	1,203	1,203	1,203		H10-TRAXFR
KATY	SAN JACINTO	HARRIS	080312000		None	CONSERVATION	H	3810101	10		170	206	242	279	315	352		H01-MNCON3
KATY	SAN JACINTO	HARRIS	080312000		WHCRWA	LAKE HOUSTON ADDITIONAL YIELD	H	H15-HOUYLD	10		673	673	673	0	0	0		H15-HOUYLD
KATY	SAN JACINTO	HARRIS	080312000		WHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	4,207	4,207	4,207	4,207	4,207		H10-TRAXFR
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000		None	CONSERVATION	H	3810101	10		15	18	20	23	25	28		H01-MNCON3
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	203	203	278	278	278		H10-TRAXFR
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		58	58	58	58	58	58		H27-NWCUST
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000		None	CONSERVATION	H	3811101	11		1	1	1	1	1	1		H01-MNCON3
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08		13	13	13	13	13	13		H27-NWCUST
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000		None	CONSERVATION	H	3810101	10		35	0	66	82	97	112		H01-MNCON2
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08		0	421	421	898	898	898		H10-TRAXFR
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	396201	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08			28,566	28,566	28,566	28,566	28,566		H27-NWCUST

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	TRA-Houston	$71,997	$0	$38,625	$38,625	$38,625	$38,625	$38,625
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	084184000	New Contracts	$0	$2,385	$2,385	$2,385	$2,385	$2,385	$2,385
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	MUNICIPAL CONSERVATION	$0	$5,772	$6,084	$6,396	$6,864	$7,176	$7,644
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	TRA-Houston	$45,901	$0	$14,125	$14,125	$24,625	$24,625	$24,625
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	084185000	New Contracts	$0	$20,970	$20,970	$20,970	$20,970	$20,970	$20,970
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	MUNICIPAL CONSERVATION	$0	$21,413	$26,404	$31,234	$35,903	$40,572	$45,724
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	INCREASE EXIST CONTRACT	$0	$85,320	$85,320	$85,320	$85,320	$85,320	$85,320
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	084186000	TRA-Houston	$429,885	$0	$129,125	$129,125	$230,625	$230,625	$230,625
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	MUNICIPAL CONSERVATION	$0	$6,552	$7,020	$7,488	$8,112	$8,580	$9,360
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	INCREASE EXIST CONTRACT	$0	$13,200	$13,200	$13,200	$13,200	$13,200	$13,200
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	084189000	TRA-Houston	$66,405	$0	$19,750	$19,750	$35,625	$35,625	$35,625
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	MUNICIPAL CONSERVATION	$0	$4,928	$5,390	$5,852	$6,314	$6,776	$7,238
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	TRA-Houston	$122,092	$0	$52,750	$52,750	$65,500	$65,500	$65,500
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	084190000	New Contracts	$0	$7,515	$7,515	$7,515	$7,515	$7,515	$7,515
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	MUNICIPAL CONSERVATION	$0	$3,900	$4,524	$4,992	$5,616	$6,084	$6,708
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	TRA-Houston	$109,044	$0	$44,375	$44,375	$58,500	$58,500	$58,500
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	084191000	New Contracts	$0	$5,445	$5,445	$5,445	$5,445	$5,445	$5,445
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	MUNICIPAL CONSERVATION	$0	$0	$14,007	$15,617	$17,227	$18,998	$20,769
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	INCREASE EXIST CONTRACT	$0	$0	$98,400	$98,400	$98,400	$98,400	$98,400
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	INCREASE EXIST CONTRACT	$0	$0	$0	$0	$0	$0	$1,080
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	084193000	COH Reuse	$0	$0	$0	$0	$0	$2,640	$2,640
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	MUNICIPAL CONSERVATION	$0	$7,020	$7,020	$7,020	$6,864	$6,864	$6,864
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	TRA-Houston	$86,909	$0	$46,625	$46,625	$46,625	$46,625	$46,625
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	084195000	New Contracts	$0	$9,585	$9,585	$9,585	$9,585	$9,585	$9,585
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	MUNICIPAL CONSERVATION	$0	$15,778	$16,261	$16,744	$17,227	$17,871	$18,676
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	INCREASE EXIST CONTRACT	$0	$17,880	$17,880	$17,880	$17,880	$17,880	$17,880
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	TRA-Houston	$61,745	$0	$17,125	$17,125	$33,125	$33,125	$33,125
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	084196000	New Contracts	$0	$5,535	$5,535	$5,535	$5,535	$5,535	$5,535
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197001	MUNICIPAL CONSERVATION	$0	$14,973	$16,100	$17,227	$18,354	$19,642	$20,930
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197001	INCREASE EXIST CONTRACT	$0	$24,000	$24,000	$24,000	$24,000	$24,000	$24,000
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	084197000	TRA-Houston	$120,927	$0	$36,750	$36,750	$64,875	$64,875	$64,875
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	MUNICIPAL CONSERVATION	$0	$5,616	$6,240	$6,708	$7,176	$7,644	$8,268
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	TRA-Houston	$64,308	$0	$19,500	$19,500	$34,500	$34,500	$34,500
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	084198000	New Contracts	$0	$23,040	$23,040	$23,040	$23,040	$23,040	$23,040
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	MUNICIPAL CONSERVATION	$0	$2,464	$2,464	$2,464	$2,310	$2,310	$2,310
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	TRA-Houston	$32,387	$0	$17,375	$17,375	$17,375	$17,375	$17,375
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	084199000	New Contracts	$0	$3,825	$3,825	$3,825	$3,825	$3,825	$3,825
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	MUNICIPAL CONSERVATION	$0	$5,148	$5,304	$5,304	$5,304	$5,304	$5,304
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	INCREASE EXIST CONTRACT	$0	$7,680	$7,680	$7,680	$7,680	$7,680	$7,680
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	084200000	New Contracts	$0	$7,470	$7,470	$7,470	$7,470	$7,470	$7,470
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	MUNICIPAL CONSERVATION	$0	$7,176	$7,176	$7,020	$7,020	$7,020	$7,020
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	INCREASE EXIST CONTRACT	$0	$16,920	$16,920	$16,920	$16,920	$16,920	$16,920
HEDWIG VILLAGE	SAN JACINTO	HARRIS	080269000	New Contracts	$0	$16,380	$16,380	$16,380	$16,380	$16,380	$16,380
HILLSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	MUNICIPAL CONSERVATION	$0	$0	$1,092	$1,092	$1,092	$1,092	$1,092
HILLSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	INCREASE EXIST CONTRACT	$0	$0	$960	$960	$960	$960	$960
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	081025000	TRA-Houston	$5,592	$0	$3,000	$3,000	$3,000	$3,000	$3,000
HOUSTON	SAN JACINTO	HARRIS	080285000	COH Reuse	$0	$0	$0	$0	$0	$2,400,000	$2,400,000
HOUSTON	SAN JACINTO	HARRIS	080285000	MUN CONSERVATION	$0	$4,077,486	$4,494,476	$4,883,774	$5,285,147	$5,709,865	$6,169,037
HOUSTON	SAN JACINTO-BRAZOS	HARRIS	080285000	MUN CONSERVATION	$0	$227,171	$250,516	$272,251	$294,469	$318,136	$343,735
HUMBLE	SAN JACINTO	HARRIS	080289000	MUNICIPAL CONSERVATION	$0	$40,733	$45,080	$49,427	$53,935	$58,604	$63,434
HUMBLE	SAN JACINTO	HARRIS	080289000	INCREASE EXIST CONTRACT	$0	$153,000	$153,000	$153,000	$153,000	$153,000	$153,000
HUMBLE	SAN JACINTO	HARRIS	080289000	TRA-Houston	$770,298	$0	$266,750	$266,750	$413,250	$413,250	$413,250
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	MUNICIPAL CONSERVATION	$0	$16,224	$17,316	$18,408	$19,500	$20,592	$21,684
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	INCREASE EXIST CONTRACT	$0	$50,520	$50,520	$50,520	$50,520	$50,520	$50,520
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	TRA-Houston	$125,587	$0	$39,875	$39,875	$67,375	$67,375	$67,375
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	080290000	New Contracts	$0	$24,930	$24,930	$24,930	$24,930	$24,930	$24,930
JACINTO CITY	SAN JACINTO	HARRIS	080301000	MUNICIPAL CONSERVATION	$0	$0	$0	$11,270	$16,100	$16,905	$17,871
JACINTO CITY	SAN JACINTO	HARRIS	080301000	INCREASE EXIST CONTRACT	$0	$0	$0	$0	$5,400	$5,400	$5,400
JACINTO CITY	SAN JACINTO	HARRIS	080301000	COH Reuse	$0	$0	$0	$0	$0	$13,920	$13,920
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	MUNICIPAL CONSERVATION	$0	$0	$20,930	$24,150	$27,370	$30,590	$33,971
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	INCREASE EXIST CONTRACT	$0	$0	$55,680	$55,680	$55,680	$55,680	$55,680
JERSEY VILLAGE	SAN JACINTO	HARRIS	080709000	TRA-Houston	$280,299	$0	$150,375	$150,375	$150,375	$150,375	$150,375
KATY	SAN JACINTO	HARRIS	080312000	MUNICIPAL CONSERVATION	$0	$27,370	$33,166	$38,962	$44,919	$50,715	$56,672
KATY	SAN JACINTO	HARRIS	080312000	Lake Houston Additional Yield	$0	$80,760	$80,760	$80,760	$0	$0	$0
KATY	SAN JACINTO	HARRIS	080312000	TRA-Houston	$980,231	$0	$525,875	$525,875	$525,875	$525,875	$525,875
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	MUNICIPAL CONSERVATION	$0	$2,415	$2,898	$3,220	$3,703	$4,025	$4,508
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	TRA-Houston	$64,774	$0	$25,375	$25,375	$34,750	$34,750	$34,750
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	084222000	New Contracts	$0	$2,610	$2,610	$2,610	$2,610	$2,610	$2,610
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000	MUNICIPAL CONSERVATION	$0	$161	$161	$161	$161	$161	$161
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	080350000	New Contracts	$0	$585	$585	$585	$585	$585	$585
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000	MUNICIPAL CONSERVATION	$0	$5,460	$0	$10,296	$12,792	$15,132	$17,472
LONGHORN TOWN UD	SAN JACINTO	HARRIS	084235000	TRA-Houston	$209,234	$0	$52,625	$52,625	$112,250	$112,250	$112,250
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	New Contracts	$0	$0	$1,285,470	$1,285,470	$1,285,470	$1,285,470	$1,285,470

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	396201	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	25,326	10,780	10,780	10,780	10,780	10,780	H27-NWCUST
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	7,000	7,000	7,000	7,000	7,000	7,000	H27-NWCUST
MANUFACTURING	SAN JACINTO	HARRIS	081001101	396201	COH	COH DIRECT REUSE (INDUSTRY)	H	3610101	10	0	67,200	67,200	67,200	67,200	67,200	H09-REUIND
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	396201	COH	COH INDIRECT REUSE	H	3510101COH	10	0	0	0	0	2,471	2,471	H13-REUHOU
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	396201	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	11,426	11,426	11,426	11,426	11,426	H27-NWCUST
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	2,835	2,835	2,835	2,835	2,835	2,835	H27-NWCUST
MASON CREEK UD	SAN JACINTO	HARRIS	084247000		None	CONSERVATION	H	3810101	10	140	138	137	135	135	135	H01-MNCON2
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	1,135	1,135	1,135	1,135	1,135	H10-TRAXFR
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	663	663	663	663	663	663	H27-NWCUST
MINING	SAN JACINTO	HARRIS	081003101	396201	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	513	513	513	513	513	H27-NWCUST
MINING	SAN JACINTO	HARRIS	081003101	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	266	266	266	266	266	266	H27-NWCUST
MINING	SAN JACINTO-BRAZOS	HARRIS	081003101	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	15	15	15	15	15	15	H27-NWCUST
MISSOURI CITY	SAN JACINTO	HARRIS	080409000		None	CONSERVATION	H	3810101	10	0	0	123	140	158	176	H01-MNCON3
MISSOURI CITY	SAN JACINTO	HARRIS	080409000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	223	223	781	781	781	H10-TRAXFR
NHCRWA	SAN JACINTO	HARRIS	088000000		None	CONSERVATION	H	3810101	10	0	8,289	9,564	10,857	12,125	13,454	H01-MNCON3
NHCRWA	SAN JACINTO	HARRIS	088000000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	34,873	34,873	34,873	34,873	34,873	H02-INCR
NHCRWA	SAN JACINTO	HARRIS	088000000		NHCRWA	LAKE HOUSTON ADDITIONAL YIELD	H	H15-HOUYLD	10	0	6,239	6,239	6,000	3,000	500	H15-HOUYLD
NHCRWA	SAN JACINTO	HARRIS	088000000	396200	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	10,000	10,000	10,000	10,000	10,000	H27-NWCUST
NHCRWA	SAN JACINTO	HARRIS	088000000		NHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	49,034	49,034	49,034	49,034	49,034	H10-TRAXFR
NHCRWA	SAN JACINTO	HARRIS	088000000		NHCRWA	NHCRWA INDIRECT REUSE	H	3510101NHC	10	0	0	0	0	15,000	31,400	H14-REUNHC
NORTH BELT UD	SAN JACINTO	HARRIS	084275000		None	CONSERVATION	H	3810101	10	32	41	50	60	69	79	H01-MNCON2
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	563	563	821	821	821	H10-TRAXFR
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	126	126	126	126	126	126	H27-NWCUST
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000		None	CONSERVATION	H	3810101	10	21	23	24	26	28	30	H01-MNCON2
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	246	246	311	311	311	H10-TRAXFR
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	99	99	99	99	99	99	H27-NWCUST
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000		None	CONSERVATION	H	3810101	10	40	50	60	69	79	90	H01-MNCON2
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	640	640	912	912	912	H10-TRAXFR
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	160	160	160	160	160	160	H27-NWCUST
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000		None	CONSERVATION	H	3810101	10	92	100	107	114	122	132	H01-MNCON3
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	937	937	1,175	1,175	1,175	H10-TRAXFR
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	362	362	362	362	362	362	H27-NWCUST
PARKWAY UD	SAN JACINTO	HARRIS	084298000		None	CONSERVATION	H	3810101	10	17	16	16	16	15	15	H01-MNCON1
PARKWAY UD	SAN JACINTO	HARRIS	084298000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	258	258	258	258	258	258	H27-NWCUST
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000		None	CONSERVATION	H	3811101	11	0	23	31	34	38	42	H01-MNCON2
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	0	46	46	46	46	H02-INCR
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	21	21	120	120	120	H10-TRAXFR
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000		None	CONSERVATION	H	3810101	10	56	60	64	68	72	77	H01-MNCON2
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	158	158	158	158	158	158	H02-INCR
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	197	197	343	343	343	H10-TRAXFR
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	68	68	68	68	68	68	H27-NWCUST
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000		None	CONSERVATION	H	3810101	10	76	79	81	84	86	90	H01-MNCON2
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	268	268	268	268	268	268	H02-INCR
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	150	150	250	250	250	H10-TRAXFR
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	444	444	444	444	444	444	H27-NWCUST
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000		None	CONSERVATION	H	3810101	10	39	40	42	43	45	47	H01-MNCON1
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	414	414	472	472	472	H10-TRAXFR
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	202	202	202	202	202	202	H27-NWCUST
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000		None	CONSERVATION	H	3811101	11	167	198	227	257	287	319	H01-MNCON3
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000	651900	CITY OF PASADENA	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	2,830	2,830	2,830	2,830	2,830	2,830	H02-INCR
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000		None	CONSERVATION	H	3810101	10	11	24	25	27	28	30	H01-MNCON2
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	0	33	33	33	33	33	H02-INCR
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	31	31	86	86	86	H10-TRAXFR
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000		None	CONSERVATION	H	3810101	10	49	55	61	66	72	79	H01-MNCON3
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	565	565	737	737	737	H10-TRAXFR
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	194	194	194	194	194	194	H27-NWCUST
SPRING VALLEY	SAN JACINTO	HARRIS	080575000		None	CONSERVATION	H	3810101	10	53	55	56	58	60	63	H01-MNCON2
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	517	517	589	589	589	H10-TRAXFR
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	250	250	250	250	250	250	H27-NWCUST
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002101	396201	COH	COH INDIRECT REUSE	H	3510101COH	10	0	0	0	0	12,600	12,600	H13-REUHOU
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002101	396201	COH	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	16,695	16,695	16,695	16,695	16,695	H27-NWCUST
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	HARRIS	081002101	396201	COH	COH INDIRECT REUSE	H	3510101COH	10	0	0	0	0	275	275	H13-REUHOU
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000		None	CONSERVATION	H	3810101	10	310	361	409	460	510	562	H01-MNCON3
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	1,721	1,721	1,721	1,721	1,721	1,721	H02-INCR
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	3,075	3,075	4,464	4,464	4,464	H10-TRAXFR
TOMBALL	SAN JACINTO	HARRIS	080608000		None	CONSERVATION	H	3810101	10	181	228	265	333	384	457	H01-MNCON3
TOMBALL	SAN JACINTO	HARRIS	080608000		NHCRWA	LAKE HOUSTON ADDITIONAL YIELD	H	H15-HOUYLD	10	2,083	2,083	2,083	0	0	0	H15-HOUYLD
TOMBALL	SAN JACINTO	HARRIS	080608000		NHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	5,575	5,575	5,575	5,575	5,575	H10-TRAXFR
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000		None	CONSERVATION	H	3810101	10	97	95	94	92	92	92	H01-MNCON3
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	1,057	1,057	1,057	1,057	1,057	H10-TRAXFR
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	385	385	385	385	385	385	H27-NWCUST
WALLER	SAN JACINTO	HARRIS	080629000		None	CONSERVATION	H	3810101	10	7	9	11	13	15	18	H01-MNCON2
WALLER	SAN JACINTO	HARRIS	080629000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	149	149	215	215	215	H10-TRAXFR

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	New Contracts	$0	$1,139,670	$485,100	$485,100	$485,100	$485,100	$485,100
MANUFACTURING	TRINITY-SAN JACINTO	HARRIS	081001101	New Contracts	$0	$315,000	$315,000	$315,000	$315,000	$315,000	$315,000
MANUFACTURING	SAN JACINTO	HARRIS	081001101	Direct Reuse for Industry	$234,158,000	$0	$49,929,600	$49,929,600	$49,929,600	$49,929,600	$49,929,600
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	COH Reuse	$0	$0	$0	$0	$0	$296,520	$296,520
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	New Contracts	$0	$0	$514,170	$514,170	$514,170	$514,170	$514,170
MANUFACTURING	SAN JACINTO-BRAZOS	HARRIS	081001101	New Contracts	$0	$127,575	$127,575	$127,575	$127,575	$127,575	$127,575
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	MUNICIPAL CONSERVATION	$0	$21,840	$21,528	$21,372	$21,060	$21,060	$21,060
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	TRA-Houston	$264,455	$0	$141,875	$141,875	$141,875	$141,875	$141,875
MASON CREEK UD	SAN JACINTO	HARRIS	084247000	New Contracts	$0	$29,835	$29,835	$29,835	$29,835	$29,835	$29,835
MINING	SAN JACINTO	HARRIS	081003101	New Contracts	$0	$0	$23,085	$23,085	$23,085	$23,085	$23,085
MINING	SAN JACINTO	HARRIS	081003101	New Contracts	$0	$11,970	$11,970	$11,970	$11,970	$11,970	$11,970
MINING	SAN JACINTO-BRAZOS	HARRIS	081003101	New Contracts	$0	$675	$675	$675	$675	$675	$675
MISSOURI CITY	SAN JACINTO	HARRIS	080409000	MUNICIPAL CONSERVATION	$0	$0	$0	$19,803	$22,540	$25,438	$28,336
MISSOURI CITY	SAN JACINTO	HARRIS	080409000	TRA-Houston	$181,973	$0	$27,875	$27,875	$97,625	$97,625	$97,625
NHCRWA	SAN JACINTO	HARRIS	088000000	MUNICIPAL CONSERVATION	$0	$0	$1,334,529	$1,539,804	$1,747,977	$1,952,125	$2,166,094
NHCRWA	SAN JACINTO	HARRIS	088000000	INCREASE EXIST CONTRACT	$0	$0	$4,184,760	$4,184,760	$4,184,760	$4,184,760	$4,184,760
NHCRWA	SAN JACINTO	HARRIS	088000000	Lake Houston Additional Yield	$0	$0	$748,680	$748,680	$0	$0	$0
NHCRWA	SAN JACINTO	HARRIS	088000000	New Contracts	$0	$0	$450,000	$450,000	$450,000	$450,000	$450,000
NHCRWA	SAN JACINTO	HARRIS	088000000	TRA-Houston	$11,424,922	$0	$6,129,250	$6,129,250	$6,129,250	$6,129,250	$6,129,250
NHCRWA	SAN JACINTO	HARRIS	088000000	NHCRWA Reuse	$0	$0	$0	$0	$0	$1,800,000	$3,768,000
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	MUNICIPAL CONSERVATION	$0	$4,992	$6,396	$7,800	$9,360	$10,764	$12,324
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	TRA-Houston	$191,293	$0	$70,375	$70,375	$102,625	$102,625	$102,625
NORTH BELT UD	SAN JACINTO	HARRIS	084275000	New Contracts	$0	$5,670	$5,670	$5,670	$5,670	$5,670	$5,670
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	MUNICIPAL CONSERVATION	$0	$3,276	$3,588	$3,744	$4,056	$4,368	$4,680
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	TRA-Houston	$72,463	$0	$30,750	$30,750	$38,875	$38,875	$38,875
NORTH GREEN MUD	SAN JACINTO	HARRIS	084279000	New Contracts	$0	$4,455	$4,455	$4,455	$4,455	$4,455	$4,455
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	MUNICIPAL CONSERVATION	$0	$6,240	$7,800	$9,360	$10,764	$12,324	$14,040
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	TRA-Houston	$212,496	$0	$80,000	$80,000	$114,000	$114,000	$114,000
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	084286000	New Contracts	$0	$7,200	$7,200	$7,200	$7,200	$7,200	$7,200
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	MUNICIPAL CONSERVATION	$0	$14,812	$16,100	$17,227	$18,354	$19,642	$21,252
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	TRA-Houston	$273,775	$0	$117,125	$117,125	$146,875	$146,875	$146,875
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	084287000	New Contracts	$0	$16,290	$16,290	$16,290	$16,290	$16,290	$16,290
PARKWAY UD	SAN JACINTO	HARRIS	084298000	MUNICIPAL CONSERVATION	$0	$2,618	$2,464	$2,464	$2,464	$2,310	$2,310
PARKWAY UD	SAN JACINTO	HARRIS	084298000	New Contracts	$0	$11,610	$11,610	$11,610	$11,610	$11,610	$11,610
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	MUNICIPAL CONSERVATION	$0	$0	$3,588	$4,836	$5,304	$5,928	$6,552
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	INCREASE EXIST CONTRACT	$0	$0	$0	$5,520	$5,520	$5,520	$5,520
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	080457000	TRA-Houston	$27,960	$0	$2,625	$2,625	$15,000	$15,000	$15,000
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	MUNICIPAL CONSERVATION	$0	$8,736	$9,360	$9,984	$10,608	$11,232	$12,012
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	INCREASE EXIST CONTRACT	$0	$18,960	$18,960	$18,960	$18,960	$18,960	$18,960
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	TRA-Houston	$79,919	$0	$24,625	$24,625	$42,875	$42,875	$42,875
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	084302000	New Contracts	$0	$3,060	$3,060	$3,060	$3,060	$3,060	$3,060
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	MUNICIPAL CONSERVATION	$0	$11,856	$12,324	$12,636	$13,104	$13,416	$14,040
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	INCREASE EXIST CONTRACT	$0	$32,160	$32,160	$32,160	$32,160	$32,160	$32,160
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	TRA-Houston	$58,250	$0	$18,750	$18,750	$31,250	$31,250	$31,250
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	080468000	New Contracts	$0	$19,980	$19,980	$19,980	$19,980	$19,980	$19,980
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	MUNICIPAL CONSERVATION	$0	$6,006	$6,160	$6,468	$6,622	$6,930	$7,238
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	TRA-Houston	$109,976	$0	$51,750	$51,750	$59,000	$59,000	$59,000
ROLLING FORK PUD	SAN JACINTO	HARRIS	084411000	New Contracts	$0	$9,090	$9,090	$9,090	$9,090	$9,090	$9,090
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000	MUNICIPAL CONSERVATION	$0	$26,887	$31,878	$36,547	$41,377	$46,207	$51,359
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	080545000	INCREASE EXIST CONTRACT	$0	$339,600	$339,600	$339,600	$339,600	$339,600	$339,600
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	MUNICIPAL CONSERVATION	$0	$1,716	$3,744	$3,900	$4,212	$4,368	$4,680
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	INCREASE EXIST CONTRACT	$0	$0	$3,960	$3,960	$3,960	$3,960	$3,960
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	080572000	TRA-Houston	$20,038	$0	$3,875	$3,875	$10,750	$10,750	$10,750
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	MUNICIPAL CONSERVATION	$0	$7,889	$8,855	$9,821	$10,626	$11,592	$12,719
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	TRA-Houston	$171,721	$0	$70,625	$70,625	$92,125	$92,125	$92,125
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	084343000	New Contracts	$0	$8,730	$8,730	$8,730	$8,730	$8,730	$8,730
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	MUNICIPAL CONSERVATION	$0	$8,268	$8,580	$8,736	$9,048	$9,360	$9,828
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	TRA-Houston	$137,237	$0	$64,625	$64,625	$73,625	$73,625	$73,625
SPRING VALLEY	SAN JACINTO	HARRIS	080575000	New Contracts	$0	$11,250	$11,250	$11,250	$11,250	$11,250	$11,250
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002101	COH Reuse	$0	$0	$0	$0	$0	$1,512,000	$1,512,000
STEAM ELECTRIC POWER	SAN JACINTO	HARRIS	081002101	New Contracts	$0	$0	$751,275	$751,275	$751,275	$751,275	$751,275
STEAM ELECTRIC POWER	SAN JACINTO-BRAZOS	HARRIS	081002101	COH Reuse	$0	$0	$0	$0	$0	$33,000	$33,000
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	MUNICIPAL CONSERVATION	$0	$49,910	$58,121	$65,849	$74,060	$82,110	$90,482
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	INCREASE EXIST CONTRACT	$0	$206,520	$206,520	$206,520	$206,520	$206,520	$206,520
SUNBELT FWSD	SAN JACINTO	HARRIS	084350000	TRA-Houston	$1,040,112	$0	$384,375	$384,375	$558,000	$558,000	$558,000
TOMBALL	SAN JACINTO	HARRIS	080608000	MUNICIPAL CONSERVATION	$0	$29,141	$36,708	$42,665	$53,613	$61,824	$73,577
TOMBALL	SAN JACINTO	HARRIS	080608000	Lake Houston Additional Yield	$0	$249,960	$249,960	$249,960	$0	$0	$0
TOMBALL	SAN JACINTO	HARRIS	080608000	TRA-Houston	$1,298,975	$0	$696,875	$696,875	$696,875	$696,875	$696,875
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	MUNICIPAL CONSERVATION	$0	$15,617	$15,295	$15,134	$14,812	$14,812	$14,812
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	TRA-Houston	$246,281	$0	$132,125	$132,125	$132,125	$132,125	$132,125
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	084355000	New Contracts	$0	$17,325	$17,325	$17,325	$17,325	$17,325	$17,325
WALLER	SAN JACINTO	HARRIS	080629000	MUNICIPAL CONSERVATION	$0	$1,092	$1,404	$1,716	$2,028	$2,340	$2,808
WALLER	SAN JACINTO	HARRIS	080629000	TRA-Houston	$50,095	$0	$18,625	$18,625	$26,875	$26,875	$26,875

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
WALLER	SAN JACINTO	HARRIS	080629000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	34	34	34	34	34	34	H27-NWCUST
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000		None	CONSERVATION	H	3810101	10	34	33	33	33	32	32	H01-MNCON2
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	283	283	283	283	283	H10-TRAXFR
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	158	158	158	158	158	158	H27-NWCUST
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000		None	CONSERVATION	H	3810101	10	214	226	237	248	261	275	H01-MNCON3
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	313	313	313	313	313	313	H02-INCR
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	442	442	813	813	813	H10-TRAXFR
WHCRWA	SAN JACINTO	HARRIS	088002000		None	CONSERVATION	H	3810101	10	0	3,951	4,754	5,266	5,793	6,372	H01-MNCON3
WHCRWA	SAN JACINTO	HARRIS	088002000	396200	CITY OF HOUSTON	CONROE LAKE/RESERVOIR	H	10060	10	0	7,990	7,990	7,990	7,990	7,990	H02-INCR
WHCRWA	SAN JACINTO	HARRIS	088002000	396200	CITY OF HOUSTON	HOUSTON LAKE/RESERVOIR	H	10030	10	0	7,676	7,676	7,676	7,676	7,676	H02-INCR
WHCRWA	SAN JACINTO	HARRIS	088002000	396201	COH	COH INDIRECT REUSE	H	3510101COH	10	0	0	0	0	8,000	8,000	H13-REUHOU
WHCRWA	SAN JACINTO	HARRIS	088002000		WHCRWA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	32,624	32,624	32,624	32,624	32,624	H10-TRAXFR
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000		None	CONSERVATION	H	3810101	10	40	39	38	37	37	37	H01-MNCON2
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	315	315	315	315	315	H10-TRAXFR
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	187	187	187	187	187	187	H27-NWCUST
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000		None	CONSERVATION	H	3810101	10	48	62	60	60	60	60	H01-MNCON2
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	08400	08	198	198	198	198	198	198	H02-INCR
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	523	523	523	523	523	H10-TRAXFR
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000		None	CONSERVATION	H	3810101	10	37	49	60	71	82	93	H01-MNCON2
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	396200	CITY OF HOUSTON	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	782	782	1,140	1,140	1,140	H10-TRAXFR
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	396200	COH	TRINITY RIVER RUN-OF-RIVER	H	3460804261	08	176	176	176	176	176	176	H27-NWCUST
IRRIGATION	NECHES	LIBERTY	081004146		None	CONSERVATION	H	3806146	06	835	835	835	835	835	835	H03-IRRCON
IRRIGATION	NECHES-TRINITY	LIBERTY	081004146		None	CONSERVATION	H	3807146	07	2,088	2,088	2,088	2,088	2,088	2,088	H03-IRRCON
IRRIGATION	NECHES-TRINITY	LIBERTY	081004146	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	1,000	1,000	1,000	1,000	1,000	500	H27-NWCUST
IRRIGATION	TRINITY	LIBERTY	081004146		None	CONSERVATION	H	3808146	08	13,360	13,360	13,360	13,360	13,360	13,360	H03-IRRCON
IRRIGATION	TRINITY	LIBERTY	081004146	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	1,000	1,000	1,000	1,000	1,000	1,000	H27-NWCUST
IRRIGATION	TRINITY	LIBERTY	081004146	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	2,000	2,000	2,000	2,000	2,000	2,000	H27-NWCUST
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146		None	CONSERVATION	H	3809146	09	4,384	4,384	4,384	4,384	4,384	4,384	H03-IRRCON
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	6,500	6,500	6,500	6,500	6,500	6,500	H27-NWCUST
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146	150	CLCND	TRINITY RIVER RUN-OF-RIVER	H	3460804279B	08	5,000	5,000	5,000	5,000	5,000	2,500	H27-NWCUST
IRRIGATION	SAN JACINTO	LIBERTY	081004146		None	CONSERVATION	H	3810146	10	209	209	209	209	209	209	H03-IRRCON
CONROE	SAN JACINTO	MONTGOMERY	080130000		None	CONSERVATION	H	3810170	10	644	732	910	1,125	1,408	1,744	H01-MNCON3
CONROE	SAN JACINTO	MONTGOMERY	080130000	240	SJRA	CONROE LAKE/RESERVOIR	H	3461004963B	10	6,165	6,165	6,165	6,165	6,165	6,165	H27-NWCUST
CONROE	SAN JACINTO	MONTGOMERY	080130000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	3,290	3,290	3,290	3,290	3,290	3,290	H27-NWCUST
CONROE	SAN JACINTO	MONTGOMERY	080130000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	0	7,002	7,002	7,002	7,002	7,002	H27-NWCUST
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000		None	CONSERVATION	H	3810170	10	14	16	21	25	32	40	H01-MNCON2
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	376	376	376	376	376	376	H27-NWCUST
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	376	376	376	376	376	376	H27-NWCUST
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170		None	CONSERVATION	H	3810170	10	1,200	1,496	2,129	2,872	3,932	5,164	H01-MNCON3
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170	240	SJRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	0	0	50,000	50,000	50,000	50,000	H23-TRAXF2
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	11,419	11,419	11,419	11,419	11,419	11,419	H27-NWCUST
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000		None	CONSERVATION	H	3810170	10	39	47	63	82	108	139	H01-MNCON3
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	1,306	1,306	1,306	1,306	1,306	1,306	H27-NWCUST
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	080854000		None	CONSERVATION	H	3810170	10	1	1	2	2	3	3	H01-MNCON2
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000		None	CONSERVATION	H	3810170	10	26	32	43	56	73	94	H01-MNCON2
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	170	170	170	170	170	170	H27-NWCUST
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	0	867	867	867	867	867	H27-NWCUST
H M W SUD	SAN JACINTO	MONTGOMERY	084147000		None	CONSERVATION	H	3810170	10	112	126	155	189	235	288	H01-MNCON3
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	566	566	566	566	566	566	H27-NWCUST
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3410805271B	08	0	2,153	2,153	2,153	2,153	2,153	H27-NWCUST
HOUSTON	SAN JACINTO	MONTGOMERY	080285000		None	CONSERVATION	H	3810170	10	13	18	26	36	49	65	H01-MNCON3
MAGNOLIA	SAN JACINTO	MONTGOMERY	080907000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	2	2	2	2	3	4	H27-NWCUST
MANUFACTURING	SAN JACINTO	MONTGOMERY	081001170	240	SJRA	SJRA INDIRECT REUSE	H	3411005809	10	2,442	2,442	2,442	2,442	2,442	2,442	H27-NWCUST
MINING	SAN JACINTO	MONTGOMERY	081003170	240	SJRA	SJRA INDIRECT REUSE	H	3411005809	10	413	413	413	413	413	413	H27-NWCUST
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000		None	CONSERVATION	H	3810170	10	116	157	237	330	453	596	H01-MNCON3
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	705	705	705	705	705	705	H27-NWCUST
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	4,920	4,920	4,920	4,920	4,920	H27-NWCUST
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000		None	CONSERVATION	H	3810170	10	25	25	25	25	25	25	H01-MNCON1
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	147	147	147	147	147	147	H27-NWCUST
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	148	148	148	148	148	H27-NWCUST
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000		None	CONSERVATION	H	3810170	10	63	75	97	123	158	200	H01-MNCON3
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	336	336	336	336	336	336	H27-NWCUST
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	1,547	1,547	1,547	1,547	1,547	H27-NWCUST
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000		None	CONSERVATION	H	3810170	10	59	73	100	132	175	224	H01-MNCON2
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	328	328	328	328	328	328	H27-NWCUST
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	1,790	1,790	1,790	1,790	1,790	H27-NWCUST
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000		None	CONSERVATION	H	3810170	10	29	29	28	28	28	28	H01-MNCON1
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	168	168	168	168	168	168	H27-NWCUST
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	169	169	169	169	169	H27-NWCUST
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000		None	CONSERVATION	H	3810170	10	28	30	33	37	43	50	H01-MNCON2
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	159	159	159	159	159	159	H27-NWCUST
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	398	398	398	398	398	H27-NWCUST
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000		None	CONSERVATION	H	3810170	10	55	54	54	53	53	53	H01-MNCON2

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
WALLER	SAN JACINTO	HARRIS	080629000	New Contracts	$0	$1,530	$1,530	$1,530	$1,530	$1,530	$1,530
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	MUNICIPAL CONSERVATION	$0	$5,304	$5,148	$5,148	$5,148	$4,992	$4,992
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	TRA-Houston	$65,939	$0	$35,375	$35,375	$35,375	$35,375	$35,375
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	084387000	New Contracts	$0	$7,110	$7,110	$7,110	$7,110	$7,110	$7,110
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	MUNICIPAL CONSERVATION	$0	$34,454	$36,386	$38,157	$39,928	$42,021	$44,275
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	INCREASE EXIST CONTRACT	$0	$37,560	$37,560	$37,560	$37,560	$37,560	$37,560
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	080643000	TRA-Houston	$189,429	$0	$55,250	$55,250	$101,625	$101,625	$101,625
WHCRWA	SAN JACINTO	HARRIS	088002000	MUNICIPAL CONSERVATION	$0	$0	$636,111	$765,394	$847,826	$932,673	$1,025,892
WHCRWA	SAN JACINTO	HARRIS	088002000	INCREASE EXIST CONTRACT	$0	$0	$958,800	$958,800	$958,800	$958,800	$958,800
WHCRWA	SAN JACINTO	HARRIS	088002000	INCREASE EXIST CONTRACT	$0	$0	$921,120	$921,120	$921,120	$921,120	$921,120
WHCRWA	SAN JACINTO	HARRIS	088002000	COH Reuse	$0	$0	$0	$0	$0	$960,000	$960,000
WHCRWA	SAN JACINTO	HARRIS	088002000	TRA-Houston	$7,601,392	$0	$4,078,000	$4,078,000	$4,078,000	$4,078,000	$4,078,000
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	MUNICIPAL CONSERVATION	$0	$6,240	$6,084	$5,928	$5,772	$5,772	$5,772
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	TRA-Houston	$73,395	$0	$39,375	$39,375	$39,375	$39,375	$39,375
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	084398000	New Contracts	$0	$8,415	$8,415	$8,415	$8,415	$8,415	$8,415
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	MUNICIPAL CONSERVATION	$0	$7,488	$9,672	$9,360	$9,360	$9,360	$9,360
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	INCREASE EXIST CONTRACT	$0	$23,760	$23,760	$23,760	$23,760	$23,760	$23,760
WINDFERN FOREST UD	SAN JACINTO	HARRIS	084401000	TRA-Houston	$121,859	$0	$65,375	$65,375	$65,375	$65,375	$65,375
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	MUNICIPAL CONSERVATION	$0	$5,772	$7,644	$9,360	$11,076	$12,792	$14,508
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	TRA-Houston	$265,620	$0	$97,750	$97,750	$142,500	$142,500	$142,500
WOODCREEK MUD	SAN JACINTO	HARRIS	084404000	New Contracts	$0	$7,920	$7,920	$7,920	$7,920	$7,920	$7,920
IRRIGATION	NECHES	LIBERTY	081004146	IRRIGATION CONSERVATION	$6,710	$62,785	$62,785	$62,785	$62,785	$62,785	$62,785
IRRIGATION	NECHES-TRINITY	LIBERTY	081004146	IRRIGATION CONSERVATION	$16,778	$157,000	$157,000	$157,000	$157,000	$157,000	$157,000
IRRIGATION	NECHES-TRINITY	LIBERTY	081004146	NEW CONTRACTS	$0	$45,000	$45,000	$45,000	$45,000	$45,000	$22,500
IRRIGATION	TRINITY	LIBERTY	081004146	IRRIGATION CONSERVATION	$107,352	$1,004,559	$1,004,559	$1,004,559	$1,004,559	$1,004,559	$1,004,559
IRRIGATION	TRINITY	LIBERTY	081004146	NEW CONTRACTS	$0	$45,000	$45,000	$45,000	$45,000	$45,000	$45,000
IRRIGATION	TRINITY	LIBERTY	081004146	NEW CONTRACTS	$0	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146	IRRIGATION CONSERVATION	$35,227	$329,640	$329,640	$329,640	$329,640	$329,640	$329,640
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146	NEW CONTRACTS	$0	$292,500	$292,500	$292,500	$292,500	$292,500	$292,500
IRRIGATION	TRINITY-SAN JACINTO	LIBERTY	081004146	NEW CONTRACTS	$0	$225,000	$225,000	$225,000	$225,000	$225,000	$112,500
IRRIGATION	SAN JACINTO	LIBERTY	081004146	IRRIGATION CONSERVATION	$1,679	$15,715	$15,715	$15,715	$15,715	$15,715	$15,715
CONROE	SAN JACINTO	MONTGOMERY	080130000	MUNICIPAL CONSERVATION	$0	$103,684	$117,852	$146,510	$181,125	$226,688	$280,784
CONROE	SAN JACINTO	MONTGOMERY	080130000	NEW CONTRACTS	$0	$277,425	$277,425	$277,425	$277,425	$277,425	$277,425
CONROE	SAN JACINTO	MONTGOMERY	080130000	NEW CONTRACTS	$0	$148,050	$148,050	$148,050	$148,050	$148,050	$148,050
CONROE	SAN JACINTO	MONTGOMERY	080130000	NEW CONTRACTS	$0	$0	$315,090	$315,090	$315,090	$315,090	$315,090
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	MUNICIPAL CONSERVATION	$0	$2,184	$2,496	$3,276	$3,900	$4,992	$6,240
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	NEW CONTRACTS	$0	$16,920	$16,920	$16,920	$16,920	$16,920	$16,920
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	084072000	NEW CONTRACTS	$0	$16,920	$16,920	$16,920	$16,920	$16,920	$16,920
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170	MUNICIPAL CONSERVATION	$0	$193,200	$240,856	$342,769	$462,392	$633,052	$831,404
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170	TRA-Houston/SJRA	$11,650,000	$0	$0	$6,250,000	$6,250,000	$6,250,000	$6,250,000
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	080757170	NEW CONTRACTS	$0	$513,855	$513,855	$513,855	$513,855	$513,855	$513,855
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000	MUNICIPAL CONSERVATION	$0	$6,279	$7,567	$10,143	$13,202	$17,388	$22,379
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	084081000	NEW CONTRACTS	$0	$58,770	$58,770	$58,770	$58,770	$58,770	$58,770
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	080854000	MUNICIPAL CONSERVATION	$0	$156	$156	$312	$312	$468	$468
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	MUNICIPAL CONSERVATION	$0	$4,056	$4,992	$6,708	$8,736	$11,388	$14,664
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	NEW CONTRACTS	$0	$7,650	$7,650	$7,650	$7,650	$7,650	$7,650
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	084098000	NEW CONTRACTS	$0	$0	$39,015	$39,015	$39,015	$39,015	$39,015
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	MUNICIPAL CONSERVATION	$0	$18,032	$20,286	$24,955	$30,429	$37,835	$46,368
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	NEW CONTRACTS	$0	$25,470	$25,470	$25,470	$25,470	$25,470	$25,470
H M W SUD	SAN JACINTO	MONTGOMERY	084147000	NEW CONTRACTS	$0	$0	$96,885	$96,885	$96,885	$96,885	$96,885
HOUSTON	SAN JACINTO	MONTGOMERY	080285000	MUN CONSERVATION	$0	$2,093	$2,898	$4,186	$5,796	$7,889	$10,465
MAGNOLIA	SAN JACINTO	MONTGOMERY	080907000	NEW CONTRACTS	$0	$90	$90	$90	$90	$135	$180
MANUFACTURING	SAN JACINTO	MONTGOMERY	081001170	New Contracts	$0	$109,890	$109,890	$109,890	$109,890	$109,890	$109,890
MINING	SAN JACINTO	MONTGOMERY	081003170	New Contracts	$0	$18,585	$18,585	$18,585	$18,585	$18,585	$18,585
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	MUNICIPAL CONSERVATION	$0	$18,676	$25,277	$38,157	$53,130	$72,933	$95,956
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	NEW CONTRACTS	$0	$31,725	$31,725	$31,725	$31,725	$31,725	$31,725
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	084261000	NEW CONTRACTS	$0	$0	$221,400	$221,400	$221,400	$221,400	$221,400
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	MUNICIPAL CONSERVATION	$0	$3,850	$3,850	$3,850	$3,850	$3,850	$3,850
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	NEW CONTRACTS	$0	$6,615	$6,615	$6,615	$6,615	$6,615	$6,615
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	084262000	NEW CONTRACTS	$0	$0	$6,660	$6,660	$6,660	$6,660	$6,660
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	MUNICIPAL CONSERVATION	$0	$10,143	$12,075	$15,617	$19,803	$25,438	$32,200
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	NEW CONTRACTS	$0	$15,120	$15,120	$15,120	$15,120	$15,120	$15,120
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	084263000	NEW CONTRACTS	$0	$0	$69,615	$69,615	$69,615	$69,615	$69,615
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	MUNICIPAL CONSERVATION	$0	$9,204	$11,388	$15,600	$20,592	$27,300	$34,944
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	NEW CONTRACTS	$0	$14,760	$14,760	$14,760	$14,760	$14,760	$14,760
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	084264000	NEW CONTRACTS	$0	$0	$80,550	$80,550	$80,550	$80,550	$80,550
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	MUNICIPAL CONSERVATION	$0	$4,466	$4,466	$4,312	$4,312	$4,312	$4,312
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	NEW CONTRACTS	$0	$7,560	$7,560	$7,560	$7,560	$7,560	$7,560
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	084265000	NEW CONTRACTS	$0	$0	$7,605	$7,605	$7,605	$7,605	$7,605
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	MUNICIPAL CONSERVATION	$0	$4,368	$4,680	$5,148	$5,772	$6,708	$7,800
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	NEW CONTRACTS	$0	$7,155	$7,155	$7,155	$7,155	$7,155	$7,155
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	084266000	NEW CONTRACTS	$0	$0	$17,910	$17,910	$17,910	$17,910	$17,910
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	MUNICIPAL CONSERVATION	$0	$8,580	$8,424	$8,424	$8,268	$8,268	$8,268

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	alpha_provider	alpha_name	so_name	so_rwpg	so_id	so_basin_id	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	WMS_PROJECT_ID
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	292	292	292	292	292	292	H27-NWCUST
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	297	297	297	297	297	H27-NWCUST
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000		None	CONSERVATION	H	3810170	10	29	31	34	38	45	52	H01-MNCON2
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	163	163	163	163	163	163	H27-NWCUST
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	417	417	417	417	417	H27-NWCUST
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000		None	CONSERVATION	H	3810170	10	95	110	146	184	239	303	H01-MNCON3
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	497	497	497	497	497	497	H27-NWCUST
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	2,366	2,366	2,366	2,366	2,366	H27-NWCUST
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000		None	CONSERVATION	H	3810170	10	41	45	53	64	77	94	H01-MNCON2
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	239	239	239	239	239	239	H27-NWCUST
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	800	800	800	800	800	H27-NWCUST
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000		None	CONSERVATION	H	3810170	10	46	51	63	69	68	68	H01-MNCON2
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	276	276	276	276	276	276	H27-NWCUST
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	483	483	483	483	483	H27-NWCUST
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	080734000		None	CONSERVATION	H	3810170	10	1	1	1	1	1	1	H01-MNCON2
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000		None	CONSERVATION	H	3810170	10	46	60	88	119	162	211	H01-MNCON3
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	271	271	271	271	271	271	H27-NWCUST
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	1,723	1,723	1,723	1,723	1,723	H27-NWCUST
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000		None	CONSERVATION	H	3810170	10	127	145	183	228	226	226	H01-MNCON3
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	653	653	653	653	653	653	H27-NWCUST
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	1,478	1,478	1,478	1,478	1,478	H27-NWCUST
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000		None	CONSERVATION	H	3810170	10	145	143	142	142	142	142	H01-MNCON3
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	645	645	645	645	645	645	H27-NWCUST
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	695	695	695	695	695	H27-NWCUST
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000		None	CONSERVATION	H	3810170	10	46	45	45	44	44	44	H01-MNCON1
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	525	525	525	525	525	525	H27-NWCUST
ROMAN FOREST	SAN JACINTO	MONTGOMERY	080801000		None	CONSERVATION	H	3810170	10	1	1	2	2	2	3	H01-MNCON2
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000		None	CONSERVATION	H	3810170	10	28	28	28	28	27	27	H01-MNCON1
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	328	328	328	328	328	328	H27-NWCUST
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000		None	CONSERVATION	H	3810170	10	123	148	146	145	145	145	H01-MNCON3
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	667	667	667	667	667	667	H27-NWCUST
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	705	705	705	705	705	H27-NWCUST
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000		None	CONSERVATION	H	3810170	10	17	19	24	29	37	46	H01-MNCON2
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	436	436	436	436	436	436	H27-NWCUST
SPLENDORA	SAN JACINTO	MONTGOMERY	080962000		None	CONSERVATION	H	3810170	10	1	1	2	2	3	4	H01-MNCON2
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000		None	CONSERVATION	H	3810170	10	35	41	54	70	91	116	H01-MNCON3
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	184	184	184	184	184	184	H27-NWCUST
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	910	910	910	910	910	H27-NWCUST
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000		None	CONSERVATION	H	3810170	10	41	52	52	51	51	51	H01-MNCON2
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	567	567	567	567	567	567	H27-NWCUST
STEAM ELECTRIC POWER	SAN JACINTO	MONTGOMERY	081002170	240	SJRA	SJRA INDIRECT REUSE	H	3411005809	10	0	0	0	6,885	6,885	6,885	H27-NWCUST
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000		None	CONSERVATION	H	3810170	10	1,012	1,835	1,954	1,945	1,936	1,936	H01-MNCON3
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	8,246	8,246	8,246	8,246	8,246	8,246	H27-NWCUST
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	240	SJRA	SJRA INDIRECT REUSE	H	3411005809	10	5,000	5,000	5,000	5,000	5,000	5,000	H27-NWCUST
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	5,022	5,022	5,022	5,022	5,022	H27-NWCUST
WILLIS	SAN JACINTO	MONTGOMERY	080655000		None	CONSERVATION	H	3810170	10	39	45	56	71	89	112	H01-MNCON3
WILLIS	SAN JACINTO	MONTGOMERY	080655000	240	SJRA	SAN JACINTO RIVER RUN-OF-RIVER	H	3461004964	10	201	201	201	201	201	201	H27-NWCUST
WILLIS	SAN JACINTO	MONTGOMERY	080655000	240	SJRA	TRINITY RIVER RUN-OF-RIVER	H	3460804279A	08	0	858	858	858	858	858	H27-NWCUST
WOODBRANCH	SAN JACINTO	MONTGOMERY	080807000		None	CONSERVATION	H	3810170	10	1	1	1	1	1	1	H01-MNCON1
IRRIGATION	TRINITY	SAN JACINTO	081004204	187	TRA	LIVINGSTON-WALLISVILLE SYSTEM	H	8400	08	500	500	500	500	500	500	H27-NWCUST
BROOKSHIRE	BRAZOS	WALLER	080077000		None	CONSERVATION	H	3812237	12	0	0	0	0	20	61	H01-MNCON2
BROOKSHIRE	BRAZOS	WALLER	080077000		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	0	42	H19-EXPGW
COUNTY-OTHER	SAN JACINTO	WALLER	080757237		None	CONSERVATION	H	3810237	10	0	0	0	0	0	69	H01-MNCON3
COUNTY-OTHER	BRAZOS	WALLER	080757237		None	CONSERVATION	H	3812237	12	0	0	0	0	45	133	H01-MNCON3
COUNTY-OTHER	BRAZOS	WALLER	080757237		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	0	108	H19-EXPGW
HEMPSTEAD	BRAZOS	WALLER	080271000		None	CONSERVATION	H	3812237	12	0	0	0	0	50	178	H01-MNCON3
HEMPSTEAD	BRAZOS	WALLER	080271000		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	0	81	H19-EXPGW
IRRIGATION	SAN JACINTO	WALLER	081004237		None	CONSERVATION	H	3810237	10	5,219	5,219	5,219	5,219	5,219	5,219	H03-IRRCON
IRRIGATION	BRAZOS	WALLER	081004237		None	CONSERVATION	H	3812237	12	1,387	1,387	1,387	1,387	1,387	1,387	H03-IRRCON
KATY	SAN JACINTO	WALLER	080312000		None	CONSERVATION	H	3810237	10	10	10	10	10	10	10	H01-MNCON3
KATY	SAN JACINTO	WALLER	080312000		WHCRWA	LAKE HOUSTON ADDITIONAL YIELD	H	H15-HOUYLD	10	111	111	111	111	111	111	H15-HOUYLD
MANUFACTURING	SAN JACINTO	WALLER	081001237		None	GULF COAST AQUIFER	H	23715	10	0	0	0	0	0	3	H19-EXPGW
MANUFACTURING	BRAZOS	WALLER	081001237		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	1	3	H19-EXPGW
PINE ISLAND	BRAZOS	WALLER	080938000		None	CONSERVATION	H	3812237	12	0	0	0	0	6	17	H01-MNCON1
PINE ISLAND	BRAZOS	WALLER	080938000		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	0	14	H19-EXPGW
PRAIRIE VIEW	SAN JACINTO	WALLER	080485000		None	CONSERVATION	H	3810237	10	0	0	0	0	0	5	H01-MNCON2
PRAIRIE VIEW	BRAZOS	WALLER	080485000		None	CONSERVATION	H	3812237	12	0	0	0	0	36	103	H01-MNCON2
PRAIRIE VIEW	BRAZOS	WALLER	080485000		None	GULF COAST AQUIFER	H	23715	12	0	0	0	0	0	70	H19-EXPGW
WALLER	SAN JACINTO	WALLER	080629000		None	CONSERVATION	H	3810237	10	0	0	0	0	0	26	H01-MNCON2
WALLER	SAN JACINTO	WALLER	080629000		None	GULF COAST AQUIFER	H	23715	10	0	0	0	0	0	26	H19-EXPGW

Region H

Table 4A-7: Recommended WUG Water Management Strategies

wug_name	wug_basin	wug_county	wug_id	WMS_NAME	Capital_Cost	Cost_2010	Cost_2020	Cost_2030	Cost_2040	Cost_2050	Cost_2060
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	NEW CONTRACTS	$0	$13,140	$13,140	$13,140	$13,140	$13,140	$13,140
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	084267000	NEW CONTRACTS	$0	$0	$13,365	$13,365	$13,365	$13,365	$13,365
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	MUNICIPAL CONSERVATION	$0	$4,524	$4,836	$5,304	$5,928	$7,020	$8,112
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	NEW CONTRACTS	$0	$7,335	$7,335	$7,335	$7,335	$7,335	$7,335
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	084268000	NEW CONTRACTS	$0	$0	$18,765	$18,765	$18,765	$18,765	$18,765
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	MUNICIPAL CONSERVATION	$0	$15,295	$17,710	$23,506	$29,624	$38,479	$48,783
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	NEW CONTRACTS	$0	$22,365	$22,365	$22,365	$22,365	$22,365	$22,365
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	084272000	NEW CONTRACTS	$0	$0	$106,470	$106,470	$106,470	$106,470	$106,470
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	MUNICIPAL CONSERVATION	$0	$6,396	$7,020	$8,268	$9,984	$12,012	$14,664
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	NEW CONTRACTS	$0	$10,755	$10,755	$10,755	$10,755	$10,755	$10,755
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	080726000	NEW CONTRACTS	$0	$0	$36,000	$36,000	$36,000	$36,000	$36,000
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	MUNICIPAL CONSERVATION	$0	$7,176	$7,956	$9,828	$10,764	$10,608	$10,608
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	NEW CONTRACTS	$0	$12,420	$12,420	$12,420	$12,420	$12,420	$12,420
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	080732000	NEW CONTRACTS	$0	$0	$21,735	$21,735	$21,735	$21,735	$21,735
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	080734000	MUNICIPAL CONSERVATION	$0	$156	$156	$156	$156	$156	$156
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	MUNICIPAL CONSERVATION	$0	$7,406	$9,660	$14,168	$19,159	$26,082	$33,971
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	NEW CONTRACTS	$0	$12,195	$12,195	$12,195	$12,195	$12,195	$12,195
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	084305000	NEW CONTRACTS	$0	$0	$77,535	$77,535	$77,535	$77,535	$77,535
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	MUNICIPAL CONSERVATION	$0	$20,447	$23,345	$29,463	$36,708	$36,386	$36,386
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	NEW CONTRACTS	$0	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385
PORTER WSC	SAN JACINTO	MONTGOMERY	084307000	NEW CONTRACTS	$0	$0	$66,510	$66,510	$66,510	$66,510	$66,510
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	MUNICIPAL CONSERVATION	$0	$23,345	$23,023	$22,862	$22,862	$22,862	$22,862
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	NEW CONTRACTS	$0	$29,025	$29,025	$29,025	$29,025	$29,025	$29,025
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	084312000	NEW CONTRACTS	$0	$0	$31,275	$31,275	$31,275	$31,275	$31,275
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000	MUNICIPAL CONSERVATION	$0	$7,084	$6,930	$6,930	$6,776	$6,776	$6,776
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	084322000	NEW CONTRACTS	$0	$23,625	$23,625	$23,625	$23,625	$23,625	$23,625
ROMAN FOREST	SAN JACINTO	MONTGOMERY	080801000	MUNICIPAL CONSERVATION	$0	$156	$156	$312	$312	$312	$468
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000	MUNICIPAL CONSERVATION	$0	$4,312	$4,312	$4,312	$4,312	$4,158	$4,158
SHENANDOAH	SAN JACINTO	MONTGOMERY	080745000	NEW CONTRACTS	$0	$14,760	$14,760	$14,760	$14,760	$14,760	$14,760
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	MUNICIPAL CONSERVATION	$0	$19,803	$23,828	$23,506	$23,345	$23,345	$23,345
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	NEW CONTRACTS	$0	$30,015	$30,015	$30,015	$30,015	$30,015	$30,015
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	084339000	NEW CONTRACTS	$0	$0	$31,725	$31,725	$31,725	$31,725	$31,725
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000	MUNICIPAL CONSERVATION	$0	$2,652	$2,964	$3,744	$4,524	$5,772	$7,176
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	084343000	NEW CONTRACTS	$0	$19,620	$19,620	$19,620	$19,620	$19,620	$19,620
SPLENDORA	SAN JACINTO	MONTGOMERY	080962000	MUNICIPAL CONSERVATION	$0	$156	$156	$312	$312	$468	$624
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	MUNICIPAL CONSERVATION	$0	$5,635	$6,601	$8,694	$11,270	$14,651	$18,676
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	NEW CONTRACTS	$0	$8,280	$8,280	$8,280	$8,280	$8,280	$8,280
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	084344000	NEW CONTRACTS	$0	$0	$40,950	$40,950	$40,950	$40,950	$40,950
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000	MUNICIPAL CONSERVATION	$0	$6,396	$8,112	$8,112	$7,956	$7,956	$7,956
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	084347000	NEW CONTRACTS	$0	$25,515	$25,515	$25,515	$25,515	$25,515	$25,515
STEAM ELECTRIC POWER	SAN JACINTO	MONTGOMERY	081002170	New Contracts	$0	$0	$0	$0	$309,825	$309,825	$309,825
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	MUNICIPAL CONSERVATION	$0	$162,932	$295,435	$314,594	$313,145	$311,696	$311,696
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	NEW CONTRACTS	$0	$371,070	$371,070	$371,070	$371,070	$371,070	$371,070
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	New Contracts	$0	$225,000	$225,000	$225,000	$225,000	$225,000	$225,000
THE WOODLANDS	SAN JACINTO	MONTGOMERY	088001000	NEW CONTRACTS	$0	$0	$225,990	$225,990	$225,990	$225,990	$225,990
WILLIS	SAN JACINTO	MONTGOMERY	080655000	MUNICIPAL CONSERVATION	$0	$6,279	$7,245	$9,016	$11,431	$14,329	$18,032
WILLIS	SAN JACINTO	MONTGOMERY	080655000	NEW CONTRACTS	$0	$9,045	$9,045	$9,045	$9,045	$9,045	$9,045
WILLIS	SAN JACINTO	MONTGOMERY	080655000	NEW CONTRACTS	$0	$0	$38,610	$38,610	$38,610	$38,610	$38,610
WOODBRANCH	SAN JACINTO	MONTGOMERY	080807000	MUNICIPAL CONSERVATION	$0	$154	$154	$154	$154	$154	$154
IRRIGATION	TRINITY	SAN JACINTO	081004204	NEW CONTRACTS	$0	$22,500	$22,500	$22,500	$22,500	$22,500	$22,500
BROOKSHIRE	BRAZOS	WALLER	080077000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$3,120	$9,516
BROOKSHIRE	BRAZOS	WALLER	080077000	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
COUNTY-OTHER	SAN JACINTO	WALLER	080757237	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$0	$11,109
COUNTY-OTHER	BRAZOS	WALLER	080757237	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$7,245	$21,413
COUNTY-OTHER	BRAZOS	WALLER	080757237	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
HEMPSTEAD	BRAZOS	WALLER	080271000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$8,050	$28,658
HEMPSTEAD	BRAZOS	WALLER	080271000	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
IRRIGATION	SAN JACINTO	WALLER	081004237	IRRIGATION CONSERVATION	$0	$438,396	$438,396	$438,396	$438,396	$438,396	$438,396
IRRIGATION	BRAZOS	WALLER	081004237	IRRIGATION CONSERVATION	$0	$116,508	$116,508	$116,508	$116,508	$116,508	$116,508
KATY	SAN JACINTO	WALLER	080312000	MUNICIPAL CONSERVATION	$0	$1,610	$1,610	$1,610	$1,610	$1,610	$1,610
KATY	SAN JACINTO	WALLER	080312000	Lake Houston Additional Yield	$0	$13,320	$13,320	$13,320	$13,320	$13,320	$13,320
MANUFACTURING	SAN JACINTO	WALLER	081001237	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
MANUFACTURING	BRAZOS	WALLER	081001237	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
PINE ISLAND	BRAZOS	WALLER	080938000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$924	$2,618
PINE ISLAND	BRAZOS	WALLER	080938000	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
PRAIRIE VIEW	SAN JACINTO	WALLER	080485000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$0	$780
PRAIRIE VIEW	BRAZOS	WALLER	080485000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$5,616	$16,068
PRAIRIE VIEW	BRAZOS	WALLER	080485000	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0
WALLER	SAN JACINTO	WALLER	080629000	MUNICIPAL CONSERVATION	$0	$0	$0	$0	$0	$0	$4,056
WALLER	SAN JACINTO	WALLER	080629000	EXPANDED USE OF GW	$0	$0	$0	$0	$0	$0	$0

Capital Costs reflect pro rata share of total strategy cost.
Decade costs equal unit water rate times amount supplied.

Table 4A-8 - Recommended Water Management Strategies by Wholesale Water Provider

MajorWaterProviderName	Alpha Provider	Basin #	Strategy Type	Source Region	Source County	Source Basin	Strategy Name	Source ID	Source Name	Capital Cost	Supply 2010	Supply 2020	Supply 2030	Supply 2040	Supply 2050	Supply 2060	WMS_ID	Comments
BAYTOWN AREA WATER AUTHORITY	000015	9	E	H	999	08	INCREASE CONTRACT FROM CITY OF HOUSTON	08400	LAKE LIVINGSTON	$ -	0	820	820	820	820	820	H02-INCR	Contract increase to serve existing customer WUGs
BAYTOWN AREA WATER AUTHORITY	000015	9	E	H	999	08	NEW CONTRACT FROM CITY OF HOUSTON	08400	LAKE LIVINGSTON	$ -	2,599	2,599	2,599	2,599	2,599	2,599	H27-NWCUST	New contract to serve additional WUGs
BRAZOS RIVER AUTHORITY	000331	12	N	H	008	12	ALLENS CREEK RESERVOIR	12900	ALLENS CREEK RESERVOIR	$ 51,012,000	0	0	29,900	29,900	29,900	29,900	H05-ALLENS	BRA receives 30% share (29,900 of 99,650 afy) of Allen's Creek Reservoir. BRA pays 30% of capital cost.
BRAZOS RIVER AUTHORITY	000331	12	N	H	020	12	FREEPORT DESALINATION PLANT	12-TBD	GULF OF MEXICO	$ 745,765,000	11,200	11,200	11,200	11,200	22,400	33,600	H20-DESAL1	Seawater desalination demonstration project will initially produce 10 mgd. It has the potential to exceed 50 mgd in future decades.
BRAZOS RIVER AUTHORITY	000331	12	E	H	020	12	BRAZOS SALTWATER BARRIER	N/A	BRAZOS RIVER RUN-OF-RIVER	$ 30,300,000	0	0	0	0	0	0	H21-BRSWB	Saltwater barrier to protect lower basin diversion points from seawater intrusion. Required by 2030.
BRAZOS RIVER AUTHORITY	000331	12	N	G	999	12	ADDITIONAL ROR YIELD THROUGH SYSTEM OPERATION	120B0	BRA/COE SYSTEM	$ -	311,499	311,499	311,499	311,499	311,499	311,499	HG01BRASYS	Additional yield realized through reservoir system operation. Of this, 120,000 ac-ft/yr is allcoated to WUGs in the lower basin (Region H).
BRAZOS RIVER AUTHORITY	000331	12	R	G	999	12	INDIRECT WASTEWATER REUSE	3512999	INDIRECT REUSE	$ -	110,000	110,000	110,000	110,000	110,000	110,000	HG01BRASYS	Appropriation of return flows, when available, is included in the BRA permit application. This portion of the strategy was not allocated within Region H.
BRAZOS RIVER AUTHORITY	000331	12	N	G	166	12	LITTLE RIVER OFF-CHANNEL RESERVOIR	12-TBD	LITTLE RIVER OFF-CHANNEL RESERVOIR	$ 96,512,000	0	0	0	0	32,110	32,110	HG03LRIV2	New off-channel reservoir in Milam County. Yield is enhanced when included in BRA system operations
BRAZOSPORT WATER AUTHORITY	002000	12	E	H	020	12	BRAZOS SALTWATER BARRIER	N/A	BRAZOS RIVER RUN-OF-RIVER	$ -	0	0	0	0	0	0	H21-BRSWB	Saltwater barrier to protect lower basin diversion points from seawater intrusion. Required by 2030. Cost shown on BRA entry for this WMS. BWA has a surplus of supply throughout the planning period. Contract expansions for customer WUGs
CHAMBERS-LIBERTY COUNTIES NAVIGATION DISTRICT	000150						NONE REQUIRED FOR THIS WWP											CLCND has a surplus of supply throughout the planning period. Contract expansions and new contracts for customer WUGs are recommended WMS.
CHOC0LATE BAYOU WATER COMPANY	000260	12	E	H	079	12	CONTRACTUAL TRANSFER	3461205320	BRAZOS RIVER RUN-OF-RIVER	$ -	5,253	5,253	5,253	5,253	5,253	5,253	H08-CONXFR	Shortages in irrigation supply are recommended to be met through a contractual trasnfer of surplus irrigation supply owned by Texas Genco.
CITY OF HOUSTON	396200	10	C	H	079, 101, 170	10, 11	MUNICIPAL CONSERVATION	3810079, 3811079, 3810101,	CONSERVATION	$ -	27,235	30,046	32,693	35,424	38,344	41,517	H01-MNCON3	Conservation by the City of Hosuton WUG, which gives the City of Houston WWP a surplus.
CITY OF HOUSTON	396200	11	N	H	008	12	ALLENS CREEK RESERVOIR	12900	ALLENS CREEK RESERVOIR	$ 119,028,000	0	0	69,750	69,750	69,750	69,750	H05-ALLENS	COH receives 70% share (69,750 of 99,650 afy) of Allen's Creek Reservoir. COH pays 70% of capital cost.
CITY OF HOUSTON	396200	10	N	H	101	10	WASTEWATER REUSE FOR INDUSTRY	3610101	DIRECT REUSE	$ 234,158,000	0	67,200	67,200	67,200	67,200	67,200	H09-REUIND	Project may be expanded to meet industry needs. COH pays 100% of capital cost and receives full yield.
CITY OF HOUSTON	396200	10	E	H	999	08	HOUSTON / TRA CONTRACT	08400	LAKE LIVINGSTON	$ -	0	150,000	150,000	150,000	150,000	150,000	H10-TRAXFR	COH buys additional 150,000 afy from TRA Contract has no capital cost. COH pays cost of water to TRA.
CITY OF HOUSTON	396200	10	E	H	999	08	LUCE BAYOU TRANSFER	08400	LAKE LIVINGSTON	$ 239,000,000	0	0	0	0	0	0	H11-LUCE	Transfer of existing supply. COH is sponsor WWP, but benefits SJRA, NHCRWA and WHCRWA.
CITY OF HOUSTON	396200	10	N	H	101	10	WASTEWATER REUSE	3510101	INDIRECT REUSE	$ -	490,223	490,223	490,223	490,223	490,223	490,223	H13-REUHOU	Reuse of return flows from City of Houston wastewater treatment plants. Current permitted dsicharge less 5% channel loss used as projected yield. Value also excludes 90,700 afy for direct industrial reuse. Recommended allocation is 20% of the total shown.
CITY OF HOUSTON	396200	10	N	H	101	10	MUNICIPAL IRRIGATION REUSE	3510101	INDIRECT REUSE	$ -								
CITY OF HOUSTON	396200	10	N	H	101	10	ADDITIONAL YIELD IN LAKE HOUSTON	10030	LAKE HOUSTON	$ -	13,500	11,000	8,500	6,000	3,500	1,000	H15-HOUYLD	New permit for unappropriated flows identifed in the WAM model. Joint application between COH and SJRA. No capital cost facilities identified with this strategy.
CITY OF HOUSTON	396200	10	N	H	170	10	ADDITIONAL SAN JACINTO RIVER YIELD	10500	SAN JACINTO RIVER	$ -	40,000	40,000	40,000	40,000	40,000	40,000	H16-SJROR	New permit for unappropriated flows identifed in the WAM model. Supply is not 100% reliable. Joint application between COH and SJRA. No capital cost facilities identified with this strategy.
CITY OF HOUSTON	396200	10	N	H	101	10	ADDITIONAL SAN JACINTO BASIN YIELD	10500	SIMS, BRAYS, WHITE OAK AND BUFFALO BAYOUS	$ 9,013,000	160,000	160,000	160,000	160,000	160,000	160,000	H17-BAYOUS	New permit for unappropriated flows in Sims, Brays, White Oak and Buffalo Bayous. Supply is not 100% reliable. No capital cost facilities identified with this strategy.
CITY OF HUNTSVILLE	410000						NONE REQUIRED FOR THIS WWP											Huntsville has a surplus of supply throughout the planning period.
CITY OF PASADENA	651900						NONE REQUIRED FOR THIS WWP											Pasadena has a surplus of supply throughout the planning period. Contract expansions for customer WUGs are recommended WMS.
CLEAR LAKE CITY WATER AUTHORITY	159000						NONE REQUIRED FOR THIS WWP											CLCWA has a surplus of supply throughout the planning period.
DOW CHEMICAL COMPANY	237200	12	E	H	020	12	BRAZOS SALTWATER BARRIER	N/A	BRAZOS RIVER RUN-OF-RIVER	$ -	0	0	0	0	0	0	H21-BRSWB	Saltwater barrier to protect lower basin diversion points from seawater intrusion. Required by 2030. Cost shown on BRA entry for this WMS.
DOW CHEMICAL COMPANY	237200	12	N	G	999	12	ADDITIONAL ROR YIELD THROUGH SYSTEM OPERATION	120B0	BRA/COE SYSTEM	$ -	31,022	31,022	31,022	31,022	31,022	31,022	HG01BRASYS	Shortages in manufacturing are recommended to be met from BRA system operations additional yield.
FORT BEND COUNTY WCID 1	000380						NONE REQUIRED FOR THIS WWP											FBC WCID 1 has a surplus of supply throughout the planning period.
GALVESTON COUNTY WCID 1	316325						NONE REQUIRED FOR THIS WWP											
GULF COAST WATER AUTHORITY	000325	11	N	H	008	12	ALLENS CREEK RESERVOIR	12900	ALLENS CREEK RESERVOIR	$ -	0	0	4,000	4,000	4,000	4,000	H05-ALLENS	Supply required by Pearland, conveyed via GCWA system. Capital cost reflected under COH/BRA entries.

Table 4A-8 - Recommended Water Management Strategies by Wholesale Water Provider

MajorWaterProviderName	Alpha Provider	Basin #	Strategy Type	Source Region	Source County	Source Basin	Strategy Name	Source ID	Source Name	Capital Cost	Supply 2010	Supply 2020	Supply 2030	Supply 2040	Supply 2050	Supply 2060	WMS_ID	Comments
GULF COAST WATER AUTHORITY	000325	11	E	H	999	08	HOUSTON / GCWA TRANSFER	08400	LAKE LIVINGSTON	$ 102,382,000	0	0	0	0	28,000	28,000	H12-COHXFR	GCWA buys 28,000 afy from COH at Bayport Reservoir, to off-set Brazos supply used for Fort Bend WUGs. GCWA pays 100% of capital cost. GCWA pays cost of water to COH.
GULF COAST WATER AUTHORITY	000325	11	E	G	999	12	NEW CONTRACT - BRA	120B0	BRA/COE SYSTEM	$ -	10,000	10,000	10,000	10,000	10,000	10,000	H27-NWCUST	GCWA buys additional 10,000 afy from BRA. Contract has no capital cost. GCWA pays cost of water to BRA.
GULF COAST WATER AUTHORITY	000325	11	E	H	999	08	NEW CONTRACT - HOUSTON	08400	LAKE LIVINGSTON	$ -	2,000	2,000	2,000	2,000	2,000	2,000	H27-NWCUST	GCWA buys additional 2,000 afy from Houston to serve League City. Alternative is a direct contract between League City and Houston.
LA PORTE AREA WATER AUTHORITY	001095						NONE REQUIRED FOR THIS WWP											LPAWA has a surplus of supply throughout the planning period.
LOWER NECHES VALLEY AUTHORITY	000140						NONE REQUIRED FOR THIS WWP											LNVA has a surplus of supply throughout the planning period.
LYONDELL-CITGO REFINING							NONE REQUIRED FOR THIS WWP											Liondell-Citgo has a surplus of supply throughout the planning period.
NORTH CHANNEL WATER AUTHORITY	607437	10	N	H	101	10	EXPANDED USE OF GROUNDWATER	10115	GULF COAST AQUIFER	$ -	1,439	1,439	1,439	1,439	1,439	1,439	H19-EXPGW	Increase groundwater purchased from COH to serve existing customer WUGs (amount is within the HGCSD permitted limits).
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		10	C	H	101	10, 11	MUNICIPAL CONSERVATION	3810101	CONSERVATION	$ -	0	8,289	9,564	10,857	12,125	13,454	H01-MNCON3	Conservation by the NHCRWA WUG, which reduces the WWP shortage.
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		10	E	H	999	08	INCREASE CONTRACT FROM CITY OF HOUSTON	08400	LAKE LIVINGSTON	$ -	0	34,873	34,873	34,873	34,873	34,873	H02-INCR	Increase contract from City of Houston. Capital costs reflected in WUG tables.
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		10	E	H	999	08	NEW CONTRACT - HOUSTON	08400	LAKE LIVINGSTON	$ -	0	55,812	55,812	55,812	55,812	55,812	H10-TRAXFR	New contract from Houston for water from the TRA-Houston transfer. This project requires the Luce Bayou conveyance to be constructed (listed separately).
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		10	N	H	101	10	WASTEWATER REUSE	3510101	INDIRECT REUSE	$ -	78,000	94,000	110,000	126,000	141,000	157,000	H14-REUNHC	Reuse of return flows from NHCRWA member wastewater treatment plants. Projected future dsicharge less 5% channel loss used as projected yield. Recommended allocation is 20% of the total shown, beginning in 2050.
NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		10	N	H	101	10	ADDITIONAL YIELD IN LAKE HOUSTON	10030	LAKE HOUSTON	$ -	2,083	8,322	8,322	6,000	3,000	500	H15-HOUYLD	New contract from Houston for water from Lake Houston additional yeild. As this yield is lost to sedimentation, it is replaced with reuse within the NHCRWA.
SAN JACINTO RIVER AUTHORITY	000240	10	N	H	101	10	ADDITIONAL YIELD IN LAKE HOUSTON	10030	LAKE HOUSTON	$ -	13,500	11,000	8,500	6,000	3,500	1,000	H15-HOUYLD	New permit for unappropriated flows identifed in the WAM model. Joint application between COH and SJRA. No capital cost facilities identified with this strategy.
SAN JACINTO RIVER AUTHORITY	000240	10	N	H	170	10	ADDITIONAL SAN JACINTO RIVER YIELD	10500	SAN JACINTO RIVER	$ -	40,000	40,000	40,000	40,000	40,000	40,000	H16-SJROR	New permit for unappropriated flows identifed in the WAM model. Supply is not 100% reliable. Joint application between COH and SJRA. No capital cost facilities identified with this strategy.
SAN JACINTO RIVER AUTHORITY	000240	10	E	H	999	08	SJRA / TRA CONTRACT	08400	LAKE LIVINGSTON	$ -	0	50,000	50,000	50,000	50,000	50,000	H23-TRAXF2	SJRA buys 50,000 afy from TRA. SJRA pays the cost of water to TRA. This project requires the Luce Bayou conveyance to be constructed (listed separately).
TEXAS GENCO	398300						NONE REQUIRED FOR THIS WWP											Texas Genco has a surplus of supply throughout the planning period. Contractual transfer of a portion of that surplus to is a recommended WMS.
TRINITY RIVER AUTHORITY	000187						NONE REQUIRED FOR THIS WWP											TRA has a surplus of supply throughout the planning period. Sales of available TRA supply to Houston, SJRA and individual WUGs are recommended WMS.
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		10	C	H	079, 101	10	MUNICIPAL CONSERVATION	3810101	CONSERVATION	$ -	0	8,289	9,564	10,857	12,125	13,454	H01-MNCON3	Conservation by the WHCRWA WUG, which reduces the WWP shortage.
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		10	E	H	999	08	INCREASE CONTRACT FROM CITY OF HOUSTON	08400	LAKE LIVINGSTON	$ -	0	16,844	16,844	16,844	16,844	16,844	H02-INCR	Increase contract from City of Houston. Capital costs reflected in WUG tables.
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		10	E	H	999	08	NEW CONTRACT - HOUSTON	08400	LAKE LIVINGSTON	$ -	0	36,831	39,886	39,886	39,886	39,886	H10-TRAXFR	New contract from Houston for water from the TRA-Houston transfer. This project requires the Luce Bayou conveyance to be constructed (listed separately).
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		10	N	H	101	10	WASTEWATER REUSE	3510101	INDIRECT REUSE	$ -	0	0	0	0	8,000	8000	H13-REUHOU	Indirect reuse of wastewater, blended through Lake Hosuton and treated as part of the City municipal supply.
WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		10	N	H	101	10	ADDITIONAL YIELD IN LAKE HOUSTON	10030	LAKE HOUSTON	$ -	1,143	1,143	1,143	470	470	470	H15-HOUYLD	New contract from Houston for water from Lake Houston additional yeild. As this yield is lost to sedimentation, it is replaced with reuse within the NHCRWA.

Strategy Types:

C - Conservation
E - Existing Source or expanded use of existing source
N - New Source
R - Reuse
Blank - None required

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
ALVIN	80013000	BRAZORIA	SAN JACINTO-BRAZOS	Population	21413	23231	25123	26935	28605	30375	32223				
				Population Total	**21413**	**23231**	**25123**	**26935**	**28605**	**30375**	**32223**				
ALVIN	80013000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	2974	3123	3293	3440	3557	3743	3970				
				Demand Total	**2974**	**3123**	**3293**	**3440**	**3557**	**3743**	**3970**				
ALVIN	80013000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	2974	2974	2974	2974	2974	2974	2974	GULF COAST AQUIFER	None		
				Supply Total	**2974**	**2974**	**2974**	**2974**	**2974**	**2974**	**2974**				
ALVIN	80013000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	149	319	466	583	769	996	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,822,600.00
				WMS Total	**0**	**149**	**319**	**466**	**583**	**769**	**996**				**$1,822,600.00**
AMES	80676000	LIBERTY	TRINITY	Population	1079	1140	1207	1271	1334	1403	1480				
				Population Total	**1079**	**1140**	**1207**	**1271**	**1334**	**1403**	**1480**				
AMES	80676000	LIBERTY	TRINITY	Demand	114	116	118	120	121	126	133				
				Demand Total	**114**	**116**	**118**	**120**	**121**	**126**	**133**				
AMES	80676000	LIBERTY	TRINITY	Supply	114	114	114	114	114	114	114	GULF COAST AQUIFER	None		
				Supply Total	**114**	**114**	**114**	**114**	**114**	**114**	**114**				
AMES	80676000	LIBERTY	TRINITY	WMS	0	2	4	6	7	12	19	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**2**	**4**	**6**	**7**	**12**	**19**				**$0.00**
ANAHUAC	80015000	CHAMBERS	NECHES-TRINITY	Population	1715	1866	2035	2192	2328	2466	2607				
ANAHUAC	80015000	CHAMBERS	TRINITY	Population	495	539	588	633	672	712	753				
				Population Total	**2210**	**2405**	**2623**	**2825**	**3000**	**3178**	**3360**				
ANAHUAC	80015000	CHAMBERS	NECHES-TRINITY	Demand	259	274	292	307	318	334	353				
ANAHUAC	80015000	CHAMBERS	TRINITY	Demand	75	79	84	89	92	97	102				
				Demand Total	**334**	**353**	**376**	**396**	**410**	**431**	**455**				
ANAHUAC	80015000	CHAMBERS	NECHES-TRINITY	Supply	813	814	815	813	814	813	814	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT		
ANAHUAC	80015000	CHAMBERS	TRINITY	Supply	236	235	234	236	235	236	235	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT		
				Supply Total	**1049**	**1049**	**1049**	**1049**	**1049**	**1049**	**1049**				
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	Population	18130	18951	19805	20623	21377	22176	23010				
				Population Total	**18130**	**18951**	**19805**	**20623**	**21377**	**22176**	**23010**				
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	2071	2102	2108	2125	2131	2186	2268				
				Demand Total	**2071**	**2102**	**2108**	**2125**	**2131**	**2186**	**2268**				
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	1815	1815	1815	1815	1815	1815	1815	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	95	95	95	95	95	95	95	GULF COAST AQUIFER	None		
				Supply Total	**1910**	**1910**	**1910**	**1910**	**1910**	**1910**	**1910**				
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	143	145	145	147	147	151	156	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	170	170	170	170	170	170	170	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
ANGLETON	80018000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	30	45	40	28	30	35	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**313**	**345**	**360**	**357**	**345**	**351**	**361**				**$0.00**
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	Population	1048	2500	2750	3025	3328	3661	4026				
				Population Total	**1048**	**2500**	**2750**	**3025**	**3328**	**3661**	**4026**				
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	Demand	175	403	434	474	514	566	622				
				Demand Total	**175**	**403**	**434**	**474**	**514**	**566**	**622**				
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	Supply	135	135	135	135	135	135	135	GULF COAST AQUIFER	None		
				Supply Total	**135**	**135**	**135**	**135**	**135**	**135**	**135**				
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	WMS	10	24	26	28	31	34	37	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	336	336	336	336	336	336	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$3,505,017
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	106	106	106	106	106	106	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
ARCOLA	80998000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	138	86	8	8	8	8	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**10**	**604**	**554**	**478**	**481**	**484**	**487**				**$3,921,017.45**
BACLIFF MUD	84012000	GALVESTON	SAN JACINTO-BRAZOS	Population	7014	7816	8509	8919	9085	9209	9289				
				Population Total	**7014**	**7816**	**8509**	**8919**	**9085**	**9209**	**9289**				
BACLIFF MUD	84012000	GALVESTON	SAN JACINTO-BRAZOS	Demand	526	552	572	569	560	557	562				
				Demand Total	**526**	**552**	**572**	**569**	**560**	**557**	**562**				
BACLIFF MUD	84012000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1185	1185	1185	1185	1185	1185	1185	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**1185**	**1185**	**1185**	**1185**	**1185**	**1185**	**1185**				
BAILEY'S PRAIRIE	80817000	BRAZORIA	SAN JACINTO-BRAZOS	Population	581	623	666	707	745	786	828				
BAILEY'S PRAIRIE	80817000	BRAZORIA	BRAZOS	Population	113	121	129	137	144	152	160				
				Population Total	**694**	**744**	**795**	**844**	**889**	**938**	**988**				
BAILEY'S PRAIRIE	80817000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	72	75	78	80	82	85	90				
BAILEY'S PRAIRIE	80817000	BRAZORIA	BRAZOS	Demand	14	15	15	15	16	17	17				
				Demand Total	**86**	**90**	**93**	**95**	**98**	**102**	**107**				
BAILEY'S PRAIRIE	80817000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	72	72	72	72	72	72	72	GULF COAST AQUIFER	None		
BAILEY'S PRAIRIE	80817000	BRAZORIA	BRAZOS	Supply	14	14	14	14	14	14	14	GULF COAST AQUIFER	None		
				Supply Total	**86**	**86**	**86**	**86**	**86**	**86**	**86**				
BAILEY'S PRAIRIE	80817000	BRAZORIA	BRAZOS	WMS	0	1	1	1	2	3	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
BAILEY'S PRAIRIE	80817000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	3	6	8	10	13	18	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**4**	**7**	**9**	**12**	**16**	**21**				**$0.00**
BAYOU VISTA	80759000	GALVESTON	SAN JACINTO-BRAZOS	Population	1644	1816	1964	2052	2088	2114	2131				
				Population Total	**1644**	**1816**	**1964**	**2052**	**2088**	**2114**	**2131**				
BAYOU VISTA	80759000	GALVESTON	SAN JACINTO-BRAZOS	Demand	396	429	458	471	475	478	482				
				Demand Total	**396**	**429**	**458**	**471**	**475**	**478**	**482**				
BAYOU VISTA	80759000	GALVESTON	SAN JACINTO-BRAZOS	Supply	40	40	40	40	40	40	40	GULF COAST AQUIFER	None		
BAYOU VISTA	80759000	GALVESTON	SAN JACINTO-BRAZOS	Supply	448	448	448	448	448	448	448	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**488**	**488**	**488**	**488**	**488**	**488**	**488**				
BAYOU VISTA	80759000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	3	6	7	8	8	8	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**3**	**6**	**7**	**8**	**8**	**8**				**$0.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
BAYTOWN	80042000	CHAMBERS	TRINITY-SAN JACINTO	Population	3154	3541	3972	4373	4720	5072	5433				
BAYTOWN	80042000	HARRIS	TRINITY-SAN JACINTO	Population	59737	61583	63380	65148	66898	68637	70369				
BAYTOWN	80042000	HARRIS	SAN JACINTO	Population	3539	3648	3754	3859	3963	4066	4169				
				Population Total	**66430**	**68772**	**71106**	**73380**	**75581**	**77775**	**79971**				
BAYTOWN	80042000	CHAMBERS	TRINITY-SAN JACINTO	Demand	519	571	623	671	708	756	809				
BAYTOWN	80042000	HARRIS	TRINITY-SAN JACINTO	Demand	9836	9933	9939	9998	10041	10225	10484				
BAYTOWN	80042000	HARRIS	SAN JACINTO	Demand	583	588	589	592	595	606	621				
				Demand Total	**10938**	**11092**	**11151**	**11261**	**11344**	**11587**	**11914**				
BAYTOWN	80042000	CHAMBERS	TRINITY-SAN JACINTO	Supply	52	52	52	52	52	52	52	GULF COAST AQUIFER	None		
BAYTOWN	80042000	CHAMBERS	TRINITY-SAN JACINTO	Supply	520	565	613	654	685	716	745	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY		
BAYTOWN	80042000	HARRIS	TRINITY-SAN JACINTO	Supply	984	984	984	984	984	984	984	GULF COAST AQUIFER	None		
BAYTOWN	80042000	HARRIS	TRINITY-SAN JACINTO	Supply	9866	9825	9779	9741	9712	9683	9656	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY		
BAYTOWN	80042000	HARRIS	SAN JACINTO	Supply	650	646	644	641	639	637	635	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY		
				Supply Total	**12072**	**12072**	**12072**	**12072**	**12072**	**12072**	**12072**				
BAYTOWN	80042000	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	5	10	15	19	24	29	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
BAYTOWN	80042000	HARRIS	TRINITY-SAN JACINTO	WMS	0	9	10	16	20	39	64	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**14**	**20**	**31**	**39**	**63**	**93**				**$0.00**
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	Population	1441	2066	2762	3409	3970	4539	5122				
BEACH CITY	80822000	CHAMBERS	TRINITY	Population	204	292	391	483	562	643	726				
				Population Total	**1645**	**2358**	**3153**	**3892**	**4532**	**5182**	**5848**				
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	Demand	200	275	362	439	507	580	654				
BEACH CITY	80822000	CHAMBERS	TRINITY	Demand	28	39	51	62	72	82	93				
				Demand Total	**228**	**314**	**413**	**501**	**579**	**662**	**747**				
BEACH CITY	80822000	CHAMBERS	TRINITY	Supply	5	5	5	5	5	5	5	GULF COAST AQUIFER	None		
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	Supply	67	67	67	67	67	67	67	GULF COAST AQUIFER	None		
				Supply Total	**72**	**72**	**72**	**72**	**72**	**72**	**72**				
BEACH CITY	80822000	CHAMBERS	TRINITY	WMS	2	2	3	4	4	5	6	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BEACH CITY	80822000	CHAMBERS	TRINITY	WMS	0	73	73	73	73	73	73	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$0.00
BEACH CITY	80822000	CHAMBERS	TRINITY	WMS	0	2	4	5	6	8	9	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	WMS	12	16	22	26	30	35	39	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	475	475	475	475	475	475	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$3,895,822.89
BEACH CITY	80822000	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	15	37	50	59	67	73	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**14**	**583**	**614**	**633**	**647**	**663**	**675**				**$3,895,822.89**
BEASLEY	81012000	FORT BEND	BRAZOS	Population	52	62	72	84	97	114	133				
BEASLEY	81012000	FORT BEND	BRAZOS-COLORADO	Population	538	639	743	871	1002	1174	1371				
				Population Total	**590**	**701**	**815**	**955**	**1099**	**1288**	**1504**				
BEASLEY	81012000	FORT BEND	BRAZOS	Demand	7	8	9	10	12	14	16				
BEASLEY	81012000	FORT BEND	BRAZOS-COLORADO	Demand	74	84	95	108	122	142	166				
				Demand Total	**81**	**92**	**104**	**118**	**134**	**156**	**182**				
BEASLEY	81012000	FORT BEND	BRAZOS	Supply	2	2	2	2	2	2	2	GULF COAST AQUIFER	None		
BEASLEY	81012000	FORT BEND	BRAZOS-COLORADO	Supply	74	74	74	74	74	74	74	GULF COAST AQUIFER	None		
				Supply Total	**76**	**76**	**76**	**76**	**76**	**76**	**76**				
BEASLEY	81012000	FORT BEND	BRAZOS	WMS	0	0	0	1	1	1	1	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BEASLEY	81012000	FORT BEND	BRAZOS	WMS	0	10	10	10	10	10	10	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
BEASLEY	81012000	FORT BEND	BRAZOS	WMS	0	1	2	3	3	3	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
BEASLEY	81012000	FORT BEND	BRAZOS-COLORADO	WMS	0	10	21	34	48	68	92	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**21**	**33**	**48**	**62**	**82**	**106**				**$0.00**
BELLAIRE	80046000	HARRIS	SAN JACINTO	Population	15642	17272	18859	20420	21965	23500	25029				
				Population Total	**15642**	**17272**	**18859**	**20420**	**21965**	**23500**	**25029**				
BELLAIRE	80046000	HARRIS	SAN JACINTO	Demand	3452	3734	3993	4254	4527	4817	5131				
				Demand Total	**3452**	**3734**	**3993**	**4254**	**4527**	**4817**	**5131**				
BELLAIRE	80046000	HARRIS	SAN JACINTO	Supply	690	690	690	662	662	662	662	GULF COAST AQUIFER	None		
BELLAIRE	80046000	HARRIS	SAN JACINTO	Supply	1310	1310	1310	1310	1310	1310	1310	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**2000**	**2000**	**2000**	**1972**	**1972**	**1972**	**1972**				
BELLAIRE	80046000	HARRIS	SAN JACINTO	WMS	238	258	275	293	312	332	354	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BELLAIRE	80046000	HARRIS	SAN JACINTO	WMS	781	781	781	781	781	781	781	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
BELLAIRE	80046000	HARRIS	SAN JACINTO	WMS	0	0	780	780	1342	1342	1342	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$312,686.00
BELLAIRE	80046000	HARRIS	SAN JACINTO	WMS	0	682	682	682	682	682	682	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$6,654,359.88
BELLAIRE	80046000	HARRIS	SAN JACINTO	WMS	0	13	109	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**1019**	**1734**	**2627**	**2536**	**3117**	**3137**	**3159**				**$7,383,045.88**
BELLVILLE	80048000	AUSTIN	BRAZOS	Population	3794	4191	4567	4830	4986	5061	5164				
				Population Total	**3794**	**4191**	**4567**	**4830**	**4986**	**5061**	**5164**				
BELLVILLE	80048000	AUSTIN	BRAZOS	Demand	884	958	1028	1071	1089	1100	1122				
				Demand Total	**884**	**958**	**1028**	**1071**	**1089**	**1100**	**1122**				
BELLVILLE	80048000	AUSTIN	BRAZOS	Supply	884	884	884	884	884	884	884	GULF COAST AQUIFER	None		
				Supply Total	**884**	**884**	**884**	**884**	**884**	**884**	**884**				
BELLVILLE	80048000	AUSTIN	BRAZOS	WMS	0	74	144	187	205	216	238	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,228,400.00
				WMS Total	**0**	**74**	**144**	**187**	**205**	**216**	**238**				**$1,228,400.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	Population	2055	4215	6453	9190	12004	15695	19913				
				Population Total	**2055**	**4215**	**6453**	**9190**	**12004**	**15695**	**19913**				
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	Demand	292	581	875	1246	1614	2110	2677				
				Demand Total	**292**	**581**	**875**	**1246**	**1614**	**2110**	**2677**				
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	Supply	283	283	283	283	283	283	283	GULF COAST AQUIFER	None		
				Supply Total	**283**	**283**	**283**	**283**	**283**	**283**	**283**				
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	WMS	9	40	60	86	111	146	185	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	WMS	0	0	0	1332	1332	1332	1332	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,272,887.91
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	WMS	0	685	685	685	685	685	685	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$9,196,535
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	WMS	0	66	66	66	66	66	66	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
BIG OAKS MUD	84020000	FORT BEND	SAN JACINTO	WMS	0	192	217	126	126	126	126	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**9**	**983**	**1028**	**2295**	**2320**	**2355**	**2394**				**$11,885,422.85**
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	Population	2592	2592	2592	2592	2592	2592	2592				
				Population Total	**2592**	**2592**	**2592**	**2592**	**2592**	**2592**	**2592**				
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	Demand	581	572	563	555	546	540	540				
				Demand Total	**581**	**572**	**563**	**555**	**546**	**540**	**540**				
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	Supply	581	377	169	87	87	87	87	GULF COAST AQUIFER	None		
				Supply Total	**581**	**377**	**169**	**87**	**87**	**87**	**87**				
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	WMS	0	32	31	31	30	30	30	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	WMS	0	0	274	274	274	274	274	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$63,842.00
BLUE BELL MANOR UTILITY COMPANY	84026000	HARRIS	SAN JACINTO	WMS	0	163	163	163	163	163	163	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,232,496.81
				WMS Total	**0**	**195**	**468**	**468**	**467**	**467**	**467**				**$2,296,338.81**
BOLIVAR PENINSULAR SUD	84027000	GALVESTON	NECHES-TRINITY	Population	3853	4266	4622	4833	4918	4982	5023				
				Population Total	**3853**	**4266**	**4622**	**4833**	**4918**	**4982**	**5023**				
BOLIVAR PENINSULAR SUD	84027000	GALVESTON	NECHES-TRINITY	Demand	1032	1123	1201	1240	1251	1261	1272				
				Demand Total	**1032**	**1123**	**1201**	**1240**	**1251**	**1261**	**1272**				
BOLIVAR PENINSULAR SUD	84027000	GALVESTON	NECHES-TRINITY	Supply	5038	5038	5038	5038	5038	5038	5038	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
				Supply Total	**5038**	**5038**	**5038**	**5038**	**5038**	**5038**	**5038**				
BRAZORIA	80072000	BRAZORIA	BRAZOS	Population	678	692	707	721	734	748	762				
BRAZORIA	80072000	BRAZORIA	BRAZOS-COLORADO	Population	2109	2153	2199	2243	2283	2326	2371				
				Population Total	**2787**	**2845**	**2906**	**2964**	**3017**	**3074**	**3133**				
BRAZORIA	80072000	BRAZORIA	BRAZOS	Demand	70	68	67	66	64	65	66				
BRAZORIA	80072000	BRAZORIA	BRAZOS-COLORADO	Demand	217	212	209	206	199	201	205				
				Demand Total	**287**	**280**	**276**	**272**	**263**	**266**	**271**				
BRAZORIA	80072000	BRAZORIA	BRAZOS	Supply	82	82	82	82	82	82	82	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
BRAZORIA	80072000	BRAZORIA	BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
BRAZORIA	80072000	BRAZORIA	BRAZOS-COLORADO	Supply	254	254	254	254	254	254	254	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
BRAZORIA	80072000	BRAZORIA	BRAZOS-COLORADO	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
				Supply Total	**336**	**336**	**336**	**336**	**336**	**336**	**336**				
BRAZORIA COUNTY MUD #1	84030000	BRAZORIA	SAN JACINTO-BRAZOS	Population	4110	7517	11063	14458	17587	20904	24368				
				Population Total	**4110**	**7517**	**11063**	**14458**	**17587**	**20904**	**24368**				
BRAZORIA COUNTY MUD #1	84030000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	479	842	1214	1587	1911	2271	2648				
				Demand Total	**479**	**842**	**1214**	**1587**	**1911**	**2271**	**2648**				
BRAZORIA COUNTY MUD #1	84030000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	479	479	479	479	479	479	479	GULF COAST AQUIFER	None		
				Supply Total	**479**	**479**	**479**	**479**	**479**	**479**	**479**				
BRAZORIA COUNTY MUD #1	84030000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	363	735	1108	1432	1792	2169	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$2,973,100.00
				WMS Total	**0**	**363**	**735**	**1108**	**1432**	**1792**	**2169**				**$2,973,100.00**
BRAZORIA COUNTY MUD #2	84031000	BRAZORIA	BRAZOS	Population	2838	4857	6959	8971	10826	12792	14845				
				Population Total	**2838**	**4857**	**6959**	**8971**	**10826**	**12792**	**14845**				
BRAZORIA COUNTY MUD #2	84031000	BRAZORIA	BRAZOS	Demand	664	1115	1590	2050	2462	2909	3376				
				Demand Total	**664**	**1115**	**1590**	**2050**	**2462**	**2909**	**3376**				
BRAZORIA COUNTY MUD #2	84031000	BRAZORIA	BRAZOS	Supply	664	664	664	664	664	664	664	GULF COAST AQUIFER	None		
				Supply Total	**664**	**664**	**664**	**664**	**664**	**664**	**664**				
BRAZORIA COUNTY MUD #2	84031000	BRAZORIA	BRAZOS	WMS	0	451	926	1386	1798	2245	2712	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$3,054,100.00
				WMS Total	**0**	**451**	**926**	**1386**	**1798**	**2245**	**2712**				**$3,054,100.00**
BRAZORIA COUNTY MUD #3	84032000	BRAZORIA	SAN JACINTO-BRAZOS	Population	2727	4987	7340	9593	11669	13870	16168				
				Population Total	**2727**	**4987**	**7340**	**9593**	**11669**	**13870**	**16168**				
BRAZORIA COUNTY MUD #3	84032000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	345	603	872	1139	1372	1631	1902				
				Demand Total	**345**	**603**	**872**	**1139**	**1372**	**1631**	**1902**				
BRAZORIA COUNTY MUD #3	84032000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	345	345	345	345	345	345	345	GULF COAST AQUIFER	None		
				Supply Total	**345**	**345**	**345**	**345**	**345**	**345**	**345**				
BRAZORIA COUNTY MUD #3	84032000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	258	527	794	1027	1286	1557	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$2,881,500.00
				WMS Total	**0**	**258**	**527**	**794**	**1027**	**1286**	**1557**				**$2,881,500.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
BRAZORIA COUNTY MUD #4	84033000	BRAZORIA	SAN JACINTO-BRAZOS	Population	3438	3438	3438	3438	3438	3438	3438				
				Population Total	**3438**	**3438**	**3438**	**3438**	**3438**	**3438**	**3438**				
BRAZORIA COUNTY MUD #4	84033000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	593	578	570	562	558	558	558				
				Demand Total	**593**	**578**	**570**	**562**	**558**	**558**	**558**				
BRAZORIA COUNTY MUD #4	84033000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	593	578	570	562	558	558	558	GULF COAST AQUIFER	None		
				Supply Total	**593**	**578**	**570**	**562**	**558**	**558**	**558**				
BRAZORIA COUNTY MUD #5	84034000	BRAZORIA	SAN JACINTO-BRAZOS	Population	4743	4743	4743	4743	4743	4743	4743				
				Population Total	**4743**	**4743**	**4743**	**4743**	**4743**	**4743**	**4743**				
BRAZORIA COUNTY MUD #5	84034000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	707	680	669	659	653	653	653				
				Demand Total	**707**	**680**	**669**	**659**	**653**	**653**	**653**				
BRAZORIA COUNTY MUD #5	84034000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	707	680	669	659	653	653	653	GULF COAST AQUIFER	None		
				Supply Total	**707**	**680**	**669**	**659**	**653**	**653**	**653**				
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	Population	1668	2061	2444	2821	3194	3565	3934				
				Population Total	**1668**	**2061**	**2444**	**2821**	**3194**	**3565**	**3934**				
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	Demand	390	471	550	626	705	783	864				
				Demand Total	**390**	**471**	**550**	**626**	**705**	**783**	**864**				
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	Supply	390	311	165	97	97	97	97	GULF COAST AQUIFER	None		
				Supply Total	**390**	**311**	**165**	**97**	**97**	**97**	**97**				
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	WMS	0	28	33	37	42	47	51	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	WMS	0	0	434	434	584	584	584	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$136,072.00
BRITMOORE UTILITIES	84036000	HARRIS	SAN JACINTO	WMS	0	132	132	132	132	132	132	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,985,839.37
				WMS Total	**0**	**160**	**599**	**603**	**758**	**763**	**767**				**$3,121,911.37**
BROOKSHIRE	80077000	WALLER	BRAZOS	Population	3450	3930	4499	5133	5838	6678	7642				
				Population Total	**3450**	**3930**	**4499**	**5133**	**5838**	**6678**	**7642**				
BROOKSHIRE	80077000	WALLER	BRAZOS	Demand	522	572	635	707	791	898	1027				
				Demand Total	**522**	**572**	**635**	**707**	**791**	**898**	**1027**				
BROOKSHIRE	80077000	WALLER	BRAZOS	Supply	522	522	522	522	522	522	522	GULF COAST AQUIFER	None		
				Supply Total	**522**	**522**	**522**	**522**	**522**	**522**	**522**				
BROOKSHIRE	80077000	WALLER	BRAZOS	WMS	0	0	0	0	0	20	61	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BROOKSHIRE	80077000	WALLER	BRAZOS	WMS	0	0	0	0	0	0	42	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
BROOKSHIRE	80077000	WALLER	BRAZOS	WMS	0	50	113	185	269	356	402	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,382,900.00
BROOKSHIRE	80077000	WALLER	BRAZOS	WMS	0						42	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**50**	**113**	**185**	**269**	**376**	**547**				**$1,382,900.00**
BROOKSIDE VILLAGE	80078000	BRAZORIA	SAN JACINTO-BRAZOS	Population	1960	2282	2618	2939	3235	3549	3877				
				Population Total	**1960**	**2282**	**2618**	**2939**	**3235**	**3549**	**3877**				
BROOKSIDE VILLAGE	80078000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	239	266	296	323	348	378	413				
				Demand Total	**239**	**266**	**296**	**323**	**348**	**378**	**413**				
BROOKSIDE VILLAGE	80078000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	239	239	239	239	239	239	239	GULF COAST AQUIFER	None		
				Supply Total	**239**	**239**	**239**	**239**	**239**	**239**	**239**				
BROOKSIDE VILLAGE	80078000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	27	57	84	109	139	174	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**27**	**57**	**84**	**109**	**139**	**174**				**$416,000.00**
BUFFALO	80083000	LEON	TRINITY	Population	1804	2074	2345	2506	2516	2501	2521				
				Population Total	**1804**	**2074**	**2345**	**2506**	**2516**	**2501**	**2521**				
BUFFALO	80083000	LEON	TRINITY	Demand	311	348	384	401	397	392	395				
				Demand Total	**311**	**348**	**384**	**401**	**397**	**392**	**395**				
BUFFALO	80083000	LEON	TRINITY	Supply	311	311	311	311	311	311	311	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**311**	**311**	**311**	**311**	**311**	**311**	**311**				
BUFFALO	80083000	LEON	TRINITY	WMS	0	37	73	90	86	81	84	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**37**	**73**	**90**	**86**	**81**	**84**				**$0.00**
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	Population	3654	3750	3750	3750	3750	3750	3750				
				Population Total	**3654**	**3750**	**3750**	**3750**	**3750**	**3750**	**3750**				
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	Demand	1478	1504	1491	1479	1466	1462	1462				
				Demand Total	**1478**	**1504**	**1491**	**1479**	**1466**	**1462**	**1462**				
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	Supply	296	283	296	230	230	230	230	GULF COAST AQUIFER	None		
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	Supply	635	635	635	635	635	635	635	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**931**	**918**	**931**	**865**	**865**	**865**	**865**				
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	WMS	88	90	89	88	87	87	87	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	WMS	142	142	142	142	142	142	142	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	WMS	0	384	384	384	384	384	384	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,082,906.41
BUNKER HILL VILLAGE	80085000	HARRIS	SAN JACINTO	WMS	0	0	2	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**230**	**616**	**617**	**614**	**613**	**613**	**613**				**$2,082,906.41**
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	Population	1758	2213	2656	3092	3523	3952	4379				
				Population Total	**1758**	**2213**	**2656**	**3092**	**3523**	**3952**	**4379**				
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	Demand	368	451	530	610	691	770	853				
				Demand Total	**368**	**451**	**530**	**610**	**691**	**770**	**853**				
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	Supply	368	297	159	95	95	95	95	GULF COAST AQUIFER	None		
				Supply Total	**368**	**297**	**159**	**95**	**95**	**95**	**95**				
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	WMS	0	27	32	36	41	46	51	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	WMS	0	0	428	428	580	580	580	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$135,140.00
CANDLELIGHT HILLS SUBDIVISION	84043000	HARRIS	SAN JACINTO	WMS	0	127	127	127	127	127	127	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,676,477.13
				WMS Total	**0**	**154**	**587**	**591**	**748**	**753**	**758**				**$4,811,617.13**
CENTERVILLE	80105000	LEON	TRINITY	Population	903	1002	1101	1160	1164	1158	1165				
				Population Total	**903**	**1002**	**1101**	**1160**	**1164**	**1158**	**1165**				
CENTERVILLE	80105000	LEON	TRINITY	Demand	174	189	203	210	207	205	206				
				Demand Total	**174**	**189**	**203**	**210**	**207**	**205**	**206**				
CENTERVILLE	80105000	LEON	TRINITY	Supply	174	174	174	174	174	174	174	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**174**	**174**	**174**	**174**	**174**	**174**	**174**				
CENTERVILLE	80105000	LEON	TRINITY	WMS	0	15	29	36	33	31	32	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**15**	**29**	**36**	**33**	**31**	**32**				**$0.00**
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	Population	5128	6412	6412	6412	6412	6412	6412				
				Population Total	**5128**	**6412**	**6412**	**6412**	**6412**	**6412**	**6412**				
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	Demand	557	668	646	625	618	611	611				
				Demand Total	**557**	**668**	**646**	**625**	**618**	**611**	**611**				
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	Supply	557	440	194	97	97	97	97	GULF COAST AQUIFER	None		
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	Supply	426	426	426	426	426	426	426	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**983**	**866**	**620**	**523**	**523**	**523**	**523**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	WMS	0	0	26	37	37	36	36	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	WMS	0	0	0	14	14	14	14	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
CHIMNEY HILL MUD	84053000	HARRIS	SAN JACINTO	WMS	0	0	51	51	51	51	51	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$11,883.00
				WMS Total	**0**	**0**	**77**	**102**	**102**	**101**	**101**				**$11,883.00**
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	Population	3971	8145	12471	17760	23198	30330	38480				
				Population Total	**3971**	**8145**	**12471**	**17760**	**23198**	**30330**	**38480**				
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	Demand	1085	2190	3325	4735	6158	8052	10215				
				Demand Total	**1085**	**2190**	**3325**	**4735**	**6158**	**8052**	**10215**				
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	Supply	1053	1053	1053	1053	1053	1053	1053	GULF COAST AQUIFER	None		
				Supply Total	**1053**	**1053**	**1053**	**1053**	**1053**	**1053**	**1053**				
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	WMS	32	151	229	327	425	555	705	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	WMS	0	0	0	5102	5102	5102	5102	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$8,705,911.49
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	WMS	0	2604	2604	2604	2604	2604	2604	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$32,592,735
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	WMS	0	249	249	249	249	249	249	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CINCO MUD #2	84058000	FORT BEND	SAN JACINTO	WMS	0	737	846	502	502	502	502	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,566,300.00
				WMS Total	**32**	**3741**	**3928**	**8784**	**8882**	**9012**	**9162**				**$42,864,946.93**
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	Population	1139	2336	3577	5094	6654	8700	11038				
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	Population	515	982	1437	1884	2327	2767	3205				
				Population Total	**1654**	**3318**	**5014**	**6978**	**8981**	**11467**	**14243**				
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	Demand	204	406	613	873	1133	1481	1879				
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	Demand	92	170	246	323	396	471	546				
				Demand Total	**296**	**576**	**859**	**1196**	**1529**	**1952**	**2425**				
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	Supply	198	198	198	198	198	198	198	GULF COAST AQUIFER	None		
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	Supply	92	92	74	50	50	50	50	GULF COAST AQUIFER	None		
				Supply Total	**290**	**290**	**272**	**248**	**248**	**248**	**248**				
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	WMS	6	28	42	60	78	102	130	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	WMS	0	0	0	936	936	936	936	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$1,597,164.48
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	WMS	0	481	481	481	481	481	481	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$9,325,221
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	WMS	0	46	46	46	46	46	46	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CINCO MUD #6	84059000	FORT BEND	SAN JACINTO	WMS	0	134	152	88	88	88	88	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	WMS	0	12	17	22	27	32	38	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	WMS	0	0	273	273	412	412	412	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$95,996.00
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	WMS	0	46	46	46	46	46	46	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
CINCO MUD #6	84059000	HARRIS	SAN JACINTO	WMS	0	20						GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**6**	**767**	**1057**	**1952**	**2114**	**2143**	**2177**				**$11,850,381.10**
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	Population	2711	5560	8513	12124	15837	20706	26270				
				Population Total	**2711**	**5560**	**8513**	**12124**	**15837**	**20706**	**26270**				
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	Demand	531	1065	1612	2295	2980	3897	4944				
				Demand Total	**531**	**1065**	**1612**	**2295**	**2980**	**3897**	**4944**				
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	Supply	515	515	515	515	515	515	515	GULF COAST AQUIFER	None		
				Supply Total	**515**	**515**	**515**	**515**	**515**	**515**	**515**				
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	WMS	16	73	111	158	206	269	341	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	WMS	0	0	0	2466	2466	2466	2466	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$4,207,914.10
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	WMS	0	1261	1261	1261	1261	1261	1261	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$16,252,157
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	WMS	0	122	122	122	122	122	122	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CINCO MUD #7	84060000	FORT BEND	SAN JACINTO	WMS	0	355	405	239	239	239	239	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,383,400.00
				WMS Total	**16**	**1811**	**1899**	**4246**	**4294**	**4357**	**4429**				**$21,843,471.33**
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	Population	2395	3500	3500	3500	3500	3500	3500				
				Population Total	**2395**	**3500**	**3500**	**3500**	**3500**	**3500**	**3500**				
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	Demand	322	455	447	447	443	443	443				
				Demand Total	**322**	**455**	**447**	**447**	**443**	**443**	**443**				
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	Supply	312	312	255	147	147	147	147	GULF COAST AQUIFER	None		
				Supply Total	**312**	**312**	**255**	**147**	**147**	**147**	**147**				
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	WMS	10	27	27	27	26	26	26	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	WMS	0	217	217	217	217	217	217	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$1,655,869
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	WMS	0	56	56	56	56	56	56	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CINCO MUD #8	84061000	FORT BEND	SAN JACINTO	WMS	0	60	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**10**	**360**	**300**	**300**	**299**	**299**	**299**				**$1,655,868.90**
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	Population	3373	6918	10592	15085	19704	25762	32685				
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	Population	599	1100	1588	2068	2543	3015	3485				
				Population Total	**3972**	**8018**	**12180**	**17153**	**22247**	**28777**	**36170**				
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	Demand	691	1387	2100	2991	3885	5079	6444				
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	Demand	123	221	315	410	501	594	687				
				Demand Total	**814**	**1608**	**2415**	**3401**	**4386**	**5673**	**7131**				
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	Supply	670	670	670	670	670	670	670	GULF COAST AQUIFER	None		
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	Supply	123	123	95	63	63	63	63	GULF COAST AQUIFER	None		
				Supply Total	**793**	**793**	**765**	**733**	**733**	**733**	**733**				
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	WMS	21	96	145	206	268	350	445	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	WMS	0	0	0	3214	3214	3214	3214	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$5,484,280.58
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	WMS	0	1646	1646	1646	1646	1646	1646	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$23,260,316
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	WMS	0	157	157	157	157	157	157	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CINCO MUD #9	84062000	FORT BEND	SAN JACINTO	WMS	0	464	529	312	312	312	312	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,397,900.00
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	WMS	0	15	22	28	35	41	47	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	WMS	0	0	343	343	517	517	517	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$120,461.00
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	WMS	0	60	60	60	60	60	60	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
CINCO MUD #9	84062000	HARRIS	SAN JACINTO	WMS	0	23						GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,397,900.00
				WMS Total	**21**	**2461**	**2902**	**5966**	**6209**	**6297**	**6398**				**$31,660,857.21**
CLEAR BROOK CITY MUD WOODMEADOWS	84063000	HARRIS	SAN JACINTO	Population	8943	10417	11852	13263	14660	16048	17431				
				Population Total	**8943**	**10417**	**11852**	**13263**	**14660**	**16048**	**17431**				
CLEAR BROOK CITY MUD WOODMEADOWS	84063000	HARRIS	SAN JACINTO	Demand	902	1003	1089	1189	1281	1384	1503				
				Demand Total	**902**	**1003**	**1089**	**1189**	**1281**	**1384**	**1503**				
CLEAR BROOK CITY MUD WOODMEADOWS	84063000	HARRIS	SAN JACINTO	Supply	180	180	180	180	180	180	180	GULF COAST AQUIFER	None		
CLEAR BROOK CITY MUD WOODMEADOWS	84063000	HARRIS	SAN JACINTO	Supply	1680	1680	1680	1680	1680	1680	1680	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**1860**	**1860**	**1860**	**1860**	**1860**	**1860**	**1860**				
CLEAR BROOK CITY MUD WOODMEADOWS	84063000	HARRIS	SAN JACINTO	WMS	0	9	38	5	5	5	5	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**9**	**38**	**5**	**5**	**5**	**5**				**$0.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
CLEAR LAKE SHORES	80764000	GALVESTON	SAN JACINTO-BRAZOS	Population	1205	1263	1313	1343	1355	1364	1370				
				Population Total	**1205**	**1263**	**1313**	**1343**	**1355**	**1364**	**1370**				
CLEAR LAKE SHORES	80764000	GALVESTON	SAN JACINTO-BRAZOS	Demand	273	282	287	289	287	287	289				
				Demand Total	**273**	**282**	**287**	**289**	**287**	**287**	**289**				
CLEAR LAKE SHORES	80764000	GALVESTON	SAN JACINTO-BRAZOS	Supply	27	27	27	27	27	27	27	GULF COAST AQUIFER	None		
CLEAR LAKE SHORES	80764000	GALVESTON	SAN JACINTO-BRAZOS	Supply	689	689	689	689	689	689	689	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**716**	**716**	**716**	**716**	**716**	**716**	**716**				
CLEAR LAKE SHORES	80764000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	1	2	2	2	2	2	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**2**	**2**	**2**	**2**	**2**				**$0.00**
CLEVELAND	80116000	LIBERTY	SAN JACINTO	Population	7605	7930	8288	8631	8967	9336	9749				
				Population Total	**7605**	**7930**	**8288**	**8631**	**8967**	**9336**	**9749**				
CLEVELAND	80116000	LIBERTY	SAN JACINTO	Demand	1312	1341	1365	1392	1416	1464	1529				
				Demand Total	**1312**	**1341**	**1365**	**1392**	**1416**	**1464**	**1529**				
CLEVELAND	80116000	LIBERTY	SAN JACINTO	Supply	1312	1312	1312	1312	1312	1312	1312	GULF COAST AQUIFER	None		
				Supply Total	**1312**	**1312**	**1312**	**1312**	**1312**	**1312**	**1312**				
CLEVELAND	80116000	LIBERTY	SAN JACINTO	WMS	0	29	53	80	104	152	217	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,225,300.00
				WMS Total	**0**	**29**	**53**	**80**	**104**	**152**	**217**				**$1,225,300.00**
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	Population	10424	11217	12043	12834	13563	14335	15141				
				Population Total	**10424**	**11217**	**12043**	**12834**	**13563**	**14335**	**15141**				
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	1133	1181	1214	1265	1291	1349	1425				
				Demand Total	**1133**	**1181**	**1214**	**1265**	**1291**	**1349**	**1425**				
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	1120	1120	1120	1120	1120	1120	1120	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	5	5	5	5	5	5	5	GULF COAST AQUIFER	None		
				Supply Total	**1125**	**1125**	**1125**	**1125**	**1125**	**1125**	**1125**				
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	8	34	49	82	89	93	98	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	0	120	120	120	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
CLUTE	80118000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	22	40	58	62	72	83	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**8**	**56**	**89**	**140**	**271**	**285**	**301**				**$0.00**
COLDSPRING	80122000	SAN JACINTO	TRINITY	Population	543	649	753	836	888	918	932				
COLDSPRING	80122000	SAN JACINTO	SAN JACINTO	Population	148	177	205	228	242	250	254				
				Population Total	**691**	**826**	**958**	**1064**	**1130**	**1168**	**1186**				
COLDSPRING	80122000	SAN JACINTO	TRINITY	Demand	138	163	186	205	216	222	225				
COLDSPRING	80122000	SAN JACINTO	SAN JACINTO	Demand	38	44	51	56	59	60	61				
				Demand Total	**176**	**207**	**237**	**261**	**275**	**282**	**286**				
COLDSPRING	80122000	SAN JACINTO	TRINITY	Supply	138	138	138	138	138	138	138	GULF COAST AQUIFER	None		
COLDSPRING	80122000	SAN JACINTO	SAN JACINTO	Supply	38	38	38	38	38	38	38	GULF COAST AQUIFER	None		
				Supply Total	**176**	**176**	**176**	**176**	**176**	**176**	**176**				
COLDSPRING	80122000	SAN JACINTO	SAN JACINTO	WMS	0	6	13	18	21	22	23	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COLDSPRING	80122000	SAN JACINTO	TRINITY	WMS	0	25	48	67	78	84	87	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**31**	**61**	**85**	**99**	**106**	**110**				**$416,000.00**
CONROE	80130000	MONTGOMERY	SAN JACINTO	Population	36811	49602	57413	72685	90440	113860	141060				
				Population Total	**36811**	**49602**	**57413**	**72685**	**90440**	**113860**	**141060**				
CONROE	80130000	MONTGOMERY	SAN JACINTO	Demand	7175	9334	10611	13190	16310	20406	25281				
				Demand Total	**7175**	**9334**	**10611**	**13190**	**16310**	**20406**	**25281**				
CONROE	80130000	MONTGOMERY	SAN JACINTO	Supply	7175	7175	6589	6662	6849	6979	7080	GULF COAST AQUIFER	None		
				Supply Total	**7175**	**7175**	**6589**	**6662**	**6849**	**6979**	**7080**				
CONROE	80130000	MONTGOMERY	SAN JACINTO	WMS	0	644	732	910	1125	1408	1744	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CONROE	80130000	MONTGOMERY	SAN JACINTO	WMS	0	6165	6165	6165	6165	6165	6165	CONROE LAKE/RESERVOIR	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
CONROE	80130000	MONTGOMERY	SAN JACINTO	WMS	0	3290	3290	3290	3290	3290	3290	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
CONROE	80130000	MONTGOMERY	SAN JACINTO	WMS	0	0	7002	7002	7002	7002	7002	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$48,702,100.00
CONROE	80130000	MONTGOMERY	SAN JACINTO	WMS	0	594	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$663,000.00
				WMS Total	**0**	**10693**	**17189**	**17367**	**17582**	**17865**	**18201**				**$49,365,100.00**
CONSOLIDATED WSC	84071000	WALKER	TRINITY	Population	87	100	110	115	113	114	114				
				Population Total	**87**	**100**	**110**	**115**	**113**	**114**	**114**				
CONSOLIDATED WSC	84071000	WALKER	TRINITY	Demand	7	8	9	9	8	8	8				
				Demand Total	**7**	**8**	**9**	**9**	**8**	**8**	**8**				
CONSOLIDATED WSC	84071000	WALKER	TRINITY	Supply	7	7	7	7	7	7	7	YEGUA-JACKSON AQUIFER	None		
				Supply Total	**7**	**7**	**7**	**7**	**7**	**7**	**7**				
CONSOLIDATED WSC	84071000	WALKER	TRINITY	WMS	0	1	2	2	1	1	1	YEGUA-JACKSON AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**2**	**2**	**1**	**1**	**1**				**$0.00**
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	Population	2667	4243	5778	7288	8782	10267	11746				
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	Population	1623	2236	2610	3342	4193	5316	6620				
				Population Total	**4290**	**6479**	**8388**	**10630**	**12975**	**15583**	**18366**				
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	Demand	269	399	524	653	767	897	1026				
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	Demand	164	210	237	299	366	464	578				
				Demand Total	**433**	**609**	**761**	**952**	**1133**	**1361**	**1604**				
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	Supply	269	262	157	102	102	102	102	GULF COAST AQUIFER	None		
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	Supply	164	164	147	151	154	159	162	GULF COAST AQUIFER	None		
				Supply Total	**433**	**426**	**304**	**253**	**256**	**261**	**264**				
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	WMS	0	28	36	45	53	62	71	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	WMS	0	0	503	503	744	744	744	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$173,352.00
CONSUMERS WATER INC	84072000	HARRIS	SAN JACINTO	WMS	0	109	109	109	109	109	109	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	WMS	0	14	16	21	25	32	40	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	WMS	0	376	376	376	376	376	376	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	WMS	0	376	376	376	376	376	376	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$5,986,413.30
CONSUMERS WATER INC	84072000	MONTGOMERY	SAN JACINTO	WMS	0	11	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**914**	**1416**	**1430**	**1683**	**1699**	**1716**				**$6,159,765.30**
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	Population	1740	2870	4041	5473	6945	8876	11082				
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	Population	2628	3947	5231	6494	7744	8986	10224				
				Population Total	**4368**	**6817**	**9272**	**11967**	**14689**	**17862**	**21306**				
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	Demand	351	563	779	1048	1322	1690	2110				
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	Demand	530	774	1008	1244	1475	1711	1947				
				Demand Total	**881**	**1337**	**1787**	**2292**	**2797**	**3401**	**4057**				
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	Supply	340	340	340	340	340	340	340	GULF COAST AQUIFER	None		
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	Supply	530	510	302	193	193	193	193	GULF COAST AQUIFER	None		
				Supply Total	**870**	**850**	**642**	**533**	**533**	**533**	**533**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	WMS	11	14	16	21	25	32	40	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	WMS	0	0	0	1043	1043	1043	1043	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$1,779,746.31
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	WMS	0	594	594	594	594	594	594	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$15,908,785
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	WMS	0	89	89	89	89	89	89	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
CORNERSTONES MUD	84073000	FORT BEND	SAN JACINTO	WMS	0	120	105	4	4	4	4	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	WMS	0	81	84	87	89	93	98	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	WMS	0	0	1010	1010	1473	1473	1473	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$343,209.00
CORNERSTONES MUD	84073000	HARRIS	SAN JACINTO	WMS	0	183	183	183	183	183	183	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**11**	**1081**	**2081**	**3031**	**3500**	**3511**	**3524**				**$18,031,740.16**
COUNTY-OTHER	80757008	AUSTIN	BRAZOS	Population	10254	11984	13627	14772	15452	15778	16226				
COUNTY-OTHER	80757008	AUSTIN	BRAZOS-COLORADO	Population	2061	2409	2739	2969	3106	3172	3262				
COUNTY-OTHER	80757008	AUSTIN	COLORADO	Population	193	226	257	279	292	298	306				
				Population Total	**12508**	**14619**	**16623**	**18020**	**18850**	**19248**	**19794**				
COUNTY-OTHER	80757008	AUSTIN	BRAZOS	Demand	1240	1396	1526	1622	1662	1679	1727				
COUNTY-OTHER	80757008	AUSTIN	BRAZOS-COLORADO	Demand	249	281	307	326	334	338	347				
COUNTY-OTHER	80757008	AUSTIN	COLORADO	Demand	23	26	29	31	31	32	33				
				Demand Total	**1512**	**1703**	**1862**	**1979**	**2027**	**2049**	**2107**				
COUNTY-OTHER	80757008	AUSTIN	BRAZOS	Supply	1240	1240	1240	1240	1240	1240	1240	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757008	AUSTIN	BRAZOS-COLORADO	Supply	249	249	249	249	249	249	249	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757008	AUSTIN	COLORADO	Supply	23	23	23	23	23	23	23	GULF COAST AQUIFER	None		
				Supply Total	**1512**	**1512**	**1512**	**1512**	**1512**	**1512**	**1512**				
COUNTY-OTHER	80757008	AUSTIN	BRAZOS	WMS	0	156	286	382	422	439	487	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,528,800.00
COUNTY-OTHER	80757008	AUSTIN	BRAZOS-COLORADO	WMS	0	32	58	77	85	89	98	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757008	AUSTIN	COLORADO	WMS	0	3	6	8	8	9	10	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**191**	**350**	**467**	**515**	**537**	**595**				**$1,528,800.00**
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	Population	48803	43405	49911	56948	63403	70271	77465				
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	Population	500	539	580	619	655	693	733				
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	Population	15963	17213	18514	19759	20907	22124	23394				
				Population Total	**65266**	**61157**	**69005**	**77326**	**84965**	**93088**	**101592**				
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	Demand	12245	10696	12132	13715	15056	16609	18309				
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	Demand	125	133	141	149	156	164	173				
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	Demand	4005	4242	4500	4759	4965	5229	5529				
				Demand Total	**16375**	**15071**	**16773**	**18623**	**20177**	**22002**	**24011**				
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	196	196	196	196	196	196	196	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	4450	4450	4450	4450	4450	4450	4450	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	Supply	30	12	8	6	5	4	3	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	Supply	224	224	224	224	224	224	224	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	Supply	1944	1944	1944	1944	1944	1944	1944	GULF COAST AQUIFER	None		
				Supply Total	**6844**	**6826**	**6822**	**6820**	**6819**	**6818**	**6817**				
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	WMS	7	7	8	8	9	9	10	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	WMS	0	160	160	160	160	160	160	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	New Contracts	$0.00
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS	WMS	0	50	50	50	50	50	50	FREEPORT DESAL	BRAZOS RIVER AUTHORITY	Freeport Desal	$380,504.00
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	WMS	222	236	250	264	276	290	307	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	WMS	0	2641	2641	2641	2641	2641	2641	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	New Contracts	$0.00
COUNTY-OTHER	80757020	BRAZORIA	BRAZOS-COLORADO	WMS	0	84	198	279	329	369	413	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$2,901,100.00
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	680	594	674	761	836	922	1017	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	2240	2240	2240	2240	2240	2240	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	New Contracts	$0.00
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	11150	11150	11150	11150	11150	11150	FREEPORT DESAL	BRAZOS RIVER AUTHORITY	Freeport Desal	$84,852,496.00
COUNTY-OTHER	80757020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	138	1264	1433	1343	1065	753	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**909**	**17300**	**18635**	**18986**	**19034**	**18896**	**18741**				**$88,134,100.00**
COUNTY-OTHER	80757036	CHAMBERS	NECHES-TRINITY	Population	415	410	403	397	394	388	381				
COUNTY-OTHER	80757036	CHAMBERS	TRINITY	Population	2083	2054	2022	1992	1966	1940	1913				
COUNTY-OTHER	80757036	CHAMBERS	TRINITY-SAN JACINTO	Population	1343	1324	1303	1284	1267	1250	1233				
				Population Total	**3841**	**3788**	**3728**	**3673**	**3627**	**3578**	**3527**				
COUNTY-OTHER	80757036	CHAMBERS	NECHES-TRINITY	Demand	52	50	48	46	44	43	42				
COUNTY-OTHER	80757036	CHAMBERS	TRINITY	Demand	261	251	240	230	220	213	210				
COUNTY-OTHER	80757036	CHAMBERS	TRINITY-SAN JACINTO	Demand	168	162	155	148	142	137	135				
				Demand Total	**481**	**463**	**443**	**424**	**406**	**393**	**387**				
COUNTY-OTHER	80757036	CHAMBERS	NECHES-TRINITY	Supply	2	2	2	2	2	2	2	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757036	CHAMBERS	TRINITY	Supply	49	44	40	37	35	33	32	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757036	CHAMBERS	TRINITY-SAN JACINTO	Supply	56	49	45	40	35	32	29	GULF COAST AQUIFER	None		
				Supply Total	**107**	**95**	**87**	**79**	**72**	**67**	**63**				
COUNTY-OTHER	80757036	CHAMBERS	NECHES-TRINITY	WMS	3	3	3	3	2	2	2	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757036	CHAMBERS	NECHES-TRINITY	WMS	0	45	45	45	45	45	45	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
COUNTY-OTHER	80757036	CHAMBERS	TRINITY	WMS	14	14	13	13	12	12	12	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757036	CHAMBERS	TRINITY	WMS	0	193	193	193	193	193	193	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
COUNTY-OTHER	80757036	CHAMBERS	TRINITY-SAN JACINTO	WMS	9	9	9	8	8	8	7	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	104	104	104	104	104	104	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$0.00
				WMS Total	**26**	**368**	**367**	**366**	**364**	**364**	**363**				**$0.00**
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	Population	2352	2471	6326	11972	17825	27606	35966				
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Population	8353	10952	31676	62882	95148	147078	193702				
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	Population	22415	45838	77762	116908	157164	210218	270499				
COUNTY-OTHER	80757079	FORT BEND	BRAZOS-COLORADO	Population	5048	4804	4551	4242	3924	3507	3030				
				Population Total	**38168**	**64065**	**120315**	**196004**	**274061**	**388409**	**503197**				
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	Demand	398	404	1040	1955	2852	4387	5726				
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Demand	1415	1791	5207	10270	15226	23373	30832				
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	Demand	3796	7498	12784	19094	25150	33407	43056				
COUNTY-OTHER	80757079	FORT BEND	BRAZOS-COLORADO	Demand	855	786	748	693	628	557	482				
				Demand Total	**6464**	**10479**	**19779**	**32012**	**43856**	**61724**	**80096**				
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	Supply	386	330	386	386	386	386	386	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Supply	1088	1088	1088	1088	1088	1088	1088	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	Supply	110	110	110	110	110	110	110	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	Supply	1349	1349	1349	1349	1349	1349	1349	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757079	FORT BEND	BRAZOS-COLORADO	Supply	855	786	748	693	628	557	482	GULF COAST AQUIFER	None		

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
				Supply Total	**3788**	**3663**	**3681**	**3626**	**3561**	**3490**	**3415**				
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	WMS	211	416	710	1060	1396	1855	2390	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	WMS	0	0	0	10844	10844	10844	10844	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$18,503,901.25
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	WMS	0	12000	12000	12000	12000	12000	12000	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	WMS	0	0	0	0	0	14000	14000	LIVINGSTON-WALLISVILLE SYSTEM	GULF COAST WATER AUTHORITY	COH-GCWA Transfer	$0.00
COUNTY-OTHER	80757079	FORT BEND	BRAZOS	WMS	0	1171	2391	2473	2473	2473	2473	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$5,203,100.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	WMS	12	22	58	109	158	244	318	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	WMS	0	0	0	3766	3766	3766	3766	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$6,426,198.09
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	WMS	0	1000	1000	1000	1000	1000	1000	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO	WMS	0	0	208	256	256	256	256	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	79	99	289	570	845	1298	1712	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	5924	5924	5924	5924	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$10,108,549.52
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	6000	6000	6000	6000	6000	6000	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	8000	8000	LITTLE RIVER OFF-CHANNEL RESERVOIR	BRAZOS RIVER AUTHORITY	Little River Off-Channel Reservoir	$24,034,116.73
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	6000	6000	LIVINGSTON-WALLISVILLE SYSTEM	GULF COAST WATER AUTHORITY	COH-GCWA Transfer	$0.00
COUNTY-OTHER	80757079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	124	1566	1998	1998	1998	1998	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**302**	**20832**	**24222**	**46000**	**46660**	**75658**	**76681**				**$64,275,865.60**
COUNTY-OTHER	80757084	GALVESTON	NECHES-TRINITY	Population	0	1	3	4	3	4	5				
COUNTY-OTHER	80757084	GALVESTON	SAN JACINTO-BRAZOS	Population	9792	8522	7426	6777	6514	6318	6191				
				Population Total	**9792**	**8523**	**7429**	**6781**	**6517**	**6322**	**6196**				
COUNTY-OTHER	80757084	GALVESTON	NECHES-TRINITY	Demand	0	0	0	1	0	0	1				
COUNTY-OTHER	80757084	GALVESTON	SAN JACINTO-BRAZOS	Demand	1272	1098	948	850	795	764	749				
				Demand Total	**1272**	**1098**	**948**	**851**	**795**	**764**	**750**				
COUNTY-OTHER	80757084	GALVESTON	NECHES-TRINITY	Supply	1	1	1	1	1	1	1	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
COUNTY-OTHER	80757084	GALVESTON	SAN JACINTO-BRAZOS	Supply	127	110	95	85	80	76	75	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757084	GALVESTON	SAN JACINTO-BRAZOS	Supply	237	237	237	237	237	237	237	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
COUNTY-OTHER	80757084	GALVESTON	SAN JACINTO-BRAZOS	Supply	18477	18477	18477	18477	18477	18477	18477	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**18842**	**18825**	**18810**	**18800**	**18795**	**18791**	**18790**				
COUNTY-OTHER	80757101	HARRIS	TRINITY-SAN JACINTO	Population	17558	10657	6466	3923	2379	1444	877				
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Population	39060	42884	37347	37978	67303	97478	125821				
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Population	19391	11771	7447	4936	3526	2930	2739				
				Population Total	**76009**	**65312**	**51260**	**46837**	**73208**	**101852**	**129437**				
COUNTY-OTHER	80757101	HARRIS	TRINITY-SAN JACINTO	Demand	3088	1826	1086	646	384	231	140				
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Demand	6869	7350	6275	6254	10856	15614	20154				
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Demand	3410	2017	1251	813	569	469	439				
				Demand Total	**13367**	**11193**	**8612**	**7713**	**11809**	**16314**	**20733**				
COUNTY-OTHER	80757101	HARRIS	TRINITY-SAN JACINTO	Supply	618	365	217	129	77	46	28	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757101	HARRIS	TRINITY-SAN JACINTO	Supply	798	798	798	798	798	798	798	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	TRINITY-SAN JACINTO	Supply	2016	2016	2016	2016	2016	2016	2016	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	6869	4842	1883	972	972	972	972	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	2645	2645	2645	2645	2645	2645	2645	GULF COAST AQUIFER	CITY OF HOUSTON		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	281	281	281	281	281	281	281	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	896	896	896	896	896	896	896	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	296	296	296	296	296	296	296	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	0	1957	2675	2952	3195	3266	3292	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	Supply	308	308	308	308	308	308	308	LIVINGSTON-WALLISVILLE SYSTEM	LA PORTE AREA WATER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Supply	341	202	125	82	57	47	44	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Supply	147	147	147	147	147	147	147	GULF COAST AQUIFER	CITY OF HOUSTON		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Supply	308	308	308	308	308	308	308	LIVINGSTON-WALLISVILLE SYSTEM	LA PORTE AREA WATER AUTHORITY		
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO-BRAZOS	Supply	3360	1403	685	408	165	94	68	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
				Supply Total	**18883**	**16464**	**13280**	**12238**	**12161**	**12120**	**12099**				
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	WMS	0	0	0	0	158	244	318	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	9041	9041	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
COUNTY-OTHER	80757101	HARRIS	SAN JACINTO	WMS	0	0	2105	2105	2105	2105	2105	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$490,465.00
				WMS Total	**0**	**0**	**2105**	**2105**	**2263**	**11390**	**11464**				**$490,465.00**
COUNTY-OTHER	80757145	LEON	TRINITY	Population	3811	4189	4568	4793	4807	4787	4817				
COUNTY-OTHER	80757145	LEON	BRAZOS	Population	3499	3846	4195	4402	4415	4396	4422				
				Population Total	**7310**	**8035**	**8763**	**9195**	**9222**	**9183**	**9239**				
COUNTY-OTHER	80757145	LEON	TRINITY	Demand	406	432	455	462	452	445	448				
COUNTY-OTHER	80757145	LEON	BRAZOS	Demand	372	396	418	424	415	409	411				
				Demand Total	**778**	**828**	**873**	**886**	**867**	**854**	**859**				
COUNTY-OTHER	80757145	LEON	TRINITY	Supply	135	135	135	135	135	135	135	SPARTA AQUIFER	None		
COUNTY-OTHER	80757145	LEON	TRINITY	Supply	135	135	135	135	135	135	135	QUEEN CITY AQUIFER	None		
COUNTY-OTHER	80757145	LEON	TRINITY	Supply	136	136	136	136	136	136	136	CARRIZO-WILCOX AQUIFER	None		
COUNTY-OTHER	80757145	LEON	BRAZOS	Supply	171	171	171	171	171	171	171	CARRIZO-WILCOX AQUIFER	None		
COUNTY-OTHER	80757145	LEON	BRAZOS	Supply	201	201	201	201	201	201	201	QUEEN CITY AQUIFER	None		
				Supply Total	**778**	**778**	**778**	**778**	**778**	**778**	**778**				
COUNTY-OTHER	80757145	LEON	BRAZOS	WMS	0	24	46	52	43	37	39	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$416,000.00
COUNTY-OTHER	80757145	LEON	TRINITY	WMS	0	9	17	19	16	13	14	SPARTA AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757145	LEON	TRINITY	WMS	0	9	17	19	16	13	14	QUEEN CITY AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757145	LEON	TRINITY	WMS	0	8	15	18	14	13	14	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**50**	**95**	**108**	**89**	**76**	**81**				**$416,000.00**
COUNTY-OTHER	80757146	LIBERTY	NECHES	Population	1328	1633	1968	2292	2608	2955	3343				
COUNTY-OTHER	80757146	LIBERTY	NECHES-TRINITY	Population	91	112	135	157	179	203	230				
COUNTY-OTHER	80757146	LIBERTY	TRINITY	Population	25319	31143	37557	43708	49734	56340	63744				
COUNTY-OTHER	80757146	LIBERTY	TRINITY-SAN JACINTO	Population	1614	1985	2394	2786	3170	3591	4063				
COUNTY-OTHER	80757146	LIBERTY	SAN JACINTO	Population	11177	13748	16579	19294	21954	24870	28138				
				Population Total	**39529**	**48621**	**58633**	**68237**	**77645**	**87959**	**99518**				
COUNTY-OTHER	80757146	LIBERTY	NECHES	Demand	132	154	179	203	228	255	288				
COUNTY-OTHER	80757146	LIBERTY	NECHES-TRINITY	Demand	9	11	12	14	16	18	20				
COUNTY-OTHER	80757146	LIBERTY	TRINITY	Demand	2524	2930	3408	3868	4345	4859	5498				
COUNTY-OTHER	80757146	LIBERTY	TRINITY-SAN JACINTO	Demand	161	187	217	247	277	310	350				
COUNTY-OTHER	80757146	LIBERTY	SAN JACINTO	Demand	1114	1294	1504	1707	1918	2145	2427				
				Demand Total	**3940**	**4576**	**5320**	**6039**	**6784**	**7587**	**8583**				
COUNTY-OTHER	80757146	LIBERTY	NECHES	Supply	132	132	132	132	132	132	132	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757146	LIBERTY	NECHES-TRINITY	Supply	9	9	9	9	9	9	9	GULF COAST AQUIFER	None		

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
COUNTY-OTHER	80757146	LIBERTY	TRINITY	Supply	2524	2524	2524	2524	2524	2524	2524	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757146	LIBERTY	TRINITY-SAN JACINTO	Supply	161	161	161	161	161	161	161	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757146	LIBERTY	SAN JACINTO	Supply	1114	1114	1114	1114	1114	1114	1114	GULF COAST AQUIFER	None		
				Supply Total	**3940**	**3940**	**3940**	**3940**	**3940**	**3940**	**3940**				
COUNTY-OTHER	80757146	LIBERTY	NECHES	WMS	0	22	47	71	96	123	156	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757146	LIBERTY	NECHES-TRINITY	WMS	0	2	3	5	7	9	11	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757146	LIBERTY	SAN JACINTO	WMS	0	180	390	593	804	1031	1313	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757146	LIBERTY	TRINITY	WMS	0	406	884	1344	1821	2335	2974	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$5,214,800.00
COUNTY-OTHER	80757146	LIBERTY	TRINITY-SAN JACINTO	WMS	0	26	56	86	116	149	189	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**636**	**1380**	**2099**	**2844**	**3647**	**4643**				**$5,214,800.00**
COUNTY-OTHER	80757157	MADISON	TRINITY	Population	7815	8425	9038	9525	9980	10383	10736				
COUNTY-OTHER	80757157	MADISON	BRAZOS	Population	922	994	1066	1124	1178	1226	1268				
				Population Total	**8737**	**9419**	**10104**	**10649**	**11158**	**11609**	**12004**				
COUNTY-OTHER	80757157	MADISON	TRINITY	Demand	867	897	931	960	973	1000	1034				
COUNTY-OTHER	80757157	MADISON	BRAZOS	Demand	102	106	110	113	115	118	122				
				Demand Total	**969**	**1003**	**1041**	**1073**	**1088**	**1118**	**1156**				
COUNTY-OTHER	80757157	MADISON	TRINITY	Supply	350	347	350	350	350	350	319	CARRIZO-WILCOX AQUIFER	None		
COUNTY-OTHER	80757157	MADISON	TRINITY	Supply	96	95	96	96	96	96	96	QUEEN CITY AQUIFER	None		
COUNTY-OTHER	80757157	MADISON	TRINITY	Supply	87	87	87	73	87	87	87	SPARTA AQUIFER	None		
COUNTY-OTHER	80757157	MADISON	TRINITY	Supply	334	332	334	334	333	329	329	UNDIFFERENTIATED AQUIFER	None		
COUNTY-OTHER	80757157	MADISON	BRAZOS	Supply	102	102	102	102	102	102	102	SPARTA AQUIFER	None		
				Supply Total	**969**	**963**	**969**	**955**	**968**	**964**	**933**				
COUNTY-OTHER	80757157	MADISON	BRAZOS	WMS	0	4	8	11	13	16	20	SPARTA AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757157	MADISON	TRINITY	WMS	0	0	50	100	57	0	0	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$1,220,700.00
COUNTY-OTHER	80757157	MADISON	TRINITY	WMS	0		11	7	4	9	9	QUEEN CITY AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757157	MADISON	TRINITY	WMS	0	36	3	0	46	129	194	SPARTA AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**40**	**72**	**118**	**120**	**154**	**223**				**$1,220,700.00**
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	Population	99788	156912	198870	287661	391340	535846	703682				
				Population Total	**99788**	**156912**	**198870**	**287661**	**391340**	**535846**	**703682**				
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	Demand	14307	21619	26954	38344	51726	70827	93011				
				Demand Total	**14307**	**21619**	**26954**	**38344**	**51726**	**70827**	**93011**				
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	Supply	14307	14307	14307	14307	14307	14307	14307	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	Supply	381	381	381	381	381	381	381	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**14688**	**14688**	**14688**	**14688**	**14688**	**14688**	**14688**				
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	WMS	0	1200	1496	2129	2872	3932	5164	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	WMS	0	0	0	50000	50000	50000	50000	LIVINGSTON-WALLISVILLE SYSTEM	SAN JACINTO RIVER AUTHORITY	TRA-Houston/SJRA	$11,650,000.00
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	WMS	0	11419	11419	11419	11419	11419	11419	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
COUNTY-OTHER	80757170	MONTGOMERY	SAN JACINTO	WMS	0	3689	2432	5062	7413	9917	11740	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$10,019,300.00
				WMS Total	**0**	**16308**	**15347**	**68610**	**71704**	**75268**	**78323**				**$21,669,300.00**
COUNTY-OTHER	80757187	POLK	TRINITY	Population	10836	13130	15422	17228	18630	20129	21563				
				Population Total	**10836**	**13130**	**15422**	**17228**	**18630**	**20129**	**21563**				
COUNTY-OTHER	80757187	POLK	TRINITY	Demand	1517	1780	2038	2219	2358	2525	2705				
				Demand Total	**1517**	**1780**	**2038**	**2219**	**2358**	**2525**	**2705**				
COUNTY-OTHER	80757187	POLK	TRINITY	Supply	1517	1517	1517	1517	1517	1517	1517	GULF COAST AQUIFER	None		
				Supply Total	**1517**	**1517**	**1517**	**1517**	**1517**	**1517**	**1517**				
COUNTY-OTHER	80757187	POLK	TRINITY	WMS	0	263	521	702	841	1008	1188	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,851,300.00
				WMS Total	**0**	**263**	**521**	**702**	**841**	**1008**	**1188**				**$1,851,300.00**
COUNTY-OTHER	80757204	SAN JACINTO	TRINITY	Population	3917	4589	5249	5777	6106	6296	6382				
COUNTY-OTHER	80757204	SAN JACINTO	SAN JACINTO	Population	6068	7109	8130	8946	9455	9750	9884				
				Population Total	**9985**	**11698**	**13379**	**14723**	**15561**	**16046**	**16266**				
COUNTY-OTHER	80757204	SAN JACINTO	TRINITY	Demand	496	560	629	679	704	719	729				
COUNTY-OTHER	80757204	SAN JACINTO	SAN JACINTO	Demand	768	868	974	1052	1091	1114	1129				
				Demand Total	**1264**	**1428**	**1603**	**1731**	**1795**	**1833**	**1858**				
COUNTY-OTHER	80757204	SAN JACINTO	TRINITY	Supply	560	560	560	560	560	560	560	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
COUNTY-OTHER	80757204	SAN JACINTO	TRINITY	Supply	496	496	496	496	496	496	496	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757204	SAN JACINTO	SAN JACINTO	Supply	768	768	768	768	768	768	768	GULF COAST AQUIFER	None		
				Supply Total	**1824**	**1824**	**1824**	**1824**	**1824**	**1824**	**1824**				
COUNTY-OTHER	80757204	SAN JACINTO	SAN JACINTO	WMS	0	100	206	284	323	346	361	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,528,500.00
COUNTY-OTHER	80757204	SAN JACINTO	TRINITY	WMS	0	64	133	183	208	223	233	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**164**	**339**	**467**	**531**	**569**	**594**				**$1,528,500.00**
COUNTY-OTHER	80757228	TRINITY	TRINITY	Population	2571	2866	3092	3167	3129	3005	2891				
				Population Total	**2571**	**2866**	**3092**	**3167**	**3129**	**3005**	**2891**				
COUNTY-OTHER	80757228	TRINITY	TRINITY	Demand	484	526	558	561	547	522	502				
				Demand Total	**484**	**526**	**558**	**561**	**547**	**522**	**502**				
COUNTY-OTHER	80757228	TRINITY	TRINITY	Supply	3171	3171	3171	3171	3171	3171	3171	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
COUNTY-OTHER	80757228	TRINITY	TRINITY	Supply	1056	1056	1056	1056	1056	1056	1056	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
COUNTY-OTHER	80757228	TRINITY	TRINITY	Supply	484	484	484	484	484	484	484	GULF COAST AQUIFER	None		
				Supply Total	**4711**	**4711**	**4711**	**4711**	**4711**	**4711**	**4711**				
COUNTY-OTHER	80757228	TRINITY	TRINITY	WMS	0	42	74	77	63	38	18	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**42**	**74**	**77**	**63**	**38**	**18**				**$0.00**
COUNTY-OTHER	80757236	WALKER	TRINITY	Population	5866	6712	7400	7732	7651	7667	7667				
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	Population	9084	10395	11461	11973	11848	11876	11876				
				Population Total	**14950**	**17107**	**18861**	**19705**	**19499**	**19543**	**19543**				
COUNTY-OTHER	80757236	WALKER	TRINITY	Demand	3272	3714	4070	4235	4174	4174	4174				
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	Demand	5067	5752	6303	6558	6463	6465	6465				
				Demand Total	**8339**	**9466**	**10373**	**10793**	**10637**	**10639**	**10639**				
COUNTY-OTHER	80757236	WALKER	TRINITY	Supply	1681	1681	1668	1472	1536	1523	1500	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HUNTSVILLE		
COUNTY-OTHER	80757236	WALKER	TRINITY	Supply	1846	1287	1656	1846	1846	1846	1846	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757236	WALKER	TRINITY	Supply	200	200	200	200	200	200	200	UNDIFFERENTIATED AQUIFER	None		
COUNTY-OTHER	80757236	WALKER	TRINITY	Supply	546	546	546	546	546	546	546	YEGUA-JACKSON AQUIFER	None		
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	Supply	0	0	13	209	145	158	181	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HUNTSVILLE		
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	Supply	4976	4976	4976	4976	4976	4976	4976	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	Supply	91	91	91	91	91	91	91	YEGUA-JACKSON AQUIFER	None		
				Supply Total	**9340**	**8781**	**9150**	**9340**	**9340**	**9340**	**9340**				
COUNTY-OTHER	80757236	WALKER	SAN JACINTO	WMS	0	685	1223	1282	1251	1240	1217	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,846,200.00
COUNTY-OTHER	80757236	WALKER	TRINITY	WMS	0			171	46	59	82	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
				WMS Total	**0**	**685**	**1223**	**1453**	**1297**	**1299**	**1299**				**$1,846,200.00**
COUNTY-OTHER	80757237	WALLER	SAN JACINTO	Population	8498	11536	15136	19145	23604	28914	35015				
COUNTY-OTHER	80757237	WALLER	BRAZOS	Population	8257	11210	14708	18602	22936	28096	34023				
				Population Total	**16755**	**22746**	**29844**	**37747**	**46540**	**57010**	**69038**				
COUNTY-OTHER	80757237	WALLER	SAN JACINTO	Demand	695	892	1119	1394	1666	2040	2471				
COUNTY-OTHER	80757237	WALLER	BRAZOS	Demand	675	866	1087	1354	1619	1983	2401				
				Demand Total	**1370**	**1758**	**2206**	**2748**	**3285**	**4023**	**4872**				
COUNTY-OTHER	80757237	WALLER	SAN JACINTO	Supply	695	695	695	695	695	695	695	GULF COAST AQUIFER	None		
COUNTY-OTHER	80757237	WALLER	BRAZOS	Supply	675	675	675	675	675	675	675	GULF COAST AQUIFER	None		
				Supply Total	**1370**	**1370**	**1370**	**1370**	**1370**	**1370**	**1370**				
COUNTY-OTHER	80757237	WALLER	BRAZOS	WMS	0	0	0	0	0	45	133	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757237	WALLER	BRAZOS	WMS	0	0	0	0	0	0	108	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757237	WALLER	BRAZOS	WMS	0	191	412	679	944	1263	1485	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757237	WALLER	BRAZOS	WMS	0						108	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
COUNTY-OTHER	80757237	WALLER	SAN JACINTO	WMS	0	0	0	0	0	0	69	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
COUNTY-OTHER	80757237	WALLER	SAN JACINTO	WMS	0	197	424	699	971	1345	1707	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$4,061,700.00
				WMS Total	**0**	**388**	**836**	**1378**	**1915**	**2653**	**3610**				**$4,061,700.00**
CROSBY MUD	84078000	HARRIS	SAN JACINTO	Population	3162	3162	3162	3162	3162	3162	3162				
				Population Total	**3162**	**3162**	**3162**	**3162**	**3162**	**3162**	**3162**				
CROSBY MUD	84078000	HARRIS	SAN JACINTO	Demand	613	599	588	577	567	560	560				
				Demand Total	**613**	**599**	**588**	**577**	**567**	**560**	**560**				
CROSBY MUD	84078000	HARRIS	SAN JACINTO	Supply	123	113	118	90	90	90	90	GULF COAST AQUIFER	None		
CROSBY MUD	84078001	HARRIS	SAN JACINTO	Supply	1050	1050	1050	1050	1050	1050	1050	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
				Supply Total	**1173**	**1163**	**1168**	**1140**	**1140**	**1140**	**1140**				
CRYSTAL SPRNGS WATER COMPANY	84081000	HARRIS	SAN JACINTO	Population	158	234	308	381	453	525	596				
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	Population	3781	6212	7696	10598	13972	18422	23591				
				Population Total	**3939**	**6446**	**8004**	**10979**	**14425**	**18947**	**24187**				
CRYSTAL SPRNGS WATER COMPANY	84081000	HARRIS	SAN JACINTO	Demand	15	21	27	33	39	45	51				
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	Demand	368	564	681	914	1189	1568	2008				
				Demand Total	**383**	**585**	**708**	**947**	**1228**	**1613**	**2059**				
CRYSTAL SPRNGS WATER COMPANY	84081000	HARRIS	SAN JACINTO	Supply	15	14	8	5	5	5	5	GULF COAST AQUIFER	None		
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	Supply	368	368	368	368	368	368	368	GULF COAST AQUIFER	None		
				Supply Total	**383**	**382**	**376**	**373**	**373**	**373**	**373**				
CRYSTAL SPRNGS WATER COMPANY	84081000	HARRIS	SAN JACINTO	WMS	0	1	2	2	3	3	4	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CRYSTAL SPRNGS WATER COMPANY	84081000	HARRIS	SAN JACINTO	WMS	0	42	42	42	42	42	42	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	WMS	0	39	47	63	82	108	139	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	WMS	0	1306	1306	1306	1306	1306	1306	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
CRYSTAL SPRNGS WATER COMPANY	84081000	MONTGOMERY	SAN JACINTO	WMS	0	101	54	93	131	168	195	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,220,600.00
				WMS Total	**0**	**1489**	**1451**	**1506**	**1564**	**1627**	**1686**				**$1,220,600.00**
CUT AND SHOOT	80854000	MONTGOMERY	SAN JACINTO	Population	1158	1515	1733	2159	2655	3309	4068				
				Population Total	**1158**	**1515**	**1733**	**2159**	**2655**	**3309**	**4068**				
CUT AND SHOOT	80854000	MONTGOMERY	SAN JACINTO	Demand	169	210	235	285	348	430	529				
				Demand Total	**169**	**210**	**235**	**285**	**348**	**430**	**529**				
CUT AND SHOOT	80854000	MONTGOMERY	SAN JACINTO	Supply	169	169	169	169	169	169	169	GULF COAST AQUIFER	None		
				Supply Total	**169**	**169**	**169**	**169**	**169**	**169**	**169**				
CUT AND SHOOT	80854000	MONTGOMERY	SAN JACINTO	WMS	0	1	1	2	2	3	3	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
CUT AND SHOOT	80854000	MONTGOMERY	SAN JACINTO	WMS	0	40	65	114	177	258	357	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,376,300.00
				WMS Total	**0**	**41**	**66**	**116**	**179**	**261**	**360**				**$1,376,300.00**
DAISETTA	80149000	LIBERTY	NECHES	Population	402	419	438	456	474	493	515				
DAISETTA	80149000	LIBERTY	TRINITY	Population	632	659	689	717	745	775	809				
				Population Total	**1034**	**1078**	**1127**	**1173**	**1219**	**1268**	**1324**				
DAISETTA	80149000	LIBERTY	NECHES	Demand	57	58	59	60	61	62	65				
DAISETTA	80149000	LIBERTY	TRINITY	Demand	90	91	93	94	95	98	102				
				Demand Total	**147**	**149**	**152**	**154**	**156**	**160**	**167**				
DAISETTA	80149000	LIBERTY	NECHES	Supply	57	57	57	57	57	57	57	GULF COAST AQUIFER	None		
DAISETTA	80149000	LIBERTY	TRINITY	Supply	90	90	90	90	90	90	90	GULF COAST AQUIFER	None		
				Supply Total	**147**	**147**	**147**	**147**	**147**	**147**	**147**				
DAISETTA	80149000	LIBERTY	NECHES	WMS	0	1	2	3	4	5	8	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
DAISETTA	80149000	LIBERTY	TRINITY	WMS	0	1	3	4	5	8	12	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**2**	**5**	**7**	**9**	**13**	**20**				**$0.00**
DANBURY	80693000	BRAZORIA	SAN JACINTO-BRAZOS	Population	1611	1747	1888	2023	2148	2280	2418				
				Population Total	**1611**	**1747**	**1888**	**2023**	**2148**	**2280**	**2418**				
DANBURY	80693000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	202	211	222	231	238	250	265				
				Demand Total	**202**	**211**	**222**	**231**	**238**	**250**	**265**				
DANBURY	80693000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	202	202	202	202	202	202	202	GULF COAST AQUIFER	None		
				Supply Total	**202**	**202**	**202**	**202**	**202**	**202**	**202**				
DANBURY	80693000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	9	20	29	36	48	63	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**9**	**20**	**29**	**36**	**48**	**63**				**$0.00**
DAYTON	80152000	LIBERTY	TRINITY	Population	5709	6160	6656	7132	7598	8109	8682				
				Population Total	**5709**	**6160**	**6656**	**7132**	**7598**	**8109**	**8682**				
DAYTON	80152000	LIBERTY	TRINITY	Demand	1356	1428	1521	1606	1685	1789	1916				
				Demand Total	**1356**	**1428**	**1521**	**1606**	**1685**	**1789**	**1916**				
DAYTON	80152000	LIBERTY	TRINITY	Supply	1356	1356	1356	1356	1356	1356	1356	GULF COAST AQUIFER	None		
				Supply Total	**1356**	**1356**	**1356**	**1356**	**1356**	**1356**	**1356**				
DAYTON	80152000	LIBERTY	TRINITY	WMS	0	72	165	250	329	433	560	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,523,500.00
				WMS Total	**0**	**72**	**165**	**250**	**329**	**433**	**560**				**$1,523,500.00**
DEER PARK	80154000	HARRIS	SAN JACINTO	Population	11258	11650	12032	12408	12780	13149	13517				
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	Population	17262	17863	18448	19024	19594	20160	20724				
				Population Total	**28520**	**29513**	**30480**	**31432**	**32374**	**33309**	**34241**				
DEER PARK	80154000	HARRIS	SAN JACINTO	Demand	1702	1723	1725	1737	1746	1782	1832				
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	Demand	2610	2641	2645	2664	2678	2732	2809				
				Demand Total	**4312**	**4364**	**4370**	**4401**	**4424**	**4514**	**4641**				
DEER PARK	80154000	HARRIS	SAN JACINTO	Supply	170	162	170	135	135	135	135	GULF COAST AQUIFER	None		
DEER PARK	80154000	HARRIS	SAN JACINTO	Supply	1562	1569	1562	1585	1586	1587	1590	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	Supply	261	261	261	261	261	261	261	GULF COAST AQUIFER	None		
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	Supply	2394	2387	2394	2371	2370	2369	2366	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
				Supply Total	**4387**	**4379**	**4387**	**4352**	**4352**	**4352**	**4352**				
DEER PARK	80154000	HARRIS	SAN JACINTO	WMS	0	0	0	17	25	60	107	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
DEER PARK	80154000	HARRIS	SAN JACINTO	WMS	0		3					GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	0	27	40	90	162	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
DEER PARK	80154000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	3	4	5	7	12	20	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**3**	**7**	**49**	**72**	**162**	**289**				**$0.00**
DICKINSON	80165000	GALVESTON	SAN JACINTO-BRAZOS	Population	17093	19955	22425	23888	24480	24921	25208				
				Population Total	**17093**	**19955**	**22425**	**23888**	**24480**	**24921**	**25208**				
DICKINSON	80165000	GALVESTON	SAN JACINTO-BRAZOS	Demand	2719	3085	3416	3586	3620	3657	3699				
				Demand Total	**2719**	**3085**	**3416**	**3586**	**3620**	**3657**	**3699**				
DICKINSON	80165000	GALVESTON	SAN JACINTO-BRAZOS	Supply	272	272	272	272	272	272	272	GULF COAST AQUIFER	GALVESTON COUNTY WCID #1		
DICKINSON	80165000	GALVESTON	SAN JACINTO-BRAZOS	Supply	3502	3502	3502	3502	3502	3502	3502	BRAZOS RIVER RUN-OF-RIVER	GALVESTON COUNTY WCID #1		
				Supply Total	**3774**	**3774**	**3774**	**3774**	**3774**	**3774**	**3774**				
DICKINSON	80165000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	37	70	87	90	94	98	GULF COAST AQUIFER	GALVESTON COUNTY WCID #1	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**37**	**70**	**87**	**90**	**94**	**98**				**$0.00**
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	Population	1400	2240	2753	3756	4922	6460	8246				
				Population Total	**1400**	**2240**	**2753**	**3756**	**4922**	**6460**	**8246**				
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	Demand	284	439	533	719	937	1230	1570				
				Demand Total	**284**	**439**	**533**	**719**	**937**	**1230**	**1570**				
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	Supply	284	284	284	284	284	284	284	GULF COAST AQUIFER	None		
				Supply Total	**284**	**284**	**284**	**284**	**284**	**284**	**284**				
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	WMS	0	26	32	43	56	73	94	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	WMS	0	170	170	170	170	170	170	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	WMS	0	0	867	867	867	867	867	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$5,105,000.00
EAST PLANTATION UD	84098000	MONTGOMERY	SAN JACINTO	WMS	0	82	47	79	110	136	155	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**278**	**1116**	**1159**	**1203**	**1246**	**1286**				**$5,521,000.00**
EL DORADO UD	84101000	HARRIS	SAN JACINTO	Population	2952	3350	3737	4118	4495	4870	5243				
				Population Total	**2952**	**3350**	**3737**	**4118**	**4495**	**4870**	**5243**				
EL DORADO UD	84101000	HARRIS	SAN JACINTO	Demand	427	465	507	544	584	627	675				
				Demand Total	**427**	**465**	**507**	**544**	**584**	**627**	**675**				
EL DORADO UD	84101000	HARRIS	SAN JACINTO	Supply	427	427	427	423	423	423	423	GULF COAST AQUIFER	None		
				Supply Total	**427**	**427**	**427**	**423**	**423**	**423**	**423**				
EL DORADO UD	84101000	HARRIS	SAN JACINTO	WMS	0	28	0	32	35	37	40	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
EL DORADO UD	84101000	HARRIS	SAN JACINTO	WMS	0	0	212	212	212	212	212	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$49,396.00
EL DORADO UD	84101000	HARRIS	SAN JACINTO	WMS	0	10	80					GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**38**	**292**	**244**	**247**	**249**	**252**				**$49,396.00**
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	Population	3075	3075	3075	3075	3075	3075	3075				
				Population Total	**3075**	**3075**	**3075**	**3075**	**3075**	**3075**	**3075**				
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	Demand	548	534	524	513	503	496	496				
				Demand Total	**548**	**534**	**524**	**513**	**503**	**496**	**496**				
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	Supply	55	53	52	51	50	50	50	GULF COAST AQUIFER	None		
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	Supply	244	203	173	151	133	119	108	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
				Supply Total	**299**	**256**	**225**	**202**	**183**	**169**	**158**				
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	WMS	30	30	29	28	28	28	28	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
EL LAGO	80695000	HARRIS	SAN JACINTO-BRAZOS	WMS	310	310	310	310	310	310	310	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA	INCREASE EXIST CONTRACT	$0.00
				WMS Total	**340**	**340**	**339**	**338**	**338**	**338**	**338**				**$0.00**
FAIRCHILDS	81019000	FORT BEND	BRAZOS	Population	678	929	1189	1507	1834	2263	2754				
				Population Total	**678**	**929**	**1189**	**1507**	**1834**	**2263**	**2754**				
FAIRCHILDS	81019000	FORT BEND	BRAZOS	Demand	300	406	515	650	787	971	1182				
				Demand Total	**300**	**406**	**515**	**650**	**787**	**971**	**1182**				
FAIRCHILDS	81019000	FORT BEND	BRAZOS	Supply	107	107	107	107	107	107	107	GULF COAST AQUIFER	None		
				Supply Total	**107**	**107**	**107**	**107**	**107**	**107**	**107**				
FAIRCHILDS	81019000	FORT BEND	BRAZOS	WMS	17	23	29	36	44	54	66	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FAIRCHILDS	81019000	FORT BEND	BRAZOS	WMS	0	544	544	544	544	544	544	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$6,345,929
FAIRCHILDS	81019000	FORT BEND	BRAZOS	WMS	0	247	247	247	247	247	247	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FAIRCHILDS	81019000	FORT BEND	BRAZOS	WMS	0	29	108	218	218	218	218	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,225,500.00
				WMS Total	**17**	**843**	**928**	**1045**	**1053**	**1063**	**1075**				**$7,571,429.11**
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	Population	6065	7487	8872	10234	11582	12922	14257				
				Population Total	**6065**	**7487**	**8872**	**10234**	**11582**	**12922**	**14257**				
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	Demand	673	797	914	1020	1142	1259	1389				
				Demand Total	**673**	**797**	**914**	**1020**	**1142**	**1259**	**1389**				
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	Supply	673	526	274	158	158	158	158	GULF COAST AQUIFER	None		
				Supply Total	**673**	**526**	**274**	**158**	**158**	**158**	**158**				
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	WMS	0	55	63	70	79	87	96	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	WMS	0	0	689	689	919	919	919	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$214,127.00
FALLBROOK UD	84109000	HARRIS	SAN JACINTO	WMS	0	216	216	216	216	216	216	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,948,856.98
				WMS Total	**0**	**271**	**968**	**975**	**1214**	**1222**	**1231**				**$5,162,983.98**
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	Population	6171	8561	8561	8561	8561	8561	8561				
				Population Total	**6171**	**8561**	**8561**	**8561**	**8561**	**8561**	**8561**				
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	Demand	1085	1467	1448	1438	1429	1429	1429				
				Demand Total	**1085**	**1467**	**1448**	**1438**	**1429**	**1429**	**1429**				
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	Supply	386	386	386	288	288	288	288	GULF COAST AQUIFER	None		
				Supply Total	**386**	**386**	**386**	**288**	**288**	**288**	**288**				
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	WMS	65	87	86	86	85	85	85	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	WMS	0	177	177	177	177	177	177	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$5,667,262
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	WMS	0	887	887	887	887	887	887	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FIRST COLONY MUD #9	84113000	FORT BEND	BRAZOS	WMS	0	107	38	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**65**	**1258**	**1188**	**1150**	**1149**	**1149**	**1149**				**$6,083,261.54**
FLO COMMUNITY WSC	84114000	LEON	TRINITY	Population	3782	5335	6894	7820	7878	7791	7908				
				Population Total	**3782**	**5335**	**6894**	**7820**	**7878**	**7791**	**7908**				
FLO COMMUNITY WSC	84114000	LEON	TRINITY	Demand	318	418	525	578	574	559	567				
				Demand Total	**318**	**418**	**525**	**578**	**574**	**559**	**567**				
FLO COMMUNITY WSC	84114000	LEON	TRINITY	Supply	318	318	318	318	318	318	318	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**318**	**318**	**318**	**318**	**318**	**318**	**318**				
FLO COMMUNITY WSC	84114000	LEON	TRINITY	WMS	0	100	207	260	256	241	249	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$1,361,700.00
				WMS Total	**0**	**100**	**207**	**260**	**256**	**241**	**249**				**$1,361,700.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	Population	2562	3285	3285	3285	3285	3285	3285				
				Population Total	**2562**	**3285**	**3285**	**3285**	**3285**	**3285**	**3285**				
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	Demand	766	968	960	960	957	957	957				
				Demand Total	**766**	**968**	**960**	**960**	**957**	**957**	**957**				
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	Supply	272	272	272	192	192	192	192	GULF COAST AQUIFER	None		
				Supply Total	**272**	**272**	**272**	**192**	**192**	**192**	**192**				
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	WMS	43	54	53	53	53	53	53	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	WMS	0	126	126	126	126	126	126	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$4,106,740
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	WMS	0	589	589	589	589	589	589	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #106	84117000	FORT BEND	BRAZOS	WMS	0	53	9	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**43**	**822**	**777**	**768**	**768**	**768**	**768**				**$4,106,740.47**
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	Population	2490	2817	2817	2817	2817	2817	2817				
				Population Total	**2490**	**2817**	**2817**	**2817**	**2817**	**2817**	**2817**				
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	Demand	533	587	577	574	571	571	571				
				Demand Total	**533**	**587**	**577**	**574**	**571**	**571**	**571**				
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	Supply	189	189	169	115	115	115	115	GULF COAST AQUIFER	None		
				Supply Total	**189**	**189**	**169**	**115**	**115**	**115**	**115**				
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	WMS	30	33	32	32	32	32	32	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	WMS	0	70	70	70	70	70	70	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$3,098,019
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	WMS	0	357	357	357	357	357	357	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #108	84118000	FORT BEND	BRAZOS	WMS	0	8	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**30**	**468**	**459**	**459**	**459**	**459**	**459**				**$3,098,019.12**
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	Population	3315	3315	3315	3315	3315	3315	3315				
				Population Total	**3315**	**3315**	**3315**	**3315**	**3315**	**3315**	**3315**				
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	Demand	798	780	772	772	769	769	769				
				Demand Total	**798**	**780**	**772**	**772**	**769**	**769**	**769**				
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	Supply	284	262	226	155	155	155	155	GULF COAST AQUIFER	None		
				Supply Total	**284**	**262**	**226**	**155**	**155**	**155**	**155**				
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	WMS	48	46	46	46	46	46	46	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	WMS	0	99	99	99	99	99	99	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$2,696,265
FORT BEND COUNTY MUD #111	84119000	FORT BEND	BRAZOS	WMS	0	472	472	472	472	472	472	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**48**	**617**	**617**	**617**	**617**	**617**	**617**				**$2,696,265.23**
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	Population	1807	2130	2130	2130	2130	2130	2130				
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	Population	6501	7662	7662	7662	7662	7662	7662				
				Population Total	**8308**	**9792**	**9792**	**9792**	**9792**	**9792**	**9792**				
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	Demand	287	329	320	315	310	308	308				
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	Demand	1034	1184	1150	1133	1116	1107	1107				
				Demand Total	**1321**	**1513**	**1470**	**1448**	**1426**	**1415**	**1415**				
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	Supply	278	269	183	103	103	103	103	GULF COAST AQUIFER	None		
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	Supply	795	795	586	340	340	340	340	GULF COAST AQUIFER	None		
				Supply Total	**1073**	**1064**	**769**	**443**	**443**	**443**	**443**				
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	WMS	9	20	19	19	18	18	18	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	WMS	0	153	153	153	153	153	153	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO	WMS	0	40	40	40	40	40	40	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	WMS	62	71	69	68	67	66	66	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	413	413	413	413	413	413	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$4,520,217
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	312	312	312	312	312	312	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #2	84120000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	6	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**71**	**1015**	**1006**	**1005**	**1003**	**1002**	**1002**				**$4,520,216.56**
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	Population	2961	5968	9084	12895	16813	21952	27824				
				Population Total	**2961**	**5968**	**9084**	**12895**	**16813**	**21952**	**27824**				
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	Demand	338	675	1018	1444	1883	2459	3117				
				Demand Total	**338**	**675**	**1018**	**1444**	**1883**	**2459**	**3117**				
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	Supply	260	260	260	260	260	260	260	GULF COAST AQUIFER	None		
				Supply Total	**260**	**260**	**260**	**260**	**260**	**260**	**260**				
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	WMS	23	47	70	100	130	170	215	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	1558	1558	1558	1558	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,658,528.05
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	739	739	739	739	739	739	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$12,084,878
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	171	171	171	171	171	171	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #23	84121000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	197	259	174	174	174	174	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$546,000.00
				WMS Total	**23**	**1154**	**1239**	**2742**	**2772**	**2812**	**2857**				**$15,289,406.09**
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	Population	6700	11336	16141	22016	28057	35979	45032				
				Population Total	**6700**	**11336**	**16141**	**22016**	**28057**	**35979**	**45032**				
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	Demand	976	1587	2224	3009	3803	4877	6104				
				Demand Total	**976**	**1587**	**2224**	**3009**	**3803**	**4877**	**6104**				
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	Supply	750	750	750	750	750	750	750	GULF COAST AQUIFER	None		
				Supply Total	**750**	**750**	**750**	**750**	**750**	**750**	**750**				
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	WMS	67	109	153	208	262	336	421	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	2882	2882	2882	2882	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$4,917,764.98
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	1492	1492	1492	1492	1492	1492	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$20,177,015
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	404	404	404	404	404	404	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #25	84122000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	324	384	155	155	155	155	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$546,000.00
				WMS Total	**67**	**2329**	**2433**	**5141**	**5195**	**5269**	**5354**				**$25,640,780.30**
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	Population	2937	3962	5024	6323	7658	9409	11410				
				Population Total	**2937**	**3962**	**5024**	**6323**	**7658**	**9409**	**11410**				
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	Demand	382	493	608	751	901	1096	1329				
				Demand Total	**382**	**493**	**608**	**751**	**901**	**1096**	**1329**				
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	Supply	371	371	348	246	246	246	246	GULF COAST AQUIFER	None		
				Supply Total	**371**	**371**	**348**	**246**	**246**	**246**	**246**				
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	WMS	11	34	42	52	62	76	92	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	WMS	0	935	935	935	935	935	935	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$4,801,056
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	WMS	0	56	56	56	56	56	56	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #30	84123000	FORT BEND	SAN JACINTO	WMS	0	32	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**11**	**1057**	**1033**	**1043**	**1053**	**1067**	**1083**				**$4,801,056.15**
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	Population	1367	2362	3394	4655	5952	7653	9597				
				Population Total	**1367**	**2362**	**3394**	**4655**	**5952**	**7653**	**9597**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	Demand	377	640	912	1246	1587	2040	2559				
				Demand Total	**377**	**640**	**912**	**1246**	**1587**	**2040**	**2559**				
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	Supply	366	366	366	366	366	366	366	GULF COAST AQUIFER	None		
				Supply Total	**366**	**366**	**366**	**366**	**366**	**366**	**366**				
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	WMS	11	38	54	74	95	122	153	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	WMS	0	1918	1918	1918	1918	1918	1918	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$10,423,151
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	WMS	0	79	79	79	79	79	79	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #37	84124000	FORT BEND	SAN JACINTO	WMS	0	157	154	43	43	43	43	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**11**	**2192**	**2205**	**2114**	**2135**	**2162**	**2193**				**$10,839,150.63**
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	Population	3453	6144	8933	12343	15849	20447	25701				
				Population Total	**3453**	**6144**	**8933**	**12343**	**15849**	**20447**	**25701**				
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	Demand	445	764	1101	1507	1917	2474	3109				
				Demand Total	**445**	**764**	**1101**	**1507**	**1917**	**2474**	**3109**				
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	Supply	158	158	158	158	158	158	158	GULF COAST AQUIFER	None		
				Supply Total	**158**	**158**	**158**	**158**	**158**	**158**	**158**				
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	WMS	31	53	76	104	132	171	214	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	WMS	0	0	0	1492	1492	1492	1492	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,545,907.48
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	WMS	0	647	647	647	647	647	647	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$11,226,958
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	WMS	0	454	454	454	454	454	454	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #41	84125000	FORT BEND	BRAZOS	WMS	0	99	164	144	144	144	144	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**31**	**1253**	**1341**	**2841**	**2869**	**2908**	**2951**				**$14,188,865.21**
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	Population	3306	3306	3306	3306	3306	3306	3306				
				Population Total	**3306**	**3306**	**3306**	**3306**	**3306**	**3306**	**3306**				
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	Demand	748	730	722	718	715	715	715				
				Demand Total	**748**	**730**	**722**	**718**	**715**	**715**	**715**				
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	Supply	266	245	211	144	144	144	144	GULF COAST AQUIFER	None		
				Supply Total	**266**	**245**	**211**	**144**	**144**	**144**	**144**				
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	WMS	45	44	43	43	43	43	43	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	WMS	0	90	90	90	90	90	90	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$2,568,069
FORT BEND COUNTY MUD #67	84126000	FORT BEND	BRAZOS	WMS	0	441	441	441	441	441	441	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**45**	**575**	**574**	**574**	**574**	**574**	**574**				**$2,568,069.08**
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	Population	3717	3717	3717	3717	3717	3717	3717				
				Population Total	**3717**	**3717**	**3717**	**3717**	**3717**	**3717**	**3717**				
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	Demand	604	604	600	600	600	600	600				
				Demand Total	**604**	**604**	**600**	**600**	**600**	**600**	**600**				
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	Supply	215	203	176	120	120	120	120	GULF COAST AQUIFER	None		
				Supply Total	**215**	**203**	**176**	**120**	**120**	**120**	**120**				
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	WMS	36	36	36	36	36	36	36	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	WMS	0	79	79	79	79	79	79	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$2,292,187
FORT BEND COUNTY MUD #68	84127000	FORT BEND	BRAZOS	WMS	0	365	365	365	365	365	365	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**36**	**480**	**480**	**480**	**480**	**480**	**480**				**$2,292,187.38**
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	Population	1701	1701	1701	1701	1701	1701	1701				
				Population Total	**1701**	**1701**	**1701**	**1701**	**1701**	**1701**	**1701**				
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	Demand	394	391	391	389	389	389	389				
				Demand Total	**394**	**391**	**391**	**389**	**389**	**389**	**389**				
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	Supply	140	131	115	78	78	78	78	GULF COAST AQUIFER	None		
				Supply Total	**140**	**131**	**115**	**78**	**78**	**78**	**78**				
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	WMS	22	22	22	22	22	22	22	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	WMS	0	51	51	51	51	51	51	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$1,797,992
FORT BEND COUNTY MUD #69	84128000	FORT BEND	BRAZOS	WMS	0	238	238	238	238	238	238	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**22**	**311**	**311**	**311**	**311**	**311**	**311**				**$1,797,992.23**
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	Population	1371	2054	2762	3628	4518	5685	7019				
				Population Total	**1371**	**2054**	**2762**	**3628**	**4518**	**5685**	**7019**				
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	Demand	524	773	1033	1349	1675	2108	2602				
				Demand Total	**524**	**773**	**1033**	**1349**	**1675**	**2108**	**2602**				
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	Supply	186	186	186	186	186	186	186	GULF COAST AQUIFER	None		
				Supply Total	**186**	**186**	**186**	**186**	**186**	**186**	**186**				
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	WMS	31	46	62	80	100	126	155	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	WMS	0	0	0	1178	1178	1178	1178	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,010,106.57
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	WMS	0	532	532	532	532	532	532	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$725,400
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	WMS	0	467	467	467	467	467	467	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FORT BEND COUNTY MUD #81	84129000	FORT BEND	BRAZOS	WMS	0	74	116	84	84	84	84	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**31**	**1119**	**1177**	**2341**	**2361**	**2387**	**2416**				**$3,151,506.57**
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	Population	2444	2984	3510	4027	4539	5048	5555				
				Population Total	**2444**	**2984**	**3510**	**4027**	**4539**	**5048**	**5555**				
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	Demand	290	341	389	438	483	532	585				
				Demand Total	**290**	**341**	**389**	**438**	**483**	**532**	**585**				
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	Supply	290	225	117	69	69	69	69	GULF COAST AQUIFER	None		
				Supply Total	**290**	**225**	**117**	**69**	**69**	**69**	**69**				
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	WMS	0	20	23	26	29	32	35	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	WMS	0	0	289	289	385	385	385	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$89,705.00
FOUNTAINVIEW SUBDIVISION	84132000	HARRIS	SAN JACINTO	WMS	0	96	96	96	96	96	96	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,452,864.49
				WMS Total	**0**	**116**	**408**	**411**	**510**	**513**	**516**				**$2,542,569.49**
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	Population	11535	14621	17833	20909	23744	26749	29886				
FREEPORT	80217000	BRAZORIA	BRAZOS	Population	1173	1173	1173	1173	1173	1173	1173				
				Population Total	**12708**	**15794**	**19006**	**22082**	**24917**	**27922**	**31059**				
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	1447	1752	2057	2366	2633	2936	3281				
FREEPORT	80217000	BRAZORIA	BRAZOS	Demand	147	140	135	132	130	129	129				
				Demand Total	**1594**	**1892**	**2192**	**2498**	**2763**	**3065**	**3410**				
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	1728	1763	1787	1803	1814	1824	1832	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
FREEPORT	80217000	BRAZORIA	BRAZOS	Supply	176	141	117	101	90	80	72	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
FREEPORT	80217000	BRAZORIA	BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
				Supply Total	**1904**	**1904**	**1904**	**1904**	**1904**	**1904**	**1904**				
FREEPORT	80217000	BRAZORIA	BRAZOS	WMS	0	0	9	9	9	9	9	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FREEPORT	80217000	BRAZORIA	BRAZOS	WMS	0	0	50	50	50	50	50	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
FREEPORT	80217000	BRAZORIA	BRAZOS	WMS	0	0	1	1	1	1	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	142	163	182	203	226	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	820	820	820	820	820	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
FREEPORT	80217000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	113	230	306	362	406	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,383,800.00
				WMS Total	**0**	**0**	**1135**	**1273**	**1368**	**1445**	**1512**				**$1,383,800.00**
FRIENDSWOOD	80219000	GALVESTON	SAN JACINTO-BRAZOS	Population	21237	24553	27415	29110	29796	30307	30639				
FRIENDSWOOD	80219000	HARRIS	SAN JACINTO-BRAZOS	Population	7800	7800	7800	7800	7800	7800	7800				
				Population Total	**29037**	**32353**	**35215**	**36910**	**37596**	**38107**	**38439**				
FRIENDSWOOD	80219000	GALVESTON	SAN JACINTO-BRAZOS	Demand	2902	3245	3532	3652	3638	3666	3707				
FRIENDSWOOD	80219000	HARRIS	SAN JACINTO-BRAZOS	Demand	1066	1031	1005	979	952	944	944				
				Demand Total	**3968**	**4276**	**4537**	**4631**	**4590**	**4610**	**4651**				
FRIENDSWOOD	80219000	GALVESTON	SAN JACINTO-BRAZOS	Supply	580	580	580	580	580	580	580	GULF COAST AQUIFER	None		
FRIENDSWOOD	80219000	GALVESTON	SAN JACINTO-BRAZOS	Supply	4914	5099	5231	5299	5325	5343	5356	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
FRIENDSWOOD	80219000	HARRIS	SAN JACINTO-BRAZOS	Supply	213	206	201	196	190	189	189	GULF COAST AQUIFER	None		
FRIENDSWOOD	80219000	HARRIS	SAN JACINTO-BRAZOS	Supply	1805	1620	1488	1420	1394	1376	1363	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**7512**	**7505**	**7500**	**7495**	**7489**	**7488**	**7488**				
FRIENDSWOOD	80219000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	69	126	150	148	153	161	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**69**	**126**	**150**	**148**	**153**	**161**				**$416,000.00**
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	Population	283	349	417	501	587	700	829				
FULSHEAR	80869000	FORT BEND	BRAZOS	Population	433	534	639	767	899	1072	1269				
				Population Total	**716**	**883**	**1056**	**1268**	**1486**	**1772**	**2098**				
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	Demand	92	111	131	157	182	216	256				
FULSHEAR	80869000	FORT BEND	BRAZOS	Demand	141	170	201	240	279	331	392				
				Demand Total	**233**	**281**	**332**	**397**	**461**	**547**	**648**				
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	Supply	71	71	67	47	47	47	47	GULF COAST AQUIFER	None		
FULSHEAR	80869000	FORT BEND	BRAZOS	Supply	50	50	50	48	48	48	48	GULF COAST AQUIFER	None		
				Supply Total	**121**	**121**	**117**	**95**	**95**	**95**	**95**				
FULSHEAR	80869000	FORT BEND	BRAZOS	WMS	8	9	11	13	15	18	22	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FULSHEAR	80869000	FORT BEND	BRAZOS	WMS	0	218	218	218	218	218	218	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$3,345,545
FULSHEAR	80869000	FORT BEND	BRAZOS	WMS	0	104	104	104	104	104	104	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FULSHEAR	80869000	FORT BEND	BRAZOS	WMS	0	7	9	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	WMS	5	6	7	9	10	12	14	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	165	165	165	165	165	165	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	30	30	30	30	30	30	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
FULSHEAR	80869000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	4						GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**13**	**543**	**544**	**539**	**542**	**547**	**553**				**$3,345,545.16**
GALENA PARK	80226000	HARRIS	SAN JACINTO	Population	10592	11099	11592	12077	12557	13034	13510				
				Population Total	**10592**	**11099**	**11592**	**12077**	**12557**	**13034**	**13510**				
GALENA PARK	80226000	HARRIS	SAN JACINTO	Demand	1222	1231	1234	1245	1252	1285	1332				
				Demand Total	**1222**	**1231**	**1234**	**1245**	**1252**	**1285**	**1332**				
GALENA PARK	80226000	HARRIS	SAN JACINTO	Supply	122	116	122	97	97	97	97	GULF COAST AQUIFER	None		
GALENA PARK	80226000	HARRIS	SAN JACINTO	Supply	954	954	954	954	954	954	954	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**1076**	**1070**	**1076**	**1051**	**1051**	**1051**	**1051**				
GALENA PARK	80226000	HARRIS	SAN JACINTO	WMS	84	85	85	86	86	89	92	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
GALENA PARK	80226000	HARRIS	SAN JACINTO	WMS	53	53	53	53	53	53	53	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
GALENA PARK	80226000	HARRIS	SAN JACINTO	WMS	0	0	39	39	113	113	113	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$26,329.00
GALENA PARK	80226000	HARRIS	SAN JACINTO	WMS	0	23	23	23	23	23	23	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
GALENA PARK	80226000	HARRIS	SAN JACINTO	WMS	0	0	1	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**137**	**161**	**201**	**201**	**275**	**278**	**281**				**$26,329.00**
GALVESTON	80227000	GALVESTON	SAN JACINTO-BRAZOS	Population	57247	57247	57247	57247	57247	57247	57247				
				Population Total	**57247**	**57247**	**57247**	**57247**	**57247**	**57247**	**57247**				
GALVESTON	80227000	GALVESTON	SAN JACINTO-BRAZOS	Demand	16288	16095	15903	15711	15518	15390	15390				
				Demand Total	**16288**	**16095**	**15903**	**15711**	**15518**	**15390**	**15390**				
GALVESTON	80227000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1629	1610	1590	1571	1552	1539	1539	GULF COAST AQUIFER	None		
GALVESTON	80227000	GALVESTON	SAN JACINTO-BRAZOS	Supply	20143	19992	19859	19782	19746	19720	19704	BRAZOS RIVER RUN-OF-RIVER	CITY OF GALVESTON		
				Supply Total	**21772**	**21602**	**21449**	**21353**	**21298**	**21259**	**21243**				
GALVESTON COUNTY MUD #1	84135000	GALVESTON	SAN JACINTO-BRAZOS	Population	2823	3493	4071	4413	4552	4655	4722				
				Population Total	**2823**	**3493**	**4071**	**4413**	**4552**	**4655**	**4722**				
GALVESTON COUNTY MUD #1	84135000	GALVESTON	SAN JACINTO-BRAZOS	Demand	357	426	483	514	525	532	540				
				Demand Total	**357**	**426**	**483**	**514**	**525**	**532**	**540**				
GALVESTON COUNTY MUD #1	84135000	GALVESTON	SAN JACINTO-BRAZOS	Supply	36	36	36	36	36	36	36	GULF COAST AQUIFER	None		
GALVESTON COUNTY MUD #1	84135000	GALVESTON	SAN JACINTO-BRAZOS	Supply	441	529	604	648	667	682	691	BRAZOS RIVER RUN-OF-RIVER	CITY OF GALVESTON		
				Supply Total	**477**	**565**	**640**	**684**	**703**	**718**	**727**				
GALVESTON COUNTY MUD #1	84135000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	7	12	15	17	17	18	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**7**	**12**	**15**	**17**	**17**	**18**				**$0.00**
GALVESTON COUNTY WCID #12	84136000	GALVESTON	SAN JACINTO-BRAZOS	Population	1386	1641	1861	1992	2045	2084	2110				
				Population Total	**1386**	**1641**	**1861**	**1992**	**2045**	**2084**	**2110**				
GALVESTON COUNTY WCID #12	84136000	GALVESTON	SAN JACINTO-BRAZOS	Demand	231	267	296	312	316	320	324				
				Demand Total	**231**	**267**	**296**	**312**	**316**	**320**	**324**				
GALVESTON COUNTY WCID #12	84136000	GALVESTON	SAN JACINTO-BRAZOS	Supply	134	134	134	134	134	134	134	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**134**	**134**	**134**	**134**	**134**	**134**	**134**				
GALVESTON COUNTY WCID #12	84136000	GALVESTON	SAN JACINTO-BRAZOS	WMS	13	15	16	17	18	18	18	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
GALVESTON COUNTY WCID #12	84136000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	172	172	172	172	172	172	BRAZOS RIVER AUTHORITY SYSTEM	GULF COAST WATER AUTHORITY	New Contracts	$401,800.00
				WMS Total	**13**	**187**	**188**	**189**	**190**	**190**	**190**				**$401,800.00**
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	Population	1874	3844	5885	8381	10947	14313	18159				
				Population Total	**1874**	**3844**	**5885**	**8381**	**10947**	**14313**	**18159**				
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	Demand	441	887	1345	1915	2489	3255	4129				
				Demand Total	**441**	**887**	**1345**	**1915**	**2489**	**3255**	**4129**				
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	Supply	428	428	428	428	428	428	428	GULF COAST AQUIFER	None		
				Supply Total	**428**	**428**	**428**	**428**	**428**	**428**	**428**				
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	WMS	13	61	93	132	172	225	285	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	WMS	0	0	0	2061	2061	2061	2061	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$3,516,833.32
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	WMS	0	1053	1053	1053	1053	1053	1053	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$13,734,438
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	WMS	0	101	101	101	101	101	101	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
GRAND LAKES MUD #4	84142000	FORT BEND	SAN JACINTO	WMS	0	297	340	201	201	201	201	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,373,700.00
				WMS Total	**13**	**1512**	**1587**	**3548**	**3588**	**3641**	**3701**				**$18,624,971.63**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	Population	2293	2694	3084	3468	3848	4225	4601				
				Population Total	**2293**	**2694**	**3084**	**3468**	**3848**	**4225**	**4601**				
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	Demand	791	917	1036	1158	1276	1396	1520				
				Demand Total	**791**	**917**	**1036**	**1158**	**1276**	**1396**	**1520**				
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	Supply	791	604	311	180	180	180	180	GULF COAST AQUIFER	None		
				Supply Total	**791**	**604**	**311**	**180**	**180**	**180**	**180**				
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	WMS	0	55	62	69	76	83	91	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	WMS	0	0	762	762	991	991	991	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$230,903.00
GREEN TRAILS MUD	84143000	HARRIS	SAN JACINTO	WMS	0	258	258	258	258	258	258	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$6,035,328.34
				WMS Total	**0**	**313**	**1082**	**1089**	**1325**	**1332**	**1340**				**$6,266,231.34**
GROVETON	80255000	TRINITY	TRINITY	Population	565	630	680	696	688	660	635				
				Population Total	**565**	**630**	**680**	**696**	**688**	**660**	**635**				
GROVETON	80255000	TRINITY	TRINITY	Demand	109	119	126	127	123	118	113				
				Demand Total	**109**	**119**	**126**	**127**	**123**	**118**	**113**				
GROVETON	80255000	TRINITY	TRINITY	Supply	109	119	126	127	123	118	113	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**109**	**119**	**126**	**127**	**123**	**118**	**113**				
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	Population	8450	10987	12536	15565	19086	23731	29126				
				Population Total	**8450**	**10987**	**12536**	**15565**	**19086**	**23731**	**29126**				
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	Demand	1268	1625	1825	2249	2737	3403	4176				
				Demand Total	**1268**	**1625**	**1825**	**2249**	**2737**	**3403**	**4176**				
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	Supply	1268	1268	1133	1136	1149	1164	1169	GULF COAST AQUIFER	None		
				Supply Total	**1268**	**1268**	**1133**	**1136**	**1149**	**1164**	**1169**				
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	WMS	0	112	126	155	189	235	288	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	WMS	0	566	566	566	566	566	566	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	WMS	0	0	2153	2153	2153	2153	2153	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$10,765,200.00
H M W SUD	84147000	MONTGOMERY	SAN JACINTO	WMS	0	85	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**763**	**2845**	**2874**	**2908**	**2954**	**3007**				**$10,765,200.00**
HARDIN	80878000	LIBERTY	TRINITY	Population	755	885	1028	1165	1299	1446	1611				
				Population Total	**755**	**885**	**1028**	**1165**	**1299**	**1446**	**1611**				
HARDIN	80878000	LIBERTY	TRINITY	Demand	119	136	155	172	191	211	235				
				Demand Total	**119**	**136**	**155**	**172**	**191**	**211**	**235**				
HARDIN	80878000	LIBERTY	TRINITY	Supply	119	119	119	119	119	119	119	GULF COAST AQUIFER	None		
				Supply Total	**119**	**119**	**119**	**119**	**119**	**119**	**119**				
HARDIN	80878000	LIBERTY	TRINITY	WMS	0	17	36	53	72	92	116	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**17**	**36**	**53**	**72**	**92**	**116**				**$416,000.00**
HARDIN WSC	84148000	LIBERTY	TRINITY	Population	2600	3184	3828	4445	5050	5713	6456				
				Population Total	**2600**	**3184**	**3828**	**4445**	**5050**	**5713**	**6456**				
HARDIN WSC	84148000	LIBERTY	TRINITY	Demand	478	567	669	767	865	973	1099				
				Demand Total	**478**	**567**	**669**	**767**	**865**	**973**	**1099**				
HARDIN WSC	84148000	LIBERTY	TRINITY	Supply	478	478	478	478	478	478	478	GULF COAST AQUIFER	None		
				Supply Total	**478**	**478**	**478**	**478**	**478**	**478**	**478**				
HARDIN WSC	84148000	LIBERTY	TRINITY	WMS	0	89	191	289	387	495	621	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,532,700.00
				WMS Total	**0**	**89**	**191**	**289**	**387**	**495**	**621**				**$1,532,700.00**
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	Population	4290	4290	4290	4290	4290	4290	4290				
				Population Total	**4290**	**4290**	**4290**	**4290**	**4290**	**4290**	**4290**				
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	Demand	437	423	408	394	380	370	370				
				Demand Total	**437**	**423**	**408**	**394**	**380**	**370**	**370**				
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	Supply	87	80	82	61	61	61	61	GULF COAST AQUIFER	None		
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	Supply	288	288	288	288	288	288	288	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**375**	**368**	**370**	**349**	**349**	**349**	**349**				
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	WMS	26	25	24	23	23	21	21	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY FWSD #47	84149000	HARRIS	SAN JACINTO	WMS	0	30	30	30	30	30	30	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**26**	**55**	**54**	**53**	**53**	**51**	**51**				**$0.00**
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	Population	16884	18866	18866	18866	18866	18866	18866				
				Population Total	**16884**	**18866**	**18866**	**18866**	**18866**	**18866**	**18866**				
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	Demand	2345	2536	2473	2451	2409	2409	2409				
				Demand Total	**2345**	**2536**	**2473**	**2451**	**2409**	**2409**	**2409**				
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	Supply	469	469	469	381	381	381	381	GULF COAST AQUIFER	None		
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	Supply	1539	1539	1539	1539	1539	1539	1539	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**2008**	**2008**	**2008**	**1920**	**1920**	**1920**	**1920**				
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	WMS	162	175	171	169	166	166	166	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	WMS	90	90	90	90	90	90	90	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	WMS	0	272	272	272	272	272	272	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
HARRIS COUNTY FWSD #51	84150000	HARRIS	SAN JACINTO	WMS	0	8	26	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**252**	**545**	**559**	**531**	**528**	**528**	**528**				**$0.00**
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	Population	3000	3722	4424	5115	5799	6479	7156				
				Population Total	**3000**	**3722**	**4424**	**5115**	**5799**	**6479**	**7156**				
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	Demand	292	346	396	441	494	544	601				
				Demand Total	**292**	**346**	**396**	**441**	**494**	**544**	**601**				
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	Supply	29	29	29	29	29	29	29	GULF COAST AQUIFER	None		
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	Supply	187	187	187	187	187	187	187	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**216**	**216**	**216**	**216**	**216**	**216**	**216**				
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	WMS	17	21	24	26	29	32	36	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	WMS	96	96	96	96	96	96	96	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	WMS	0	0	139	139	239	239	239	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$55,687.00
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	WMS	0	9	9	9	9	9	9	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
HARRIS COUNTY FWSD #6	84151000	HARRIS	SAN JACINTO	WMS	0	4	11	5	5	5	5	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**113**	**130**	**279**	**275**	**378**	**381**	**385**				**$55,687.00**
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	Population	2444	2905	3354	3796	4233	4668	5101				
				Population Total	**2444**	**2905**	**3354**	**3796**	**4233**	**4668**	**5101**				
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	Demand	364	417	470	523	574	627	686				
				Demand Total	**364**	**417**	**470**	**523**	**574**	**627**	**686**				
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	Supply	364	274	141	82	82	82	82	GULF COAST AQUIFER	None		
				Supply Total	**364**	**274**	**141**	**82**	**82**	**82**	**82**				
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	WMS	0	25	28	31	34	37	41	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	WMS	0	0	340	340	445	445	445	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$103,685.00

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HARRIS COUNTY MUD #11	84153000	HARRIS	SAN JACINTO	WMS	0	118	118	118	118	118	118	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$3,936,602.09
				WMS Total	**0**	**143**	**486**	**489**	**597**	**600**	**604**				**$4,040,287.09**
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	Population	6633	8079	8725	8725	8725	8725	8725				
				Population Total	**6633**	**8079**	**8725**	**8725**	**8725**	**8725**	**8725**				
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	Demand	750	878	919	899	880	870	870				
				Demand Total	**750**	**878**	**919**	**899**	**880**	**870**	**870**				
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	Supply	750	579	276	140	140	140	140	GULF COAST AQUIFER	None		
				Supply Total	**750**	**579**	**276**	**140**	**140**	**140**	**140**				
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	WMS	0	52	55	54	52	52	52	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	WMS	0	0	458	458	458	458	458	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$106,714.00
HARRIS COUNTY MUD #119 INWOOD NORTH	84154000	HARRIS	SAN JACINTO	WMS	0	247	247	247	247	247	247	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,670,986.57
				WMS Total	**0**	**299**	**760**	**759**	**757**	**757**	**757**				**$4,777,700.57**
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	Population	6963	9436	11844	14212	16556	18885	21206				
				Population Total	**6963**	**9436**	**11844**	**14212**	**16556**	**18885**	**21206**				
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	Demand	1334	1755	2176	2579	2986	3385	3801				
				Demand Total	**1334**	**1755**	**2176**	**2579**	**2986**	**3385**	**3801**				
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	Supply	1334	1157	653	401	401	401	401	GULF COAST AQUIFER	None		
				Supply Total	**1334**	**1157**	**653**	**401**	**401**	**401**	**401**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	WMS	0	121	150	178	206	234	262	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	WMS	0	0	1902	1902	2661	2661	2661	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$620,013.00
HARRIS COUNTY MUD #132	84157000	HARRIS	SAN JACINTO	WMS	0	477	477	477	477	477	477	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$12,433,881.18
				WMS Total	**0**	**598**	**2529**	**2557**	**3344**	**3372**	**3400**				**$13,053,894.18**
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	Population	8352	9606	10827	12028	13216	14397	15573				
				Population Total	**8352**	**9606**	**10827**	**12028**	**13216**	**14397**	**15573**				
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	Demand	1123	1248	1370	1482	1599	1726	1867				
				Demand Total	**1123**	**1248**	**1370**	**1482**	**1599**	**1726**	**1867**				
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	Supply	1123	822	411	230	230	230	230	GULF COAST AQUIFER	None		
				Supply Total	**1123**	**822**	**411**	**230**	**230**	**230**	**230**				
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	WMS	0	86	95	102	110	119	129	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	WMS	0	0	919	919	1168	1168	1168	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$272,144.00
HARRIS COUNTY MUD #150	84158000	HARRIS	SAN JACINTO	WMS	0	340	340	340	340	340	340	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$6,311,701.15
				WMS Total	**0**	**426**	**1354**	**1361**	**1618**	**1627**	**1637**				**$6,583,845.15**
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	Population	4986	7392	7392	7392	7392	7392	7392				
				Population Total	**4986**	**7392**	**7392**	**7392**	**7392**	**7392**	**7392**				
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	Demand	882	1275	1267	1259	1250	1250	1250				
				Demand Total	**882**	**1275**	**1267**	**1259**	**1250**	**1250**	**1250**				
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	Supply	882	840	380	196	196	196	196	GULF COAST AQUIFER	None		
				Supply Total	**882**	**840**	**380**	**196**	**196**	**196**	**196**				
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	WMS	0	76	76	75	75	75	75	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	WMS	0	0	629	629	629	629	629	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$146,557.00
HARRIS COUNTY MUD #151	84159000	HARRIS	SAN JACINTO	WMS	0	359	359	359	359	359	359	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,974,510.26
				WMS Total	**0**	**435**	**1064**	**1063**	**1063**	**1063**	**1063**				**$5,121,067.26**
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	Population	4062	5956	7800	9614	11410	13195	14973				
				Population Total	**4062**	**5956**	**7800**	**9614**	**11410**	**13195**	**14973**				
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	Demand	560	787	1014	1228	1444	1670	1895				
				Demand Total	**560**	**787**	**1014**	**1228**	**1444**	**1670**	**1895**				
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	Supply	560	519	304	191	191	191	191	GULF COAST AQUIFER	None		
				Supply Total	**560**	**519**	**304**	**191**	**191**	**191**	**191**				
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	WMS	0	54	70	85	100	115	131	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	WMS	0	0	939	939	1359	1359	1359	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$316,647.00
HARRIS COUNTY MUD #152	84160000	HARRIS	SAN JACINTO	WMS	0	214	214	214	214	214	214	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$7,028,844.35
				WMS Total	**0**	**268**	**1223**	**1238**	**1673**	**1688**	**1704**				**$7,345,491.35**
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	Population	4212	6887	9491	12053	14589	17109	19619				
				Population Total	**4212**	**6887**	**9491**	**12053**	**14589**	**17109**	**19619**				
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	Demand	769	1227	1669	2106	2533	2971	3406				
				Demand Total	**769**	**1227**	**1669**	**2106**	**2533**	**2971**	**3406**				
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	Supply	769	769	501	328	328	328	328	GULF COAST AQUIFER	None		
				Supply Total	**769**	**769**	**501**	**328**	**328**	**328**	**328**				
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	WMS	0	85	115	145	175	205	235	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	WMS	0	0	1696	1696	2509	2509	2509	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$584,597.00
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	WMS	0	334	334	334	334	334	334	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$11,283,368.85
HARRIS COUNTY MUD #153	84161000	HARRIS	SAN JACINTO	WMS	0	39	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**458**	**2145**	**2175**	**3018**	**3048**	**3078**				**$11,867,965.85**
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	Population	4785	6485	8141	9769	11381	12983	14579				
				Population Total	**4785**	**6485**	**8141**	**9769**	**11381**	**12983**	**14579**				
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	Demand	525	676	830	974	1122	1265	1421				
				Demand Total	**525**	**676**	**830**	**974**	**1122**	**1265**	**1421**				
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	Supply	525	445	249	151	151	151	151	GULF COAST AQUIFER	None		
				Supply Total	**525**	**445**	**249**	**151**	**151**	**151**	**151**				
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	WMS	0	47	57	67	77	87	98	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	WMS	0	0	710	710	988	988	988	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$230,204.00
HARRIS COUNTY MUD #154	84162000	HARRIS	SAN JACINTO	WMS	0	184	184	184	184	184	184	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,655,832.34
				WMS Total	**0**	**231**	**951**	**961**	**1249**	**1259**	**1270**				**$5,886,036.34**
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	Population	3918	5487	7015	7015	7015	7015	7015				
				Population Total	**3918**	**5487**	**7015**	**7015**	**7015**	**7015**	**7015**				
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	Demand	369	486	597	589	574	574	574				
				Demand Total	**369**	**486**	**597**	**589**	**574**	**574**	**574**				
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	Supply	369	320	179	92	92	92	92	GULF COAST AQUIFER	None		
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	Supply	411	411	411	411	411	411	411	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**780**	**731**	**590**	**503**	**503**	**503**	**503**				
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	WMS	0	0	7	35	34	34	34	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	WMS	0	0	0	10	10	10	10	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY MUD #158	84165000	HARRIS	SAN JACINTO	WMS	0	0	41	41	41	41	41	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$9,553.00
				WMS Total	**0**	**0**	**48**	**86**	**85**	**85**	**85**				**$9,553.00**
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	Population	4027	5339	6616	7872	9115	10351	11582				
				Population Total	**4027**	**5339**	**6616**	**7872**	**9115**	**10351**	**11582**				
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	Demand	483	616	741	864	990	1113	1245				
				Demand Total	**483**	**616**	**741**	**864**	**990**	**1113**	**1245**				
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	Supply	483	406	222	135	135	135	135	GULF COAST AQUIFER	None		
				Supply Total	**483**	**406**	**222**	**135**	**135**	**135**	**135**				
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	WMS	0	42	51	60	68	77	86	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	WMS	0	0	619	619	856	856	856	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$199,448.00
HARRIS COUNTY MUD #180	84170000	HARRIS	SAN JACINTO	WMS	0	168	168	168	168	168	168	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,471,530.90
				WMS Total	**0**	**210**	**838**	**847**	**1092**	**1101**	**1110**				**$4,670,978.90**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	Population	4965	6588	8169	9724	11263	12792	14316				
				Population Total	**4965**	**6588**	**8169**	**9724**	**11263**	**12792**	**14316**				
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	Demand	634	804	970	1133	1299	1462	1636				
				Demand Total	**634**	**804**	**970**	**1133**	**1299**	**1462**	**1636**				
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	Supply	634	530	291	176	176	176	176	GULF COAST AQUIFER	None		
				Supply Total	**634**	**530**	**291**	**176**	**176**	**176**	**176**				
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	WMS	0	55	67	78	90	101	113	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	WMS	0	0	814	814	1128	1128	1128	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$262,824.00
HARRIS COUNTY MUD #189	84174000	HARRIS	SAN JACINTO	WMS	0	219	219	219	219	219	219	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$6,480,111.06
				WMS Total	**0**	**274**	**1100**	**1111**	**1437**	**1448**	**1460**				**$6,742,935.06**
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	Population	9339	16788	24041	31175	38236	45253	52244				
				Population Total	**9339**	**16788**	**24041**	**31175**	**38236**	**45253**	**52244**				
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	Demand	1119	1956	2774	3562	4369	5170	5969				
				Demand Total	**1119**	**1956**	**2774**	**3562**	**4369**	**5170**	**5969**				
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	Supply	1119	1119	832	553	553	553	553	GULF COAST AQUIFER	None		
				Supply Total	**1119**	**1119**	**832**	**553**	**553**	**553**	**553**				
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	WMS	0	135	191	246	301	357	412	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	WMS	0	0	2982	2982	4471	4471	4471	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$1,041,743.00
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	WMS	0	533	533	533	533	533	533	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$17,966,447.29
HARRIS COUNTY MUD #200	84176000	HARRIS	SAN JACINTO	WMS	0	169	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**837**	**3706**	**3761**	**5305**	**5361**	**5416**				**$19,424,190.29**
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	Population	1374	1374	1374	1374	1374	1374	1374				
				Population Total	**1374**	**1374**	**1374**	**1374**	**1374**	**1374**	**1374**				
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	Demand	876	870	867	867	865	865	865				
				Demand Total	**876**	**870**	**867**	**867**	**865**	**865**	**865**				
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	Supply	876	573	260	135	135	135	135	GULF COAST AQUIFER	None		
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	Supply	70	70	64	65	65	65	65	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**946**	**643**	**324**	**200**	**200**	**200**	**200**				
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	WMS	0	48	48	48	48	48	48	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	WMS	0	172	172	172	172	172	172	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	WMS	0	0	443	443	443	443	443	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$103,219.00
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	WMS	0	4	4	4	4	4	4	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,300,428.81
HARRIS COUNTY MUD #261	84179000	HARRIS	SAN JACINTO	WMS	0	3	0	0	0	0	0	GULF COAST AQUIFER	CITY OF HOUSTON	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**227**	**667**	**667**	**667**	**667**	**667**				**$2,403,647.81**
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	Population	4977	5800	6601	7389	8169	8944	9716				
				Population Total	**4977**	**5800**	**6601**	**7389**	**8169**	**8944**	**9716**				
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	Demand	881	1001	1109	1225	1336	1453	1578				
				Demand Total	**881**	**1001**	**1109**	**1225**	**1336**	**1453**	**1578**				
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	Supply	881	659	333	190	190	190	190	GULF COAST AQUIFER	None		
				Supply Total	**881**	**659**	**333**	**190**	**190**	**190**	**190**				
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	WMS	0	60	66	73	80	87	94	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	WMS	0	0	784	784	1012	1012	1012	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$235,796.00
HARRIS COUNTY MUD #33	84180000	HARRIS	SAN JACINTO	WMS	0	282	282	282	282	282	282	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,530,720.66
				WMS Total	**0**	**342**	**1132**	**1139**	**1374**	**1381**	**1388**				**$4,766,516.66**
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	Population	3879	5285	5285	5285	5285	5285	5285				
				Population Total	**3879**	**5285**	**5285**	**5285**	**5285**	**5285**	**5285**				
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	Demand	1056	1415	1403	1403	1397	1397	1397				
				Demand Total	**1056**	**1415**	**1403**	**1403**	**1397**	**1397**	**1397**				
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	Supply	1056	933	421	219	219	219	219	GULF COAST AQUIFER	None		
				Supply Total	**1056**	**933**	**421**	**219**	**219**	**219**	**219**				
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	WMS	0	84	84	84	83	83	83	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	WMS	0	0	702	702	702	702	702	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$163,566.00
HARRIS COUNTY MUD #345	84182000	HARRIS	SAN JACINTO	WMS	0	398	398	398	398	398	398	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,454,681.62
				WMS Total	**0**	**482**	**1184**	**1184**	**1183**	**1183**	**1183**				**$5,618,247.62**
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	Population	4140	6326	6326	6326	6326	6326	6326				
				Population Total	**4140**	**6326**	**6326**	**6326**	**6326**	**6326**	**6326**				
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	Demand	566	836	822	808	801	801	801				
				Demand Total	**566**	**836**	**822**	**808**	**801**	**801**	**801**				
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	Supply	566	551	247	126	126	126	126	GULF COAST AQUIFER	None		
				Supply Total	**566**	**551**	**247**	**126**	**126**	**126**	**126**				
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	WMS	0	50	49	48	48	48	48	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	WMS	0	0	399	399	399	399	399	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$92,967.00
HARRIS COUNTY MUD #46	84183000	HARRIS	SAN JACINTO	WMS	0	235	235	235	235	235	235	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,302,571.69
				WMS Total	**0**	**285**	**683**	**682**	**682**	**682**	**682**				**$4,395,538.69**
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	Population	4062	4062	4062	4062	4062	4062	4062				
				Population Total	**4062**	**4062**	**4062**	**4062**	**4062**	**4062**	**4062**				
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	Demand	673	655	642	628	614	605	605				
				Demand Total	**673**	**655**	**642**	**628**	**614**	**605**	**605**				
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	Supply	673	432	193	98	98	98	98	GULF COAST AQUIFER	None		
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**673**	**432**	**193**	**98**	**98**	**98**	**98**				
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	WMS	0	39	38	37	37	36	36	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	WMS	0	131	131	131	131	131	131	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	WMS	0	0	309	309	309	309	309	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$71,997.00
HARRIS COUNTY MUD #5	84184000	HARRIS	SAN JACINTO	WMS	0	53	53	53	53	53	53	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,602,898.89
				WMS Total	**0**	**223**	**531**	**530**	**530**	**529**	**529**				**$2,674,895.89**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	Population	3048	3334	3612	3885	4156	4425	4693				
				Population Total	**3048**	**3334**	**3612**	**3885**	**4156**	**4425**	**4693**				
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	Demand	580	620	655	696	731	773	820				
				Demand Total	**580**	**620**	**655**	**696**	**731**	**773**	**820**				
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	Supply	116	116	116	108	108	108	108	GULF COAST AQUIFER	None		
				Supply Total	**116**	**116**	**116**	**108**	**108**	**108**	**108**				
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	WMS	35	37	39	41	44	46	49	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	WMS	0	0	113	113	197	197	197	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$45,901.00
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	WMS	0	466	466	466	466	466	466	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,381,284.81
HARRIS COUNTY MUD #50	84185000	HARRIS	SAN JACINTO	WMS	0	1	15	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**35**	**504**	**633**	**620**	**707**	**709**	**712**				**$4,427,185.81**
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	Population	13181	17972	22637	27225	31767	36281	40778				
				Population Total	**13181**	**17972**	**22637**	**27225**	**31767**	**36281**	**40778**				
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	Demand	1491	1933	2384	2806	3238	3658	4111				
				Demand Total	**1491**	**1933**	**2384**	**2806**	**3238**	**3658**	**4111**				
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	Supply	298	298	298	298	298	298	298	GULF COAST AQUIFER	None		
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	Supply	836	836	836	836	836	836	836	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**1134**	**1134**	**1134**	**1134**	**1134**	**1134**	**1134**				
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	WMS	103	133	164	194	223	252	284	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	WMS	711	711	711	711	711	711	711	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	WMS	0	0	1033	1033	1845	1845	1845	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$429,885.00
HARRIS COUNTY MUD #53	84186000	HARRIS	SAN JACINTO	WMS	0	66	179	137	137	137	137	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**814**	**910**	**2087**	**2075**	**2916**	**2945**	**2977**				**$845,885.00**
HARRIS COUNTY MUD #55	84187000	HARRIS	SAN JACINTO-BRAZOS	Population	11556	11556	11556	11556	11556	11556	11556				
				Population Total	**11556**	**11556**	**11556**	**11556**	**11556**	**11556**	**11556**				
HARRIS COUNTY MUD #55	84187000	HARRIS	SAN JACINTO-BRAZOS	Demand	1553	1502	1463	1424	1385	1359	1359				
				Demand Total	**1553**	**1502**	**1463**	**1424**	**1385**	**1359**	**1359**				
HARRIS COUNTY MUD #55	84187000	HARRIS	SAN JACINTO-BRAZOS	Supply	3877	3877	3877	3877	3877	3877	3877	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**3877**	**3877**	**3877**	**3877**	**3877**	**3877**	**3877**				
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	Population	5469	6225	6961	7685	8402	9114	9823				
				Population Total	**5469**	**6225**	**6961**	**7685**	**8402**	**9114**	**9823**				
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	Demand	637	697	756	809	866	929	1001				
				Demand Total	**637**	**697**	**756**	**809**	**866**	**929**	**1001**				
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	Supply	127	127	127	126	126	126	126	GULF COAST AQUIFER	None		
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	Supply	420	420	420	420	420	420	420	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**547**	**547**	**547**	**546**	**546**	**546**	**546**				
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	WMS	38	42	45	48	52	55	60	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	WMS	110	110	110	110	110	110	110	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	WMS	0	0	158	158	285	285	285	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$66,405.00
HARRIS COUNTY MUD #8	84189000	HARRIS	SAN JACINTO	WMS	0	4	24	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**148**	**156**	**337**	**316**	**447**	**450**	**455**				**$66,405.00**
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	Population	1522	1699	1871	2040	2208	2375	2541				
				Population Total	**1522**	**1699**	**1871**	**2040**	**2208**	**2375**	**2541**				
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	Demand	530	582	635	686	737	790	845				
				Demand Total	**530**	**582**	**635**	**686**	**737**	**790**	**845**				
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	Supply	530	383	191	107	107	107	107	GULF COAST AQUIFER	None		
				Supply Total	**530**	**383**	**191**	**107**	**107**	**107**	**107**				
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	WMS	0	32	35	38	41	44	47	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	WMS	0	0	422	422	524	524	524	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$122,092.00
HARRIS COUNTY UD #14	84190000	HARRIS	SAN JACINTO	WMS	0	167	167	167	167	167	167	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,920,652.65
				WMS Total	**0**	**199**	**624**	**627**	**732**	**735**	**738**				**$3,042,744.65**
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	Population	2712	3259	3792	4316	4835	5351	5865				
				Population Total	**2712**	**3259**	**3792**	**4316**	**4835**	**5351**	**5865**				
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	Demand	371	427	484	541	596	653	716				
				Demand Total	**371**	**427**	**484**	**541**	**596**	**653**	**716**				
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	Supply	371	281	145	84	84	84	84	GULF COAST AQUIFER	None		
				Supply Total	**371**	**281**	**145**	**84**	**84**	**84**	**84**				
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	WMS	0	25	29	32	36	39	43	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	WMS	0	0	355	355	468	468	468	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$109,044.00
HARRIS COUNTY UD #15	84191000	HARRIS	SAN JACINTO	WMS	0	121	121	121	121	121	121	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,645,879.37
				WMS Total	**0**	**146**	**505**	**508**	**625**	**628**	**632**				**$2,754,923.37**
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	Population	8004	9665	11283	12874	14449	16014	17573				
				Population Total	**8004**	**9665**	**11283**	**12874**	**14449**	**16014**	**17573**				
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	Demand	968	1115	1264	1413	1554	1704	1870				
				Demand Total	**968**	**1115**	**1264**	**1413**	**1554**	**1704**	**1870**				
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	Supply	968	735	379	220	220	220	220	GULF COAST AQUIFER	None		
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	Supply	670	670	670	670	670	670	670	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY		
				Supply Total	**1638**	**1405**	**1049**	**890**	**890**	**890**	**890**				
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	WMS	0	0	87	97	107	118	129	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	WMS	0	0	820	820	820	820	820	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	0	9	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY WCID #1	84193000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	22	22	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
				WMS Total	**0**	**0**	**907**	**917**	**927**	**960**	**980**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	Population	4502	4577	4652	4727	4802	4877	4877				
				Population Total	**4502**	**4577**	**4652**	**4727**	**4802**	**4877**	**4877**				
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	Demand	756	754	750	747	737	743	743				
				Demand Total	**756**	**754**	**750**	**747**	**737**	**743**	**743**				
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	Supply	756	496	225	116	116	116	116	GULF COAST AQUIFER	None		
				Supply Total	**756**	**496**	**225**	**116**	**116**	**116**	**116**				
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	WMS	0	45	45	45	44	44	44	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	WMS	0	0	373	373	373	373	373	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$86,909.00
HARRIS COUNTY WCID #133	84195000	HARRIS	SAN JACINTO	WMS	0	213	213	213	213	213	213	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,637,843.53
				WMS Total	**0**	**258**	**631**	**631**	**630**	**630**	**630**				**$2,724,752.53**
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	Population	9500	10120	10724	11318	11906	12490	13072				
				Population Total	**9500**	**10120**	**10724**	**11318**	**11906**	**12490**	**13072**				
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	Demand	1373	1417	1466	1509	1547	1609	1684				
				Demand Total	**1373**	**1417**	**1466**	**1509**	**1547**	**1609**	**1684**				
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	Supply	137	134	137	118	118	118	118	GULF COAST AQUIFER	None		
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	Supply	913	913	913	913	913	913	913	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**1050**	**1047**	**1050**	**1031**	**1031**	**1031**	**1031**				
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	WMS	95	98	101	104	107	111	116	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	WMS	149	149	149	149	149	149	149	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	WMS	0	0	137	137	265	265	265	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$61,745.00
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	WMS	0	123	123	123	123	123	123	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$3,268,806.41
HARRIS COUNTY WCID #21	84196000	HARRIS	SAN JACINTO	WMS	0	0	10	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**244**	**370**	**520**	**513**	**644**	**648**	**653**				**$3,330,551.41**
HARRIS COUNTY WCID #36	84197000	HARRIS	SAN JACINTO	Population	9300	10451	11572	12674	13765	14849	15929				
				Population Total	**9300**	**10451**	**11572**	**12674**	**13765**	**14849**	**15929**				
HARRIS COUNTY WCID #36	84197000	HARRIS	SAN JACINTO	Demand	1240	1346	1452	1547	1650	1763	1891				
				Demand Total	**1240**	**1346**	**1452**	**1547**	**1650**	**1763**	**1891**				
HARRIS COUNTY WCID #36	84197000	HARRIS	SAN JACINTO	Supply	248	248	248	240	240	240	240	GULF COAST AQUIFER	None		
				Supply Total	**248**	**248**	**248**	**240**	**240**	**240**	**240**				
HARRIS COUNTY WCID #36	84197000	HARRIS	SAN JACINTO	WMS	0	0	294	294	519	519	519	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$120,927.00
HARRIS COUNTY WCID #36	84197000	HARRIS	SAN JACINTO	WMS	0	5	42					GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**5**	**336**	**294**	**519**	**519**	**519**				**$120,927.00**
HARRIS COUNTY WCID #36	84197001	HARRIS	SAN JACINTO	Supply	802	802	802	802	802	802	802	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**802**	**802**	**802**	**802**	**802**	**802**	**802**				
HARRIS COUNTY WCID #36	84197001	HARRIS	SAN JACINTO	WMS	86	93	100	107	114	122	130	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #36	84197001	HARRIS	SAN JACINTO	WMS	200	200	200	200	200	200	200	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
				WMS Total	**286**	**293**	**300**	**307**	**314**	**322**	**330**				**$0.00**
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	Population	4100	4700	5284	5859	6428	6993	7556				
				Population Total	**4100**	**4700**	**5284**	**5859**	**6428**	**6993**	**7556**				
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	Demand	547	605	663	715	770	830	897				
				Demand Total	**547**	**605**	**663**	**715**	**770**	**830**	**897**				
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	Supply	55	55	55	55	55	55	55	GULF COAST AQUIFER	None		
				Supply Total	**55**	**55**	**55**	**55**	**55**	**55**	**55**				
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	WMS	33	36	40	43	46	49	53	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	WMS	0	0	156	156	276	276	276	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$64,308.00
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	WMS	0	512	512	512	512	512	512	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,069,499.53
HARRIS COUNTY WCID #50	84198000	HARRIS	SAN JACINTO	WMS	0	2	11	1	1	1	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**33**	**550**	**719**	**712**	**835**	**838**	**842**				**$5,133,807.53**
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	Population	1788	1788	1788	1788	1788	1788	1788				
				Population Total	**1788**	**1788**	**1788**	**1788**	**1788**	**1788**	**1788**				
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	Demand	304	296	290	284	278	274	274				
				Demand Total	**304**	**296**	**290**	**284**	**278**	**274**	**274**				
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	Supply	304	195	87	44	44	44	44	GULF COAST AQUIFER	None		
				Supply Total	**304**	**195**	**87**	**44**	**44**	**44**	**44**				
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	WMS	0	16	16	16	15	15	15	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	WMS	0	0	139	139	139	139	139	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$32,387.00
HARRIS COUNTY WCID #76	84199000	HARRIS	SAN JACINTO	WMS	0	85	85	85	85	85	85	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**0**	**101**	**240**	**240**	**239**	**239**	**239**				**$32,387.00**
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	Population	2430	2475	2519	2562	2605	2648	2691				
				Population Total	**2430**	**2475**	**2519**	**2562**	**2605**	**2648**	**2691**				
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	Demand	599	602	604	606	604	611	621				
				Demand Total	**599**	**602**	**604**	**606**	**604**	**611**	**621**				
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	Supply	60	56	60	47	47	47	47	GULF COAST AQUIFER	None		
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	Supply	310	310	310	310	310	310	310	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**370**	**366**	**370**	**357**	**357**	**357**	**357**				
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	WMS	33	33	34	34	34	34	34	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	WMS	64	64	64	64	64	64	64	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HARRIS COUNTY WCID #84	84200000	HARRIS	SAN JACINTO	WMS	0	166	166	166	166	166	166	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**97**	**263**	**264**	**264**	**264**	**264**	**264**				**$0.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	Population	2334	2334	2334	2334	2334	2334	2334				
				Population Total	**2334**	**2334**	**2334**	**2334**	**2334**	**2334**	**2334**				
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	Demand	839	831	824	816	808	803	803				
				Demand Total	**839**	**831**	**824**	**816**	**808**	**803**	**803**				
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	Supply	168	156	165	127	127	127	127	GULF COAST AQUIFER	None		
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	Supply	170	161	154	147	139	132	126	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**338**	**317**	**319**	**274**	**266**	**259**	**253**				
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	WMS	47	46	46	45	45	45	45	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	WMS	141	141	141	141	141	141	141	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HEDWIG VILLAGE	80269000	HARRIS	SAN JACINTO	WMS	0	364	364	364	364	364	364	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,063,989.45
				WMS Total	**188**	**551**	**551**	**550**	**550**	**550**	**550**				**$2,063,989.45**
HEMPSTEAD	80271000	WALLER	BRAZOS	Population	4691	5724	6947	8309	9825	11630	13703				
				Population Total	**4691**	**5724**	**6947**	**8309**	**9825**	**11630**	**13703**				
HEMPSTEAD	80271000	WALLER	BRAZOS	Demand	946	1128	1346	1582	1860	2189	2579				
				Demand Total	**946**	**1128**	**1346**	**1582**	**1860**	**2189**	**2579**				
HEMPSTEAD	80271000	WALLER	BRAZOS	Supply	946	946	946	946	946	946	946	GULF COAST AQUIFER	None		
				Supply Total	**946**	**946**	**946**	**946**	**946**	**946**	**946**				
HEMPSTEAD	80271000	WALLER	BRAZOS	WMS	0	0	0	0	0	50	178	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HEMPSTEAD	80271000	WALLER	BRAZOS	WMS	0	0	0	0	0	0	81	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
HEMPSTEAD	80271000	WALLER	BRAZOS	WMS	0	182	400	636	914	1193	1374	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,918,100.00
HEMPSTEAD	80271000	WALLER	BRAZOS	WMS	0						81	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**182**	**400**	**636**	**914**	**1243**	**1714**				**$1,918,100.00**
HILLCREST	80881000	BRAZORIA	SAN JACINTO-BRAZOS	Population	722	744	767	789	810	832	855				
				Population Total	**722**	**744**	**767**	**789**	**810**	**832**	**855**				
HILLCREST	80881000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	124	125	126	126	127	130	133				
				Demand Total	**124**	**125**	**126**	**126**	**127**	**130**	**133**				
HILLCREST	80881000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	124	124	124	124	124	124	124	GULF COAST AQUIFER	None		
				Supply Total	**124**	**124**	**124**	**124**	**124**	**124**	**124**				
HILLCREST	80881000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	1	2	2	3	6	9	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**2**	**2**	**3**	**6**	**9**				**$0.00**
HILLSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	Supply	182	126	56	29	29	29	29	GULF COAST AQUIFER	None		
HILLSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	Supply	117	117	117	117	117	117	117	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**299**	**243**	**173**	**146**	**146**	**146**	**146**				
HILLSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	WMS	0	0	7	7	7	7	7	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HILLSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	WMS	0	0	8	8	8	8	8	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
				WMS Total	**0**	**0**	**15**	**15**	**15**	**15**	**15**				**$0.00**
HILSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	Population	720	770	770	770	770	770	770				
				Population Total	**720**	**770**	**770**	**770**	**770**	**770**	**770**				
HILSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	Demand	182	191	188	185	183	182	182				
				Demand Total	**182**	**191**	**188**	**185**	**183**	**182**	**182**				
HILSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	WMS	0	0	24	24	24	24	24	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$5,592.00
				WMS Total	**0**	**0**	**24**	**24**	**24**	**24**	**24**				**$5,592.00**
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	Population	6386	6660	6897	7037	7094	7136	7163				
				Population Total	**6386**	**6660**	**6897**	**7037**	**7094**	**7136**	**7163**				
HILSHIRE VILLAGE	81025000	HARRIS	SAN JACINTO	WMS	0	0	24	24	24	24	24	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$5,592.00
				WMS Total	**0**	**0**	**24**	**24**	**24**	**24**	**24**				**$5,592.00**
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	Population	6386	6660	6897	7037	7094	7136	7163				
				Population Total	**6386**	**6660**	**6897**	**7037**	**7094**	**7136**	**7163**				
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	Demand	916	933	935	930	914	911	915				
				Demand Total	**916**	**933**	**935**	**930**	**914**	**911**	**915**				
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	Supply	92	92	92	92	91	91	92	GULF COAST AQUIFER	None		
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1493	1493	1493	1493	1493	1493	1493	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**1585**	**1585**	**1585**	**1585**	**1584**	**1584**	**1585**				
HITCHCOCK	80279000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	1	2	1	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**2**	**1**	**0**	**0**	**0**				**$0.00**
HOLIDAY LAKES	80779000	BRAZORIA	SAN JACINTO-BRAZOS	Population	1095	1141	1189	1235	1278	1323	1370				
				Population Total	**1095**	**1141**	**1189**	**1235**	**1278**	**1323**	**1370**				
HOLIDAY LAKES	80779000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	93	92	91	90	89	90	94				
				Demand Total	**93**	**92**	**91**	**90**	**89**	**90**	**94**				
HOLIDAY LAKES	80779000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	93	92	91	90	89	90	93	GULF COAST AQUIFER	None		
				Supply Total	**93**	**92**	**91**	**90**	**89**	**90**	**93**				
HOLIDAY LAKES	80779000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0						1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**0**	**0**	**0**	**0**	**0**	**1**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
HOUSTON	80285000	FORT BEND	SAN JACINTO	Population	19597	23433	27408	32268	37266	43820	51309				
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	Population	13763	16457	19249	22663	26173	30776	36036				
HOUSTON	80285000	HARRIS	SAN JACINTO	Population	1818471	2083856	2342251	2596403	2847979	3097992	3347056				
HOUSTON	80285000	HARRIS	SAN JACINTO-BRAZOS	Population	101342	116132	130532	144696	158716	172649	186529				
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	Population	458	1096	1486	2248	3134	4303	5661				
				Population Total	**1953631**	**2240974**	**2520926**	**2798278**	**3073268**	**3349540**	**3626591**				
HOUSTON	80285000	FORT BEND	SAN JACINTO	Demand	3490	4068	4667	5386	6136	7166	8391				
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	Demand	2451	2857	3277	3782	4310	5033	5893				
HOUSTON	80285000	HARRIS	SAN JACINTO	Demand	323875	361804	398796	433343	468951	506649	547381				
HOUSTON	80285000	HARRIS	SAN JACINTO-BRAZOS	Demand	18049	20163	22225	24150	26134	28235	30505				
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	Demand	82	190	253	375	516	704	926				
				Demand Total	**347947**	**389082**	**429218**	**467036**	**506047**	**547787**	**593096**				
HOUSTON	80285000	FORT BEND	SAN JACINTO	Supply	3490	4068	4667	5386	6136	7166	8391	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	Supply	1884	1884	1670	1137	1137	1137	1137	GULF COAST AQUIFER	CITY OF HOUSTON		
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	Supply	567	924	1607	2645	3173	3896	4756	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
HOUSTON	80285000	HARRIS	SAN JACINTO	Supply	68385	68385	68385	68385	68385	68385	68385	GULF COAST AQUIFER	CITY OF HOUSTON		
HOUSTON	80285000	HARRIS	SAN JACINTO	Supply	255490	289866	314592	362616	398224	435922	476654	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
HOUSTON	80285000	HARRIS	SAN JACINTO-BRAZOS	Supply	9973	12087	14149	16074	18058	20159	22429	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
HOUSTON	80285000	HARRIS	SAN JACINTO-BRAZOS	Supply	8076	8076	8076	8076	8076	8076	8076	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	Supply	82	82	82	82	82	82	82	GULF COAST AQUIFER	CITY OF HOUSTON		
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	Supply	0	32	96	185	299	463	667	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**347947**	**385404**	**413324**	**464586**	**503570**	**545286**	**590577**				
HOUSTON	80285000	FORT BEND	SAN JACINTO	WMS	0	285	327	377	430	502	587	CONSERVATION	None	MUN CONSERVATION	$0.00
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	200	229	265	302	352	413	CONSERVATION	None	MUN CONSERVATION	$0.00
HOUSTON	80285000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	49						GULF COAST AQUIFER	CITY OF HOUSTON	EXPANDED USE OF GW	$0.00
HOUSTON	80285000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	20000	20000	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
HOUSTON	80285000	HARRIS	SAN JACINTO	WMS	0	25326	27916	30334	32827	35465	38317	CONSERVATION	None	MUN CONSERVATION	$0.00
HOUSTON	80285000	HARRIS	SAN JACINTO	WMS	0	3553	15819	2342	2342	2342	2342	GULF COAST AQUIFER	CITY OF HOUSTON	EXPANDED USE OF GW	$13,023,300.00
HOUSTON	80285000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	1411	1556	1691	1829	1976	2135	CONSERVATION	None	MUN CONSERVATION	$0.00
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	WMS	0	13	18	26	36	49	65	CONSERVATION	None	MUN CONSERVATION	$0.00
HOUSTON	80285000	MONTGOMERY	SAN JACINTO	WMS	0	76	75	108	135	159	177	GULF COAST AQUIFER	CITY OF HOUSTON	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**30913**	**45940**	**35143**	**37901**	**60845**	**64036**				**$13,023,300.00**
HUMBLE	80289000	HARRIS	SAN JACINTO	Population	14579	16862	19085	21272	23436	25587	27730				
				Population Total	**14579**	**16862**	**19085**	**21272**	**23436**	**25587**	**27730**				
HUMBLE	80289000	HARRIS	SAN JACINTO	Demand	3233	3664	4062	4456	4857	5274	5715				
				Demand Total	**3233**	**3664**	**4062**	**4456**	**4857**	**5274**	**5715**				
HUMBLE	80289000	HARRIS	SAN JACINTO	Supply	3233	2414	1219	693	693	693	693	GULF COAST AQUIFER	None		
HUMBLE	80289000	HARRIS	SAN JACINTO	Supply	47	47	47	47	47	47	47	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**3280**	**2461**	**1266**	**740**	**740**	**740**	**740**				
HUMBLE	80289000	HARRIS	SAN JACINTO	WMS	0	253	280	307	335	364	394	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HUMBLE	80289000	HARRIS	SAN JACINTO	WMS	0	1275	1275	1275	1275	1275	1275	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HUMBLE	80289000	HARRIS	SAN JACINTO	WMS	0	0	2134	2134	3306	3306	3306	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$770,298.00
				WMS Total	**0**	**1528**	**3689**	**3716**	**4916**	**4945**	**4975**				**$770,298.00**
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	Population	4374	4755	5126	5491	5852	6211	6568				
				Population Total	**4374**	**4755**	**5126**	**5491**	**5852**	**6211**	**6568**				
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	Demand	1627	1747	1866	1981	2091	2212	2340				
				Demand Total	**1627**	**1747**	**1866**	**1981**	**2091**	**2212**	**2340**				
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	Supply	325	325	325	308	308	308	308	GULF COAST AQUIFER	None		
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	Supply	329	339	348	356	364	372	379	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**654**	**664**	**673**	**664**	**672**	**680**	**687**				
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	WMS	97	104	111	118	125	132	139	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	WMS	421	421	421	421	421	421	421	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	WMS	0	0	319	319	539	539	539	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$125,587.00
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	WMS	0	554	554	554	554	554	554	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$4,068,523.06
HUNTERS CREEK VILLAGE	80290000	HARRIS	SAN JACINTO	WMS	0	4	48	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**518**	**1083**	**1453**	**1412**	**1639**	**1646**	**1653**				**$4,194,110.06**
HUNTSVILLE	80292000	WALKER	TRINITY	Population	6388	7310	8059	8420	8331	8351	8351				
HUNTSVILLE	80292000	WALKER	SAN JACINTO	Population	28690	32831	36196	37816	37419	37507	37507				
				Population Total	**35078**	**40141**	**44255**	**46236**	**45750**	**45858**	**45858**				
HUNTSVILLE	80292000	WALKER	TRINITY	Demand	930	1024	1101	1122	1092	1085	1085				
HUNTSVILLE	80292000	WALKER	SAN JACINTO	Demand	4178	4597	4946	5041	4904	4874	4874				
				Demand Total	**5108**	**5621**	**6047**	**6163**	**5996**	**5959**	**5959**				
HUNTSVILLE	80292000	WALKER	TRINITY	Supply	9521	9521	9182	6849	7542	7400	7147	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
HUNTSVILLE	80292000	WALKER	TRINITY	Supply	725	687	668	640	608	586	567	GULF COAST AQUIFER	CITY OF HUNTSVILLE		
HUNTSVILLE	80292000	WALKER	SAN JACINTO	Supply	0	0	339	2672	1979	2121	2374	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
HUNTSVILLE	80292000	WALKER	SAN JACINTO	Supply	4178	4178	4178	4178	4178	4178	4178	GULF COAST AQUIFER	CITY OF HUNTSVILLE		
				Supply Total	**14424**	**14386**	**14367**	**14339**	**14307**	**14285**	**14266**				
HUNTSVILLE	80292000	WALKER	SAN JACINTO	WMS	0	419	752	675	599	553	524	GULF COAST AQUIFER	CITY OF HUNTSVILLE	EXPANDED USE OF GW	$1,543,900.00
				WMS Total	**0**	**419**	**752**	**675**	**599**	**553**	**524**				**$1,543,900.00**
IOWA COLONY	80885000	BRAZORIA	SAN JACINTO-BRAZOS	Population	804	911	1022	1129	1227	1331	1440				
				Population Total	**804**	**911**	**1022**	**1129**	**1227**	**1331**	**1440**				
IOWA COLONY	80885000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	100	108	118	126	135	145	156				
				Demand Total	**100**	**108**	**118**	**126**	**135**	**145**	**156**				
IOWA COLONY	80885000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	100	100	100	100	100	100	100	GULF COAST AQUIFER	None		
				Supply Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**				
IOWA COLONY	80885000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	8	18	26	35	45	56	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**8**	**18**	**26**	**35**	**45**	**56**				**$0.00**
IRRIGATION	81004008	AUSTIN	BRAZOS	Demand	743	743	743	743	743	743	743				
IRRIGATION	81004008	AUSTIN	BRAZOS-COLORADO	Demand	9874	9874	9874	9874	9874	9874	9874				
				Demand Total	**10617**	**10617**	**10617**	**10617**	**10617**	**10617**	**10617**				
IRRIGATION	81004008	AUSTIN	BRAZOS	Supply	743	743	743	743	743	743	743	GULF COAST AQUIFER	None		
IRRIGATION	81004008	AUSTIN	BRAZOS-COLORADO	Supply	9874	9874	9874	9874	9874	9874	9874	GULF COAST AQUIFER	None		
				Supply Total	**10617**	**10617**	**10617**	**10617**	**10617**	**10617**	**10617**				
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Demand	138447	125311	114251	110009	107452	107452	107452				
IRRIGATION	81004020	BRAZORIA	BRAZOS	Demand	4624	4186	3816	3675	3589	3589	3589				
IRRIGATION	81004020	BRAZORIA	BRAZOS-COLORADO	Demand	6117	5536	5048	4860	4747	4747	4747				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
				Demand Total	**149188**	**135033**	**123115**	**118544**	**115788**	**115788**	**115788**				
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	23257	21778	18563	15030	12465	10744	9187	GULF COAST AQUIFER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	711	711	711	711	711	711	711	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	962	962	962	962	962	962	962	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	1360	1360	1360	1360	1360	1360	1360	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	3347	3347	3347	3347	3347	3347	3347	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	766	766	766	766	766	766	766	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	558	558	558	558	558	558	558	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	1025	1025	1025	1025	1025	1025	1025	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	63812	63812	63812	63812	63812	63812	63812	BRAZOS RIVER RUN-OF-RIVER	CHOCOLATE BAYOU WATER CO.		
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	2935	2935	2935	2935	2935	2935	2935	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	CHOCOLATE BAYOU WATER CO.		
IRRIGATION	81004020	BRAZORIA	BRAZOS	Supply	1800	1800	1800	1800	1800	1800	1800	BRAZOS RIVER RUN-OF-RIVER	None		
IRRIGATION	81004020	BRAZORIA	BRAZOS	Supply	553	174	90	58	40	29	21	GULF COAST AQUIFER	None		
IRRIGATION	81004020	BRAZORIA	BRAZOS	Supply	500	500	500	500	500	500	500	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	CHOCOLATE BAYOU WATER CO.		
IRRIGATION	81004020	BRAZORIA	BRAZOS-COLORADO	Supply	3145	2794	2528	2382	2276	2194	2108	GULF COAST AQUIFER	None		
				Supply Total	**104731**	**102522**	**98957**	**95246**	**92557**	**90743**	**89092**				
IRRIGATION	81004020	BRAZORIA	BRAZOS	WMS	0	1130	1130	1130	1130	1130	1130	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO	Contractual Transfer	$0.00
IRRIGATION	81004020	BRAZORIA	BRAZOS	WMS	0	582	582	582	582	582	582	CONSERVATION	None	IRRIGATION CONSERVATION	$4,656.00
IRRIGATION	81004020	BRAZORIA	BRAZOS-COLORADO	WMS	0	1971	1971	1971	1971	1971	1971	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO	Contractual Transfer	$0.00
IRRIGATION	81004020	BRAZORIA	BRAZOS-COLORADO	WMS	0	771	771	771	771	771	771	CONSERVATION	None	IRRIGATION CONSERVATION	$6,168.00
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	10618	10618	10618	10618	10618	10618	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO	Contractual Transfer	$0.00
IRRIGATION	81004020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	17439	17439	17439	17439	17439	17439	CONSERVATION	None	IRRIGATION CONSERVATION	$139,512.00
				WMS Total	**0**	**32511**	**32511**	**32511**	**32511**	**32511**	**32511**				**$150,336.00**
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Demand	83269	83269	83269	83269	83269	83269	83269				
IRRIGATION	81004036	CHAMBERS	TRINITY	Demand	32741	32741	32741	32741	32741	32741	32741				
IRRIGATION	81004036	CHAMBERS	TRINITY-SAN JACINTO	Demand	1767	1767	1767	1767	1767	1767	1767				
				Demand Total	**117777**	**117777**	**117777**	**117777**	**117777**	**117777**	**117777**				
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	3899	3890	3884	3880	3879	3876	3876	GULF COAST AQUIFER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	2528	2528	2528	2528	2528	2528	2528	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1626	1626	1626	1626	1626	1626	1626	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1997	1997	1997	1997	1997	1997	1997	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1069	1069	1069	1069	1069	1069	1069	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1078	1078	1078	1078	1078	1078	1078	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1205	1205	1205	1205	1205	1205	1205	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1173	1173	1173	1173	1173	1173	1173	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	1818	1818	1818	1818	1818	1818	1818	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	2093	2093	2093	2093	2093	2093	2093	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	2663	2663	2663	2663	2663	2663	2663	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	901	901	901	901	901	901	901	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	573	573	573	573	573	573	573	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	805	805	805	805	805	805	805	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	771	771	771	771	771	771	771	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	711	711	711	711	711	711	711	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	691	691	691	691	691	691	691	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	805	805	805	805	805	805	805	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	771	771	771	771	771	771	771	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	711	711	711	711	711	711	711	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	691	691	691	691	691	691	691	NECHES-TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	10000	10000	10000	10000	10000	10000	10000	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	33300	33300	33300	33300	33300	33300	33300	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	Supply	17309	16818	16552	16370	16170	15941	15669	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
IRRIGATION	81004036	CHAMBERS	TRINITY	Supply	6189	5688	5464	5330	5207	5089	4988	GULF COAST AQUIFER	None		
IRRIGATION	81004036	CHAMBERS	TRINITY-SAN JACINTO	Supply	589	530	509	472	439	409	379	GULF COAST AQUIFER	None		
IRRIGATION	81004036	CHAMBERS	TRINITY-SAN JACINTO	Supply	1084	1084	1084	1084	1084	1084	1084	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	None		
IRRIGATION	81004036	CHAMBERS	TRINITY-SAN JACINTO	Supply	1209	1209	1209	1209	1209	1209	1209	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	None		
				Supply Total	**95281**	**94221**	**93704**	**93347**	**92990**	**92610**	**92207**				
IRRIGATION	81004036	CHAMBERS	NECHES-TRINITY	WMS	0	16981	16981	16981	16981	16981	16981	CONSERVATION	None	IRRIGATION CONSERVATION	$152,829.00
IRRIGATION	81004036	CHAMBERS	TRINITY	WMS	0	6677	6677	6677	6677	6677	6677	CONSERVATION	None	IRRIGATION CONSERVATION	$60,093.00
IRRIGATION	81004036	CHAMBERS	TRINITY	WMS	0	3120	3120	3120	3120	3120	3120	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
IRRIGATION	81004036	CHAMBERS	TRINITY	WMS	0	18939	18939	18939	18939	18939	18939	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
IRRIGATION	81004036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	360	360	360	360	360	360	CONSERVATION	None	IRRIGATION CONSERVATION	$3,240.00
				WMS Total	**0**	**46077**	**46077**	**46077**	**46077**	**46077**	**46077**				**$216,162.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
IRRIGATION	81004079	FORT BEND	SAN JACINTO	Demand	7538	7538	7538	7538	7538	7538	7538				
IRRIGATION	81004079	FORT BEND	SAN JACINTO-BRAZOS	Demand	9141	9141	9141	9141	9141	9141	9141				
IRRIGATION	81004079	FORT BEND	BRAZOS	Demand	17907	17907	17907	17907	17907	17907	17907				
IRRIGATION	81004079	FORT BEND	BRAZOS-COLORADO	Demand	18869	18869	18869	18869	18869	18869	18869				
				Demand Total	**53455**	**53455**	**53455**	**53455**	**53455**	**53455**	**53455**				
IRRIGATION	81004079	FORT BEND	SAN JACINTO	Supply	7538	7538	7538	7538	7538	7538	7538	GULF COAST AQUIFER	None		
IRRIGATION	81004079	FORT BEND	SAN JACINTO-BRAZOS	Supply	8093	8093	8093	8093	8093	8093	8093	GULF COAST AQUIFER	None		
IRRIGATION	81004079	FORT BEND	SAN JACINTO-BRAZOS	Supply	1098	1098	1098	1098	1098	1098	1098	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
IRRIGATION	81004079	FORT BEND	BRAZOS	Supply	17907	17907	17907	17907	17907	17907	17907	BRAZOS RIVER ALLUVIUM AQUIFER	None		
IRRIGATION	81004079	FORT BEND	BRAZOS	Supply	20944	20944	20944	20944	20944	20944	20944	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO		
IRRIGATION	81004079	FORT BEND	BRAZOS	Supply	5625	5625	5625	5625	5625	5625	5625	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	CHOCOLATE BAYOU WATER CO.		
IRRIGATION	81004079	FORT BEND	BRAZOS-COLORADO	Supply	18869	18869	18869	18869	18869	18869	18869	GULF COAST AQUIFER	None		
				Supply Total	**80074**	**80074**	**80074**	**80074**	**80074**	**80074**	**80074**				
IRRIGATION	81004079	FORT BEND	BRAZOS	WMS	0	1757	1757	1757	1757	1757	1757	CONSERVATION	None	IRRIGATION CONSERVATION	$14,056.00
IRRIGATION	81004079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	3440	3440	3440	3440	3440	3440	CONSERVATION	None	IRRIGATION CONSERVATION	$27,520.00
				WMS Total	**0**	**5197**	**5197**	**5197**	**5197**	**5197**	**5197**				**$41,576.00**
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	Demand	10342	10342	10342	10342	10342	10342	10342				
				Demand Total	**10342**	**10342**	**10342**	**10342**	**10342**	**10342**	**10342**				
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	Supply	441	90	424	441	441	441	441	GULF COAST AQUIFER	None		
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	Supply	109	109	109	109	109	109	109	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**550**	**199**	**533**	**550**	**550**	**550**	**550**				
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	7751	7417	6872	6869	6885	6912	BRAZOS RIVER AUTHORITY SYSTEM	GULF COAST WATER AUTHORITY	New Contracts	$0.00
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	2392	2392	2392	2392	2392	2392	CONSERVATION	None	IRRIGATION CONSERVATION	$21,528.00
IRRIGATION	81004084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0			528	531	515	488	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,539,200.00
				WMS Total	**0**	**10143**	**9809**	**9792**	**9792**	**9792**	**9792**				**$1,560,728.00**
IRRIGATION	81004101	HARRIS	TRINITY-SAN JACINTO	Demand	5417	5417	5417	5417	5417	5417	5417				
IRRIGATION	81004101	HARRIS	SAN JACINTO	Demand	9883	9883	9883	9883	9883	9883	9883				
				Demand Total	**15300**	**15300**	**15300**	**15300**	**15300**	**15300**	**15300**				
IRRIGATION	81004101	HARRIS	TRINITY-SAN JACINTO	Supply	5417	5417	5417	5417	5417	5417	5417	GULF COAST AQUIFER	None		
IRRIGATION	81004101	HARRIS	TRINITY-SAN JACINTO	Supply	628	628	628	628	628	628	628	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	None		
IRRIGATION	81004101	HARRIS	TRINITY-SAN JACINTO	Supply	626	626	626	626	626	626	626	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	None		
IRRIGATION	81004101	HARRIS	SAN JACINTO	Supply	9883	9265	9883	9145	9145	9145	9145	GULF COAST AQUIFER	None		
IRRIGATION	81004101	HARRIS	SAN JACINTO	Supply	738	738	738	738	738	738	738	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
				Supply Total	**17292**	**16674**	**17292**	**16554**	**16554**	**16554**	**16554**				
IRRIGATION	81004145	LEON	TRINITY	Demand	542	542	542	542	542	542	542				
				Demand Total	**542**	**542**	**542**	**542**	**542**	**542**	**542**				
IRRIGATION	81004145	LEON	TRINITY	Supply	261	261	261	261	261	261	261	CARRIZO-WILCOX AQUIFER	None		
IRRIGATION	81004145	LEON	TRINITY	Supply	281	281	281	281	281	281	281	SPARTA AQUIFER	None		
				Supply Total	**542**	**542**	**542**	**542**	**542**	**542**	**542**				
IRRIGATION	81004146	LIBERTY	NECHES	Demand	3317	3317	3317	3317	3317	3317	3317				
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	Demand	8289	8289	8289	8289	8289	8289	8289				
IRRIGATION	81004146	LIBERTY	TRINITY	Demand	53056	53056	53056	53056	53056	53056	53056				
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	Demand	17409	17409	17409	17409	17409	17409	17409				
IRRIGATION	81004146	LIBERTY	SAN JACINTO	Demand	830	830	830	830	830	830	830				
				Demand Total	**82901**	**82901**	**82901**	**82901**	**82901**	**82901**	**82901**				
IRRIGATION	81004146	LIBERTY	NECHES	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
IRRIGATION	81004146	LIBERTY	NECHES	Supply	2500	2500	2500	2500	2500	2500	2500	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	Supply	378	375	374	372	369	368	367	GULF COAST AQUIFER	None		
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	Supply	423	392	377	367	356	344	330	TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	Supply	17200	17200	17200	17200	17200	17200	17200	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	Supply	1725	1677	1651	1632	1614	1590	1563	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
IRRIGATION	81004146	LIBERTY	TRINITY	Supply	14236	10554	8467	6995	5353	3406	1030	GULF COAST AQUIFER	None		
IRRIGATION	81004146	LIBERTY	TRINITY	Supply	33000	33000	33000	33000	33000	33000	33000	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON		
IRRIGATION	81004146	LIBERTY	TRINITY	Supply	2077	2108	2123	2133	2144	2156	2170	TRINITY RIVER RUN-OF-RIVER	None		
IRRIGATION	81004146	LIBERTY	TRINITY	Supply	8466	9005	9297	9498	9716	9969	10268	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	Supply	5741	5683	5643	5608	5573	5535	5507	GULF COAST AQUIFER	None		
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	Supply	685	685	685	685	685	685	685	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	None		
IRRIGATION	81004146	LIBERTY	SAN JACINTO	Supply	830	830	830	830	830	830	830	GULF COAST AQUIFER	None		
				Supply Total	**87261**	**84009**	**82147**	**80820**	**79340**	**77583**	**75450**				
IRRIGATION	81004146	LIBERTY	NECHES	WMS	0	835	835	835	835	835	835	CONSERVATION	None	IRRIGATION CONSERVATION	$6,709.50
IRRIGATION	81004146	LIBERTY	NECHES	WMS	0	12	24	36	47	59	90	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	WMS	0	2088	2088	2088	2088	2088	2088	CONSERVATION	None	IRRIGATION CONSERVATION	$16,777.78
IRRIGATION	81004146	LIBERTY	NECHES-TRINITY	WMS	0	1000	1000	1000	1000	1000	500	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
IRRIGATION	81004146	LIBERTY	SAN JACINTO	WMS	0	209	209	209	209	209	209	CONSERVATION	None	IRRIGATION CONSERVATION	$1,679.38
IRRIGATION	81004146	LIBERTY	TRINITY	WMS	0	13360	13360	13360	13360	13360	13360	CONSERVATION	None	IRRIGATION CONSERVATION	$107,352.06
IRRIGATION	81004146	LIBERTY	TRINITY	WMS	0	1000	1000	1000	1000	1000	1000	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
IRRIGATION	81004146	LIBERTY	TRINITY	WMS	0	2000	2000	2000	2000	2000	2000	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	WMS	0	4384	4384	4384	4384	4384	4384	CONSERVATION	None	IRRIGATION CONSERVATION	$35,226.91
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	WMS	0	6500	6500	6500	6500	6500	6500	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
IRRIGATION	81004146	LIBERTY	TRINITY-SAN JACINTO	WMS	0	5000	5000	5000	5000	5000	2500	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
				WMS Total	**0**	**36388**	**36400**	**36412**	**36423**	**36435**	**33466**				**$167,745.64**
IRRIGATION	81004157	MADISON	TRINITY	Demand	19	19	19	19	19	19	19				
				Demand Total	**19**	**19**	**19**	**19**	**19**	**19**	**19**				
IRRIGATION	81004157	MADISON	TRINITY	Supply	19	19	19	19	19	19	19	CARRIZO-WILCOX AQUIFER	None		

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
				Supply Total	**19**	**19**	**19**	**19**	**19**	**19**	**19**				
IRRIGATION	81004170	MONTGOMERY	SAN JACINTO	Demand	66	66	66	66	66	66	66				
				Demand Total	**66**	**66**	**66**	**66**	**66**	**66**	**66**				
IRRIGATION	81004170	MONTGOMERY	SAN JACINTO	Supply	497	497	497	497	497	497	497	CONROE LAKE/RESERVOIR	SAN JACINTO RIVER AUTHORITY		
				Supply Total	**497**	**497**	**497**	**497**	**497**	**497**	**497**				
IRRIGATION	81004204	SAN JACINTO	TRINITY	Demand	667	667	667	667	667	667	667				
				Demand Total	**667**	**667**	**667**	**667**	**667**	**667**	**667**				
IRRIGATION	81004204	SAN JACINTO	TRINITY	Supply	175	175	175	175	175	175	175	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**175**	**175**	**175**	**175**	**175**	**175**	**175**				
IRRIGATION	81004204	SAN JACINTO	TRINITY	WMS	0	500	500	500	500	500	500	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
				WMS Total	**0**	**500**	**500**	**500**	**500**	**500**	**500**				**$0.00**
IRRIGATION	81004228	TRINITY	TRINITY	Demand	467	467	467	467	467	467	467				
				Demand Total	**467**	**467**	**467**	**467**	**467**	**467**	**467**				
IRRIGATION	81004228	TRINITY	TRINITY	Supply	270	270	270	270	270	270	270	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
IRRIGATION	81004228	TRINITY	TRINITY	Supply	467	467	467	467	467	467	467	GULF COAST AQUIFER	None		
				Supply Total	**737**	**737**	**737**	**737**	**737**	**737**	**737**				
IRRIGATION	81004236	WALKER	TRINITY	Demand	6	6	6	6	6	6	6				
IRRIGATION	81004236	WALKER	SAN JACINTO	Demand	5	5	5	5	5	5	5				
				Demand Total	**11**	**11**	**11**	**11**	**11**	**11**	**11**				
IRRIGATION	81004236	WALKER	TRINITY	Supply	10	10	10	10	10	10	10	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
IRRIGATION	81004236	WALKER	TRINITY	Supply	5	5	4	4	4	4	4	GULF COAST AQUIFER	None		
IRRIGATION	81004236	WALKER	SAN JACINTO	Supply	5	5	5	5	5	5	5	GULF COAST AQUIFER	None		
				Supply Total	**20**	**20**	**19**	**19**	**19**	**19**	**19**				
IRRIGATION	81004237	WALLER	SAN JACINTO	Demand	18153	18153	18153	18153	18153	18153	18153				
IRRIGATION	81004237	WALLER	BRAZOS	Demand	4825	4825	4825	4825	4825	4825	4825				
				Demand Total	**22978**	**22978**	**22978**	**22978**	**22978**	**22978**	**22978**				
IRRIGATION	81004237	WALLER	SAN JACINTO	Supply	8100	7700	7226	7701	8100	8100	7752	GULF COAST AQUIFER	None		
IRRIGATION	81004237	WALLER	SAN JACINTO	Supply	10053	10053	10053	10053	10040	9737	9268	GULF COAST AQUIFER	None		
IRRIGATION	81004237	WALLER	BRAZOS	Supply	4825	4825	4825	4825	4825	4825	4825	BRAZOS RIVER ALLUVIUM AQUIFER	None		
				Supply Total	**22978**	**22578**	**22104**	**22579**	**22965**	**22662**	**21845**				
IRRIGATION	81004237	WALLER	BRAZOS	WMS	0	1387	1387	1387	1387	1387	1387	CONSERVATION	None	IRRIGATION CONSERVATION	$0.00
IRRIGATION	81004237	WALLER	SAN JACINTO	WMS	0	5219	5219	5219	5219	5219	5219	CONSERVATION	None	IRRIGATION CONSERVATION	$0.00
IRRIGATION	81004237	WALLER	SAN JACINTO	WMS	0				13	124		GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
IRRIGATION	81004237	WALLER	SAN JACINTO	WMS	0	400	874	399				GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**7006**	**7480**	**7005**	**6619**	**6730**	**6606**				**$0.00**
JACINTO CITY	80301000	HARRIS	SAN JACINTO	Population	10302	11171	12017	12849	13673	14492	15308				
				Population Total	**10302**	**11171**	**12017**	**12849**	**13673**	**14492**	**15308**				
JACINTO CITY	80301000	HARRIS	SAN JACINTO	Demand	1235	1301	1346	1410	1455	1526	1612				
				Demand Total	**1235**	**1301**	**1346**	**1410**	**1455**	**1526**	**1612**				
JACINTO CITY	80301000	HARRIS	SAN JACINTO	Supply	247	244	247	220	220	220	220	GULF COAST AQUIFER	None		
JACINTO CITY	80301000	HARRIS	SAN JACINTO	Supply	1120	1120	1120	1120	1120	1120	1120	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**1367**	**1364**	**1367**	**1340**	**1340**	**1340**	**1340**				
JACINTO CITY	80301000	HARRIS	SAN JACINTO	WMS	0	0	0	70	100	105	111	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
JACINTO CITY	80301000	HARRIS	SAN JACINTO	WMS	0	0	0	0	45	45	45	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
JACINTO CITY	80301000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	116	116	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
JACINTO CITY	80301000	HARRIS	SAN JACINTO	WMS	0	0	22	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**0**	**22**	**70**	**145**	**266**	**272**				**$0.00**
JAMAICA BEACH	80886000	GALVESTON	SAN JACINTO-BRAZOS	Population	1075	1314	1520	1642	1691	1728	1752				
				Population Total	**1075**	**1314**	**1520**	**1642**	**1691**	**1728**	**1752**				
JAMAICA BEACH	80886000	GALVESTON	SAN JACINTO-BRAZOS	Demand	250	300	344	368	377	383	389				
				Demand Total	**250**	**300**	**344**	**368**	**377**	**383**	**389**				
JAMAICA BEACH	80886000	GALVESTON	SAN JACINTO-BRAZOS	Supply	25	25	25	25	25	25	25	GULF COAST AQUIFER	None		
JAMAICA BEACH	80886000	GALVESTON	SAN JACINTO-BRAZOS	Supply	309	372	430	463	480	491	498	BRAZOS RIVER RUN-OF-RIVER	CITY OF GALVESTON		
				Supply Total	**334**	**397**	**455**	**488**	**505**	**516**	**523**				
JAMAICA BEACH	80886000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	5	9	12	13	13	14	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**5**	**9**	**12**	**13**	**13**	**14**				**$0.00**
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	Population	6880	8742	10555	12338	14103	15857	17604				
				Population Total	**6880**	**8742**	**10555**	**12338**	**14103**	**15857**	**17604**				
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	Demand	1279	1586	1880	2170	2464	2753	3056				
				Demand Total	**1279**	**1586**	**1880**	**2170**	**2464**	**2753**	**3056**				
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	Supply	1279	1044	564	338	338	338	338	GULF COAST AQUIFER	None		
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	Supply	840	840	840	840	840	840	840	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**2119**	**1884**	**1404**	**1178**	**1178**	**1178**	**1178**				
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	WMS	0	0	130	150	170	190	211	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	WMS	0	0	464	464	464	464	464	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
JERSEY VILLAGE	80709000	HARRIS	SAN JACINTO	WMS	0	0	1203	1203	1203	1203	1203	LIVINGSTON-WALLISVILLE SYSTEM	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$280,299.00
				WMS Total	**0**	**0**	**1797**	**1817**	**1837**	**1857**	**1878**				**$280,299.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
JEWETT	80887000	LEON	TRINITY	Population	645	802	959	1052	1058	1049	1061				
JEWETT	80887000	LEON	BRAZOS	Population	216	269	322	353	355	352	356				
				Population Total	**861**	**1071**	**1281**	**1405**	**1413**	**1401**	**1417**				
JEWETT	80887000	LEON	TRINITY	Demand	125	151	177	192	191	188	190				
JEWETT	80887000	LEON	BRAZOS	Demand	42	51	60	64	64	63	64				
				Demand Total	**167**	**202**	**237**	**256**	**255**	**251**	**254**				
JEWETT	80887000	LEON	TRINITY	Supply	125	125	125	125	125	125	125	CARRIZO-WILCOX AQUIFER	None		
JEWETT	80887000	LEON	BRAZOS	Supply	42	42	42	42	42	42	42	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**167**	**167**	**167**	**167**	**167**	**167**	**167**				
JEWETT	80887000	LEON	BRAZOS	WMS	0	9	18	22	22	21	22	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
JEWETT	80887000	LEON	TRINITY	WMS	0	26	52	67	66	63	65	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**35**	**70**	**89**	**88**	**84**	**87**				**$0.00**
JONES CREEK	80308000	BRAZORIA	BRAZOS-COLORADO	Population	2130	2130	2130	2130	2130	2130	2130				
				Population Total	**2130**	**2130**	**2130**	**2130**	**2130**	**2130**	**2130**				
JONES CREEK	80308000	BRAZORIA	BRAZOS-COLORADO	Demand	105	98	91	84	76	72	72				
				Demand Total	**105**	**98**	**91**	**84**	**76**	**72**	**72**				
JONES CREEK	80308000	BRAZORIA	BRAZOS-COLORADO	Supply	105	98	91	84	76	72	72	GULF COAST AQUIFER	None		
				Supply Total	**105**	**98**	**91**	**84**	**76**	**72**	**72**				
KATY	80312000	FORT BEND	SAN JACINTO	Population	889	1078	1274	1514	1761	2084	2453				
KATY	80312000	HARRIS	SAN JACINTO	Population	10082	13372	16576	19727	22846	25946	29034				
KATY	80312000	WALLER	SAN JACINTO	Population	804	804	804	804	804	804	804				
				Population Total	**11775**	**15254**	**18654**	**22045**	**25411**	**28834**	**32291**				
KATY	80312000	FORT BEND	SAN JACINTO	Demand	169	199	230	270	312	366	431				
KATY	80312000	HARRIS	SAN JACINTO	Demand	1920	2471	2989	3513	4043	4563	5106				
KATY	80312000	WALLER	SAN JACINTO	Demand	153	149	145	143	142	141	141				
				Demand Total	**2242**	**2819**	**3364**	**3926**	**4497**	**5070**	**5678**				
KATY	80312000	FORT BEND	SAN JACINTO	Supply	169	131	69	42	42	42	42	GULF COAST AQUIFER	None		
KATY	80312000	HARRIS	SAN JACINTO	Supply	1920	1628	897	547	547	547	547	GULF COAST AQUIFER	None		
KATY	80312000	WALLER	SAN JACINTO	Supply	153	97	44	22	22	22	22	GULF COAST AQUIFER	None		
				Supply Total	**2242**	**1856**	**1010**	**611**	**611**	**611**	**611**				
KATY	80312000	FORT BEND	SAN JACINTO	WMS	0	14	16	19	22	25	30	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KATY	80312000	FORT BEND	SAN JACINTO	WMS	0	359	359	359	359	359	359	LAKE HOUSTON ADDITIONAL YIELD	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	Lake Houston Additional Yield	$29,576,495
KATY	80312000	HARRIS	SAN JACINTO	WMS	0	170	206	242	279	315	352	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KATY	80312000	HARRIS	SAN JACINTO	WMS	0	673	673	673	0	0	0	LAKE HOUSTON ADDITIONAL YIELD	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	Lake Houston Additional Yield	$0.00
KATY	80312000	HARRIS	SAN JACINTO	WMS	0	0	4207	4207	4207	4207	4207	LIVINGSTON-WALLISVILLE SYSTEM	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$980,231.00
KATY	80312000	WALLER	SAN JACINTO	WMS	0	10	10	10	10	10	10	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KATY	80312000	WALLER	SAN JACINTO	WMS	0	111	111	111	111	111	111	LAKE HOUSTON ADDITIONAL YIELD	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	Lake Houston Additional Yield	$0.00
				WMS Total	**0**	**1337**	**5582**	**5621**	**4988**	**5027**	**5069**				**$30,556,726.44**
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	Population	2330	2985	3550	3885	4021	4122	4188				
				Population Total	**2330**	**2985**	**3550**	**3885**	**4021**	**4122**	**4188**				
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	Demand	227	278	322	348	356	360	366				
				Demand Total	**227**	**278**	**322**	**348**	**356**	**360**	**366**				
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	Supply	23	23	23	23	23	23	23	GULF COAST AQUIFER	None		
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	Supply	55	55	55	55	55	55	55	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**78**	**78**	**78**	**78**	**78**	**78**	**78**				
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	WMS	14	17	19	21	21	21	22	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	252	252	252	252	252	252	BRAZOS RIVER AUTHORITY SYSTEM	GULF COAST WATER AUTHORITY	New Contracts	$592,800.00
KEMAH	80316000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	5	9	12	13	13	14	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**14**	**274**	**280**	**285**	**286**	**286**	**288**				**$592,800.00**
KENEFICK	81033000	LIBERTY	TRINITY	Population	667	824	997	1163	1325	1503	1702				
				Population Total	**667**	**824**	**997**	**1163**	**1325**	**1503**	**1702**				
KENEFICK	81033000	LIBERTY	TRINITY	Demand	79	94	112	128	144	162	183				
				Demand Total	**79**	**94**	**112**	**128**	**144**	**162**	**183**				
KENEFICK	81033000	LIBERTY	TRINITY	Supply	79	79	79	79	79	79	79	GULF COAST AQUIFER	None		
				Supply Total	**79**	**79**	**79**	**79**	**79**	**79**	**79**				
KENEFICK	81033000	LIBERTY	TRINITY	WMS	0	15	33	49	65	83	104	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**15**	**33**	**49**	**65**	**83**	**104**				**$416,000.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	Population	4377	6133	7953	10179	12468	15469	18899				
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	Population	170	238	309	395	484	601	734				
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	Population	1074	1353	1625	1892	2157	2420	2682				
				Population Total	**5621**	**7724**	**9887**	**12466**	**15109**	**18490**	**22315**				
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	Demand	721	976	1247	1573	1899	2357	2879				
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	Demand	28	38	48	61	74	92	112				
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	Demand	177	215	255	292	329	369	409				
				Demand Total	**926**	**1229**	**1550**	**1926**	**2302**	**2818**	**3400**				
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	Supply	699	699	699	516	516	516	516	GULF COAST AQUIFER	None		
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	Supply	22	22	22	18	18	18	18	GULF COAST AQUIFER	None		
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	Supply	177	142	77	45	45	45	45	GULF COAST AQUIFER	None		
				Supply Total	**898**	**863**	**798**	**579**	**579**	**579**	**579**				
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	WMS	22	67	86	109	131	163	199	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	WMS	0	0	0	1216	1216	1216	1216	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,074,948.72
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	WMS	0	837	837	837	837	837	837	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$11,203,039
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	WMS	0	111	111	111	111	111	111	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO	WMS	0	99	13					GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	WMS	2	3	3	4	5	6	8	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	86	86	86	86	86	86	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
KINGSBRIDGE MUD	84222000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	4	3	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	WMS	0	15	18	20	23	25	28	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	WMS	0	0	203	203	278	278	278	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$64,774.00
KINGSBRIDGE MUD	84222000	HARRIS	SAN JACINTO	WMS	0	58	58	58	58	58	58	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**24**	**1280**	**1418**	**2644**	**2745**	**2780**	**2821**				**$13,342,761.29**
LA MARQUE	80342000	GALVESTON	SAN JACINTO-BRAZOS	Population	13682	13682	13682	13682	13682	13682	13682				
				Population Total	**13682**	**13682**	**13682**	**13682**	**13682**	**13682**	**13682**				
LA MARQUE	80342000	GALVESTON	SAN JACINTO-BRAZOS	Demand	2207	2161	2115	2069	2023	1992	1992				
				Demand Total	**2207**	**2161**	**2115**	**2069**	**2023**	**1992**	**1992**				
LA MARQUE	80342000	GALVESTON	SAN JACINTO-BRAZOS	Supply	221	216	212	207	202	199	199	GULF COAST AQUIFER	None		
LA MARQUE	80342000	GALVESTON	SAN JACINTO-BRAZOS	Supply	2767	2767	2767	2767	2767	2767	2767	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**2988**	**2983**	**2979**	**2974**	**2969**	**2966**	**2966**				
LA PORTE	80346000	HARRIS	SAN JACINTO-BRAZOS	Population	30159	33552	36856	40105	43321	46518	49702				
LA PORTE	80346000	HARRIS	SAN JACINTO	Population	1721	1915	2104	2289	2473	2655	2837				
				Population Total	**31880**	**35467**	**38960**	**42394**	**45794**	**49173**	**52539**				
LA PORTE	80346000	HARRIS	SAN JACINTO-BRAZOS	Demand	4662	5036	5367	5750	6066	6461	6904				
LA PORTE	80346000	HARRIS	SAN JACINTO	Demand	266	287	306	328	346	369	394				
				Demand Total	**4928**	**5323**	**5673**	**6078**	**6412**	**6830**	**7298**				
LA PORTE	80346000	HARRIS	SAN JACINTO	Supply	27	27	27	25	25	25	25	GULF COAST AQUIFER	None		
LA PORTE	80346000	HARRIS	SAN JACINTO-BRAZOS	Supply	466	466	466	466	466	466	466	GULF COAST AQUIFER	None		
LA PORTE	80346000	HARRIS	SAN JACINTO-BRAZOS	Supply	7337	7334	7337	7326	7324	7322	7320	LIVINGSTON-WALLISVILLE SYSTEM	LA PORTE AREA WATER AUTHORITY		
				Supply Total	**7830**	**7827**	**7830**	**7817**	**7815**	**7813**	**7811**				
LA PORTE	80346000	HARRIS	SAN JACINTO	WMS	0	0	4	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LA PORTE	80346000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	38	71	109	141	180	224	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,226,000.00
				WMS Total	**0**	**38**	**75**	**109**	**141**	**180**	**224**				**$1,226,000.00**
LA PORTE	80346001	HARRIS	SAN JACINTO	Supply	418	421	418	429	431	433	435	LIVINGSTON-WALLISVILLE SYSTEM	LA PORTE AREA WATER AUTHORITY		
				Supply Total	**418**	**421**	**418**	**429**	**431**	**433**	**435**				
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	Population	26386	29383	32502	35488	38241	41159	44205				
				Population Total	**26386**	**29383**	**32502**	**35488**	**38241**	**41159**	**44205**				
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	3754	4015	4332	4611	4883	5210	5595				
				Demand Total	**3754**	**4015**	**4332**	**4611**	**4883**	**5210**	**5595**				
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	2240	2240	2240	2240	2240	2240	2240	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	559	559	559	559	559	559	559	GULF COAST AQUIFER	None		
				Supply Total	**2799**	**2799**	**2799**	**2799**	**2799**	**2799**	**2799**				
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	259	277	299	318	337	359	386	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	2010	2010	2010	2010	2010	2010	2010	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
LAKE JACKSON	80338000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	217	442	473	471	439	405	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,393,500.00
				WMS Total	**2269**	**2504**	**2751**	**2801**	**2818**	**2808**	**2801**				**$1,393,500.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
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Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	LIBERTY	TRINITY	Population	1479	1670	1880	2081	2278	2494	2736				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	POLK	TRINITY	Population	12091	13706	15319	16590	17577	18632	19641				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	SAN JACINTO	Population	1083	1467	1844	2145	2333	2442	2491				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	TRINITY	Population	2336	3165	3978	4628	5033	5268	5375				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	TRINITY	TRINITY	Population	1501	1673	1805	1849	1826	1754	1688				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	WALKER	TRINITY	Population	384	439	484	506	501	502	502				
				Population Total	**18874**	**22120**	**25310**	**27799**	**29548**	**31092**	**32433**				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	LIBERTY	TRINITY	Demand	103	108	116	124	130	140	153				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	POLK	TRINITY	Demand	840	890	944	985	1004	1044	1100				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	SAN JACINTO	Demand	75	95	114	127	133	137	140				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	TRINITY	Demand	162	206	245	275	288	295	301				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	TRINITY	TRINITY	Demand	104	109	111	110	104	98	95				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	WALKER	TRINITY	Demand	27	29	30	30	29	28	28				
				Demand Total	**1311**	**1437**	**1560**	**1651**	**1688**	**1742**	**1817**				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	LIBERTY	TRINITY	Supply	103	103	103	103	103	103	103	GULF COAST AQUIFER	None		
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	POLK	TRINITY	Supply	840	840	840	840	840	840	840	GULF COAST AQUIFER	None		
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	TRINITY	Supply	162	162	162	162	162	162	162	GULF COAST AQUIFER	None		
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	SAN JACINTO	Supply	75	75	75	75	75	75	75	GULF COAST AQUIFER	None		
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	TRINITY	TRINITY	Supply	104	104	104	104	104	98	95	GULF COAST AQUIFER	None		
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	WALKER	TRINITY	Supply	27	27	27	27	27	27	27	GULF COAST AQUIFER	None		
				Supply Total	**1311**	**1311**	**1311**	**1311**	**1311**	**1305**	**1302**				
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	LIBERTY	TRINITY	WMS	0	5	13	21	27	37	50	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	POLK	TRINITY	WMS	0	50	104	145	164	204	260	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	SAN JACINTO	WMS	0	20	39	52	58	62	65	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	SAN JACINTO	TRINITY	WMS	0	44	83	113	126	133	139	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	TRINITY	TRINITY	WMS	0	5	7	6	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LAKE LIVINGSTON WATER SUPPLY & SEWER SERVICE COMPANY	84226000	WALKER	TRINITY	WMS	0	2	3	3	2	1	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,397,400.00
				WMS Total	**0**	**126**	**249**	**340**	**377**	**437**	**515**				**$1,397,400.00**
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Population	45306	53403	60392	64532	66207	67454	68265				
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	Population	138	143	147	151	155	159	163				
				Population Total	**45444**	**53546**	**60539**	**64683**	**66362**	**67613**	**68428**				
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Demand	6597	7477	8253	8674	8751	8840	8947				
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	Demand	20	20	20	20	20	21	21				
				Demand Total	**6617**	**7497**	**8273**	**8694**	**8771**	**8861**	**8968**				
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Supply	660	660	660	660	660	660	660	GULF COAST AQUIFER	None		
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1985	1986	1986	1986	1986	1986	1986	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1120	1120	1120	1120	1120	1120	1120	BRAZOS RIVER RUN-OF-RIVER	GALVESTON COUNTY WCID #1		
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	Supply	11	11	11	11	11	11	11	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	Supply	2	2	2	2	2	2	2	GULF COAST AQUIFER	None		
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	Supply	6	5	5	5	5	5	5	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**3784**	**3784**	**3784**	**3784**	**3784**	**3784**	**3784**				
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	WMS	455	516	569	598	604	610	617	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	1825	2159	2704	2707	2691	2664	BRAZOS RIVER AUTHORITY SYSTEM	GULF COAST WATER AUTHORITY	New Contracts	$17,706,002.16
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	2000	2000	2000	2000	2000	2000	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
LEAGUE CITY	80350000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	88	165	207	215	224	235	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	WMS	1	1	1	1	1	1	1	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
LEAGUE CITY	80350000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	13	13	13	13	13	13	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**456**	**4443**	**4907**	**5523**	**5540**	**5539**	**5530**				**$17,706,002.16**
LIBERTY	80356000	LIBERTY	TRINITY	Population	8033	8265	8520	8765	9005	9268	9563				
				Population Total	**8033**	**8265**	**8520**	**8765**	**9005**	**9268**	**9563**				
LIBERTY	80356000	LIBERTY	TRINITY	Demand	1494	1509	1527	1532	1543	1578	1628				
				Demand Total	**1494**	**1509**	**1527**	**1532**	**1543**	**1578**	**1628**				
LIBERTY	80356000	LIBERTY	TRINITY	Supply	1494	1494	1494	1494	1494	1494	1494	GULF COAST AQUIFER	None		
				Supply Total	**1494**	**1494**	**1494**	**1494**	**1494**	**1494**	**1494**				
LIBERTY	80356000	LIBERTY	TRINITY	WMS	0	15	33	38	49	84	134	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**15**	**33**	**38**	**49**	**84**	**134**				**$416,000.00**
LIVESTOCK	81005008	AUSTIN	BRAZOS	Demand	1211	1211	1211	1211	1211	1211	1211				
LIVESTOCK	81005008	AUSTIN	BRAZOS-COLORADO	Demand	339	339	339	339	339	339	339				
LIVESTOCK	81005008	AUSTIN	COLORADO	Demand	65	65	65	65	65	65	65				
				Demand Total	**1615**	**1615**	**1615**	**1615**	**1615**	**1615**	**1615**				
LIVESTOCK	81005008	AUSTIN	BRAZOS	Supply	1211	1211	1211	1211	1211	1211	1211	GULF COAST AQUIFER	None		
LIVESTOCK	81005008	AUSTIN	BRAZOS-COLORADO	Supply	339	339	339	339	339	339	339	GULF COAST AQUIFER	None		
LIVESTOCK	81005008	AUSTIN	COLORADO	Supply	17	13	9	7	6	5	4	GULF COAST AQUIFER	None		
LIVESTOCK	81005008	AUSTIN	COLORADO	Supply	48	52	56	58	59	60	61	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**1615**	**1615**	**1615**	**1615**	**1615**	**1615**	**1615**				
LIVESTOCK	81005020	BRAZORIA	SAN JACINTO-BRAZOS	Demand	968	968	968	968	968	968	968				
LIVESTOCK	81005020	BRAZORIA	BRAZOS	Demand	242	242	242	242	242	242	242				
LIVESTOCK	81005020	BRAZORIA	BRAZOS-COLORADO	Demand	404	404	404	404	404	404	404				
				Demand Total	**1614**	**1614**	**1614**	**1614**	**1614**	**1614**	**1614**				
LIVESTOCK	81005020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	358	358	358	358	358	325	278	GULF COAST AQUIFER	None		
LIVESTOCK	81005020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	610	545	505	547	591	643	690	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005020	BRAZORIA	BRAZOS	Supply	58	22	14	10	7	6	4	GULF COAST AQUIFER	None		
LIVESTOCK	81005020	BRAZORIA	BRAZOS	Supply	184	220	228	232	235	236	238	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005020	BRAZORIA	BRAZOS-COLORADO	Supply	208	204	202	198	194	187	179	GULF COAST AQUIFER	None		
LIVESTOCK	81005020	BRAZORIA	BRAZOS-COLORADO	Supply	196	200	202	206	210	217	225	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**1614**	**1549**	**1509**	**1551**	**1595**	**1614**	**1614**				
LIVESTOCK	81005020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	65	105	63	19	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**65**	**105**	**63**	**19**	**0**	**0**				**$0.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
LIVESTOCK	81005036	CHAMBERS	NECHES-TRINITY	Demand	333	333	333	333	333	333	333				
LIVESTOCK	81005036	CHAMBERS	TRINITY	Demand	60	60	60	60	60	60	60				
LIVESTOCK	81005036	CHAMBERS	TRINITY-SAN JACINTO	Demand	69	69	69	69	69	69	69				
				Demand Total	**462**	**462**	**462**	**462**	**462**	**462**	**462**				
LIVESTOCK	81005036	CHAMBERS	NECHES-TRINITY	Supply	16	16	16	16	16	16	15	GULF COAST AQUIFER	None		
LIVESTOCK	81005036	CHAMBERS	NECHES-TRINITY	Supply	317	317	317	317	317	317	318	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005036	CHAMBERS	TRINITY	Supply	11	10	10	10	10	9	9	GULF COAST AQUIFER	None		
LIVESTOCK	81005036	CHAMBERS	TRINITY	Supply	49	50	50	50	50	51	51	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005036	CHAMBERS	TRINITY-SAN JACINTO	Supply	23	21	20	18	17	16	15	GULF COAST AQUIFER	None		
LIVESTOCK	81005036	CHAMBERS	TRINITY-SAN JACINTO	Supply	46	48	49	51	52	53	54	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**462**	**462**	**462**	**462**	**462**	**462**	**462**				
LIVESTOCK	81005079	FORT BEND	SAN JACINTO	Demand	70	70	70	70	70	70	70				
LIVESTOCK	81005079	FORT BEND	SAN JACINTO-BRAZOS	Demand	199	199	199	199	199	199	199				
LIVESTOCK	81005079	FORT BEND	BRAZOS	Demand	691	691	691	691	691	691	691				
LIVESTOCK	81005079	FORT BEND	BRAZOS-COLORADO	Demand	211	211	211	211	211	211	211				
				Demand Total	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**				
LIVESTOCK	81005079	FORT BEND	SAN JACINTO	Supply	68	57	40	23	23	23	23	GULF COAST AQUIFER	None		
LIVESTOCK	81005079	FORT BEND	SAN JACINTO	Supply	2	13	30	47	47	47	47	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005079	FORT BEND	SAN JACINTO-BRAZOS	Supply	153	135	101	60	60	60	60	GULF COAST AQUIFER	None		
LIVESTOCK	81005079	FORT BEND	SAN JACINTO-BRAZOS	Supply	46	64	98	139	139	139	139	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005079	FORT BEND	BRAZOS	Supply	691	691	484	276	276	276	276	BRAZOS RIVER ALLUVIUM AQUIFER	None		
LIVESTOCK	81005079	FORT BEND	BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
LIVESTOCK	81005079	FORT BEND	BRAZOS	Supply	0	0	207	415	415	415	415	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005079	FORT BEND	BRAZOS-COLORADO	Supply	211	211	211	211	211	211	211	GULF COAST AQUIFER	None		
				Supply Total	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**				
LIVESTOCK	81005084	GALVESTON	NECHES-TRINITY	Demand	16	16	16	16	16	16	16				
LIVESTOCK	81005084	GALVESTON	SAN JACINTO-BRAZOS	Demand	309	309	309	309	309	309	309				
				Demand Total	**325**	**325**	**325**	**325**	**325**	**325**	**325**				
LIVESTOCK	81005084	GALVESTON	NECHES-TRINITY	Supply	16	16	16	16	16	16	16	GULF COAST AQUIFER	None		
LIVESTOCK	81005084	GALVESTON	SAN JACINTO-BRAZOS	Supply	13	3	13	13	13	13	13	GULF COAST AQUIFER	None		
LIVESTOCK	81005084	GALVESTON	SAN JACINTO-BRAZOS	Supply	296	306	296	280	280	280	281	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**325**	**325**	**325**	**309**	**309**	**309**	**310**				
LIVESTOCK	81005084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	0	0	16	16	16	15	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**0**	**0**	**16**	**16**	**16**	**15**				**$0.00**
LIVESTOCK	81005101	HARRIS	TRINITY-SAN JACINTO	Demand	91	91	91	91	91	91	91				
LIVESTOCK	81005101	HARRIS	SAN JACINTO	Demand	951	951	951	951	951	951	951				
LIVESTOCK	81005101	HARRIS	SAN JACINTO-BRAZOS	Demand	91	91	91	91	91	91	91				
				Demand Total	**1133**	**1133**	**1133**	**1133**	**1133**	**1133**	**1133**				
LIVESTOCK	81005101	HARRIS	TRINITY-SAN JACINTO	Supply	18	18	18	18	18	18	18	GULF COAST AQUIFER	None		
LIVESTOCK	81005101	HARRIS	TRINITY-SAN JACINTO	Supply	73	73	73	73	73	73	73	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005101	HARRIS	SAN JACINTO	Supply	951	627	285	148	148	148	148	GULF COAST AQUIFER	None		
LIVESTOCK	81005101	HARRIS	SAN JACINTO	Supply	0	324	666	803	803	803	803	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005101	HARRIS	SAN JACINTO-BRAZOS	Supply	9	9	9	9	9	9	9	GULF COAST AQUIFER	None		
LIVESTOCK	81005101	HARRIS	SAN JACINTO-BRAZOS	Supply	82	82	82	82	82	82	82	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**1133**	**1133**	**1133**	**1133**	**1133**	**1133**	**1133**				
LIVESTOCK	81005145	LEON	TRINITY	Demand	1268	1268	1268	1268	1268	1268	1268				
LIVESTOCK	81005145	LEON	BRAZOS	Demand	423	423	423	423	423	423	423				
				Demand Total	**1691**	**1691**	**1691**	**1691**	**1691**	**1691**	**1691**				
LIVESTOCK	81005145	LEON	TRINITY	Supply	484	484	484	484	484	484	484	CARRIZO-WILCOX AQUIFER	None		
LIVESTOCK	81005145	LEON	TRINITY	Supply	784	784	784	784	784	784	784	SPARTA AQUIFER	None		
LIVESTOCK	81005145	LEON	BRAZOS	Supply	200	200	200	200	200	200	200	CARRIZO-WILCOX AQUIFER	None		
LIVESTOCK	81005145	LEON	BRAZOS	Supply	223	223	223	223	223	223	223	SPARTA AQUIFER	None		
				Supply Total	**1691**	**1691**	**1691**	**1691**	**1691**	**1691**	**1691**				
LIVESTOCK	81005146	LIBERTY	NECHES	Demand	104	104	104	104	104	104	104				
LIVESTOCK	81005146	LIBERTY	NECHES-TRINITY	Demand	35	35	35	35	35	35	35				
LIVESTOCK	81005146	LIBERTY	TRINITY	Demand	446	446	446	446	446	446	446				
LIVESTOCK	81005146	LIBERTY	TRINITY-SAN JACINTO	Demand	32	32	32	32	32	32	32				
LIVESTOCK	81005146	LIBERTY	SAN JACINTO	Demand	140	140	140	140	140	140	140				
				Demand Total	**757**	**757**	**757**	**757**	**757**	**757**	**757**				
LIVESTOCK	81005146	LIBERTY	NECHES	Supply	59	59	59	59	59	59	34	GULF COAST AQUIFER	None		
LIVESTOCK	81005146	LIBERTY	NECHES	Supply	45	45	45	45	45	45	70	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005146	LIBERTY	NECHES-TRINITY	Supply	35	35	35	35	35	35	35	GULF COAST AQUIFER	None		
LIVESTOCK	81005146	LIBERTY	TRINITY	Supply	446	446	446	446	446	446	446	GULF COAST AQUIFER	None		
LIVESTOCK	81005146	LIBERTY	TRINITY-SAN JACINTO	Supply	32	32	32	32	32	32	15	GULF COAST AQUIFER	None		
LIVESTOCK	81005146	LIBERTY	TRINITY-SAN JACINTO	Supply	0	0	0	0	0	0	17	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005146	LIBERTY	SAN JACINTO	Supply	140	140	140	140	140	140	140	GULF COAST AQUIFER	None		
				Supply Total	**757**	**757**	**757**	**757**	**757**	**757**	**757**				
LIVESTOCK	81005157	MADISON	TRINITY	Demand	630	630	630	630	630	630	630				
LIVESTOCK	81005157	MADISON	BRAZOS	Demand	120	120	120	120	120	120	120				
				Demand Total	**750**	**750**	**750**	**750**	**750**	**750**	**750**				
LIVESTOCK	81005157	MADISON	TRINITY	Supply	630	630	630	630	630	630	630	CARRIZO-WILCOX AQUIFER	None		
LIVESTOCK	81005157	MADISON	BRAZOS	Supply	120	120	120	120	120	120	120	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**750**	**750**	**750**	**750**	**750**	**750**	**750**				
LIVESTOCK	81005170	MONTGOMERY	SAN JACINTO	Demand	510	510	510	510	510	510	510				
				Demand Total	**510**	**510**	**510**	**510**	**510**	**510**	**510**				
LIVESTOCK	81005170	MONTGOMERY	SAN JACINTO	Supply	510	510	510	510	510	510	510	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**510**	**510**	**510**	**510**	**510**	**510**	**510**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
LIVESTOCK	81005187	POLK	TRINITY	Demand	134	134	134	134	134	134	134				
				Demand Total	**134**	**134**	**134**	**134**	**134**	**134**	**134**				
LIVESTOCK	81005187	POLK	TRINITY	Supply	134	134	134	134	134	134	134	GULF COAST AQUIFER	None		
				Supply Total	**134**	**134**	**134**	**134**	**134**	**134**	**134**				
LIVESTOCK	81005204	SAN JACINTO	TRINITY	Demand	142	142	142	142	142	142	142				
LIVESTOCK	81005204	SAN JACINTO	SAN JACINTO	Demand	142	142	142	142	142	142	142				
				Demand Total	**284**	**284**	**284**	**284**	**284**	**284**	**284**				
LIVESTOCK	81005204	SAN JACINTO	TRINITY	Supply	142	142	142	142	142	142	142	GULF COAST AQUIFER	None		
LIVESTOCK	81005204	SAN JACINTO	SAN JACINTO	Supply	142	142	142	142	142	142	142	GULF COAST AQUIFER	None		
				Supply Total	**284**	**284**	**284**	**284**	**284**	**284**	**284**				
LIVESTOCK	81005228	TRINITY	TRINITY	Demand	211	211	211	211	211	211	211				
				Demand Total	**211**	**211**	**211**	**211**	**211**	**211**	**211**				
LIVESTOCK	81005228	TRINITY	TRINITY	Supply	211	211	211	211	211	211	211	LIVESTOCK LOCAL SUPPLY	None		
				Supply Total	**211**	**211**	**211**	**211**	**211**	**211**	**211**				
LIVESTOCK	81005236	WALKER	TRINITY	Demand	322	322	322	322	322	322	322				
LIVESTOCK	81005236	WALKER	SAN JACINTO	Demand	310	310	310	310	310	310	310				
				Demand Total	**632**	**632**	**632**	**632**	**632**	**632**	**632**				
LIVESTOCK	81005236	WALKER	TRINITY	Supply	71	106	127	138	143	148	154	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005236	WALKER	TRINITY	Supply	251	216	195	184	179	174	168	GULF COAST AQUIFER	None		
LIVESTOCK	81005236	WALKER	SAN JACINTO	Supply	0	0	1	12	8	9	11	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005236	WALKER	SAN JACINTO	Supply	310	310	309	298	302	301	299	GULF COAST AQUIFER	None		
				Supply Total	**632**	**632**	**632**	**632**	**632**	**632**	**632**				
LIVESTOCK	81005237	WALLER	SAN JACINTO	Demand	263	263	263	263	263	263	263				
LIVESTOCK	81005237	WALLER	BRAZOS	Demand	676	676	676	676	676	676	676				
				Demand Total	**939**	**939**	**939**	**939**	**939**	**939**	**939**				
LIVESTOCK	81005237	WALLER	SAN JACINTO	Supply	90	90	90	90	90	102	107	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005237	WALLER	SAN JACINTO	Supply	173	173	173	173	173	161	156	GULF COAST AQUIFER	None		
LIVESTOCK	81005237	WALLER	BRAZOS	Supply	232	232	232	232	232	242	277	LIVESTOCK LOCAL SUPPLY	None		
LIVESTOCK	81005237	WALLER	BRAZOS	Supply	444	444	444	444	444	434	399	GULF COAST AQUIFER	None		
				Supply Total	**939**	**939**	**939**	**939**	**939**	**939**	**939**				
LIVINGSTON	80362000	POLK	TRINITY	Population	5433	5609	5784	5922	6029	6144	6254				
				Population Total	**5433**	**5609**	**5784**	**5922**	**6029**	**6144**	**6254**				
LIVINGSTON	80362000	POLK	TRINITY	Demand	1741	1778	1814	1831	1844	1872	1905				
				Demand Total	**1741**	**1778**	**1814**	**1831**	**1844**	**1872**	**1905**				
LIVINGSTON	80362000	POLK	TRINITY	Supply	5601	5601	5601	5601	5601	5601	5601	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**5601**	**5601**	**5601**	**5601**	**5601**	**5601**	**5601**				
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	Population	1038	1907	2753	3585	4409	5228	6044				
				Population Total	**1038**	**1907**	**2753**	**3585**	**4409**	**5228**	**6044**				
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	Demand	327	596	857	1112	1368	1622	1875				
				Demand Total	**327**	**596**	**857**	**1112**	**1368**	**1622**	**1875**				
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	Supply	327	327	327	327	327	327	327	GULF COAST AQUIFER	None		
				Supply Total	**327**	**327**	**327**	**327**	**327**	**327**	**327**				
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	WMS	0	35	0	66	82	97	112	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	WMS	0	0	421	421	898	898	898	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$209,234.00
LONGHORN TOWN UD	84235000	HARRIS	SAN JACINTO	WMS	0	234	530	538	538	538	538	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,403,400.00
				WMS Total	**0**	**269**	**951**	**1025**	**1518**	**1533**	**1548**				**$1,612,634.00**
MADISONVILLE	80382000	MADISON	TRINITY	Population	4159	4442	4725	4951	5162	5349	5512				
				Population Total	**4159**	**4442**	**4725**	**4951**	**5162**	**5349**	**5512**				
MADISONVILLE	80382000	MADISON	TRINITY	Demand	750	781	815	837	856	881	908				
				Demand Total	**750**	**781**	**815**	**837**	**856**	**881**	**908**				
MADISONVILLE	80382000	MADISON	TRINITY	Supply	750	750	750	750	750	750	750	SPARTA AQUIFER	None		
				Supply Total	**750**	**750**	**750**	**750**	**750**	**750**	**750**				
MADISONVILLE	80382000	MADISON	TRINITY	WMS	0	31	65	87	106	131	158	SPARTA AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**31**	**65**	**87**	**106**	**131**	**158**				**$416,000.00**
MAGNOLIA	80907000	MONTGOMERY	SAN JACINTO	Population	1111	1350	1496	1782	2114	2552	3061				
				Population Total	**1111**	**1350**	**1496**	**1782**	**2114**	**2552**	**3061**				
MAGNOLIA	80907000	MONTGOMERY	SAN JACINTO	Demand	233	275	300	351	412	495	593				
				Demand Total	**233**	**275**	**300**	**351**	**412**	**495**	**593**				
MAGNOLIA	80907000	MONTGOMERY	SAN JACINTO	Supply	233	233	233	233	233	233	233	GULF COAST AQUIFER	None		
				Supply Total	**233**	**233**	**233**	**233**	**233**	**233**	**233**				
MAGNOLIA	80907000	MONTGOMERY	SAN JACINTO	WMS	0	2	2	2	2	3	4	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MAGNOLIA	80907000	MONTGOMERY	SAN JACINTO	WMS	0	40	65	116	177	259	356	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,376,000.00
				WMS Total	**0**	**42**	**67**	**118**	**179**	**262**	**360**				**$1,376,000.00**
MANUFACTURING	81001008	AUSTIN	BRAZOS	Demand	137	172	191	208	223	236	257				
MANUFACTURING	81001008	AUSTIN	BRAZOS-COLORADO	Demand	30	38	42	45	49	52	56				
				Demand Total	**167**	**210**	**233**	**253**	**272**	**288**	**313**				
MANUFACTURING	81001008	AUSTIN	BRAZOS	Supply	137	137	137	137	137	137	137	GULF COAST AQUIFER	None		
MANUFACTURING	81001008	AUSTIN	BRAZOS-COLORADO	Supply	30	30	30	30	30	30	30	GULF COAST AQUIFER	None		
				Supply Total	**167**	**167**	**167**	**167**	**167**	**167**	**167**				
MANUFACTURING	81001008	AUSTIN	BRAZOS	WMS	0	35	54	71	86	99	120	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
MANUFACTURING	81001008	AUSTIN	BRAZOS-COLORADO	WMS	0	8	12	15	19	22	26	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**43**	**66**	**86**	**105**	**121**	**146**				**$416,000.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Demand	36014	42231	46501	50280	54094	57461	61541				
MANUFACTURING	81001020	BRAZORIA	BRAZOS	Demand	184906	216824	238749	258151	277737	295021	315974				
MANUFACTURING	81001020	BRAZORIA	BRAZOS-COLORADO	Demand	1010	1184	1304	1410	1517	1611	1726				
				Demand Total	**221930**	**260239**	**286554**	**309841**	**333348**	**354093**	**379241**				
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	202	202	202	202	202	202	202	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	49	48	48	48	49	69	49	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	14665	14665	14665	14665	14665	14665	14665	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	CHOCOLATE BAYOU WATER CO.		
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	13935	13935	13935	13935	13935	13935	13935	BRAZOS RIVER RUN-OF-RIVER	CHOCOLATE BAYOU WATER CO.		
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	17784	17784	17784	17784	17784	17784	17784	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MANUFACTURING	81001020	BRAZORIA	BRAZOS	Supply	287	288	288	288	287	267	287	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
MANUFACTURING	81001020	BRAZORIA	BRAZOS	Supply	148061	148061	148061	148061	148061	148061	148061	BRAZOS RIVER RUN-OF-RIVER	THE DOW CHEMICAL CO.		
MANUFACTURING	81001020	BRAZORIA	BRAZOS	Supply	4892	4846	4406	3924	3477	2974	2435	GULF COAST AQUIFER	None		
MANUFACTURING	81001020	BRAZORIA	BRAZOS	Supply	16000	16000	16000	16000	16000	16000	16000	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	BRAZOS RIVER AUTHORITY		
MANUFACTURING	81001020	BRAZORIA	BRAZOS-COLORADO	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
MANUFACTURING	81001020	BRAZORIA	BRAZOS-COLORADO	Supply	8519	8519	8519	8519	8519	8519	8519	SAN BERNARD RIVER RUN-OF-RIVER	None		
MANUFACTURING	81001020	BRAZORIA	BRAZOS-COLORADO	Supply	3500	3500	3500	3500	3500	3500	3500	SAN BERNARD RIVER RUN-OF-RIVER	None		
				Supply Total	**227894**	**227848**	**227408**	**226926**	**226479**	**225976**	**225437**				
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	0	0	30000	30000	30000	30000	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$51,191,169.09
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	70000	70000	70000	70000	70000	70000	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	9847	9847	5847	5847	5847	5847	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	6281	6281	6281	6281	6281	6281	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO	Contractual Transfer	$0.00
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	0	0	0	0	11200	16800	FREEPORT DESAL	BRAZOS RIVER AUTHORITY	Freeport Desal	$127,849,500.00
MANUFACTURING	81001020	BRAZORIA	BRAZOS	WMS	0	0	0	0	0	24125	24125	LITTLE RIVER OFF-CHANNEL RESERVOIR	BRAZOS RIVER AUTHORITY	Little River Off-Channel Reservoir	$72,477,883.27
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	10650	10650	10650	10650	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$18,172,865.03
MANUFACTURING	81001020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	1587	2908	3631	4282	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$2,921,600.00
				WMS Total	**0**	**86128**	**86128**	**124365**	**125686**	**161734**	**167985**				**$272,613,017.39**
MANUFACTURING	81001036	CHAMBERS	TRINITY-SAN JACINTO	Demand	9752	11802	12959	13987	15011	15932	17122				
				Demand Total	**9752**	**11802**	**12959**	**13987**	**15011**	**15932**	**17122**				
MANUFACTURING	81001036	CHAMBERS	TRINITY-SAN JACINTO	Supply	3251	3251	3251	3251	3251	3251	3251	GULF COAST AQUIFER	None		
				Supply Total	**3251**	**3251**	**3251**	**3251**	**3251**	**3251**	**3251**				
MANUFACTURING	81001036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	13445	13445	13445	13445	13445	13445	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
MANUFACTURING	81001036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	287	478	484	476	441	426	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,395,200.00
				WMS Total	**0**	**13732**	**13923**	**13929**	**13921**	**13886**	**13871**				**$1,395,200.00**
MANUFACTURING	81001079	FORT BEND	SAN JACINTO	Demand	1764	1979	2076	2154	2216	2258	2137				
MANUFACTURING	81001079	FORT BEND	SAN JACINTO-BRAZOS	Demand	3252	3649	3827	3970	4086	4162	3939				
MANUFACTURING	81001079	FORT BEND	BRAZOS	Demand	1101	1235	1296	1344	1383	1409	1334				
				Demand Total	**6117**	**6863**	**7199**	**7468**	**7685**	**7829**	**7410**				
MANUFACTURING	81001079	FORT BEND	SAN JACINTO	Supply	1711	1618	1185	708	708	708	708	GULF COAST AQUIFER	None		
MANUFACTURING	81001079	FORT BEND	SAN JACINTO-BRAZOS	Supply	2500	2468	1950	1193	1193	1193	1193	GULF COAST AQUIFER	None		
MANUFACTURING	81001079	FORT BEND	SAN JACINTO-BRAZOS	Supply	1000	1000	1000	1000	1000	1000	1000	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	FORT BEND CO. WCID 1		
MANUFACTURING	81001079	FORT BEND	BRAZOS	Supply	391	391	379	269	269	269	269	GULF COAST AQUIFER	None		
				Supply Total	**5602**	**5477**	**4514**	**3170**	**3170**	**3170**	**3170**				
MANUFACTURING	81001079	FORT BEND	BRAZOS	WMS	0	1140	1140	1140	1140	1140	1140	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
MANUFACTURING	81001079	FORT BEND	BRAZOS	WMS	0	24	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001079	FORT BEND	SAN JACINTO	WMS	0	1550	1550	1550	1550	1550	1550	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
MANUFACTURING	81001079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	1969	1969	1969	1969	1969	1969	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
				WMS Total	**0**	**4683**	**4659**	**4659**	**4659**	**4659**	**4659**				**$0.00**
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Demand	35381	41005	44330	47046	49692	51967	55491				
				Demand Total	**35381**	**41005**	**44330**	**47046**	**49692**	**51967**	**55491**				
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Supply	2539	2539	2539	2539	2539	2539	2539	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Supply	4578	4427	4294	4217	4181	4155	4139	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Supply	22479	22630	22763	22840	22876	22902	22918	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Supply	23333	23333	23333	23333	23333	23333	23333	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	GULF COAST WATER AUTHORITY		
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	Supply	9355	9355	9355	9355	9355	9355	9355	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	GULF COAST WATER AUTHORITY		
				Supply Total	**62284**	**62284**	**62284**	**62284**	**62284**	**62284**	**62284**				
MANUFACTURING	81001084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	28000	28000	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	COH-GCWA Transfer	$0.00
				WMS Total	**0**	**0**	**0**	**0**	**0**	**28000**	**28000**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	Demand	64073	72614	77888	82373	86345	89318	87826				
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Demand	226300	256465	275094	290934	304964	315464	310194				
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	Demand	59047	66918	71779	75911	79572	82312	80937				
				Demand Total	**349420**	**395997**	**424761**	**449218**	**470881**	**487094**	**478957**				
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	Supply	0	0	0	0	0	0	0	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	Supply	13604	13604	13604	13604	13604	13604	13604	CONROE LAKE/RESERVOIR	SAN JACINTO RIVER AUTHORITY		
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	Supply	29368	29368	29368	29368	29368	29368	29368	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	45260	45260	45260	45260	45260	45260	45260	GULF COAST AQUIFER	None		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	1046	1046	1046	1046	1046	1046	1046	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	70	70	70	70	70	70	70	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	31674	31674	31674	31674	31674	31674	31674	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	31674	31674	31674	31674	31674	31674	31674	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	54647	54647	54647	54647	54647	54647	54647	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	3896	3896	3896	3924	3933	3938	3936	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	54	54	54	54	54	54	54	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	0	0	0	0	0	0	0	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	34849	34849	34849	34849	34849	34849	34849	HOUSTON LAKE/RESERVOIR	COASTAL WATER AUTHORITY (Included in the COH)		
MANUFACTURING	81001101	HARRIS	SAN JACINTO	Supply	207642	207642	207642	207642	207642	207642	207642	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	Supply	5905	5905	5905	5905	5905	5905	5905	GULF COAST AQUIFER	None		
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	Supply	1144	1144	1144	1116	1107	1102	1104	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	Supply	54455	54455	54455	54455	54455	54455	54455	LIVINGSTON-WALLISVILLE SYSTEM	COASTAL WATER AUTHORITY (Included in the COH)		
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	Supply	1792	1792	1792	1792	1792	1792	1792	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
				Supply Total	**517080**	**517080**	**517080**	**517080**	**517080**	**517080**	**517080**				
MANUFACTURING	81001101	HARRIS	SAN JACINTO	WMS	0	0	67200	67200	67200	67200	67200	COH DIRECT REUSE (INDUSTRY)	CITY OF HOUSTON	Direct Reuse for Industry	$234,158,000.00
MANUFACTURING	81001101	HARRIS	SAN JACINTO	WMS	0	3125	9759	549	549	549	549	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	2471	2471	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	11426	11426	11426	11426	11426	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$0.00
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	2835	2835	2835	2835	2835	2835	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
MANUFACTURING	81001101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	787	1273	1686	2052	2326	2189	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$9,913,400.00
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	WMS	0		28566	28566	28566	28566	28566	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$0.00
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	WMS	0	25326	10780	10780	10780	10780	10780	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$0.00
MANUFACTURING	81001101	HARRIS	TRINITY-SAN JACINTO	WMS	0	7000	7000	7000	7000	7000	7000	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**0**	**39073**	**138839**	**130042**	**130408**	**133153**	**133016**				**$244,071,400.00**
MANUFACTURING	81001145	LEON	TRINITY	Demand	545	714	842	967	1093	1207	1313				
				Demand Total	**545**	**714**	**842**	**967**	**1093**	**1207**	**1313**				
MANUFACTURING	81001145	LEON	TRINITY	Supply	545	545	545	545	545	545	545	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**545**	**545**	**545**	**545**	**545**	**545**	**545**				
MANUFACTURING	81001145	LEON	TRINITY	WMS	0	169	297	422	548	662	768	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$1,554,500.00
				WMS Total	**0**	**169**	**297**	**422**	**548**	**662**	**768**				**$1,554,500.00**
MANUFACTURING	81001146	LIBERTY	TRINITY	Demand	47	62	74	85	97	108	117				
MANUFACTURING	81001146	LIBERTY	SAN JACINTO	Demand	249	331	391	452	514	570	619				
				Demand Total	**296**	**393**	**465**	**537**	**611**	**678**	**736**				
MANUFACTURING	81001146	LIBERTY	TRINITY	Supply	47	47	47	47	47	47	47	GULF COAST AQUIFER	None		
MANUFACTURING	81001146	LIBERTY	SAN JACINTO	Supply	249	249	249	249	249	249	249	GULF COAST AQUIFER	None		
				Supply Total	**296**	**296**	**296**	**296**	**296**	**296**	**296**				
MANUFACTURING	81001146	LIBERTY	SAN JACINTO	WMS	0	82	142	203	265	321	370	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,388,700.00
MANUFACTURING	81001146	LIBERTY	TRINITY	WMS	0	15	27	38	50	61	70	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**97**	**169**	**241**	**315**	**382**	**440**				**$1,388,700.00**
MANUFACTURING	81001157	MADISON	TRINITY	Demand	205	260	289	316	343	367	398				
				Demand Total	**205**	**260**	**289**	**316**	**343**	**367**	**398**				
MANUFACTURING	81001157	MADISON	TRINITY	Supply	205	205	205	205	205	205	205	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**205**	**205**	**205**	**205**	**205**	**205**	**205**				
MANUFACTURING	81001157	MADISON	TRINITY	WMS	0	55	84	111	138	162	193	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$1,221,700.00
				WMS Total	**0**	**55**	**84**	**111**	**138**	**162**	**193**				**$1,221,700.00**
MANUFACTURING	81001170	MONTGOMERY	SAN JACINTO	Demand	1587	2045	2332	2608	2883	3126	3392				
				Demand Total	**1587**	**2045**	**2332**	**2608**	**2883**	**3126**	**3392**				
MANUFACTURING	81001170	MONTGOMERY	SAN JACINTO	Supply	1587	1587	1448	1317	1211	1070	950	GULF COAST AQUIFER	None		
				Supply Total	**1587**	**1587**	**1448**	**1317**	**1211**	**1070**	**950**				
MANUFACTURING	81001170	MONTGOMERY	SAN JACINTO	WMS	0	2442	2442	2442	2442	2442	2442	SJRA INDIRECT REUSE	SAN JACINTO RIVER AUTHORITY	New Contracts	$0.00
MANUFACTURING	81001170	MONTGOMERY	SAN JACINTO	WMS	0	115	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**2557**	**2442**	**2442**	**2442**	**2442**	**2442**				**$416,000.00**
MANUFACTURING	81001204	SAN JACINTO	SAN JACINTO	Demand	39	48	52	56	60	63	68				
				Demand Total	**39**	**48**	**52**	**56**	**60**	**63**	**68**				
MANUFACTURING	81001204	SAN JACINTO	SAN JACINTO	Supply	39	39	39	39	39	39	39	GULF COAST AQUIFER	None		
				Supply Total	**39**	**39**	**39**	**39**	**39**	**39**	**39**				
MANUFACTURING	81001204	SAN JACINTO	SAN JACINTO	WMS	0	9	13	17	21	24	29	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**9**	**13**	**17**	**21**	**24**	**29**				**$0.00**
MANUFACTURING	81001236	WALKER	TRINITY	Demand	2065	2631	3049	3435	3827	4169	4524				
MANUFACTURING	81001236	WALKER	SAN JACINTO	Demand	453	577	669	753	839	914	993				
				Demand Total	**2518**	**3208**	**3718**	**4188**	**4666**	**5083**	**5517**				
MANUFACTURING	81001236	WALKER	TRINITY	Supply	2065	2065	2065	2065	2065	2065	2065	GULF COAST AQUIFER	None		
MANUFACTURING	81001236	WALKER	TRINITY	Supply	0	0	0	0	0	0	0	YEGUA-JACKSON AQUIFER	None		
MANUFACTURING	81001236	WALKER	SAN JACINTO	Supply	453	453	453	453	453	453	453	GULF COAST AQUIFER	None		
				Supply Total	**2518**	**2518**	**2518**	**2518**	**2518**	**2518**	**2518**				
MANUFACTURING	81001236	WALKER	SAN JACINTO	WMS	0	124	216	300	386	461	540	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001236	WALKER	TRINITY	WMS	0	566	357	46	247	287	304	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001236	WALKER	TRINITY	WMS	0	0	627	1324	1515	1817	2155	YEGUA-JACKSON AQUIFER	None	EXPANDED USE OF GW	$1,862,300.00
				WMS Total	**0**	**690**	**1200**	**1670**	**2148**	**2565**	**2999**				**$1,862,300.00**
MANUFACTURING	81001237	WALLER	SAN JACINTO	Demand	55	72	82	91	99	108	116				
MANUFACTURING	81001237	WALLER	BRAZOS	Demand	13	17	19	21	24	25	28				
				Demand Total	**68**	**89**	**101**	**112**	**123**	**133**	**144**				
MANUFACTURING	81001237	WALLER	SAN JACINTO	Supply	55	55	55	55	55	55	55	GULF COAST AQUIFER	None		
MANUFACTURING	81001237	WALLER	BRAZOS	Supply	13	13	13	13	13	13	13	GULF COAST AQUIFER	None		
				Supply Total	**68**	**68**	**68**	**68**	**68**	**68**	**68**				
MANUFACTURING	81001237	WALLER	BRAZOS	WMS	0	0	0	0	0	1	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001237	WALLER	BRAZOS	WMS	0	4	6	8	11	11	12	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MANUFACTURING	81001237	WALLER	BRAZOS	WMS	0					1	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001237	WALLER	SAN JACINTO	WMS	0	0	0	0	0	0	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001237	WALLER	SAN JACINTO	WMS	0	17	27	36	44	53	58	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MANUFACTURING	81001237	WALLER	SAN JACINTO	WMS	0					0	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**21**	**33**	**44**	**55**	**66**	**82**				**$0.00**
MANVEL	80721000	BRAZORIA	SAN JACINTO-BRAZOS	Population	3046	3046	3046	3046	3046	3046	3046				
				Population Total	**3046**	**3046**	**3046**	**3046**	**3046**	**3046**	**3046**				
MANVEL	80721000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	365	355	345	334	324	317	317				
				Demand Total	**365**	**355**	**345**	**334**	**324**	**317**	**317**				
MANVEL	80721000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	365	355	345	334	324	317	317	GULF COAST AQUIFER	None		
				Supply Total	**365**	**355**	**345**	**334**	**324**	**317**	**317**				
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	Population	8600	9050	9050	9050	9050	9050	9050				
				Population Total	**8600**	**9050**	**9050**	**9050**	**9050**	**9050**	**9050**				
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	Demand	2273	2352	2321	2291	2271	2261	2261				
				Demand Total	**2273**	**2352**	**2321**	**2291**	**2271**	**2261**	**2261**				
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	Supply	2273	1549	696	356	356	356	356	GULF COAST AQUIFER	None		
				Supply Total	**2273**	**1549**	**696**	**356**	**356**	**356**	**356**				
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	WMS	0	140	138	137	135	135	135	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	WMS	0	0	1135	1135	1135	1135	1135	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$264,455.00
MASON CREEK UD	84247000	HARRIS	SAN JACINTO	WMS	0	663	663	663	663	663	663	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$7,805,451.23
				WMS Total	**0**	**803**	**1936**	**1935**	**1933**	**1933**	**1933**				**$8,069,906.23**
MEADOWS	80792000	FORT BEND	SAN JACINTO	Population	4469	4469	4469	4469	4469	4468	4468				
MEADOWS	80792000	FORT BEND	SAN JACINTO-BRAZOS	Population	443	443	443	443	443	444	444				
				Population Total	**4912**	**4912**	**4912**	**4912**	**4912**	**4912**	**4912**				
MEADOWS	80792000	FORT BEND	SAN JACINTO	Demand	1352	1332	1312	1297	1282	1276	1276				
MEADOWS	80792000	FORT BEND	SAN JACINTO-BRAZOS	Demand	134	132	130	129	127	127	127				
				Demand Total	**1486**	**1464**	**1442**	**1426**	**1409**	**1403**	**1403**				
MEADOWS	80792000	FORT BEND	SAN JACINTO	Supply	1311	1089	749	426	426	426	426	GULF COAST AQUIFER	None		
MEADOWS	80792000	FORT BEND	SAN JACINTO-BRAZOS	Supply	103	89	66	39	39	39	39	GULF COAST AQUIFER	None		
				Supply Total	**1414**	**1178**	**815**	**465**	**465**	**465**	**465**				
MEADOWS	80792000	FORT BEND	SAN JACINTO	WMS	41	79	78	77	76	76	76	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MEADOWS	80792000	FORT BEND	SAN JACINTO	WMS	0	630	630	630	630	630	630	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$7,241,439
MEADOWS	80792000	FORT BEND	SAN JACINTO	WMS	0	164	164	164	164	164	164	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
MEADOWS	80792000	FORT BEND	SAN JACINTO-BRAZOS	WMS	8	8	8	8	8	8	8	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MEADOWS	80792000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	82	82	82	82	82	82	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**49**	**963**	**962**	**961**	**960**	**960**	**960**				**$7,241,438.90**
MERCY WSC	84253000	LIBERTY	SAN JACINTO	Population	333	404	482	557	630	710	800				
MERCY WSC	84253000	SAN JACINTO	SAN JACINTO	Population	1422	1820	2211	2523	2718	2831	2882				
				Population Total	**1755**	**2224**	**2693**	**3080**	**3348**	**3541**	**3682**				
MERCY WSC	84253000	LIBERTY	SAN JACINTO	Demand	64	75	88	100	113	126	142				
MERCY WSC	84253000	SAN JACINTO	SAN JACINTO	Demand	272	338	404	455	487	504	513				
				Demand Total	**336**	**413**	**492**	**555**	**600**	**630**	**655**				
MERCY WSC	84253000	LIBERTY	SAN JACINTO	Supply	64	64	64	64	64	64	64	GULF COAST AQUIFER	None		
MERCY WSC	84253000	SAN JACINTO	SAN JACINTO	Supply	272	272	272	272	272	272	272	GULF COAST AQUIFER	None		
				Supply Total	**336**	**336**	**336**	**336**	**336**	**336**	**336**				
MERCY WSC	84253000	LIBERTY	SAN JACINTO	WMS	0	11	24	36	49	62	78	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,370,600.00
MERCY WSC	84253000	SAN JACINTO	SAN JACINTO	WMS	0	66	132	183	215	232	241	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**77**	**156**	**219**	**264**	**294**	**319**				**$1,370,600.00**
MINING	81003008	AUSTIN	BRAZOS	Demand	33	40	44	47	49	51	53				
MINING	81003008	AUSTIN	BRAZOS-COLORADO	Demand	3	4	4	4	4	5	5				
MINING	81003008	AUSTIN	COLORADO	Demand	6	7	8	8	9	9	9				
				Demand Total	**42**	**51**	**56**	**59**	**62**	**65**	**67**				
MINING	81003008	AUSTIN	BRAZOS	Supply	33	33	33	33	33	33	33	GULF COAST AQUIFER	None		
MINING	81003008	AUSTIN	BRAZOS-COLORADO	Supply	3	3	3	3	3	3	3	GULF COAST AQUIFER	None		
MINING	81003008	AUSTIN	COLORADO	Supply	6	6	6	6	6	6	6	GULF COAST AQUIFER	None		
				Supply Total	**42**	**42**	**42**	**42**	**42**	**42**	**42**				
MINING	81003008	AUSTIN	BRAZOS	WMS	0	7	11	14	16	18	20	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003008	AUSTIN	BRAZOS-COLORADO	WMS	0	1	1	1	1	2	2	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003008	AUSTIN	COLORADO	WMS	0	1	2	2	3	3	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**9**	**14**	**17**	**20**	**23**	**25**				**$0.00**

Demand, supply and WMS in acre-feet/year
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Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MINING	81003020	BRAZORIA	SAN JACINTO-BRAZOS	Demand	767	945	1037	1091	1145	1198	1248				
MINING	81003020	BRAZORIA	BRAZOS	Demand	249	307	337	354	372	389	405				
MINING	81003020	BRAZORIA	BRAZOS-COLORADO	Demand	2314	2852	3128	3292	3452	3614	3766				
				Demand Total	**3330**	**4104**	**4502**	**4737**	**4969**	**5201**	**5419**				
MINING	81003020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	462	462	462	462	462	462	462	GULF COAST AQUIFER	None		
MINING	81003020	BRAZORIA	SAN JACINTO-BRAZOS	Supply	305	305	305	305	305	305	305	OTHER LOCAL SUPPLY	None		
MINING	81003020	BRAZORIA	BRAZOS	Supply	59	28	20	15	11	9	7	GULF COAST AQUIFER	None		
MINING	81003020	BRAZORIA	BRAZOS	Supply	190	190	190	190	190	190	190	OTHER LOCAL SUPPLY	None		
MINING	81003020	BRAZORIA	BRAZOS-COLORADO	Supply	1190	1190	1190	1190	1190	1190	1190	GULF COAST AQUIFER	None		
MINING	81003020	BRAZORIA	BRAZOS-COLORADO	Supply	1124	1124	1124	1124	1124	1124	1124	OTHER LOCAL SUPPLY	None		
				Supply Total	**3330**	**3299**	**3291**	**3286**	**3282**	**3280**	**3278**				
MINING	81003020	BRAZORIA	BRAZOS	WMS	0	208	208	208	208	208	208	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
MINING	81003020	BRAZORIA	BRAZOS-COLORADO	WMS	0	288	437	555	673	819	969	SAN BERNARD RIVER RUN-OF-RIVER	Phillips	Contractual Transfer	$0.00
MINING	81003020	BRAZORIA	BRAZOS-COLORADO	WMS	0	250	377	423	465	481	483	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,530,200.00
MINING	81003020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	445	445	445	445	445	445	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
MINING	81003020	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	162	266	223	173	103	36	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1353**	**1733**	**1854**	**1964**	**2056**	**2141**				**$1,530,200.00**
MINING	81003036	CHAMBERS	NECHES-TRINITY	Demand	530	639	692	725	756	788	816				
MINING	81003036	CHAMBERS	TRINITY	Demand	23414	28240	30587	32017	33420	34811	36027				
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	Demand	7083	8543	9253	9685	10110	10531	10899				
				Demand Total	**31027**	**37422**	**40532**	**42427**	**44286**	**46130**	**47742**				
MINING	81003036	CHAMBERS	NECHES-TRINITY	Supply	25	25	25	25	25	25	25	GULF COAST AQUIFER	None		
MINING	81003036	CHAMBERS	NECHES-TRINITY	Supply	505	505	505	505	505	505	505	OTHER LOCAL SUPPLY	None		
MINING	81003036	CHAMBERS	TRINITY	Supply	4425	4425	4425	4425	4425	4425	4425	GULF COAST AQUIFER	None		
MINING	81003036	CHAMBERS	TRINITY	Supply	18989	18989	18989	18989	18989	18989	18989	OTHER LOCAL SUPPLY	None		
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	Supply	2361	2361	2361	2361	2361	2361	2361	GULF COAST AQUIFER	None		
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	Supply	4722	4722	4722	4722	4722	4722	4722	OTHER LOCAL SUPPLY	None		
				Supply Total	**31027**	**31027**	**31027**	**31027**	**31027**	**31027**	**31027**				
MINING	81003036	CHAMBERS	NECHES-TRINITY	WMS	0	273	273	273	273	273	273	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
MINING	81003036	CHAMBERS	NECHES-TRINITY	WMS	0	5	7	9	10	12	13	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003036	CHAMBERS	TRINITY	WMS	0	6000	6000	6000	6000	6000	6000	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
MINING	81003036	CHAMBERS	TRINITY	WMS	0	5550	5550	5550	5550	5550	5550	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
MINING	81003036	CHAMBERS	TRINITY	WMS	0	482	679	787	890	986	1063	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,834,800.00
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	1836	1836	1836	1836	1836	1836	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY	NEW CONTRACTS	$0.00
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	2000	2000	2000	2000	2000	2000	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT	NEW CONTRACTS	$0.00
MINING	81003036	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	200	302	226	150	79	-20	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**16346**	**16647**	**16681**	**16709**	**16736**	**16715**				**$1,834,800.00**
MINING	81003079	FORT BEND	SAN JACINTO	Demand	264	280	285	289	292	295	297				
MINING	81003079	FORT BEND	SAN JACINTO-BRAZOS	Demand	1861	1972	2011	2034	2056	2076	2094				
MINING	81003079	FORT BEND	BRAZOS	Demand	583	618	630	638	644	651	656				
MINING	81003079	FORT BEND	BRAZOS-COLORADO	Demand	132	140	144	144	146	147	149				
				Demand Total	**2840**	**3010**	**3070**	**3105**	**3138**	**3169**	**3196**				
MINING	81003079	FORT BEND	SAN JACINTO	Supply	256	229	163	95	95	95	95	GULF COAST AQUIFER	None		
MINING	81003079	FORT BEND	SAN JACINTO	Supply	8	8	8	8	8	8	8	OTHER LOCAL SUPPLY	None		
MINING	81003079	FORT BEND	SAN JACINTO-BRAZOS	Supply	1431	1334	1025	612	612	612	612	GULF COAST AQUIFER	None		
MINING	81003079	FORT BEND	SAN JACINTO-BRAZOS	Supply	822	822	822	822	822	822	822	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MINING	81003079	FORT BEND	BRAZOS	Supply	207	207	207	207	207	207	207	GULF COAST AQUIFER	None		
MINING	81003079	FORT BEND	BRAZOS	Supply	1100	1100	1100	1100	1100	1100	1100	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	BRAZOS RIVER AUTHORITY		
MINING	81003079	FORT BEND	BRAZOS-COLORADO	Supply	132	132	132	132	132	132	132	GULF COAST AQUIFER	None		
				Supply Total	**3956**	**3832**	**3457**	**2976**	**2976**	**2976**	**2976**				
MINING	81003079	FORT BEND	BRAZOS	WMS	0	1	56	112	112	112	112	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003079	FORT BEND	BRAZOS-COLORADO	WMS	0	8	12	12	14	15	17	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003079	FORT BEND	SAN JACINTO	WMS	0	194	194	194	194	194	194	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
MINING	81003079	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	660	660	660	660	660	660	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$0.00
				WMS Total	**0**	**863**	**922**	**978**	**980**	**981**	**983**				**$0.00**
MINING	81003084	GALVESTON	NECHES-TRINITY	Demand	118	136	143	147	150	154	158				
MINING	81003084	GALVESTON	SAN JACINTO-BRAZOS	Demand	112	129	136	139	143	146	149				
				Demand Total	**230**	**265**	**279**	**286**	**293**	**300**	**307**				
MINING	81003084	GALVESTON	NECHES-TRINITY	Supply	12	12	12	12	12	12	12	GULF COAST AQUIFER	None		
MINING	81003084	GALVESTON	NECHES-TRINITY	Supply	106	106	106	106	106	106	106	OTHER LOCAL SUPPLY	None		
MINING	81003084	GALVESTON	SAN JACINTO-BRAZOS	Supply	11	11	11	11	11	11	11	GULF COAST AQUIFER	None		
MINING	81003084	GALVESTON	SAN JACINTO-BRAZOS	Supply	101	101	101	101	101	101	101	OTHER LOCAL SUPPLY	None		
				Supply Total	**230**	**230**	**230**	**230**	**230**	**230**	**230**				
MINING	81003084	GALVESTON	NECHES-TRINITY	WMS	0	16	23	26	29	33	36	SAM RAYBURN-STEINHAGEN	LOWER NECHES VALLEY AUTHORITY	New Contracts	$0.00
MINING	81003084	GALVESTON	NECHES-TRINITY	WMS	0	2	2	3	3	3	4	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	33	33	33	33	33	33	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY	Contractual Transfer	$0.00
MINING	81003084	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	2	3	3	3	4	4	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**53**	**61**	**65**	**68**	**73**	**77**				**$0.00**
MINING	81003101	HARRIS	SAN JACINTO	Demand	992	1258	1407	1500	1593	1688	1771				
MINING	81003101	HARRIS	SAN JACINTO-BRAZOS	Demand	19	24	27	29	31	32	34				
				Demand Total	**1011**	**1282**	**1434**	**1529**	**1624**	**1720**	**1805**				
MINING	81003101	HARRIS	SAN JACINTO	Supply	992	992	992	992	992	992	992	OTHER LOCAL SUPPLY	None		
MINING	81003101	HARRIS	SAN JACINTO-BRAZOS	Supply	19	19	19	19	19	19	19	OTHER LOCAL SUPPLY	None		
				Supply Total	**1011**	**1011**	**1011**	**1011**	**1011**	**1011**	**1011**				
MINING	81003101	HARRIS	SAN JACINTO	WMS	0	0	513	513	513	513	513	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$0.00
MINING	81003101	HARRIS	SAN JACINTO	WMS	0	266	266	266	266	266	266	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
MINING	81003101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	15	15	15	15	15	15	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**0**	**281**	**794**	**794**	**794**	**794**	**794**				**$0.00**
MINING	81003145	LEON	TRINITY	Demand	1487	1296	1251	1226	1204	1183	1166				
MINING	81003145	LEON	BRAZOS	Demand	253	221	213	209	205	201	198				
				Demand Total	**1740**	**1517**	**1464**	**1435**	**1409**	**1384**	**1364**				
MINING	81003145	LEON	TRINITY	Supply	1487	1296	1251	1226	1204	1183	1166	CARRIZO-WILCOX AQUIFER	None		
MINING	81003145	LEON	BRAZOS	Supply	253	221	213	209	205	201	198	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**1740**	**1517**	**1464**	**1435**	**1409**	**1384**	**1364**				
MINING	81003146	LIBERTY	NECHES	Demand	32	32	32	32	32	32	33				
MINING	81003146	LIBERTY	NECHES-TRINITY	Demand	22	23	23	23	24	23	22				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MINING	81003146	LIBERTY	TRINITY	Demand	4883	4924	4937	4945	4951	4958	4963				
MINING	81003146	LIBERTY	TRINITY-SAN JACINTO	Demand	3685	3717	3727	3732	3737	3742	3747				
MINING	81003146	LIBERTY	SAN JACINTO	Demand	34	34	34	34	34	35	35				
				Demand Total	**8656**	**8730**	**8753**	**8766**	**8778**	**8790**	**8800**				
MINING	81003146	LIBERTY	NECHES	Supply	32	32	32	32	32	32	32	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	NECHES-TRINITY	Supply	22	22	22	22	22	22	22	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY	Supply	4112	4070	4026	3982	3940	3893	3841	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY	Supply	771	771	771	771	771	771	771	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY-SAN JACINTO	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	TRINITY-SAN JACINTO	Supply	3685	3685	3685	3685	3685	3685	3685	GULF COAST AQUIFER	None		
MINING	81003146	LIBERTY	SAN JACINTO	Supply	34	34	34	34	34	34	34	GULF COAST AQUIFER	None		
				Supply Total	**8656**	**8614**	**8570**	**8526**	**8484**	**8437**	**8385**				
MINING	81003146	LIBERTY	NECHES	WMS	0	0	0	0	0	0	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003146	LIBERTY	NECHES-TRINITY	WMS	0	1	1	1	2	1	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003146	LIBERTY	SAN JACINTO	WMS	0	0	0	0	0	1	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MINING	81003146	LIBERTY	TRINITY	WMS	0	83	140	192	240	294	351	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
MINING	81003146	LIBERTY	TRINITY-SAN JACINTO	WMS	0	32	42	47	52	57	62	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**116**	**183**	**240**	**294**	**353**	**415**				**$416,000.00**
MINING	81003157	MADISON	TRINITY	Demand	14	15	15	15	15	15	15				
MINING	81003157	MADISON	BRAZOS	Demand	9	9	9	9	9	9	9				
				Demand Total	**23**	**24**	**24**	**24**	**24**	**24**	**24**				
MINING	81003157	MADISON	TRINITY	Supply	14	14	14	14	14	14	14	CARRIZO-WILCOX AQUIFER	None		
MINING	81003157	MADISON	BRAZOS	Supply	9	9	9	9	9	9	9	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**23**	**23**	**23**	**23**	**23**	**23**	**23**				
MINING	81003157	MADISON	TRINITY	WMS	0	1	1	1	1	1	1	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**1**	**1**	**1**	**1**	**1**				**$0.00**
MINING	81003170	MONTGOMERY	SAN JACINTO	Demand	414	480	509	526	543	559	573				
				Demand Total	**414**	**480**	**509**	**526**	**543**	**559**	**573**				
MINING	81003170	MONTGOMERY	SAN JACINTO	Supply	414	400	316	265	228	191	160	GULF COAST AQUIFER	None		
				Supply Total	**414**	**400**	**316**	**265**	**228**	**191**	**160**				
MINING	81003170	MONTGOMERY	SAN JACINTO	WMS	0	413	413	413	413	413	413	SJRA INDIRECT REUSE	SAN JACINTO RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**0**	**413**	**413**	**413**	**413**	**413**	**413**				**$0.00**
MINING	81003187	POLK	TRINITY	Demand	24	29	31	32	33	34	35				
				Demand Total	**24**	**29**	**31**	**32**	**33**	**34**	**35**				
MINING	81003187	POLK	TRINITY	Supply	24	24	24	24	24	24	24	GULF COAST AQUIFER	None		
				Supply Total	**24**	**24**	**24**	**24**	**24**	**24**	**24**				
MINING	81003187	POLK	TRINITY	WMS	0	5	7	8	9	10	11	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**5**	**7**	**8**	**9**	**10**	**11**				**$0.00**
MINING	81003204	SAN JACINTO	TRINITY	Demand	8	7	6	6	6	6	6				
MINING	81003204	SAN JACINTO	SAN JACINTO	Demand	28	23	23	22	21	20	20				
				Demand Total	**36**	**30**	**29**	**28**	**27**	**26**	**26**				
MINING	81003204	SAN JACINTO	TRINITY	Supply	8	7	6	6	6	6	6	GULF COAST AQUIFER	None		
MINING	81003204	SAN JACINTO	SAN JACINTO	Supply	28	23	23	22	21	20	20	GULF COAST AQUIFER	None		
				Supply Total	**36**	**30**	**29**	**28**	**27**	**26**	**26**				
MINING	81003228	TRINITY	TRINITY	Demand	8	6	6	6	6	6	6				
				Demand Total	**8**	**6**	**6**	**6**	**6**	**6**	**6**				
MINING	81003228	TRINITY	TRINITY	Supply	8	6	6	6	6	6	6	GULF COAST AQUIFER	None		
				Supply Total	**8**	**6**	**6**	**6**	**6**	**6**	**6**				
MINING	81003236	WALKER	TRINITY	Demand	6	6	6	6	6	6	6				
MINING	81003236	WALKER	SAN JACINTO	Demand	6	7	7	7	7	7	7				
				Demand Total	**12**	**13**	**13**	**13**	**13**	**13**	**13**				
MINING	81003236	WALKER	TRINITY	Supply	6	6	6	6	6	6	6	GULF COAST AQUIFER	None		
MINING	81003236	WALKER	SAN JACINTO	Supply	6	6	6	6	6	6	6	GULF COAST AQUIFER	None		
				Supply Total	**12**	**12**	**12**	**12**	**12**	**12**	**12**				
MINING	81003236	WALKER	SAN JACINTO	WMS	0	1	1	1	1	1	1	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**1**	**1**	**1**	**1**	**1**				**$0.00**
MINING	81003237	WALLER	SAN JACINTO	Demand	71	71	71	71	71	71	71				
MINING	81003237	WALLER	BRAZOS	Demand	9	9	9	9	9	9	9				
				Demand Total	**80**	**80**	**80**	**80**	**80**	**80**	**80**				
MINING	81003237	WALLER	SAN JACINTO	Supply	71	71	71	71	71	71	71	GULF COAST AQUIFER	None		
MINING	81003237	WALLER	BRAZOS	Supply	9	9	9	9	9	9	9	GULF COAST AQUIFER	None		
				Supply Total	**80**	**80**	**80**	**80**	**80**	**80**	**80**				

Demand, supply and WMS in acre-feet/year
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Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	Population	8395	13589	17102	20468	23885	26256	31779				
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Population	37999	61510	77411	92650	108116	118851	143849				
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	Population	5494	6887	8243	9577	10898	12210	13517				
MISSOURI CITY	80409000	FORT BEND	BRAZOS	Population	1025	1659	2088	2499	2917	3206	3880				
				Population Total	**52913**	**83645**	**104844**	**125194**	**145816**	**160523**	**193025**				
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	Demand	1625	2577	3195	3817	4460	4938	6004				
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Demand	7353	11664	14464	17280	20186	22351	27175				
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	Demand	1063	1306	1540	1786	2035	2296	2554				
MISSOURI CITY	80409000	FORT BEND	BRAZOS	Demand	198	315	390	466	545	603	733				
				Demand Total	**10239**	**15862**	**19589**	**23349**	**27226**	**30188**	**36466**				
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	Supply	1577	1577	1577	1254	1254	1254	1254	GULF COAST AQUIFER	None		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	Supply	127	96	101	103	103	103	103	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	Supply	369	1275	2100	2359	2381	2385	2417	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Supply	5653	5653	5653	5193	5193	5193	5193	GULF COAST AQUIFER	None		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Supply	1303	1303	1303	1303	1303	1303	1303	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Supply	4	12	20	22	22	22	22	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	Supply	11773	8919	9567	9821	9834	9805	9883	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	FORT BEND	BRAZOS	Supply	70	70	70	70	70	70	70	GULF COAST AQUIFER	None		
MISSOURI CITY	80409000	FORT BEND	BRAZOS	Supply	985	566	423	343	336	330	326	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	Supply	998	247	537	586	586	586	586	GULF COAST AQUIFER	None		
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	Supply	500	2867	1537	1104	1076	1107	1001	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	Supply	4	27	14	10	10	10	10	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**23363**	**22612**	**22902**	**22168**	**22168**	**22168**	**22168**				
MISSOURI CITY	80409000	FORT BEND	BRAZOS	WMS	0	0	0	32	38	42	51	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MISSOURI CITY	80409000	FORT BEND	BRAZOS	WMS	0	0	0	263	263	263	263	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$448,775.92
MISSOURI CITY	80409000	FORT BEND	BRAZOS	WMS	0	36	44	23	23	23	23	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	WMS	0	0	0	207	308	341	414	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	WMS	0	0	0	414	414	414	414	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$706,438.13
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	WMS	0	0	0	0	0	1500	1500	LIVINGSTON-WALLISVILLE SYSTEM	GULF COAST WATER AUTHORITY	COH-GCWA Transfer	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO	WMS	0	529	248	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	1192	1392	1542	1875	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	2442	2442	2442	2442	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$4,166,961.16
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	6500	6500	LIVINGSTON-WALLISVILLE SYSTEM	GULF COAST WATER AUTHORITY	COH-GCWA Transfer	$0.00
MISSOURI CITY	80409000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	2235	1718	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,872,000.00
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	WMS	0	0	0	123	140	158	176	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MISSOURI CITY	80409000	HARRIS	SAN JACINTO	WMS	0	0	223	223	781	781	781	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$181,973.00
				WMS Total	**0**	**2800**	**2233**	**4919**	**5801**	**14006**	**14439**				**$7,376,148.21**
MONT BELVIEU	80413000	CHAMBERS	TRINITY	Population	1582	2195	2878	3513	4063	4621	5193				
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	Population	742	1029	1349	1647	1905	2167	2435				
				Population Total	**2324**	**3224**	**4227**	**5160**	**5968**	**6788**	**7628**				
MONT BELVIEU	80413000	CHAMBERS	TRINITY	Demand	489	669	870	1055	1215	1382	1553				
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	Demand	229	314	408	494	570	648	728				
				Demand Total	**718**	**983**	**1278**	**1549**	**1785**	**2030**	**2281**				
MONT BELVIEU	80413000	CHAMBERS	TRINITY	Supply	92	92	92	92	92	92	92	GULF COAST AQUIFER	None		
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	Supply	76	76	76	76	76	76	76	GULF COAST AQUIFER	None		
				Supply Total	**168**	**168**	**168**	**168**	**168**	**168**	**168**				
MONT BELVIEU	80413000	CHAMBERS	TRINITY	WMS	29	40	52	63	72	82	93	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONT BELVIEU	80413000	CHAMBERS	TRINITY	WMS	0	1223	1223	1223	1223	1223	1223	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$7,680,268.35
MONT BELVIEU	80413000	CHAMBERS	TRINITY	WMS	0	24	53	80	101	123	145	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,226,500.00
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	WMS	14	19	24	29	34	39	43	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	529	529	529	529	529	529	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$0.00
MONT BELVIEU	80413000	CHAMBERS	TRINITY-SAN JACINTO	WMS	0	18	41	56	66	74	80	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**43**	**1853**	**1922**	**1980**	**2025**	**2070**	**2113**				**$8,906,768.35**
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	Population	2601	6243	8467	12815	17870	24538	32282				
				Population Total	**2601**	**6243**	**8467**	**12815**	**17870**	**24538**	**32282**				
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	Demand	720	1685	2276	3431	4784	6569	8642				
				Demand Total	**720**	**1685**	**2276**	**3431**	**4784**	**6569**	**8642**				
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	Supply	720	720	720	720	720	720	720	GULF COAST AQUIFER	None		
				Supply Total	**720**	**720**	**720**	**720**	**720**	**720**	**720**				
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	WMS	0	116	157	237	330	453	596	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	WMS	0	705	705	705	705	705	705	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	WMS	0	0	4920	4920	4920	4920	4920	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$20,403,900.00
MONTGOMERY COUNTY MUD #18	84261000	MONTGOMERY	SAN JACINTO	WMS	0	683	694	1013	1289	1527	1701	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$2,903,000.00
				WMS Total	**0**	**1504**	**6476**	**6875**	**7244**	**7605**	**7922**				**$23,306,900.00**
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	Population	3200	3200	3200	3200	3200	3200	3200				
				Population Total	**3200**	**3200**	**3200**	**3200**	**3200**	**3200**	**3200**				
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	Demand	477	459	452	448	444	444	444				
				Demand Total	**477**	**459**	**452**	**448**	**444**	**444**	**444**				
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	Supply	477	382	280	227	187	152	124	GULF COAST AQUIFER	None		
				Supply Total	**477**	**382**	**280**	**227**	**187**	**152**	**124**				
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	WMS	0	25	25	25	25	25	25	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	WMS	0	147	147	147	147	147	147	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY MUD #19	84262000	MONTGOMERY	SAN JACINTO	WMS	0	0	148	148	148	148	148	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,385,900.00
				WMS Total	**0**	**172**	**320**	**320**	**320**	**320**	**320**				**$3,385,900.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	Population	3042	4439	5292	6960	8900	11458	14429				
				Population Total	**3042**	**4439**	**5292**	**6960**	**8900**	**11458**	**14429**				
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	Demand	651	920	1085	1411	1785	2297	2893				
				Demand Total	**651**	**920**	**1085**	**1411**	**1785**	**2297**	**2893**				
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	Supply	651	651	651	651	651	651	651	GULF COAST AQUIFER	None		
				Supply Total	**651**	**651**	**651**	**651**	**651**	**651**	**651**				
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	WMS	0	63	75	97	123	158	200	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	WMS	0	336	336	336	336	336	336	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	WMS	0	0	1547	1547	1547	1547	1547	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$8,041,900.00
MONTGOMERY COUNTY MUD #8	84263000	MONTGOMERY	SAN JACINTO	WMS	0	114	23	62	99	134	159	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**513**	**1981**	**2042**	**2105**	**2175**	**2242**				**$8,457,900.00**
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	Population	1827	3058	3810	5279	6987	9240	11857				
				Population Total	**1827**	**3058**	**3810**	**5279**	**6987**	**9240**	**11857**				
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	Demand	522	856	1058	1455	1917	2536	3254				
				Demand Total	**522**	**856**	**1058**	**1455**	**1917**	**2536**	**3254**				
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	Supply	522	522	522	522	522	522	522	GULF COAST AQUIFER	None		
				Supply Total	**522**	**522**	**522**	**522**	**522**	**522**	**522**				
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	WMS	0	59	73	100	132	175	224	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	WMS	0	328	328	328	328	328	328	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	WMS	0	0	1790	1790	1790	1790	1790	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$9,026,500.00
MONTGOMERY COUNTY MUD #9	84264000	MONTGOMERY	SAN JACINTO	WMS	0	191	135	213	283	346	390	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,381,000.00
				WMS Total	**0**	**578**	**2326**	**2431**	**2533**	**2639**	**2732**				**$10,407,500.00**
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	Population	1986	2937	2937	2937	2937	2937	2937				
				Population Total	**1986**	**2937**	**2937**	**2937**	**2937**	**2937**	**2937**				
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	Demand	369	526	520	513	507	507	507				
				Demand Total	**369**	**526**	**520**	**513**	**507**	**507**	**507**				
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	Supply	369	369	323	259	213	173	142	GULF COAST AQUIFER	None		
				Supply Total	**369**	**369**	**323**	**259**	**213**	**173**	**142**				
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	WMS	0	29	29	28	28	28	28	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	WMS	0	168	168	168	168	168	168	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	WMS	0	0	169	169	169	169	169	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$2,647,400.00
MONTGOMERY COUNTY UD #2	84265000	MONTGOMERY	SAN JACINTO	WMS	0	68	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**265**	**366**	**365**	**365**	**365**	**365**				**$2,647,400.00**
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	Population	3160	3636	3927	4495	5156	6028	7040				
				Population Total	**3160**	**3636**	**3927**	**4495**	**5156**	**6028**	**7040**				
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	Demand	425	472	497	554	624	722	844				
				Demand Total	**425**	**472**	**497**	**554**	**624**	**722**	**844**				
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	Supply	425	393	308	280	262	247	237	GULF COAST AQUIFER	None		
				Supply Total	**425**	**393**	**308**	**280**	**262**	**247**	**237**				
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	WMS	0	28	30	33	37	43	50	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	WMS	0	159	159	159	159	159	159	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY UD #3	84266000	MONTGOMERY	SAN JACINTO	WMS	0	0	398	398	398	398	398	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,914,900.00
				WMS Total	**0**	**187**	**587**	**590**	**594**	**600**	**607**				**$3,914,900.00**
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	Population	3165	4686	4686	4686	4686	4686	4686				
				Population Total	**3165**	**4686**	**4686**	**4686**	**4686**	**4686**	**4686**				
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	Demand	645	924	913	903	892	892	892				
				Demand Total	**645**	**924**	**913**	**903**	**892**	**892**	**892**				
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	Supply	645	645	567	456	375	305	250	GULF COAST AQUIFER	None		
				Supply Total	**645**	**645**	**567**	**456**	**375**	**305**	**250**				
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	WMS	0	55	54	54	53	53	53	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	WMS	0	292	292	292	292	292	292	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	WMS	0	0	297	297	297	297	297	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$4,177,300.00
MONTGOMERY COUNTY UD #4	84267000	MONTGOMERY	SAN JACINTO	WMS	0	124	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**471**	**643**	**643**	**642**	**642**	**642**				**$4,593,300.00**
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	Population	3500	4053	4391	5051	5819	6832	8008				
				Population Total	**3500**	**4053**	**4391**	**5051**	**5819**	**6832**	**8008**				
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	Demand	435	486	512	571	645	750	879				
				Demand Total	**435**	**486**	**512**	**571**	**645**	**750**	**879**				
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	Supply	435	405	318	288	270	256	247	GULF COAST AQUIFER	None		
				Supply Total	**435**	**405**	**318**	**288**	**270**	**256**	**247**				
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	WMS	0	29	31	34	38	45	52	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	WMS	0	163	163	163	163	163	163	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
MONTGOMERY COUNTY WCID #1	84268000	MONTGOMERY	SAN JACINTO	WMS	0	0	417	417	417	417	417	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$4,152,700.00
				WMS Total	**0**	**192**	**611**	**614**	**618**	**625**	**632**				**$4,152,700.00**
NASSAU BAY	80424000	HARRIS	SAN JACINTO-BRAZOS	Population	4170	4170	4170	4170	4170	4170	4170				
				Population Total	**4170**	**4170**	**4170**	**4170**	**4170**	**4170**	**4170**				
NASSAU BAY	80424000	HARRIS	SAN JACINTO-BRAZOS	Demand	1042	1028	1014	1000	986	976	976				
				Demand Total	**1042**	**1028**	**1014**	**1000**	**986**	**976**	**976**				
NASSAU BAY	80424000	HARRIS	SAN JACINTO-BRAZOS	Supply	104	103	101	100	99	98	98	GULF COAST AQUIFER	None		
NASSAU BAY	80424000	HARRIS	SAN JACINTO-BRAZOS	Supply	2184	2184	2184	2184	2184	2184	2184	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
				Supply Total	**2288**	**2287**	**2285**	**2284**	**2283**	**2282**	**2282**				

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
NEEDVILLE	80428000	FORT BEND	BRAZOS	Population	1181	1376	1578	1825	2079	2412	2793				
NEEDVILLE	80428000	FORT BEND	BRAZOS-COLORADO	Population	1428	1664	1908	2207	2514	2917	3378				
				Population Total	**2609**	**3040**	**3486**	**4032**	**4593**	**5329**	**6171**				
NEEDVILLE	80428000	FORT BEND	BRAZOS	Demand	144	162	179	200	224	257	297				
NEEDVILLE	80428000	FORT BEND	BRAZOS-COLORADO	Demand	174	196	216	242	270	310	359				
				Demand Total	**318**	**358**	**395**	**442**	**494**	**567**	**656**				
NEEDVILLE	80428000	FORT BEND	BRAZOS	Supply	51	51	51	51	51	51	51	GULF COAST AQUIFER	None		
NEEDVILLE	80428000	FORT BEND	BRAZOS-COLORADO	Supply	174	174	174	174	174	174	174	GULF COAST AQUIFER	None		
				Supply Total	**225**	**225**	**225**	**225**	**225**	**225**	**225**				
NEEDVILLE	80428000	FORT BEND	BRAZOS	WMS	8	9	10	11	12	14	16	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NEEDVILLE	80428000	FORT BEND	BRAZOS	WMS	0	82	82	82	82	82	82	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$959,768
NEEDVILLE	80428000	FORT BEND	BRAZOS	WMS	0	99	99	99	99	99	99	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
NEEDVILLE	80428000	FORT BEND	BRAZOS	WMS	0	3	24	49	49	49	49	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
NEEDVILLE	80428000	FORT BEND	BRAZOS-COLORADO	WMS	0	22	42	68	96	136	185	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,227,800.00
				WMS Total	**8**	**215**	**257**	**309**	**338**	**380**	**431**				**$2,187,567.74**
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	Population	9363	14237	17213	23032	29797	38720	49084				
				Population Total	**9363**	**14237**	**17213**	**23032**	**29797**	**38720**	**49084**				
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	Demand	965	1371	1600	2116	2670	3470	4398				
				Demand Total	**965**	**1371**	**1600**	**2116**	**2670**	**3470**	**4398**				
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	Supply	965	965	965	965	965	965	965	GULF COAST AQUIFER	None		
				Supply Total	**965**	**965**	**965**	**965**	**965**	**965**	**965**				
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	WMS	0	95	110	146	184	239	303	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	WMS	0	497	497	497	497	497	497	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	WMS	0	0	2366	2366	2366	2366	2366	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$21,823,000.00
NEW CANEY MUD	84272000	MONTGOMERY	SAN JACINTO	WMS	0	177	28	104	156	222	267	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,362,800.00
				WMS Total	**0**	**769**	**3001**	**3113**	**3203**	**3324**	**3433**				**$23,185,800.00**
NEW WAVERLY	80926000	WALKER	SAN JACINTO	Population	950	1087	1199	1252	1239	1242	1242				
				Population Total	**950**	**1087**	**1199**	**1252**	**1239**	**1242**	**1242**				
NEW WAVERLY	80926000	WALKER	SAN JACINTO	Demand	195	218	235	243	236	235	235				
				Demand Total	**195**	**218**	**235**	**243**	**236**	**235**	**235**				
NEW WAVERLY	80926000	WALKER	SAN JACINTO	Supply	195	195	195	195	195	195	195	GULF COAST AQUIFER	None		
				Supply Total	**195**	**195**	**195**	**195**	**195**	**195**	**195**				
NEW WAVERLY	80926000	WALKER	SAN JACINTO	WMS	0	23	40	48	41	40	40	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**23**	**40**	**48**	**41**	**40**	**40**				**$0.00**
NHCRWA	88000000	HARRIS	SAN JACINTO	Population	410523	524304	634767	741167	846439	951057	1055278				
				Population Total	**410523**	**524304**	**634767**	**741167**	**846439**	**951057**	**1055278**				
NHCRWA	88000000	HARRIS	SAN JACINTO	Demand	81393	101015	120164	138646	157390	175778	195040				
				Demand Total	**81393**	**101015**	**120164**	**138646**	**157390**	**175778**	**195040**				
NHCRWA	88000000	HARRIS	SAN JACINTO	Supply	81393	66543	36049	21565	21565	21565	21565	GULF COAST AQUIFER	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY		
NHCRWA	88000000	HARRIS	SAN JACINTO	Supply	11	0	0	0	0	0	0	GULF COAST AQUIFER	CITY OF HOUSTON		
NHCRWA	88000000	HARRIS	SAN JACINTO	Supply	0	34714	34714	34714	34714	34714	34714	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON		
				Supply Total	**81404**	**101257**	**70763**	**56279**	**56279**	**56279**	**56279**				
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	8289	9564	10857	12125	13454	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	34873	34873	34873	34873	34873	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	6239	6239	6000	3000	500	LAKE HOUSTON ADDITIONAL YIELD	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Lake Houston Additional Yield	$0.00
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	10000	10000	10000	10000	10000	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$1,007,394,970.82
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	49034	49034	49034	49034	49034	LIVINGSTON-WALLISVILLE SYSTEM	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$11,424,922.00
NHCRWA	88000000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	15000	31400	NHCRWA INDIRECT REUSE	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	NHCRWA Reuse	$0.00
				WMS Total	**0**	**0**	**108435**	**109710**	**110764**	**124032**	**139261**				**$1,018,819,892.82**
NORMANGEE	80927000	LEON	TRINITY	Population	484	512	540	557	558	556	558				
NORMANGEE	80927000	LEON	BRAZOS	Population	191	202	213	220	220	219	220				
NORMANGEE	80927000	MADISON	TRINITY	Population	44	44	44	44	44	44	44				
				Population Total	**719**	**758**	**797**	**821**	**822**	**819**	**822**				
NORMANGEE	80927000	LEON	TRINITY	Demand	95	98	102	103	101	100	101				
NORMANGEE	80927000	LEON	BRAZOS	Demand	37	39	40	41	40	39	40				
NORMANGEE	80927000	MADISON	TRINITY	Demand	9	8	8	8	8	8	8				
				Demand Total	**141**	**145**	**150**	**152**	**149**	**147**	**149**				
NORMANGEE	80927000	LEON	TRINITY	Supply	95	95	95	95	95	95	95	CARRIZO-WILCOX AQUIFER	None		
NORMANGEE	80927000	LEON	BRAZOS	Supply	37	37	37	37	37	37	37	CARRIZO-WILCOX AQUIFER	None		
NORMANGEE	80927000	MADISON	TRINITY	Supply	9	8	8	8	8	8	8	CARRIZO-WILCOX AQUIFER	None		
				Supply Total	**141**	**140**	**140**	**140**	**140**	**140**	**140**				
NORMANGEE	80927000	LEON	BRAZOS	WMS	0	2	3	4	3	2	3	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
NORMANGEE	80927000	LEON	TRINITY	WMS	0	3	7	8	6	5	6	CARRIZO-WILCOX AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**5**	**10**	**12**	**9**	**7**	**9**				**$0.00**
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	Population	2600	3916	5197	6457	7705	8945	10180				
				Population Total	**2600**	**3916**	**5197**	**6457**	**7705**	**8945**	**10180**				
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	Demand	317	461	600	731	863	1002	1140				
				Demand Total	**317**	**461**	**600**	**731**	**863**	**1002**	**1140**				
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	Supply	317	303	180	114	114	114	114	GULF COAST AQUIFER	None		
				Supply Total	**317**	**303**	**180**	**114**	**114**	**114**	**114**				
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	WMS	0	32	41	50	60	69	79	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	WMS	0	0	563	563	821	821	821	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$191,293.00
NORTH BELT UD	84275000	HARRIS	SAN JACINTO	WMS	0	126	126	126	126	126	126	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$3,597,889.62
				WMS Total	**0**	**158**	**730**	**739**	**1007**	**1016**	**1026**				**$3,789,182.62**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	Population	3060	3503	3935	4359	4779	5197	5613				
				Population Total	**3060**	**3503**	**3935**	**4359**	**4779**	**5197**	**5613**				
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	Demand	319	349	379	405	434	466	503				
				Demand Total	**319**	**349**	**379**	**405**	**434**	**466**	**503**				
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	Supply	319	229	114	63	63	63	63	GULF COAST AQUIFER	None		
				Supply Total	**319**	**229**	**114**	**63**	**63**	**63**	**63**				
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	WMS	0	21	23	24	26	28	30	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	WMS	0	0	246	246	311	311	311	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$72,463.00
NORTH GREEN MUD	84279000	HARRIS	SAN JACINTO	WMS	0	99	99	99	99	99	99	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,159,174.25
				WMS Total	**0**	**120**	**368**	**369**	**436**	**438**	**440**				**$2,231,637.25**
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	Population	4340	7587	10952	15066	19296	24844	31184				
				Population Total	**4340**	**7587**	**10952**	**15066**	**19296**	**24844**	**31184**				
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	Demand	520	867	1239	1688	2140	2755	3458				
				Demand Total	**520**	**867**	**1239**	**1688**	**2140**	**2755**	**3458**				
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	Supply	504	504	504	504	504	504	504	GULF COAST AQUIFER	None		
				Supply Total	**504**	**504**	**504**	**504**	**504**	**504**	**504**				
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	WMS	16	60	85	116	148	190	239	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	WMS	0	0	0	1647	1647	1647	1647	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$2,810,395.18
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	WMS	0	920	920	920	920	920	920	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$11,514,488
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	WMS	0	98	98	98	98	98	98	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
NORTH MISSION GLEN MUD	84283000	FORT BEND	SAN JACINTO	WMS	0	205	203	50	50	50	50	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**16**	**1283**	**1306**	**2831**	**2863**	**2905**	**2954**				**$14,740,882.92**
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	Population	3231	4482	5700	6898	8084	9262	10436				
				Population Total	**3231**	**4482**	**5700**	**6898**	**8084**	**9262**	**10436**				
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	Demand	442	587	728	873	1005	1152	1298				
				Demand Total	**442**	**587**	**728**	**873**	**1005**	**1152**	**1298**				
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	Supply	442	387	218	136	136	136	136	GULF COAST AQUIFER	None		
				Supply Total	**442**	**387**	**218**	**136**	**136**	**136**	**136**				
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	WMS	0	40	50	60	69	79	90	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	WMS	0	0	640	640	912	912	912	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$212,496.00
NORTHWEST HARRIS COUNTY MUD #23	84286000	HARRIS	SAN JACINTO	WMS	0	160	160	160	160	160	160	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,208,404.34
				WMS Total	**0**	**200**	**850**	**860**	**1141**	**1151**	**1162**				**$5,420,900.34**
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	Population	9693	10999	12271	13522	14760	15990	17216				
				Population Total	**9693**	**10999**	**12271**	**13522**	**14760**	**15990**	**17216**				
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	Demand	1216	1331	1443	1545	1653	1773	1909				
				Demand Total	**1216**	**1331**	**1443**	**1545**	**1653**	**1773**	**1909**				
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	Supply	1216	877	433	240	240	240	240	GULF COAST AQUIFER	None		
				Supply Total	**1216**	**877**	**433**	**240**	**240**	**240**	**240**				
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	WMS	0	92	100	107	114	122	132	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	WMS	0	0	937	937	1175	1175	1175	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$273,775.00
NORTHWEST PARK MUD	84287000	HARRIS	SAN JACINTO	WMS	0	362	362	362	362	362	362	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,218,614.27
				WMS Total	**0**	**454**	**1399**	**1406**	**1651**	**1659**	**1669**				**$5,492,389.27**
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	Population	2991	3743	4202	5100	6144	7521	9120				
				Population Total	**2991**	**3743**	**4202**	**5100**	**6144**	**7521**	**9120**				
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	Demand	563	683	748	897	1067	1297	1573				
				Demand Total	**563**	**683**	**748**	**897**	**1067**	**1297**	**1573**				
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	Supply	563	563	464	453	448	443	440	GULF COAST AQUIFER	None		
				Supply Total	**563**	**563**	**464**	**453**	**448**	**443**	**440**				
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	WMS	0	41	45	53	64	77	94	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	WMS	0	239	239	239	239	239	239	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	WMS	0	0	800	800	800	800	800	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$5,110,700.00
OAK RIDGE NORTH	80726000	MONTGOMERY	SAN JACINTO	WMS	0	6	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**286**	**1084**	**1092**	**1103**	**1116**	**1133**				**$5,110,700.00**
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	Population	1364	1482	1613	1735	1841	1948	2058				
				Population Total	**1364**	**1482**	**1613**	**1735**	**1841**	**1948**	**2058**				
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	Demand	186	194	206	216	223	233	247				
				Demand Total	**186**	**194**	**206**	**216**	**223**	**233**	**247**				
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	Supply	35	34	34	35	35	35	35	GULF COAST AQUIFER	None		
				Supply Total	**35**	**34**	**34**	**35**	**35**	**35**	**35**				
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	WMS	10	11	11	12	12	13	14	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	WMS	0	195	195	195	195	195	195	LIVINGSTON-WALLISVILLE SYSTEM	BAYTOWN AREA WATER AUTHORITY	NEW CONTRACTS	$0.00
OLD RIVER-WINFREE	80727000	CHAMBERS	TRINITY	WMS	0	0	0	0	0	1	3	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**10**	**206**	**206**	**207**	**207**	**209**	**212**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
ONALASKA	80933000	POLK	TRINITY	Population	1174	1363	1552	1701	1817	1941	2059				
				Population Total	**1174**	**1363**	**1552**	**1701**	**1817**	**1941**	**2059**				
ONALASKA	80933000	POLK	TRINITY	Demand	146	165	183	196	206	217	231				
				Demand Total	**146**	**165**	**183**	**196**	**206**	**217**	**231**				
ONALASKA	80933000	POLK	TRINITY	Supply	146	146	146	146	146	146	146	GULF COAST AQUIFER	None		
				Supply Total	**146**	**146**	**146**	**146**	**146**	**146**	**146**				
ONALASKA	80933000	POLK	TRINITY	WMS	0	19	37	50	60	71	85	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**19**	**37**	**50**	**60**	**71**	**85**				**$0.00**
ONALASKA WSC	84293000	POLK	TRINITY	Population	3498	3764	4029	4238	4400	4573	4739				
				Population Total	**3498**	**3764**	**4029**	**4238**	**4400**	**4573**	**4739**				
ONALASKA WSC	84293000	POLK	TRINITY	Demand	239	240	244	247	242	246	255				
				Demand Total	**239**	**240**	**244**	**247**	**242**	**246**	**255**				
ONALASKA WSC	84293000	POLK	TRINITY	Supply	239	239	239	239	239	239	239	GULF COAST AQUIFER	None		
ONALASKA WSC	84293000	POLK	TRINITY	Supply	672	672	672	672	672	672	672	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**911**	**911**	**911**	**911**	**911**	**911**	**911**				
ONALASKA WSC	84293000	POLK	TRINITY	WMS	0	1	5	8	3	7	16	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**5**	**8**	**3**	**7**	**16**				**$0.00**
ORBIT SYSTEMS INC	84294000	BRAZORIA	BRAZOS-COLORADO	Population	410	516	627	733	831	935	1043				
ORBIT SYSTEMS INC	84294000	BRAZORIA	SAN JACINTO-BRAZOS	Population	3336	4201	5101	5963	6758	7600	8480				
ORBIT SYSTEMS INC	84294000	FORT BEND	SAN JACINTO-BRAZOS	Population	144	163	183	207	232	264	301				
				Population Total	**3890**	**4880**	**5911**	**6903**	**7821**	**8799**	**9824**				
ORBIT SYSTEMS INC	84294000	BRAZORIA	BRAZOS-COLORADO	Demand	40	47	55	63	71	79	88				
ORBIT SYSTEMS INC	84294000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	325	386	451	514	575	638	712				
ORBIT SYSTEMS INC	84294000	FORT BEND	SAN JACINTO-BRAZOS	Demand	14	15	16	18	20	22	25				
				Demand Total	**379**	**448**	**522**	**595**	**666**	**739**	**825**				
ORBIT SYSTEMS INC	84294000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	325	325	325	325	325	325	325	GULF COAST AQUIFER	None		
ORBIT SYSTEMS INC	84294000	BRAZORIA	BRAZOS-COLORADO	Supply	40	40	40	40	40	40	40	GULF COAST AQUIFER	None		
ORBIT SYSTEMS INC	84294000	FORT BEND	SAN JACINTO-BRAZOS	Supply	11	10	8	5	5	5	5	GULF COAST AQUIFER	None		
				Supply Total	**376**	**375**	**373**	**370**	**370**	**370**	**370**				
ORBIT SYSTEMS INC	84294000	BRAZORIA	BRAZOS-COLORADO	WMS	0	7	15	23	31	39	48	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
ORBIT SYSTEMS INC	84294000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	61	126	189	250	313	387	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,387,100.00
ORBIT SYSTEMS INC	84294000	FORT BEND	SAN JACINTO-BRAZOS	WMS	1	1	1	1	1	1	1	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ORBIT SYSTEMS INC	84294000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	19	19	19	19	19	19	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**1**	**88**	**161**	**232**	**301**	**372**	**455**				**$1,387,100.00**
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	Population	1192	1424	1666	1897	2110	2336	2572				
				Population Total	**1192**	**1424**	**1666**	**1897**	**2110**	**2336**	**2572**				
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	146	166	188	210	229	251	277				
				Demand Total	**146**	**166**	**188**	**210**	**229**	**251**	**277**				
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	106	106	106	106	106	106	106	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	15	15	15	15	15	15	15	GULF COAST AQUIFER	None		
				Supply Total	**121**	**121**	**121**	**121**	**121**	**121**	**121**				
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	8	9	10	12	13	14	15	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	110	110	110	110	110	110	110	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
OYSTER CREEK	80730000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	11	24	30	33	34	34	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**118**	**130**	**144**	**152**	**156**	**158**	**159**				**$0.00**
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	Population	1965	2538	2888	3572	3913	3913	3913				
				Population Total	**1965**	**2538**	**2888**	**3572**	**3913**	**3913**	**3913**				
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	Demand	605	768	864	1056	1153	1148	1148				
				Demand Total	**605**	**768**	**864**	**1056**	**1153**	**1148**	**1148**				
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	Supply	605	605	537	534	484	393	321	GULF COAST AQUIFER	None		
				Supply Total	**605**	**605**	**537**	**534**	**484**	**393**	**321**				
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	WMS	0	46	51	63	69	68	68	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	WMS	0	276	276	276	276	276	276	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	WMS	0	0	483	483	483	483	483	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,062,500.00
PANORAMA VILLAGE	80732000	MONTGOMERY	SAN JACINTO	WMS	0	34	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**356**	**810**	**822**	**828**	**827**	**827**				**$3,062,500.00**
PARKWAY UD	84298000	HARRIS	SAN JACINTO	Population	2889	2911	2932	2953	2974	2994	3014				
				Population Total	**2889**	**2911**	**2932**	**2953**	**2974**	**2994**	**3014**				
PARKWAY UD	84298000	HARRIS	SAN JACINTO	Demand	311	303	296	288	280	275	277				
				Demand Total	**311**	**303**	**296**	**288**	**280**	**275**	**277**				
PARKWAY UD	84298000	HARRIS	SAN JACINTO	Supply	31	28	30	22	22	22	22	GULF COAST AQUIFER	None		
				Supply Total	**31**	**28**	**30**	**22**	**22**	**22**	**22**				
PARKWAY UD	84298000	HARRIS	SAN JACINTO	WMS	17	17	16	16	16	15	15	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PARKWAY UD	84298000	HARRIS	SAN JACINTO	WMS	0	258	258	258	258	258	258	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
				WMS Total	**17**	**275**	**274**	**274**	**274**	**273**	**273**				**$0.00**
PASADENA	80456000	HARRIS	SAN JACINTO	Population	110695	126325	141544	156513	171330	186055	200724				
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	Population	30979	35353	39612	43801	47948	52069	56174				
				Population Total	**141674**	**161678**	**181156**	**200314**	**219278**	**238124**	**256898**				
PASADENA	80456000	HARRIS	SAN JACINTO	Demand	14507	15990	17440	18759	20151	21674	23383				
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	Demand	4060	4475	4881	5250	5639	6066	6544				
				Demand Total	**18567**	**20465**	**22321**	**24009**	**25790**	**27740**	**29927**				
PASADENA	80456000	HARRIS	SAN JACINTO	Supply	17275	17275	17275	17275	17275	17275	17275	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
PASADENA	80456000	HARRIS	SAN JACINTO	Supply	7483	7483	7482	7483	7483	7483	7483	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	Supply	1857	1857	1857	1857	1857	1857	1857	GULF COAST AQUIFER	CITY OF PASADENA		
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	Supply	3100	3100	3101	3100	3100	3100	3100	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	Supply	1136	1136	1137	1136	1136	1136	1136	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
				Supply Total	**30851**	**30851**	**30852**	**30851**	**30851**	**30851**	**30851**				
PASADENA	80456000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	190	375	544	722	918	1136	GULF COAST AQUIFER	CITY OF PASADENA	EXPANDED USE OF GW	$1,843,600.00
				WMS Total	**0**	**190**	**375**	**544**	**722**	**918**	**1136**				**$1,843,600.00**

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
PATTON VILLAGE	80734000	MONTGOMERY	SAN JACINTO	Population	1391	1721	1923	2318	2777	3382	4085				
				Population Total	**1391**	**1721**	**1923**	**2318**	**2777**	**3382**	**4085**				
PATTON VILLAGE	80734000	MONTGOMERY	SAN JACINTO	Demand	76	87	88	101	115	136	165				
				Demand Total	**76**	**87**	**88**	**101**	**115**	**136**	**165**				
PATTON VILLAGE	80734000	MONTGOMERY	SAN JACINTO	Supply	76	76	76	76	76	76	76	GULF COAST AQUIFER	None		
				Supply Total	**76**	**76**	**76**	**76**	**76**	**76**	**76**				
PATTON VILLAGE	80734000	MONTGOMERY	SAN JACINTO	WMS	0	1	1	1	1	1	1	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PATTON VILLAGE	80734000	MONTGOMERY	SAN JACINTO	WMS	0	10	11	24	38	59	88	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**11**	**12**	**25**	**39**	**60**	**89**				**$0.00**
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	Population	35696	63685	80689	96167	110461	125585	141358				
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	Population	1944	2364	2773	3175	3573	3968	4362				
				Population Total	**37640**	**66049**	**83462**	**99342**	**114034**	**129553**	**145720**				
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	5358	9202	11479	13465	15343	17443	19634				
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	Demand	292	342	394	445	496	551	606				
				Demand Total	**5650**	**9544**	**11873**	**13910**	**15839**	**17994**	**20240**				
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	9440	9597	9624	9636	9642	9649	9656	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	531	540	541	542	542	543	543	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	Supply	514	357	330	318	312	305	298	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	Supply	29	20	19	18	18	17	17	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**10514**	**10514**	**10514**	**10514**	**10514**	**10514**	**10514**				
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	685	929	1058	1203	1354	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	311	311	311	311	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	1184	1184	1184	1184	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	0	4000	4000	4000	4000	ALLENS CREEK RESERVOIR	GULF COAST WATER AUTHORITY	Allens Creek Reservoir	$6,825,489.21
PEARLAND	80457000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	0	629	1430	2011	2437	2710	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	23	31	34	38	42	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	0	46	46	46	46	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	21	21	120	120	120	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$27,960.00
PEARLAND	80457000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	22	47	65	77	83	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$3,066,600.00
				WMS Total	**0**	**0**	**1380**	**7999**	**8829**	**9416**	**9850**				**$9,920,049.21**
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	Population	9985	10220	10464	10762	11068	11470	11929				
PECAN GROVE MUD #1	84299000	FORT BEND	SAN JACINTO-BRAZOS	Population	2654	2716	2781	2860	2941	3048	3170				
				Population Total	**12639**	**12936**	**13245**	**13622**	**14009**	**14518**	**15099**				
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	Demand	2293	2301	2321	2339	2368	2441	2539				
PECAN GROVE MUD #1	84299000	FORT BEND	SAN JACINTO-BRAZOS	Demand	609	612	617	622	629	649	675				
				Demand Total	**2902**	**2913**	**2938**	**2961**	**2997**	**3090**	**3214**				
PECAN GROVE MUD #1	84299000	FORT BEND	SAN JACINTO-BRAZOS	Supply	468	414	314	187	187	187	187	GULF COAST AQUIFER	None		
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	Supply	815	773	679	468	468	468	468	GULF COAST AQUIFER	None		
				Supply Total	**1283**	**1187**	**993**	**655**	**655**	**655**	**655**				
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	WMS	158	159	160	161	163	168	175	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	WMS	0	1396	1396	1396	1396	1396	1396	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$9,953,225
PECAN GROVE MUD #1	84299000	FORT BEND	BRAZOS	WMS	0	500	500	500	500	500	500	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
PECAN GROVE MUD #1	84299000	FORT BEND	SAN JACINTO-BRAZOS	WMS	42	42	43	43	43	45	47	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PECAN GROVE MUD #1	84299000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	441	441	441	441	441	441	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**200**	**2538**	**2540**	**2541**	**2543**	**2550**	**2559**				**$9,953,225.31**
PINE ISLAND	80938000	WALLER	BRAZOS	Population	849	1102	1402	1736	2107	2549	3057				
				Population Total	**849**	**1102**	**1402**	**1736**	**2107**	**2549**	**3057**				
PINE ISLAND	80938000	WALLER	BRAZOS	Demand	95	117	146	177	210	254	305				
				Demand Total	**95**	**117**	**146**	**177**	**210**	**254**	**305**				
PINE ISLAND	80938000	WALLER	BRAZOS	Supply	95	95	95	95	95	95	95	GULF COAST AQUIFER	None		
				Supply Total	**95**	**95**	**95**	**95**	**95**	**95**	**95**				
PINE ISLAND	80938000	WALLER	BRAZOS	WMS	0	0	0	0	0	6	17	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PINE ISLAND	80938000	WALLER	BRAZOS	WMS	0	0	0	0	0	0	14	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
PINE ISLAND	80938000	WALLER	BRAZOS	WMS	0	22	51	82	115	153	179	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,219,700.00
PINE ISLAND	80938000	WALLER	BRAZOS	WMS	0						14	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**22**	**51**	**82**	**115**	**159**	**224**				**$1,219,700.00**
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	Population	5553	6166	6763	7350	7931	8508	9083				
				Population Total	**5553**	**6166**	**6763**	**7350**	**7931**	**8508**	**9083**				
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	Demand	871	939	1008	1070	1137	1210	1292				
				Demand Total	**871**	**939**	**1008**	**1070**	**1137**	**1210**	**1292**				
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	Supply	174	174	174	166	166	166	166	GULF COAST AQUIFER	None		
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	Supply	480	480	480	480	480	480	480	GULF COAST AQUIFER	NORTH CHANNEL WATER AUTHORITY		
				Supply Total	**654**	**654**	**654**	**646**	**646**	**646**	**646**				
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	WMS	52	56	60	64	68	72	77	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	WMS	158	158	158	158	158	158	158	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	WMS	0	0	197	197	343	343	343	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$79,919.00
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	WMS	0	68	68	68	68	68	68	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$3,358,700.65
PINE TRAILS UTILITY	84302000	HARRIS	SAN JACINTO	WMS	0	3	28					GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**210**	**285**	**511**	**487**	**637**	**641**	**646**				**$3,438,619.65**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	Population	3380	3546	3708	3867	4024	4180	4336				
				Population Total	**3380**	**3546**	**3708**	**3867**	**4024**	**4180**	**4336**				
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	Demand	1230	1275	1317	1360	1402	1451	1506				
				Demand Total	**1230**	**1275**	**1317**	**1360**	**1402**	**1451**	**1506**				
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	Supply	246	240	246	212	212	212	212	GULF COAST AQUIFER	None		
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	Supply	248	247	245	244	244	243	242	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**494**	**487**	**491**	**456**	**456**	**455**	**454**				
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	WMS	73	76	79	81	84	86	90	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	WMS	268	268	268	268	268	268	268	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	WMS	0	0	150	150	250	250	250	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$58,250.00
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	WMS	0	444	444	444	444	444	444	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,983,194.09
PINEY POINT VILLAGE	80468000	HARRIS	SAN JACINTO	WMS	0	0	17	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**341**	**788**	**958**	**943**	**1046**	**1048**	**1052**				**$3,041,444.09**
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	Population	3972	4130	4130	4130	4130	4130	4130				
				Population Total	**3972**	**4130**	**4130**	**4130**	**4130**	**4130**	**4130**				
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	Demand	543	546	527	518	509	504	504				
				Demand Total	**543**	**546**	**527**	**518**	**509**	**504**	**504**				
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	Supply	417	369	269	156	156	156	156	GULF COAST AQUIFER	None		
				Supply Total	**417**	**369**	**269**	**156**	**156**	**156**	**156**				
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	WMS	32	33	31	31	30	30	30	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	187	187	187	187	187	187	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$2,904,610
PLANTATION MUD	84303000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	144	144	144	144	144	144	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
				WMS Total	**32**	**364**	**362**	**362**	**361**	**361**	**361**				**$2,904,609.86**
PLEAK	81053000	FORT BEND	BRAZOS	Population	947	1158	1377	1645	1920	2281	2694				
				Population Total	**947**	**1158**	**1377**	**1645**	**1920**	**2281**	**2694**				
PLEAK	81053000	FORT BEND	BRAZOS	Demand	419	506	597	709	824	976	1153				
				Demand Total	**419**	**506**	**597**	**709**	**824**	**976**	**1153**				
PLEAK	81053000	FORT BEND	BRAZOS	Supply	419	419	419	419	419	419	419	GULF COAST AQUIFER	None		
				Supply Total	**419**	**419**	**419**	**419**	**419**	**419**	**419**				
PLEAK	81053000	FORT BEND	BRAZOS	WMS	0	87	178	290	405	557	734	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,549,500.00
				WMS Total	**0**	**87**	**178**	**290**	**405**	**557**	**734**				**$1,549,500.00**
PLUM GROVE	81054000	LIBERTY	SAN JACINTO	Population	930	1234	1569	1890	2205	2550	2937				
				Population Total	**930**	**1234**	**1569**	**1890**	**2205**	**2550**	**2937**				
PLUM GROVE	81054000	LIBERTY	SAN JACINTO	Demand	110	141	176	207	240	277	319				
				Demand Total	**110**	**141**	**176**	**207**	**240**	**277**	**319**				
PLUM GROVE	81054000	LIBERTY	SAN JACINTO	Supply	110	110	110	110	110	110	110	GULF COAST AQUIFER	None		
				Supply Total	**110**	**110**	**110**	**110**	**110**	**110**	**110**				
PLUM GROVE	81054000	LIBERTY	SAN JACINTO	WMS	0	31	66	97	130	167	209	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,224,200.00
				WMS Total	**0**	**31**	**66**	**97**	**130**	**167**	**209**				**$1,224,200.00**
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	Population	1587	3246	4259	6240	8543	11581	15109				
				Population Total	**1587**	**3246**	**4259**	**6240**	**8543**	**11581**	**15109**				
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	Demand	334	669	873	1272	1732	2348	3063				
				Demand Total	**334**	**669**	**873**	**1272**	**1732**	**2348**	**3063**				
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	Supply	334	334	334	334	334	334	334	GULF COAST AQUIFER	None		
				Supply Total	**334**	**334**	**334**	**334**	**334**	**334**	**334**				
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	WMS	0	46	60	88	119	162	211	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	WMS	0	271	271	271	271	271	271	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	WMS	0	0	1723	1723	1723	1723	1723	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$7,824,100.00
POINT AQUARIUS MUD	84305000	MONTGOMERY	SAN JACINTO	WMS	0	223	208	308	394	469	524	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,401,200.00
				WMS Total	**0**	**540**	**2262**	**2390**	**2507**	**2625**	**2729**				**$9,225,300.00**
POINT BLANK	81056000	SAN JACINTO	TRINITY	Population	559	662	763	843	893	922	935				
				Population Total	**559**	**662**	**763**	**843**	**893**	**922**	**935**				
POINT BLANK	81056000	SAN JACINTO	TRINITY	Demand	75	85	96	104	108	111	112				
				Demand Total	**75**	**85**	**96**	**104**	**108**	**111**	**112**				
POINT BLANK	81056000	SAN JACINTO	TRINITY	Supply	75	75	75	75	75	75	75	GULF COAST AQUIFER	None		
				Supply Total	**75**	**75**	**75**	**75**	**75**	**75**	**75**				
POINT BLANK	81056000	SAN JACINTO	TRINITY	WMS	0	10	21	29	33	36	37	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**10**	**21**	**29**	**33**	**36**	**37**				**$0.00**
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	Population	10348	14336	16771	21532	27067	27067	27067				
				Population Total	**10348**	**14336**	**16771**	**21532**	**27067**	**27067**	**27067**				
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	Demand	1391	1847	2104	2653	3305	3274	3274				
				Demand Total	**1391**	**1847**	**2104**	**2653**	**3305**	**3274**	**3274**				
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	Supply	1391	1391	1306	1340	1388	1119	917	GULF COAST AQUIFER	None		
				Supply Total	**1391**	**1391**	**1306**	**1340**	**1388**	**1119**	**917**				
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	WMS	0	127	145	183	228	226	226	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	WMS	0	653	653	653	653	653	653	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	WMS	0	0	1478	1478	1478	1478	1478	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$12,702,300.00
PORTER WSC	84307000	MONTGOMERY	SAN JACINTO	WMS	0	147	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**927**	**2276**	**2314**	**2359**	**2357**	**2357**				**$13,118,300.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
PRAIRIE VIEW	80485000	WALLER	BRAZOS	Population	3973	4306	4700	5139	5628	6210	6878				
PRAIRIE VIEW	80485000	WALLER	SAN JACINTO	Population	437	474	517	565	619	683	756				
				Population Total	**4410**	**4780**	**5217**	**5704**	**6247**	**6893**	**7634**				
PRAIRIE VIEW	80485000	WALLER	BRAZOS	Demand	1055	1129	1211	1307	1418	1558	1726				
PRAIRIE VIEW	80485000	WALLER	SAN JACINTO	Demand	116	124	133	144	156	171	190				
				Demand Total	**1171**	**1253**	**1344**	**1451**	**1574**	**1729**	**1916**				
PRAIRIE VIEW	80485000	WALLER	SAN JACINTO	Supply	116	116	116	116	116	116	116	GULF COAST AQUIFER	None		
PRAIRIE VIEW	80485000	WALLER	BRAZOS	Supply	1055	1055	1055	1055	1055	1055	1055	GULF COAST AQUIFER	None		
				Supply Total	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**	**1171**				
PRAIRIE VIEW	80485000	WALLER	BRAZOS	WMS	0	0	0	0	0	36	103	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PRAIRIE VIEW	80485000	WALLER	BRAZOS	WMS	0	0	0	0	0	0	70	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
PRAIRIE VIEW	80485000	WALLER	BRAZOS	WMS	0	74	156	252	363	467	498	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,524,600.00
PRAIRIE VIEW	80485000	WALLER	BRAZOS	WMS	0						70	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
PRAIRIE VIEW	80485000	WALLER	SAN JACINTO	WMS	0	0	0	0	0	0	5	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
PRAIRIE VIEW	80485000	WALLER	SAN JACINTO	WMS	0	8	17	28	40	55	69	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**82**	**173**	**280**	**403**	**558**	**815**				**$1,524,600.00**
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	Population	7625	16556	16556	16556	16556	16556	16556				
				Population Total	**7625**	**16556**	**16556**	**16556**	**16556**	**16556**	**16556**				
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	Demand	999	2096	2077	2059	2059	2059	2059				
				Demand Total	**999**	**2096**	**2077**	**2059**	**2059**	**2059**	**2059**				
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	Supply	999	999	999	999	865	704	577	GULF COAST AQUIFER	None		
				Supply Total	**999**	**999**	**999**	**999**	**865**	**704**	**577**				
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	WMS	0	145	143	142	142	142	142	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	WMS	0	645	645	645	645	645	645	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	WMS	0	0	695	695	695	695	695	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$6,458,400.00
RAYFORD ROAD MUD	84312000	MONTGOMERY	SAN JACINTO	WMS	0	747	290	41	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$663,000.00
				WMS Total	**0**	**1537**	**1773**	**1523**	**1482**	**1482**	**1482**				**$7,121,400.00**
RICHMOND	80500000	FORT BEND	BRAZOS	Population	11081	12173	13305	14689	16112	17978	20110				
				Population Total	**11081**	**12173**	**13305**	**14689**	**16112**	**17978**	**20110**				
RICHMOND	80500000	FORT BEND	BRAZOS	Demand	1899	2032	2176	2353	2527	2799	3131				
				Demand Total	**1899**	**2032**	**2176**	**2353**	**2527**	**2799**	**3131**				
RICHMOND	80500000	FORT BEND	BRAZOS	Supply	675	675	636	471	471	471	471	GULF COAST AQUIFER	None		
				Supply Total	**675**	**675**	**636**	**471**	**471**	**471**	**471**				
RICHMOND	80500000	FORT BEND	BRAZOS	WMS	131	140	150	162	174	193	216	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
RICHMOND	80500000	FORT BEND	BRAZOS	WMS	0	0	0	724	724	724	724	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$1,235,413.55
RICHMOND	80500000	FORT BEND	BRAZOS	WMS	0	720	720	720	720	720	720	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$8,714,320
RICHMOND	80500000	FORT BEND	BRAZOS	WMS	0	1000	1000	1000	1000	1000	1000	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
RICHMOND	80500000	FORT BEND	BRAZOS	WMS	0	8	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**131**	**1868**	**1870**	**2606**	**2618**	**2637**	**2660**				**$9,949,733.54**
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	Population	3012	3244	3486	3717	3930	4156	4392				
				Population Total	**3012**	**3244**	**3486**	**3717**	**3930**	**4156**	**4392**				
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	304	313	324	333	339	354	374				
				Demand Total	**304**	**313**	**324**	**333**	**339**	**354**	**374**				
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	263	263	263	263	263	263	263	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY		
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	15	15	15	15	15	15	15	GULF COAST AQUIFER	None		
				Supply Total	**278**	**278**	**278**	**278**	**278**	**278**	**278**				
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	18	19	19	20	20	21	22	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	60	60	60	60	60	60	60	BRAZOS RIVER RUN-OF-RIVER	BRAZOSPORT WATER AUTHORITY	INCREASE EXIST CONTRACT	$0.00
RICHWOOD	80501000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	7	14	15	15	16	17	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**78**	**86**	**93**	**95**	**95**	**97**	**99**				**$0.00**
RIVER PLANTATION MUD	84322000	MONTGOMERY	SAN JACINTO	Population	3160	3286	3286	3286	3286	3286	3286				
				Population Total	**3160**	**3286**	**3286**	**3286**	**3286**	**3286**	**3286**				
RIVER PLANTATION MUD	84322000	MONTGOMERY	SAN JACINTO	Demand	811	828	817	806	795	791	791				
				Demand Total	**811**	**828**	**817**	**806**	**795**	**791**	**791**				
RIVER PLANTATION MUD	84322000	MONTGOMERY	SAN JACINTO	Supply	811	689	507	408	334	270	222	GULF COAST AQUIFER	None		
				Supply Total	**811**	**689**	**507**	**408**	**334**	**270**	**222**				
RIVER PLANTATION MUD	84322000	MONTGOMERY	SAN JACINTO	WMS	0	46	45	45	44	44	44	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
RIVER PLANTATION MUD	84322000	MONTGOMERY	SAN JACINTO	WMS	0	525	525	525	525	525	525	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,830,500.00
				WMS Total	**0**	**571**	**570**	**570**	**569**	**569**	**569**				**$3,830,500.00**
RIVERSIDE WSC	84323000	SAN JACINTO	TRINITY	Population	1219	1887	2542	3066	3393	3582	3668				
RIVERSIDE WSC	84323000	WALKER	TRINITY	Population	3656	4184	4612	4819	4768	4780	4780				
				Population Total	**4875**	**6071**	**7154**	**7885**	**8161**	**8362**	**8448**				
RIVERSIDE WSC	84323000	SAN JACINTO	TRINITY	Demand	94	140	179	213	232	241	247				
RIVERSIDE WSC	84323000	WALKER	TRINITY	Demand	283	309	325	335	326	321	321				
				Demand Total	**377**	**449**	**504**	**548**	**558**	**562**	**568**				
RIVERSIDE WSC	84323000	SAN JACINTO	TRINITY	Supply	0	0	0	0	0	0	0	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
RIVERSIDE WSC	84323000	SAN JACINTO	TRINITY	Supply	94	94	94	94	94	94	94	GULF COAST AQUIFER	None		
RIVERSIDE WSC	84323000	WALKER	TRINITY	Supply	263	263	263	263	263	263	263	GULF COAST AQUIFER	None		
RIVERSIDE WSC	84323000	WALKER	TRINITY	Supply	20	20	20	20	20	20	20	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**377**	**377**	**377**	**377**	**377**	**377**	**377**				
RIVERSIDE WSC	84323000	SAN JACINTO	TRINITY	WMS	0	46	85	119	138	147	153	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
RIVERSIDE WSC	84323000	WALKER	TRINITY	WMS	0	26	42	52	43	38	38	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**72**	**127**	**171**	**181**	**185**	**191**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	Population	2334	2453	2571	2689	2808	2926	3044				
				Population Total	**2334**	**2453**	**2571**	**2689**	**2808**	**2926**	**3044**				
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	Demand	682	706	729	753	777	806	839				
				Demand Total	**682**	**706**	**729**	**753**	**777**	**806**	**839**				
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	Supply	682	465	219	118	118	118	118	GULF COAST AQUIFER	None		
				Supply Total	**682**	**465**	**219**	**118**	**118**	**118**	**118**				
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	WMS	0	39	40	42	43	45	47	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	WMS	0	0	414	414	472	472	472	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$109,976.00
ROLLING FORK PUD	84411000	HARRIS	SAN JACINTO	WMS	0	202	202	202	202	202	202	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,874,382.89
				WMS Total	**0**	**241**	**656**	**658**	**717**	**719**	**721**				**$2,984,358.89**
ROMAN FOREST	80801000	MONTGOMERY	SAN JACINTO	Population	1279	1623	1833	2244	2722	3353	4085				
				Population Total	**1279**	**1623**	**1833**	**2244**	**2722**	**3353**	**4085**				
ROMAN FOREST	80801000	MONTGOMERY	SAN JACINTO	Demand	168	202	222	266	317	387	471				
				Demand Total	**168**	**202**	**222**	**266**	**317**	**387**	**471**				
ROMAN FOREST	80801000	MONTGOMERY	SAN JACINTO	Supply	168	168	168	168	168	168	168	GULF COAST AQUIFER	None		
				Supply Total	**168**	**168**	**168**	**168**	**168**	**168**	**168**				
ROMAN FOREST	80801000	MONTGOMERY	SAN JACINTO	WMS	0	1	1	2	2	2	3	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ROMAN FOREST	80801000	MONTGOMERY	SAN JACINTO	WMS	0	33	53	96	147	217	300	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,367,700.00
				WMS Total	**0**	**34**	**54**	**98**	**149**	**219**	**303**				**$1,367,700.00**
ROSENBERG	80518000	FORT BEND	BRAZOS	Population	24043	28100	32305	37446	42732	49665	57587				
				Population Total	**24043**	**28100**	**32305**	**37446**	**42732**	**49665**	**57587**				
ROSENBERG	80518000	FORT BEND	BRAZOS	Demand	3420	3872	4306	4866	5457	6286	7289				
				Demand Total	**3420**	**3872**	**4306**	**4866**	**5457**	**6286**	**7289**				
ROSENBERG	80518000	FORT BEND	BRAZOS	Supply	1215	1215	1215	974	974	974	974	GULF COAST AQUIFER	None		
				Supply Total	**1215**	**1215**	**1215**	**974**	**974**	**974**	**974**				
ROSENBERG	80518000	FORT BEND	BRAZOS	WMS	236	267	297	336	376	434	503	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
ROSENBERG	80518000	FORT BEND	BRAZOS	WMS	0	0	0	2256	2256	2256	2256	ALLENS CREEK RESERVOIR	BRA, COH	Allens Creek Reservoir	$3,849,575.92
ROSENBERG	80518000	FORT BEND	BRAZOS	WMS	0	1556	1556	1556	1556	1556	1556	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$19,563,566
ROSENBERG	80518000	FORT BEND	BRAZOS	WMS	0	2000	2000	2000	2000	2000	2000	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
ROSENBERG	80518000	FORT BEND	BRAZOS	WMS	0	87	45	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**236**	**3910**	**3898**	**6148**	**6188**	**6246**	**6315**				**$23,413,142.09**
SAN FELIPE	80954000	AUSTIN	BRAZOS	Population	868	1106	1332	1490	1584	1629	1691				
				Population Total	**868**	**1106**	**1332**	**1490**	**1584**	**1629**	**1691**				
SAN FELIPE	80954000	AUSTIN	BRAZOS	Demand	102	124	145	159	167	170	176				
				Demand Total	**102**	**124**	**145**	**159**	**167**	**170**	**176**				
SAN FELIPE	80954000	AUSTIN	BRAZOS	Supply	102	102	102	102	102	102	102	GULF COAST AQUIFER	None		
				Supply Total	**102**	**102**	**102**	**102**	**102**	**102**	**102**				
SAN FELIPE	80954000	AUSTIN	BRAZOS	WMS	0	22	43	57	65	68	74	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**22**	**43**	**57**	**65**	**68**	**74**				**$0.00**
SAN JACINTO WSC	84328000	SAN JACINTO	TRINITY	Population	2922	3697	4457	5065	5444	5663	5763				
				Population Total	**2922**	**3697**	**4457**	**5065**	**5444**	**5663**	**5763**				
SAN JACINTO WSC	84328000	SAN JACINTO	TRINITY	Demand	337	406	474	528	561	577	587				
				Demand Total	**337**	**406**	**474**	**528**	**561**	**577**	**587**				
SAN JACINTO WSC	84328000	SAN JACINTO	TRINITY	Supply	280	280	280	280	280	280	280	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
SAN JACINTO WSC	84328000	SAN JACINTO	TRINITY	Supply	337	337	337	337	337	337	337	GULF COAST AQUIFER	None		
				Supply Total	**617**	**617**	**617**	**617**	**617**	**617**	**617**				
SAN JACINTO WSC	84328000	SAN JACINTO	TRINITY	WMS	0	69	137	191	224	240	250	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,230,300.00
				WMS Total	**0**	**69**	**137**	**191**	**224**	**240**	**250**				**$1,230,300.00**
SAN LEON MUD	84329000	GALVESTON	SAN JACINTO-BRAZOS	Population	6000	6795	7481	7887	8051	8173	8253				
				Population Total	**6000**	**6795**	**7481**	**7887**	**8051**	**8173**	**8253**				
SAN LEON MUD	84329000	GALVESTON	SAN JACINTO-BRAZOS	Demand	585	632	670	680	676	677	684				
				Demand Total	**585**	**632**	**670**	**680**	**676**	**677**	**684**				
SAN LEON MUD	84329000	GALVESTON	SAN JACINTO-BRAZOS	Supply	1777	1777	1777	1777	1777	1777	1777	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**1777**	**1777**	**1777**	**1777**	**1777**	**1777**	**1777**				
SANTA FE	80743000	GALVESTON	SAN JACINTO-BRAZOS	Population	9548	10141	10653	10956	11079	11170	11229				
				Population Total	**9548**	**10141**	**10653**	**10956**	**11079**	**11170**	**11229**				
SANTA FE	80743000	GALVESTON	SAN JACINTO-BRAZOS	Demand	963	988	990	982	956	951	956				
				Demand Total	**963**	**988**	**990**	**982**	**956**	**951**	**956**				
SANTA FE	80743000	GALVESTON	SAN JACINTO-BRAZOS	Supply	96	96	96	96	96	95	96	GULF COAST AQUIFER	None		
SANTA FE	80743000	GALVESTON	SAN JACINTO-BRAZOS	Supply	996	996	996	996	996	996	996	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**1092**	**1092**	**1092**	**1092**	**1092**	**1091**	**1092**				
SANTA FE	80743000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	3	3	2	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**3**	**3**	**2**	**0**	**0**	**0**				**$0.00**
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	Population	9443	11943	14377	16771	19141	21496	23842				
				Population Total	**9443**	**11943**	**14377**	**16771**	**19141**	**21496**	**23842**				
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	Demand	1967	2421	2867	3288	3731	4166	4620				
				Demand Total	**1967**	**2421**	**2867**	**3288**	**3731**	**4166**	**4620**				
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	Supply	197	197	197	197	197	197	197	GULF COAST AQUIFER	None		
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	Supply	876	917	947	969	987	1001	1012	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA		
				Supply Total	**1073**	**1114**	**1144**	**1166**	**1184**	**1198**	**1209**				
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	WMS	136	167	198	227	257	287	319	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	WMS	2830	2830	2830	2830	2830	2830	2830	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF PASADENA	INCREASE EXIST CONTRACT	$0.00
SEABROOK	80545000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	45	90	132	176	220	265	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,362,300.00
				WMS Total	**2966**	**3042**	**3118**	**3189**	**3263**	**3337**	**3414**				**$1,362,300.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
SEALY	80549000	AUSTIN	BRAZOS	Population	5248	5922	6562	7008	7273	7400	7574				
				Population Total	**5248**	**5922**	**6562**	**7008**	**7273**	**7400**	**7574**				
SEALY	80549000	AUSTIN	BRAZOS	Demand	876	955	1029	1083	1100	1111	1137				
				Demand Total	**876**	**955**	**1029**	**1083**	**1100**	**1111**	**1137**				
SEALY	80549000	AUSTIN	BRAZOS	Supply	876	876	876	876	876	876	876	GULF COAST AQUIFER	None		
				Supply Total	**876**	**876**	**876**	**876**	**876**	**876**	**876**				
SEALY	80549000	AUSTIN	BRAZOS	WMS	0	79	153	207	224	235	261	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,361,800.00
				WMS Total	**0**	**79**	**153**	**207**	**224**	**235**	**261**				**$1,361,800.00**
SHENANDOAH	80745000	MONTGOMERY	SAN JACINTO	Population	1503	1503	1503	1503	1503	1503	1503				
				Population Total	**1503**	**1503**	**1503**	**1503**	**1503**	**1503**	**1503**				
SHENANDOAH	80745000	MONTGOMERY	SAN JACINTO	Demand	517	512	507	502	497	493	493				
				Demand Total	**517**	**512**	**507**	**502**	**497**	**493**	**493**				
SHENANDOAH	80745000	MONTGOMERY	SAN JACINTO	Supply	517	426	315	253	209	169	138	GULF COAST AQUIFER	None		
				Supply Total	**517**	**426**	**315**	**253**	**209**	**169**	**138**				
SHENANDOAH	80745000	MONTGOMERY	SAN JACINTO	WMS	0	28	28	28	28	27	27	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SHENANDOAH	80745000	MONTGOMERY	SAN JACINTO	WMS	0	328	328	328	328	328	328	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,473,000.00
				WMS Total	**0**	**356**	**356**	**356**	**356**	**355**	**355**				**$3,473,000.00**
SHEPHERD	80746000	SAN JACINTO	TRINITY	Population	2029	2221	2409	2560	2654	2708	2733				
				Population Total	**2029**	**2221**	**2409**	**2560**	**2654**	**2708**	**2733**				
SHEPHERD	80746000	SAN JACINTO	TRINITY	Demand	243	256	270	278	279	282	285				
				Demand Total	**243**	**256**	**270**	**278**	**279**	**282**	**285**				
SHEPHERD	80746000	SAN JACINTO	TRINITY	Supply	243	243	243	243	243	243	243	GULF COAST AQUIFER	None		
				Supply Total	**243**	**243**	**243**	**243**	**243**	**243**	**243**				
SHEPHERD	80746000	SAN JACINTO	TRINITY	WMS	0	13	27	35	36	39	42	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**13**	**27**	**35**	**36**	**39**	**42**				**$0.00**
SHOREACRES	80558000	HARRIS	SAN JACINTO-BRAZOS	Population	1488	1644	1796	1945	2093	2093	2093				
				Population Total	**1488**	**1644**	**1796**	**1945**	**2093**	**2093**	**2093**				
SHOREACRES	80558000	HARRIS	SAN JACINTO-BRAZOS	Demand	192	204	217	229	239	237	237				
				Demand Total	**192**	**204**	**217**	**229**	**239**	**237**	**237**				
SHOREACRES	80558000	HARRIS	SAN JACINTO-BRAZOS	Supply	19	19	19	19	19	19	19	GULF COAST AQUIFER	None		
SHOREACRES	80558000	HARRIS	SAN JACINTO-BRAZOS	Supply	364	364	364	364	364	364	364	LIVINGSTON-WALLISVILLE SYSTEM	LA PORTE AREA WATER AUTHORITY		
				Supply Total	**383**	**383**	**383**	**383**	**383**	**383**	**383**				
SHOREACRES	80558000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	1	3	4	5	5	5	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1**	**3**	**4**	**5**	**5**	**5**				**$0.00**
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	Population	2763	5667	7000	7000	7000	7000	7000				
				Population Total	**2763**	**5667**	**7000**	**7000**	**7000**	**7000**	**7000**				
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	Demand	529	1060	1294	1294	1286	1286	1286				
				Demand Total	**529**	**1060**	**1294**	**1294**	**1286**	**1286**	**1286**				
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	Supply	407	407	407	389	389	389	389	GULF COAST AQUIFER	None		
				Supply Total	**407**	**407**	**407**	**389**	**389**	**389**	**389**				
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	WMS	32	63	77	77	77	77	77	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	548	548	548	548	548	548	BRA SYSTEM OPERATIONS	BRAZOS RIVER AUTHORITY	BRA System Operations	$4,637,501
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	280	280	280	280	280	280	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
SIENNA PLANTATION MUD #2	84334000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	310	253	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$546,000.00
				WMS Total	**32**	**1201**	**1158**	**905**	**905**	**905**	**905**				**$5,183,501.27**
SIMONTON	81062000	FORT BEND	BRAZOS	Population	718	719	720	721	722	724	726				
				Population Total	**718**	**719**	**720**	**721**	**722**	**724**	**726**				
SIMONTON	81062000	FORT BEND	BRAZOS	Demand	318	316	314	312	310	309	310				
				Demand Total	**318**	**316**	**314**	**312**	**310**	**309**	**310**				
SIMONTON	81062000	FORT BEND	BRAZOS	Supply	113	106	113	113	113	113	113	GULF COAST AQUIFER	None		
				Supply Total	**113**	**106**	**113**	**113**	**113**	**113**	**113**				
SIMONTON	81062000	FORT BEND	BRAZOS	WMS	18	18	17	17	17	17	17	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SIMONTON	81062000	FORT BEND	BRAZOS	WMS	0	192	192	192	192	192	192	BRAZOS RIVER AUTHORITY SYSTEM	BRAZOS RIVER AUTHORITY	New Contracts	$0.00
SIMONTON	81062000	FORT BEND	BRAZOS	WMS	0	0	18	43	43	43	43	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**18**	**210**	**227**	**252**	**252**	**252**	**252**				**$0.00**
SOUTH HOUSTON	80569000	HARRIS	SAN JACINTO	Population	15833	17307	18742	20153	21550	22938	24321				
				Population Total	**15833**	**17307**	**18742**	**20153**	**21550**	**22938**	**24321**				
SOUTH HOUSTON	80569000	HARRIS	SAN JACINTO	Demand	2164	2288	2393	2528	2631	2775	2942				
				Demand Total	**2164**	**2288**	**2393**	**2528**	**2631**	**2775**	**2942**				
SOUTH HOUSTON	80569000	HARRIS	SAN JACINTO	Supply	216	214	216	195	195	195	195	GULF COAST AQUIFER	None		
SOUTH HOUSTON	80569000	HARRIS	SAN JACINTO	Supply	4199	4199	4199	4199	4199	4199	4199	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**4415**	**4413**	**4415**	**4394**	**4394**	**4394**	**4394**				
SOUTH HOUSTON	80569000	HARRIS	SAN JACINTO	WMS	0	0	23	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**0**	**23**	**0**	**0**	**0**	**0**				**$0.00**
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	Population	6529	10365	12708	12708	12708	12708	12708				
				Population Total	**6529**	**10365**	**12708**	**12708**	**12708**	**12708**	**12708**				
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	Demand	1163	1776	2149	2121	2107	2107	2107				
				Demand Total	**1163**	**1776**	**2149**	**2121**	**2107**	**2107**	**2107**				
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	Supply	1163	1163	1163	1072	885	721	590	GULF COAST AQUIFER	None		
				Supply Total	**1163**	**1163**	**1163**	**1072**	**885**	**721**	**590**				
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	WMS	0	123	148	146	145	145	145	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	WMS	0	667	667	667	667	667	667	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	WMS	0	0	705	705	705	705	705	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$6,545,300.00
SOUTHERN MONTGOMERY COUNTY MUD	84339000	MONTGOMERY	SAN JACINTO	WMS	0	315	171	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$546,000.00
				WMS Total	**0**	**1105**	**1691**	**1518**	**1517**	**1517**	**1517**				**$7,091,300.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	Population	1546	1686	1822	1956	2088	2220	2351				
				Population Total	**1546**	**1686**	**1822**	**1956**	**2088**	**2220**	**2351**				
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	Demand	379	406	433	458	482	510	540				
				Demand Total	**379**	**406**	**433**	**458**	**482**	**510**	**540**				
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	Supply	76	76	76	72	72	72	72	GULF COAST AQUIFER	None		
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	Supply	319	319	319	319	319	319	319	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**395**	**395**	**395**	**391**	**391**	**391**	**391**				
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	WMS	0	11	24	25	27	28	30	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	WMS	0	0	33	33	33	33	33	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	WMS	0	0	31	31	86	86	86	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$20,038.00
SOUTHSIDE PLACE	80572000	HARRIS	SAN JACINTO	WMS	0	0	11	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**11**	**99**	**89**	**146**	**147**	**149**				**$20,038.00**
SOUTHWEST UTILITIES	84343000	BRAZORIA	SAN JACINTO-BRAZOS	Population	597	632	668	703	735	769	804				
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	Population	5335	6341	7321	8285	9239	10187	11131				
SOUTHWEST UTILITIES	84343000	LIBERTY	SAN JACINTO	Population	100	123	148	172	196	222	251				
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	Population	1541	2149	2520	3245	4088	5201	6493				
				Population Total	**7573**	**9245**	**10657**	**12405**	**14258**	**16379**	**18679**				
SOUTHWEST UTILITIES	84343000	BRAZORIA	SAN JACINTO-BRAZOS	Demand	70	71	73	75	77	79	83				
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	Demand	627	710	795	882	962	1050	1147				
SOUTHWEST UTILITIES	84343000	LIBERTY	SAN JACINTO	Demand	12	14	16	18	20	23	26				
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	Demand	181	241	274	345	426	536	669				
				Demand Total	**890**	**1036**	**1158**	**1320**	**1485**	**1688**	**1925**				
SOUTHWEST UTILITIES	84343000	BRAZORIA	SAN JACINTO-BRAZOS	Supply	70	70	70	70	70	70	70	GULF COAST AQUIFER	None		
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	Supply	627	467	239	137	137	137	137	GULF COAST AQUIFER	None		
SOUTHWEST UTILITIES	84343000	LIBERTY	SAN JACINTO	Supply	12	12	12	12	12	12	12	GULF COAST AQUIFER	None		
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	Supply	181	181	170	174	179	181	181	GULF COAST AQUIFER	None		
				Supply Total	**890**	**730**	**491**	**393**	**398**	**400**	**400**				
SOUTHWEST UTILITIES	84343000	BRAZORIA	SAN JACINTO-BRAZOS	WMS	0	1	3	5	7	9	13	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	WMS	0	49	55	61	66	72	79	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	WMS	0	0	565	565	737	737	737	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$171,721.00
SOUTHWEST UTILITIES	84343000	HARRIS	SAN JACINTO	WMS	0	194	194	194	194	194	194	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
SOUTHWEST UTILITIES	84343000	LIBERTY	SAN JACINTO	WMS	0	2	4	6	8	11	14	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	WMS	0	17	19	24	29	37	46	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	WMS	0	436	436	436	436	436	436	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
SOUTHWEST UTILITIES	84343000	MONTGOMERY	SAN JACINTO	WMS	0	20	0	0	0	2	6	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**719**	**1276**	**1291**	**1477**	**1498**	**1525**				**$171,721.00**
SPLENDORA	80962000	MONTGOMERY	SAN JACINTO	Population	1275	2017	2470	3356	4386	5745	7323				
				Population Total	**1275**	**2017**	**2470**	**3356**	**4386**	**5745**	**7323**				
SPLENDORA	80962000	MONTGOMERY	SAN JACINTO	Demand	126	188	224	297	383	502	640				
				Demand Total	**126**	**188**	**224**	**297**	**383**	**502**	**640**				
SPLENDORA	80962000	MONTGOMERY	SAN JACINTO	Supply	126	126	126	126	126	126	126	GULF COAST AQUIFER	None		
				Supply Total	**126**	**126**	**126**	**126**	**126**	**126**	**126**				
SPLENDORA	80962000	MONTGOMERY	SAN JACINTO	WMS	0	1	1	2	2	3	4	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SPLENDORA	80962000	MONTGOMERY	SAN JACINTO	WMS	0	61	97	169	255	373	510	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,399,100.00
				WMS Total	**0**	**62**	**98**	**171**	**257**	**376**	**514**				**$1,399,100.00**
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	Population	3186	4987	6087	8237	10736	14033	17862				
				Population Total	**3186**	**4987**	**6087**	**8237**	**10736**	**14033**	**17862**				
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	Demand	339	503	593	784	1010	1320	1681				
				Demand Total	**339**	**503**	**593**	**784**	**1010**	**1320**	**1681**				
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	Supply	339	339	339	339	339	339	339	GULF COAST AQUIFER	None		
				Supply Total	**339**	**339**	**339**	**339**	**339**	**339**	**339**				
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	WMS	0	35	41	54	70	91	116	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	WMS	0	184	184	184	184	184	184	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	WMS	0	0	910	910	910	910	910	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$5,441,000.00
SPRING CREEK UD	84344000	MONTGOMERY	SAN JACINTO	WMS	0	79	29	57	85	112	132	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**298**	**1164**	**1205**	**1249**	**1297**	**1342**				**$5,857,000.00**
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	Population	3611	3810	4003	4193	4381	4568	4754				
				Population Total	**3611**	**3810**	**4003**	**4193**	**4381**	**4568**	**4754**				
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	Demand	858	888	915	944	972	1008	1049				
				Demand Total	**858**	**888**	**915**	**944**	**972**	**1008**	**1049**				
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	Supply	858	585	275	147	147	147	147	GULF COAST AQUIFER	None		
				Supply Total	**858**	**585**	**275**	**147**	**147**	**147**	**147**				
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	WMS	0	53	55	56	58	60	63	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	WMS	0	0	517	517	589	589	589	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$137,237.00
SPRING VALLEY	80575000	HARRIS	SAN JACINTO	WMS	0	250	250	250	250	250	250	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$3,323,054.09
				WMS Total	**0**	**303**	**822**	**823**	**897**	**899**	**902**				**$3,460,291.09**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
STAFFORD	80577000	FORT BEND	SAN JACINTO	Population	2959	4433	5960	7827	9747	12265	15142				
STAFFORD	80577000	FORT BEND	SAN JACINTO-BRAZOS	Population	12412	18593	24999	32832	40886	51449	63519				
STAFFORD	80577000	HARRIS	SAN JACINTO	Population	310	313	316	319	322	325	328				
				Population Total	**15681**	**23339**	**31275**	**40978**	**50955**	**64039**	**78989**				
STAFFORD	80577000	FORT BEND	SAN JACINTO	Demand	239	333	434	552	677	852	1052				
STAFFORD	80577000	FORT BEND	SAN JACINTO-BRAZOS	Demand	1001	1395	1820	2317	2839	3573	4411				
STAFFORD	80577000	HARRIS	SAN JACINTO	Demand	25	23	23	23	22	23	23				
				Demand Total	**1265**	**1751**	**2277**	**2892**	**3538**	**4448**	**5486**				
STAFFORD	80577000	FORT BEND	SAN JACINTO	Supply	232	232	232	181	181	181	181	GULF COAST AQUIFER	None		
STAFFORD	80577000	FORT BEND	SAN JACINTO	Supply	288	1159	1682	1823	1844	1857	1867	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
STAFFORD	80577000	FORT BEND	SAN JACINTO-BRAZOS	Supply	770	770	770	696	696	696	696	GULF COAST AQUIFER	None		
STAFFORD	80577000	FORT BEND	SAN JACINTO-BRAZOS	Supply	9495	8572	8075	7964	7966	7963	7964	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
STAFFORD	80577000	HARRIS	SAN JACINTO	Supply	23	16	11	7	7	7	7	GULF COAST AQUIFER	None		
STAFFORD	80577000	HARRIS	SAN JACINTO	Supply	82	134	108	78	55	45	34	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**10890**	**10883**	**10878**	**10749**	**10749**	**10749**	**10749**				
STAFFORD	80577000	FORT BEND	SAN JACINTO	WMS	0	40	16	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
STAFFORD	80577000	FORT BEND	SAN JACINTO-BRAZOS	WMS	0	174	157	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**214**	**173**	**0**	**0**	**0**	**0**				**$416,000.00**
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	Population	2025	3903	5015	5015	5015	5015	5015				
				Population Total	**2025**	**3903**	**5015**	**5015**	**5015**	**5015**	**5015**				
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	Demand	367	682	871	865	859	859	859				
				Demand Total	**367**	**682**	**871**	**865**	**859**	**859**	**859**				
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	Supply	367	367	367	367	361	294	241	GULF COAST AQUIFER	None		
				Supply Total	**367**	**367**	**367**	**367**	**361**	**294**	**241**				
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	WMS	0	41	52	52	51	51	51	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	WMS	0	567	567	567	567	567	567	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,944,700.00
STANLEY LAKE MUD	84347000	MONTGOMERY	SAN JACINTO	WMS	0	201	174	70	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**809**	**793**	**689**	**618**	**618**	**618**				**$4,360,700.00**
STEAM ELECTRIC POWER	81002036	CHAMBERS	TRINITY-SAN JACINTO	Demand	5334	4435	3536	4134	4863	5751	6834				
				Demand Total	**5334**	**4435**	**3536**	**4134**	**4863**	**5751**	**6834**				
STEAM ELECTRIC POWER	81002036	CHAMBERS	TRINITY-SAN JACINTO	Supply	1782	1330	1018	1104	1208	1332	1468	GULF COAST AQUIFER	None		
STEAM ELECTRIC POWER	81002036	CHAMBERS	TRINITY-SAN JACINTO	Supply	30000	30000	30000	30000	30000	30000	30000	TRINITY-SAN JACINTO RIVER RUN-OF-RIVER	TEXAS GENCO		
				Supply Total	**31782**	**31330**	**31018**	**31104**	**31208**	**31332**	**31468**				
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	Demand	61761	66026	68046	79553	93582	110682	131527				
				Demand Total	**61761**	**66026**	**68046**	**79553**	**93582**	**110682**	**131527**				
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	Supply	8976	8976	8976	8976	8976	8976	8976	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO		
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	Supply	28711	28711	28711	28711	28711	28711	28711	BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO		
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	Supply	21944	21944	19904	15926	15926	15926	15926	GULF COAST AQUIFER	None		
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	Supply	83000	83000	83000	83000	83000	83000	83000	BRAZOS RIVER AUTHORITY MAIN STEM STYSTEM	TEXAS GENCO		
				Supply Total	**142631**	**142631**	**140591**	**136613**	**136613**	**136613**	**136613**				
STEAM ELECTRIC POWER	81002079	FORT BEND	BRAZOS	WMS	0	252	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**252**	**0**	**0**	**0**	**0**	**0**				**$0.00**
STEAM ELECTRIC POWER	81002084	GALVESTON	SAN JACINTO-BRAZOS	Demand	6054	5034	4013	4692	5519	6528	7757				
				Demand Total	**6054**	**5034**	**4013**	**4692**	**5519**	**6528**	**7757**				
STEAM ELECTRIC POWER	81002084	GALVESTON	SAN JACINTO-BRAZOS	Supply	8405	8405	8405	8405	8405	8405	8405	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**8405**	**8405**	**8405**	**8405**	**8405**	**8405**	**8405**				
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO	Demand	7169	7284	22585	26405	31062	36738	43656				
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO-BRAZOS	Demand	437	444	1377	1610	1893	2239	2661				
				Demand Total	**7606**	**7728**	**23962**	**28015**	**32955**	**38977**	**46317**				
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO	Supply	14367	14367	14367	14367	14367	14367	14367	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON		
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO-BRAZOS	Supply	44	44	44	44	44	44	44	GULF COAST AQUIFER	None		
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO-BRAZOS	Supply	2120	2120	2120	2120	2120	2120	2120	SAN JACINTO-BRAZOS RIVER RUN-OF-RIVER	TEXAS GENCO		
				Supply Total	**16531**	**16531**	**16531**	**16531**	**16531**	**16531**	**16531**				
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	12600	12600	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO	WMS	0	0	16695	16695	16695	16695	16695	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	New Contracts	$3,944,700.00
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	0	0	0	275	275	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
STEAM ELECTRIC POWER	81002101	HARRIS	SAN JACINTO-BRAZOS	WMS	0	0	94	117	145	180	222	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$4,250,900.00
				WMS Total	**0**	**0**	**16789**	**16812**	**16840**	**29750**	**29792**				**$8,195,600.00**
STEAM ELECTRIC POWER	81002146	LIBERTY	TRINITY	Demand	0	2962	4240	4957	5831	6896	8195				
				Demand Total	**0**	**2962**	**4240**	**4957**	**5831**	**6896**	**8195**				
STEAM ELECTRIC POWER	81002146	LIBERTY	TRINITY	Supply	0	0	0	0	0	0	0	GULF COAST AQUIFER	None		
				Supply Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**				
STEAM ELECTRIC POWER	81002146	LIBERTY	TRINITY	WMS	0	2962	4240	4957	5831	6896	8195	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**2962**	**4240**	**4957**	**5831**	**6896**	**8195**				**$0.00**
STEAM ELECTRIC POWER	81002170	MONTGOMERY	SAN JACINTO	Demand	2507	5046	8537	9981	11741	13886	16502				
				Demand Total	**2507**	**5046**	**8537**	**9981**	**11741**	**13886**	**16502**				
STEAM ELECTRIC POWER	81002170	MONTGOMERY	SAN JACINTO	Supply	4996	4996	4996	4996	4996	4996	4996	CONROE LAKE/RESERVOIR	SAN JACINTO RIVER AUTHORITY		
STEAM ELECTRIC POWER	81002170	MONTGOMERY	SAN JACINTO	Supply	2507	2507	2507	2507	2507	2507	2507	GULF COAST AQUIFER	None		
				Supply Total	**7503**	**7503**	**7503**	**7503**	**7503**	**7503**	**7503**				
STEAM ELECTRIC POWER	81002170	MONTGOMERY	SAN JACINTO	WMS	0	0	0	0	6885	6885	6885	SJRA INDIRECT REUSE	SAN JACINTO RIVER AUTHORITY	New Contracts	$0.00
STEAM ELECTRIC POWER	81002170	MONTGOMERY	SAN JACINTO	WMS	0	1694	2795	2535	2423	2243	2114	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**1694**	**2795**	**2535**	**9308**	**9128**	**8999**				**$0.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
SUGAR LAND	80585000	FORT BEND	SAN JACINTO-BRAZOS	Population	35079	40160	40160	40160	40160	40160	40160				
SUGAR LAND	80585000	FORT BEND	BRAZOS	Population	25677	29396	29396	29396	29396	29396	29396				
SUGAR LAND	80585000	FORT BEND	SAN JACINTO	Population	2572	2944	2944	2944	2944	2944	2944				
				Population Total	**63328**	**72500**	**72500**	**72500**	**72500**	**72500**	**72500**				
SUGAR LAND	80585000	FORT BEND	SAN JACINTO-BRAZOS	Demand	8684	9717	9627	9537	9492	9492	9492				
SUGAR LAND	80585000	FORT BEND	BRAZOS	Demand	6356	7112	7047	6981	6948	6948	6948				
SUGAR LAND	80585000	FORT BEND	SAN JACINTO	Demand	637	712	706	699	696	696	696				
				Demand Total	**15677**	**17541**	**17380**	**17217**	**17136**	**17136**	**17136**				
SUGAR LAND	80585000	FORT BEND	SAN JACINTO	Supply	618	582	403	230	230	230	230	GULF COAST AQUIFER	None		
SUGAR LAND	80585000	FORT BEND	SAN JACINTO	Supply	62	324	667	734	734	734	734	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
SUGAR LAND	80585000	FORT BEND	SAN JACINTO-BRAZOS	Supply	6677	6573	4906	2866	2866	2866	2866	GULF COAST AQUIFER	None		
SUGAR LAND	80585000	FORT BEND	SAN JACINTO-BRAZOS	Supply	6524	7828	8259	10437	10433	10433	10433	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
SUGAR LAND	80585000	FORT BEND	SAN JACINTO-BRAZOS	Supply	45	45	45	45	45	45	45	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
SUGAR LAND	80585000	FORT BEND	BRAZOS	Supply	2258	2258	2061	1397	1397	1397	1397	GULF COAST AQUIFER	None		
SUGAR LAND	80585000	FORT BEND	BRAZOS	Supply	13321	11755	10981	8736	8740	8740	8740	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**29505**	**29365**	**27322**	**24445**	**24445**	**24445**	**24445**				
SUGAR LAND	80585000	FORT BEND	BRAZOS	WMS	0	133	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**133**	**0**	**0**	**0**	**0**	**0**				**$0.00**
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	Population	19533	24141	28628	33041	37409	41750	46075				
				Population Total	**19533**	**24141**	**28628**	**33041**	**37409**	**41750**	**46075**				
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	Demand	3741	4489	5227	5922	6663	7389	8154				
				Demand Total	**3741**	**4489**	**5227**	**5922**	**6663**	**7389**	**8154**				
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	Supply	3741	2956	1568	921	921	921	921	GULF COAST AQUIFER	None		
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	Supply	187	187	187	187	187	187	187	GULF COAST AQUIFER	CITY OF HOUSTON		
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	Supply	299	299	299	299	299	299	299	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
				Supply Total	**4227**	**3442**	**2054**	**1407**	**1407**	**1407**	**1407**				
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	WMS	0	310	361	409	460	510	562	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	WMS	0	1721	1721	1721	1721	1721	1721	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
SUNBELT FWSD	84350000	HARRIS	SAN JACINTO	WMS	0	0	3075	3075	4464	4464	4464	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$1,040,112.00
				WMS Total	**0**	**2031**	**5157**	**5205**	**6645**	**6695**	**6747**				**$1,040,112.00**
SURFSIDE BEACH	80967000	BRAZORIA	BRAZOS	Population	763	889	1020	1146	1262	1385	1513				
				Population Total	**763**	**889**	**1020**	**1146**	**1262**	**1385**	**1513**				
SURFSIDE BEACH	80967000	BRAZORIA	BRAZOS	Demand	148	168	189	209	228	248	271				
				Demand Total	**148**	**168**	**189**	**209**	**228**	**248**	**271**				
SURFSIDE BEACH	80967000	BRAZORIA	BRAZOS	Supply	148	148	148	148	148	148	148	GULF COAST AQUIFER	None		
				Supply Total	**148**	**148**	**148**	**148**	**148**	**148**	**148**				
SURFSIDE BEACH	80967000	BRAZORIA	BRAZOS	WMS	0	20	41	61	80	100	123	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**20**	**41**	**61**	**80**	**100**	**123**				**$416,000.00**
SWEENY	80590000	BRAZORIA	BRAZOS-COLORADO	Population	3624	3895	4177	4447	4696	4960	5236				
				Population Total	**3624**	**3895**	**4177**	**4447**	**4696**	**4960**	**5236**				
SWEENY	80590000	BRAZORIA	BRAZOS-COLORADO	Demand	580	606	636	663	684	717	757				
				Demand Total	**580**	**606**	**636**	**663**	**684**	**717**	**757**				
SWEENY	80590000	BRAZORIA	BRAZOS-COLORADO	Supply	580	580	580	580	580	580	580	GULF COAST AQUIFER	None		
				Supply Total	**580**	**580**	**580**	**580**	**580**	**580**	**580**				
SWEENY	80590000	BRAZORIA	BRAZOS-COLORADO	WMS	0	26	56	83	104	137	177	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,219,300.00
				WMS Total	**0**	**26**	**56**	**83**	**104**	**137**	**177**				**$1,219,300.00**
TAYLOR LAKE VILLAGE	80751000	HARRIS	SAN JACINTO-BRAZOS	Population	3694	4004	4004	4004	4004	4004	4004				
				Population Total	**3694**	**4004**	**4004**	**4004**	**4004**	**4004**	**4004**				
TAYLOR LAKE VILLAGE	80751000	HARRIS	SAN JACINTO-BRAZOS	Demand	629	664	650	637	623	619	619				
				Demand Total	**629**	**664**	**650**	**637**	**623**	**619**	**619**				
TAYLOR LAKE VILLAGE	80751000	HARRIS	SAN JACINTO-BRAZOS	Supply	63	63	63	63	62	62	62	GULF COAST AQUIFER	None		
TAYLOR LAKE VILLAGE	80751000	HARRIS	SAN JACINTO-BRAZOS	Supply	1730	1730	1730	1730	1730	1730	1730	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
				Supply Total	**1793**	**1793**	**1793**	**1793**	**1792**	**1792**	**1792**				
TAYLOR LAKE VILLAGE	80751000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	3	2	1	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**3**	**2**	**1**	**0**	**0**	**0**				**$0.00**
TEXAS CITY	80602000	GALVESTON	SAN JACINTO-BRAZOS	Population	41521	41891	42211	42400	42477	42534	42571				
				Population Total	**41521**	**41891**	**42211**	**42400**	**42477**	**42534**	**42571**				
TEXAS CITY	80602000	GALVESTON	SAN JACINTO-BRAZOS	Demand	6604	6476	6383	6269	6138	6051	6056				
				Demand Total	**6604**	**6476**	**6383**	**6269**	**6138**	**6051**	**6056**				
TEXAS CITY	80602000	GALVESTON	SAN JACINTO-BRAZOS	Supply	660	648	638	627	614	605	606	GULF COAST AQUIFER	None		
TEXAS CITY	80602000	GALVESTON	SAN JACINTO-BRAZOS	Supply	10367	10367	10367	10367	10367	10367	10367	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
TEXAS CITY	80602000	GALVESTON	SAN JACINTO-BRAZOS	Supply	21	21	21	21	21	21	21	BRAZOS RIVER RUN-OF-RIVER	GALVESTON COUNTY WCID #1		
				Supply Total	**11048**	**11036**	**11026**	**11015**	**11002**	**10993**	**10994**				
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	Population	55649	60080	111470	119300	119300	119300	119300				
				Population Total	**55649**	**60080**	**111470**	**119300**	**119300**	**119300**	**119300**				
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	Demand	13714	14671	26596	28330	28197	28063	28063				
				Demand Total	**13714**	**14671**	**26596**	**28330**	**28197**	**28063**	**28063**				
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	Supply	13714	12212	13714	13714	11837	9599	7859	GULF COAST AQUIFER	SAN JACINTO RIVER AUTHORITY		
				Supply Total	**13714**	**12212**	**13714**	**13714**	**11837**	**9599**	**7859**				
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	WMS	0	1012	1835	1954	1945	1936	1936	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	WMS	0	8246	8246	8246	8246	8246	8246	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$58,565,800.00
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	WMS	0	5000	5000	5000	5000	5000	5000	SJRA INDIRECT REUSE	SAN JACINTO RIVER AUTHORITY	New Contracts	$0.00
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	WMS	0	0	5022	5022	5022	5022	5022	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
THE WOODLANDS	88001000	MONTGOMERY	SAN JACINTO	WMS	0		2801	594				GULF COAST AQUIFER	SAN JACINTO RIVER AUTHORITY	EXPANDED USE OF GW	$1,872,000.00
				WMS Total	**0**	**14258**	**22904**	**20816**	**20213**	**20204**	**20204**				**$60,437,800.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
TIKI ISLAND	80973000	GALVESTON	SAN JACINTO-BRAZOS	Population	1016	1270	1489	1619	1672	1711	1736				
				Population Total	**1016**	**1270**	**1489**	**1619**	**1672**	**1711**	**1736**				
TIKI ISLAND	80973000	GALVESTON	SAN JACINTO-BRAZOS	Demand	199	243	282	303	311	316	321				
				Demand Total	**199**	**243**	**282**	**303**	**311**	**316**	**321**				
TIKI ISLAND	80973000	GALVESTON	SAN JACINTO-BRAZOS	Supply	20	20	20	20	20	20	20	GULF COAST AQUIFER	None		
TIKI ISLAND	80973000	GALVESTON	SAN JACINTO-BRAZOS	Supply	358	358	358	358	358	358	358	BRAZOS RIVER RUN-OF-RIVER	GULF COAST WATER AUTHORITY		
				Supply Total	**378**	**378**	**378**	**378**	**378**	**378**	**378**				
TIKI ISLAND	80973000	GALVESTON	SAN JACINTO-BRAZOS	WMS	0	4	8	10	11	12	12	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**4**	**8**	**10**	**11**	**12**	**12**				**$0.00**
TOMBALL	80608000	HARRIS	SAN JACINTO	Population	9089	12059	15429	18150	22954	26554	31650				
				Population Total	**9089**	**12059**	**15429**	**18150**	**22954**	**26554**	**31650**				
TOMBALL	80608000	HARRIS	SAN JACINTO	Demand	2016	2621	3301	3842	4834	5562	6630				
				Demand Total	**2016**	**2621**	**3301**	**3842**	**4834**	**5562**	**6630**				
TOMBALL	80608000	HARRIS	SAN JACINTO	Supply	2016	1726	990	598	598	598	598	GULF COAST AQUIFER	None		
				Supply Total	**2016**	**1726**	**990**	**598**	**598**	**598**	**598**				
TOMBALL	80608000	HARRIS	SAN JACINTO	WMS	0	181	228	265	333	384	457	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
TOMBALL	80608000	HARRIS	SAN JACINTO	WMS	0	2083	2083	2083	0	0	0	LAKE HOUSTON ADDITIONAL YIELD	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	Lake Houston Additional Yield	$23,278,512
TOMBALL	80608000	HARRIS	SAN JACINTO	WMS	0	0	5575	5575	5575	5575	5575	LIVINGSTON-WALLISVILLE SYSTEM	NORTH HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$1,298,975.00
				WMS Total	**0**	**2264**	**7886**	**7923**	**5908**	**5959**	**6032**				**$24,577,486.62**
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	Population	4086	10970	10970	10970	10970	10970	10970				
				Population Total	**4086**	**10970**	**10970**	**10970**	**10970**	**10970**	**10970**				
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	Demand	549	1413	1376	1364	1339	1339	1339				
				Demand Total	**549**	**1413**	**1376**	**1364**	**1339**	**1339**	**1339**				
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	Supply	549	549	413	213	213	213	213	GULF COAST AQUIFER	None		
				Supply Total	**549**	**549**	**413**	**213**	**213**	**213**	**213**				
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	WMS	0	97	95	94	92	92	92	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	WMS	0	0	1057	1057	1057	1057	1057	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$246,281.00
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	WMS	0	385	385	385	385	385	385	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$5,167,525.14
TRAIL OF THE LAKES MUD	84355000	HARRIS	SAN JACINTO	WMS	0	382	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$546,000.00
				WMS Total	**0**	**864**	**1537**	**1536**	**1534**	**1534**	**1534**				**$5,959,806.14**
TRINITY	80610000	TRINITY	TRINITY	Population	2721	3033	3273	3352	3311	3180	3060				
				Population Total	**2721**	**3033**	**3273**	**3352**	**3311**	**3180**	**3060**				
TRINITY	80610000	TRINITY	TRINITY	Demand	165	170	172	165	152	142	137				
				Demand Total	**165**	**170**	**172**	**165**	**152**	**142**	**137**				
TRINITY	80610000	TRINITY	TRINITY	Supply	370	370	370	370	370	370	370	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
TRINITY	80610000	TRINITY	TRINITY	Supply	165	165	165	165	152	142	137	UNDIFFERENTIATED AQUIFER	None		
				Supply Total	**535**	**535**	**535**	**535**	**522**	**512**	**507**				
TRINITY	80610000	TRINITY	TRINITY	WMS	0	5	7	0				UNDIFFERENTIATED AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**5**	**7**	**0**	**0**	**0**	**0**				**$0.00**
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	NECHES-TRINITY	Population	7886	10002	12359	14553	16454	18382	20357				
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	TRINITY	Population	3607	4575	5653	6656	7525	8407	9310				
				Population Total	**11493**	**14577**	**18012**	**21209**	**23979**	**26789**	**29667**				
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	NECHES-TRINITY	Demand	989	1199	1440	1663	1862	2059	2280				
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	TRINITY	Demand	453	548	659	760	851	942	1043				
				Demand Total	**1442**	**1747**	**2099**	**2423**	**2713**	**3001**	**3323**				
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	NECHES-TRINITY	Supply	455	455	455	455	455	455	455	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT		
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	NECHES-TRINITY	Supply	1844	1845	1844	1845	1845	1844	1844	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	TRINITY	Supply	208	208	208	208	208	208	208	TRINITY RIVER RUN-OF-RIVER	CHAMBERS LIBERTY COUNTIES NAVIGATIONAL DISTRICT		
TRINITY BAY CONSERVATION DISTRICT	84362000	CHAMBERS	TRINITY	Supply	844	843	844	843	843	844	844	SAM RAYBURN-STEINHAGEN LAKE/RESERVOIR SYSTEM	LOWER NECHES VALLEY AUTHORITY		
				Supply Total	**3351**	**3351**	**3351**	**3351**	**3351**	**3351**	**3351**				
TRINITY RURAL WSC	84363000	POLK	TRINITY	Population	66	78	90	100	108	116	124				
TRINITY RURAL WSC	84363000	TRINITY	TRINITY	Population	3022	3369	3635	3722	3677	3532	3399				
TRINITY RURAL WSC	84363000	WALKER	TRINITY	Population	233	267	294	307	304	305	305				
				Population Total	**3321**	**3714**	**4019**	**4129**	**4089**	**3953**	**3828**				
TRINITY RURAL WSC	84363000	POLK	TRINITY	Demand	6	6	7	8	8	9	9				
TRINITY RURAL WSC	84363000	TRINITY	TRINITY	Demand	264	279	293	292	280	265	255				
TRINITY RURAL WSC	84363000	WALKER	TRINITY	Demand	20	22	24	24	23	23	23				
				Demand Total	**290**	**307**	**324**	**324**	**311**	**297**	**287**				
TRINITY RURAL WSC	84363000	POLK	TRINITY	Supply	6	6	7	8	8	9	9	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
TRINITY RURAL WSC	84363000	TRINITY	TRINITY	Supply	264	279	293	292	280	265	255	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
TRINITY RURAL WSC	84363000	WALKER	TRINITY	Supply	20	22	24	24	23	23	23	LIVINGSTON-WALLISVILLE SYSTEM	TRINITY RIVER AUTHORITY		
				Supply Total	**290**	**307**	**324**	**324**	**311**	**297**	**287**				
VARNER CREEK UD	84370000	BRAZORIA	BRAZOS	Population	1850	2341	2852	3341	3792	4270	4769				
				Population Total	**1850**	**2341**	**2852**	**3341**	**3792**	**4270**	**4769**				
VARNER CREEK UD	84370000	BRAZORIA	BRAZOS	Demand	294	359	428	494	556	622	694				
				Demand Total	**294**	**359**	**428**	**494**	**556**	**622**	**694**				
VARNER CREEK UD	84370000	BRAZORIA	BRAZOS	Supply	294	294	294	294	294	294	294	GULF COAST AQUIFER	None		
				Supply Total	**294**	**294**	**294**	**294**	**294**	**294**	**294**				
VARNER CREEK UD	84370000	BRAZORIA	BRAZOS	WMS	0	65	134	200	262	328	400	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,382,700.00
				WMS Total	**0**	**65**	**134**	**200**	**262**	**328**	**400**				**$1,382,700.00**
WALKER COUNTY RURAL WSC	84372000	WALKER	TRINITY	Population	6420	7347	8100	8462	8373	8393	8393				
				Population Total	**6420**	**7347**	**8100**	**8462**	**8373**	**8393**	**8393**				
WALKER COUNTY RURAL WSC	84372000	WALKER	TRINITY	Demand	762	839	898	919	891	884	884				
				Demand Total	**762**	**839**	**898**	**919**	**891**	**884**	**884**				
WALKER COUNTY RURAL WSC	84372000	WALKER	TRINITY	Supply	594	563	544	524	496	477	462	GULF COAST AQUIFER	None		
WALKER COUNTY RURAL WSC	84372000	WALKER	TRINITY	Supply	168	168	168	168	168	168	168	SPARTA AQUIFER	None		
				Supply Total	**762**	**731**	**712**	**692**	**664**	**645**	**630**				
WALKER COUNTY RURAL WSC	84372000	WALKER	TRINITY	WMS	0	108	186	227	227	239	254	SPARTA AQUIFER	None	EXPANDED USE OF GW	$416,000.00
				WMS Total	**0**	**108**	**186**	**227**	**227**	**239**	**254**				**$416,000.00**
WALLER	80629000	HARRIS	SAN JACINTO	Population	388	586	778	967	1154	1340	1525				
WALLER	80629000	WALLER	SAN JACINTO	Population	1704	2051	2462	2919	3428	4034	4730				
				Population Total	**2092**	**2637**	**3240**	**3886**	**4582**	**5374**	**6255**				
WALLER	80629000	HARRIS	SAN JACINTO	Demand	80	119	154	190	225	260	296				
WALLER	80629000	WALLER	SAN JACINTO	Demand	353	416	488	572	668	782	917				
				Demand Total	**433**	**535**	**642**	**762**	**893**	**1042**	**1213**				
WALLER	80629000	HARRIS	SAN JACINTO	Supply	80	78	46	29	29	29	29	GULF COAST AQUIFER	None		

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
WALLER	80629000	WALLER	SAN JACINTO	Supply	353	353	353	353	353	353	353	GULF COAST AQUIFER	None		
				Supply Total	**433**	**431**	**399**	**382**	**382**	**382**	**382**				
WALLER	80629000	HARRIS	SAN JACINTO	WMS	0	7	9	11	13	15	18	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WALLER	80629000	HARRIS	SAN JACINTO	WMS	0	0	149	149	215	215	215	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$50,095.00
WALLER	80629000	HARRIS	SAN JACINTO	WMS	0	34	34	34	34	34	34	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$0.00
WALLER	80629000	WALLER	SAN JACINTO	WMS	0	0	0	0	0	0	26	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WALLER	80629000	WALLER	SAN JACINTO	WMS	0	0	0	0	0	0	26	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
WALLER	80629000	WALLER	SAN JACINTO	WMS	0	63	135	219	315	429	538	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,395,600.00
WALLER	80629000	WALLER	SAN JACINTO	WMS	0						26	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**104**	**327**	**413**	**577**	**693**	**883**				**$1,445,695.00**
WALLIS	80630000	AUSTIN	BRAZOS-COLORADO	Population	1172	1335	1490	1598	1662	1693	1735				
				Population Total	**1172**	**1335**	**1490**	**1598**	**1662**	**1693**	**1735**				
WALLIS	80630000	AUSTIN	BRAZOS-COLORADO	Demand	161	178	194	202	207	209	214				
				Demand Total	**161**	**178**	**194**	**202**	**207**	**209**	**214**				
WALLIS	80630000	AUSTIN	BRAZOS-COLORADO	Supply	161	161	161	161	161	161	161	GULF COAST AQUIFER	None		
				Supply Total	**161**	**161**	**161**	**161**	**161**	**161**	**161**				
WALLIS	80630000	AUSTIN	BRAZOS-COLORADO	WMS	0	17	33	41	46	48	53	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**17**	**33**	**41**	**46**	**48**	**53**				**$0.00**
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	Population	9083	13076	16964	20788	24573	28334	32081				
				Population Total	**9083**	**13076**	**16964**	**20788**	**24573**	**28334**	**32081**				
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	Demand	1719	2417	3097	3772	4432	5110	5786				
				Demand Total	**1719**	**2417**	**3097**	**3772**	**4432**	**5110**	**5786**				
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	Supply	172	172	172	172	172	172	172	GULF COAST AQUIFER	None		
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	Supply	4535	4535	4535	4535	4535	4535	4535	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON		
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	Supply	4475	4475	4475	4475	4475	4475	4475	LIVINGSTON-WALLISVILLE SYSTEM	CLEAR LAKE CITY WATER AUTHORITY		
				Supply Total	**9182**	**9182**	**9182**	**9182**	**9182**	**9182**	**9182**				
WEBSTER	80635000	HARRIS	SAN JACINTO-BRAZOS	WMS	0	70	138	205	271	339	407	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$1,383,800.00
				WMS Total	**0**	**70**	**138**	**205**	**271**	**339**	**407**				**$1,383,800.00**
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS	Population	3571	3490	3405	3324	3249	3170	3087				
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS-COLORADO	Population	684	668	652	636	622	607	591				
				Population Total	**4255**	**4158**	**4057**	**3960**	**3871**	**3777**	**3678**				
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS	Demand	480	453	431	410	389	373	363				
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS-COLORADO	Demand	92	87	83	78	75	71	70				
				Demand Total	**572**	**540**	**514**	**488**	**464**	**444**	**433**				
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS	Supply	480	453	431	410	389	373	363	GULF COAST AQUIFER	None		
WEST COLUMBIA	80640000	BRAZORIA	BRAZOS-COLORADO	Supply	92	87	83	78	75	71	70	GULF COAST AQUIFER	None		
				Supply Total	**572**	**540**	**514**	**488**	**464**	**444**	**433**				
WEST HARDIN WSC	84383000	LIBERTY	NECHES	Population	301	412	535	653	768	894	1036				
				Population Total	**301**	**412**	**535**	**653**	**768**	**894**	**1036**				
WEST HARDIN WSC	84383000	LIBERTY	NECHES	Demand	22	29	35	42	47	54	63				
				Demand Total	**22**	**29**	**35**	**42**	**47**	**54**	**63**				
WEST HARDIN WSC	84383000	LIBERTY	NECHES	Supply	22	22	22	22	22	22	22	GULF COAST AQUIFER	None		
				Supply Total	**22**	**22**	**22**	**22**	**22**	**22**	**22**				
WEST HARDIN WSC	84383000	LIBERTY	NECHES	WMS	0	7	13	20	25	32	41	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**7**	**13**	**20**	**25**	**32**	**41**				**$0.00**
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	Population	1769	3500	3500	3500	3500	3500	3500				
				Population Total	**1769**	**3500**	**3500**	**3500**	**3500**	**3500**	**3500**				
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	Demand	301	565	561	561	549	541	541				
				Demand Total	**301**	**565**	**561**	**561**	**549**	**541**	**541**				
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	Supply	301	301	168	87	87	87	87	GULF COAST AQUIFER	None		
				Supply Total	**301**	**301**	**168**	**87**	**87**	**87**	**87**				
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	WMS	0	34	33	33	33	32	32	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	WMS	0	0	283	283	283	283	283	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$65,939.00
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	WMS	0	158	158	158	158	158	158	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,240,732.65
WEST HARRIS COUNTY MUD #6	84387000	HARRIS	SAN JACINTO	WMS	0	72	0	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**264**	**474**	**474**	**474**	**473**	**473**				**$2,306,671.65**
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	Population	14211	15381	16520	17641	18750	19852	20950				
				Population Total	**14211**	**15381**	**16520**	**17641**	**18750**	**19852**	**20950**				
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	Demand	2929	3101	3275	3438	3591	3780	3989				
				Demand Total	**2929**	**3101**	**3275**	**3438**	**3591**	**3780**	**3989**				
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	Supply	586	584	586	535	535	535	535	GULF COAST AQUIFER	None		
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	Supply	2053	2053	2053	2053	2053	2053	2053	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**2639**	**2637**	**2639**	**2588**	**2588**	**2588**	**2588**				
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	WMS	202	214	226	237	248	261	275	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	WMS	313	313	313	313	313	313	313	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	WMS	0	0	442	442	813	813	813	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$189,429.00
WEST UNIVERSITY PL.	80643000	HARRIS	SAN JACINTO	WMS	0	0	69	0	0	0	0	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**515**	**527**	**1050**	**992**	**1374**	**1387**	**1401**				**$189,429.00**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-9
Region H
WUG Summary Tables

WUG Name	WUG_ID	County	Basin	Type	2000	2010	2020	2030	2040	2050	2060	Source_Name	Supplier_Name	WMS_Name	Capital_Cost
WHCRWA	88002000	FORT BEND	SAN JACINTO	Population	10553	15078	19767	25501	31397	39129	47964				
WHCRWA	88002000	HARRIS	SAN JACINTO	Population	245708	282352	355073	433235	483377	535519	589071				
				Population Total	**256261**	**297430**	**374840**	**458736**	**514774**	**574648**	**637035**				
WHCRWA	88002000	FORT BEND	SAN JACINTO	Demand	1785	2500	3188	4056	4959	6136	7522				
WHCRWA	88002000	HARRIS	SAN JACINTO	Demand	41559	46809	57274	68911	76345	83980	92378				
				Demand Total	**43344**	**49309**	**60462**	**72967**	**81304**	**90116**	**99900**				
WHCRWA	88002000	FORT BEND	SAN JACINTO	Supply	1731	1731	1731	1331	1331	1331	1331	GULF COAST AQUIFER	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		
WHCRWA	88002000	FORT BEND	SAN JACINTO	Supply	0	563	673	913	1069	1257	1439	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON		
WHCRWA	88002000	HARRIS	SAN JACINTO	Supply	41559	30834	17182	10718	10718	10718	10718	GULF COAST AQUIFER	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY		
WHCRWA	88002000	HARRIS	SAN JACINTO	Supply	0	19874	19764	19524	19368	19180	18998	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON		
				Supply Total	**43290**	**53002**	**39350**	**32486**	**32486**	**32486**	**32486**				
WHCRWA	88002000	FORT BEND	SAN JACINTO	WMS	54	0	220	280	342	423	519	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WHCRWA	88002000	FORT BEND	SAN JACINTO	WMS	0	0	1178	1178	1178	1178	1178	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
WHCRWA	88002000	FORT BEND	SAN JACINTO	WMS	0	0	0	3055	3055	3055	3055	LIVINGSTON-WALLISVILLE SYSTEM	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$711,815.00
WHCRWA	88002000	FORT BEND	SAN JACINTO	WMS	0	312	90	0	0	0	0	GULF COAST AQUIFER	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	EXPANDED USE OF GW	$0.00
WHCRWA	88002000	HARRIS	SAN JACINTO	WMS	0	0	3951	4754	5266	5793	6372	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WHCRWA	88002000	HARRIS	SAN JACINTO	WMS	0	0	7990	7990	7990	7990	7990	CONROE LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
WHCRWA	88002000	HARRIS	SAN JACINTO	WMS	0	0	7676	7676	7676	7676	7676	HOUSTON LAKE/RESERVOIR	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
WHCRWA	88002000	HARRIS	SAN JACINTO	WMS	0	0	0	0	0	8000	8000	COH INDIRECT REUSE	CITY OF HOUSTON	COH Reuse	$0.00
WHCRWA	88002000	HARRIS	SAN JACINTO	WMS	0	0	32624	32624	32624	32624	32624	LIVINGSTON-WALLISVILLE SYSTEM	WEST HARRIS COUNTY REGIONAL WATER AUTHORITY	TRA-Houston	$7,601,392.00
				WMS Total	**54**	**312**	**53729**	**57557**	**58131**	**66739**	**67414**				**$8,313,207.00**
WILLIS	80655000	MONTGOMERY	SAN JACINTO	Population	3985	5695	6739	8780	11153	14283	17918				
				Population Total	**3985**	**5695**	**6739**	**8780**	**11153**	**14283**	**17918**				
WILLIS	80655000	MONTGOMERY	SAN JACINTO	Demand	424	568	649	816	1024	1296	1626				
				Demand Total	**424**	**568**	**649**	**816**	**1024**	**1296**	**1626**				
WILLIS	80655000	MONTGOMERY	SAN JACINTO	Supply	424	424	403	413	424	424	424	GULF COAST AQUIFER	None		
				Supply Total	**424**	**424**	**403**	**413**	**424**	**424**	**424**				
WILLIS	80655000	MONTGOMERY	SAN JACINTO	WMS	0	39	45	56	71	89	112	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WILLIS	80655000	MONTGOMERY	SAN JACINTO	WMS	0	201	201	201	201	201	201	SAN JACINTO RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$0.00
WILLIS	80655000	MONTGOMERY	SAN JACINTO	WMS	0	0	858	858	858	858	858	TRINITY RIVER RUN-OF-RIVER	SAN JACINTO RIVER AUTHORITY	NEW CONTRACTS	$3,914,600.00
WILLIS	80655000	MONTGOMERY	SAN JACINTO	WMS	0	49	0	0	6	19	31	GULF COAST AQUIFER	None	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**289**	**1104**	**1115**	**1136**	**1167**	**1202**				**$3,914,600.00**
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	Population	3663	3663	3663	3663	3663	3663	3663				
				Population Total	**3663**	**3663**	**3663**	**3663**	**3663**	**3663**	**3663**				
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	Demand	681	665	652	640	628	620	620				
				Demand Total	**681**	**665**	**652**	**640**	**628**	**620**	**620**				
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	Supply	681	438	196	100	100	100	100	GULF COAST AQUIFER	None		
				Supply Total	**681**	**438**	**196**	**100**	**100**	**100**	**100**				
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	WMS	0	40	39	38	37	37	37	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	WMS	0	0	315	315	315	315	315	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$73,395.00
WILLOW RUN SUBDIVISION	84398000	HARRIS	SAN JACINTO	WMS	0	187	187	187	187	187	187	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$2,406,594.73
				WMS Total	**0**	**227**	**541**	**540**	**539**	**539**	**539**				**$2,479,989.73**
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	Population	4491	6584	8622	8622	8622	8622	8622				
				Population Total	**4491**	**6584**	**8622**	**8622**	**8622**	**8622**	**8622**				
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	Demand	573	804	1033	1014	1004	1004	1004				
				Demand Total	**573**	**804**	**1033**	**1014**	**1004**	**1004**	**1004**				
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	Supply	573	530	310	158	158	158	158	GULF COAST AQUIFER	None		
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	Supply	70	67	70	70	70	70	70	GULF COAST AQUIFER	CITY OF HOUSTON		
				Supply Total	**643**	**597**	**380**	**228**	**228**	**228**	**228**				
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	WMS	0	48	62	60	60	60	60	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	WMS	0	198	198	198	198	198	198	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	INCREASE EXIST CONTRACT	$0.00
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	WMS	0	0	523	523	523	523	523	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$121,859.00
WINDFERN FOREST UD	84401000	HARRIS	SAN JACINTO	WMS	0		6	5	5	5	5	GULF COAST AQUIFER	CITY OF HOUSTON	EXPANDED USE OF GW	$0.00
				WMS Total	**0**	**246**	**789**	**786**	**786**	**786**	**786**				**$121,859.00**
WOODBRANCH	80807000	MONTGOMERY	SAN JACINTO	Population	1305	1305	1305	1305	1305	1305	1305				
				Population Total	**1305**	**1305**	**1305**	**1305**	**1305**	**1305**	**1305**				
WOODBRANCH	80807000	MONTGOMERY	SAN JACINTO	Demand	156	152	148	143	139	136	136				
				Demand Total	**156**	**152**	**148**	**143**	**139**	**136**	**136**				
WOODBRANCH	80807000	MONTGOMERY	SAN JACINTO	Supply	156	151	147	142	138	135	135	GULF COAST AQUIFER	None		
				Supply Total	**156**	**151**	**147**	**142**	**138**	**135**	**135**				
WOODBRANCH	80807000	MONTGOMERY	SAN JACINTO	WMS	0	1	1	1	1	1	1	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
				WMS Total	**0**	**1**	**1**	**1**	**1**	**1**	**1**				**$0.00**
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	Population	2394	3605	4784	5944	7092	8233	9369				
				Population Total	**2394**	**3605**	**4784**	**5944**	**7092**	**8233**	**9369**				
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	Demand	426	622	815	999	1184	1374	1564				
				Demand Total	**426**	**622**	**815**	**999**	**1184**	**1374**	**1564**				
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	Supply	426	409	245	155	155	155	155	GULF COAST AQUIFER	None		
				Supply Total	**426**	**409**	**245**	**155**	**155**	**155**	**155**				
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	WMS	0	37	49	60	71	82	93	CONSERVATION	None	MUNICIPAL CONSERVATION	$0.00
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	WMS	0	0	782	782	1140	1140	1140	LIVINGSTON-WALLISVILLE SYSTEM	CITY OF HOUSTON	TRA-Houston	$265,620.00
WOODCREEK MUD	84404000	HARRIS	SAN JACINTO	WMS	0	176	176	176	176	176	176	TRINITY RIVER RUN-OF-RIVER	CITY OF HOUSTON	New Contracts	$6,834,999.54
				WMS Total	**0**	**213**	**1007**	**1018**	**1387**	**1398**	**1409**				**$7,100,619.54**

Demand, supply and WMS in acre-feet/year
WMS = Water Management Strategy
WUG internal infrastructure costs are reflected under WMS: Expanded use of GW, New Contracts, BRA System Ops, and/or Lake Houston Add'l Yield

Table 4A-10
Clothes Washer Conversion Supply Reduction

4A-10 Clothes Washer Conversion Supply Reduction																								
			Savings, acft/yr							Water Supply by wug, acft/yr								% Decrease in Supply						
wug_name	wug_basin	wug_county	S2000	S2010	S2020	S2030	S2040	S2050	S2060	WS2000	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	2000	2010	2020	2030	2040	2050	2060
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	0	20	80	78	80	83	87	1910	1910	1910	1910	1910	1910	1910	0.00%	1.06%	4.20%	4.06%	4.21%	4.37%	4.53%
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	0	13	49	48	51	54	57	1125	1125	1125	1125	1125	1125	1125	0.00%	1.14%	4.32%	4.29%	4.54%	4.80%	5.07%
COUNTY-OTHER	BRAZOS	BRAZORIA	0	1	2	2	2	3	3	30	12	8	6	5	4	3	0.00%	5.18%	29.25%	38.89%	49.30%	65.24%	92.00%
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	0	20	75	74	79	83	88	2168	2168	2168	2168	2168	2168	2168	0.00%	0.91%	3.45%	3.43%	3.63%	3.84%	4.06%
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	0	26	203	214	239	264	292	4646	4646	4646	4646	4646	4646	4646	0.00%	0.55%	4.37%	4.61%	5.14%	5.69%	6.28%
FREEPORT	BRAZOS	BRAZORIA	0	1	5	4	4	4	4	243	141	117	101	90	80	72	0.00%	0.78%	4.09%	4.37%	4.91%	5.52%	6.13%
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	0	22	71	79	89	101	112	1306	1763	1787	1803	1814	1824	1832	0.00%	1.27%	3.96%	4.36%	4.93%	5.52%	6.14%
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	0	36	131	134	144	155	166	2799	2799	2799	2799	2799	2799	2799	0.00%	1.29%	4.67%	4.77%	5.14%	5.53%	5.94%
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	0	2	7	7	8	9	10	121	121	121	121	121	121	121	0.00%	1.65%	5.50%	5.90%	6.56%	7.27%	8.00%
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	0	139	315	362	416	473	532	9971	10137	10165	10178	10184	10192	10199	0.00%	1.37%	3.10%	3.56%	4.08%	4.64%	5.22%
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	0	4	14	14	15	16	17	278	278	278	278	278	278	278	0.00%	1.33%	5.06%	5.03%	5.32%	5.63%	5.95%
		BRAZORIA Total	0	283	951	1017	1127	1245	1367	24597	25100	25124	25135	25140	25147	25153	0.00%	1.13%	3.78%	4.05%	4.48%	4.95%	5.44%
BEACH CITY	TRINITY	CHAMBERS	0	1	2	2	2	2	3	5	5	5	5	5	5	5	0.00%	10.54%	30.74%	36.38%	42.40%	48.43%	54.70%
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	0	4	11	13	15	17	19	67	67	67	67	67	67	67	0.00%	5.54%	16.20%	19.16%	22.30%	25.50%	28.78%
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	0	0	2	1	1	1	1	2	2	2	2	2	2	2	0.00%	18.82%	82.49%	74.96%	74.33%	73.08%	71.82%
COUNTY-OTHER	TRINITY	CHAMBERS	0	2	8	8	7	7	7	49	44	40	37	35	33	32	0.00%	4.22%	20.67%	20.28%	21.15%	22.13%	22.50%
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	0	1	5	5	5	5	5	56	49	45	40	35	32	29	0.00%	2.45%	11.83%	12.09%	13.64%	14.70%	16.01%
MONT BELVIEU	TRINITY	CHAMBERS	0	4	11	13	15	17	20	92	92	92	92	92	92	92	0.00%	4.13%	12.31%	14.37%	16.62%	18.91%	21.25%
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	0	2	5	6	7	8	9	76	76	76	76	76	76	76	0.00%	2.34%	6.99%	8.16%	9.43%	10.74%	12.06%
OLD RIVER-WINFREE	TRINITY	CHAMBERS	0	2	6	7	7	7	8	35	34	34	35	35	35	35	0.00%	5.09%	19.11%	18.66%	19.80%	20.95%	22.13%
		CHAMBERS Total	0	15	51	54	60	66	72	382	369	361	354	347	342	338	0.00%	4.06%	14.06%	15.38%	17.33%	19.26%	21.23%
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	0	6	11	11	13	14	15	135	135	135	135	135	135	135	0.00%	4.78%	7.91%	8.43%	9.28%	10.21%	11.23%
BEASLEY	BRAZOS	FORT BEND	0	0	0	0	0	0	1	2	2	2	2	2	2	2	0.00%	4.39%	14.43%	16.00%	18.50%	21.64%	25.09%
BIG OAKS MUD	SAN JACINTO	FORT BEND	0	10	25	35	45	59	75	283	283	283	283	283	283	283	0.00%	3.56%	8.81%	12.22%	15.97%	20.87%	26.48%
CINCO MUD #2	SAN JACINTO	FORT BEND	0	19	48	67	87	114	145	1053	1053	1053	1053	1053	1053	1053	0.00%	1.85%	4.58%	6.35%	8.29%	10.84%	13.75%
CINCO MUD #6	SAN JACINTO	FORT BEND	0	6	14	19	25	33	42	198	198	198	198	198	198	198	0.00%	2.82%	6.98%	9.68%	12.65%	16.54%	20.98%
CINCO MUD #7	SAN JACINTO	FORT BEND	0	13	33	46	60	78	99	515	515	515	515	515	515	515	0.00%	2.58%	6.39%	8.86%	11.57%	15.13%	19.20%
CINCO MUD #8	SAN JACINTO	FORT BEND	0	6	14	13	13	13	13	312	312	255	147	147	147	147	0.00%	2.06%	5.46%	8.96%	8.96%	8.96%	8.96%
CINCO MUD #9	SAN JACINTO	FORT BEND	0	17	41	57	74	97	123	670	670	670	670	670	670	670	0.00%	2.47%	6.11%	8.47%	11.07%	14.47%	18.36%
CORNERSTONES MUD	SAN JACINTO	FORT BEND	0	6	16	21	26	33	42	340	340	340	340	340	340	340	0.00%	1.73%	4.63%	6.06%	7.69%	9.83%	12.27%
COUNTY-OTHER	BRAZOS	FORT BEND	0	109	300	440	592	791	1018	1349	1349	1349	1349	1349	1349	1349	0.00%	8.10%	22.22%	32.62%	43.85%	58.65%	75.47%
COUNTY-OTHER	SAN JACINTO	FORT BEND	0	3	25	45	67	104	135	386	330	386	386	386	386	386	0.00%	0.81%	6.36%	11.67%	17.38%	26.92%	35.07%
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	0	18	122	237	358	554	729	1198	1198	1198	1198	1198	1198	1198	0.00%	1.47%	10.17%	19.76%	29.89%	46.21%	60.85%
FAIRCHILDS	BRAZOS	FORT BEND	0	2	5	6	7	9	10	107	107	107	107	107	107	107	0.00%	1.48%	4.39%	5.31%	6.45%	7.96%	9.69%
FIRST COLONY MUD #9	BRAZOS	FORT BEND	0	15	34	32	32	32	32	386	386	386	288	288	288	288	0.00%	3.84%	8.85%	11.19%	11.19%	11.19%	11.19%
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	0	5	13	12	12	12	12	272	272	272	192	192	192	192	0.00%	1.89%	4.84%	6.44%	6.44%	6.44%	6.44%
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	0	4	11	11	11	11	11	189	189	169	115	115	115	115	0.00%	1.89%	6.74%	9.22%	9.22%	9.22%	9.22%
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	0	3	14	12	12	12	12	284	262	226	155	155	155	155	0.00%	1.19%	5.98%	8.05%	8.05%	8.05%	8.05%
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	0	3	9	8	8	8	8	278	269	183	103	103	103	103	0.00%	1.08%	4.69%	7.78%	7.78%	7.78%	7.78%
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	0	10	31	29	29	29	29	795	795	586	340	340	340	340	0.00%	1.32%	5.27%	8.48%	8.48%	8.48%	8.48%
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	0	14	35	49	63	83	105	260	260	260	260	260	260	260	0.00%	5.43%	13.51%	18.67%	24.34%	31.78%	40.28%
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	0	24	63	83	106	135	169	750	750	750	750	750	750	750	0.00%	3.17%	8.38%	11.05%	14.08%	18.06%	22.60%
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	0	7	20	24	29	35	43	371	371	348	246	246	246	246	0.00%	1.79%	5.70%	9.67%	11.72%	14.40%	17.46%
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	0	5	13	18	22	29	36	366	366	366	366	366	366	366	0.00%	1.38%	3.61%	4.79%	6.12%	7.87%	9.87%
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	0	13	35	46	60	77	97	158	158	158	158	158	158	158	0.00%	8.47%	21.97%	29.40%	37.76%	48.71%	61.22%
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	0	3	13	12	12	12	12	266	245	211	144	144	144	144	0.00%	1.27%	6.39%	8.64%	8.64%	8.64%	8.64%
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	0	4	15	14	14	14	14	215	203	176	120	120	120	120	0.00%	1.72%	8.61%	11.66%	11.66%	11.66%	11.66%
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	0	2	7	6	6	6	6	140	131	115	78	78	78	78	0.00%	1.23%	6.03%	8.21%	8.21%	8.21%	8.21%
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	0	4	11	14	17	21	26	186	186	186	186	186	186	186	0.00%	2.08%	5.82%	7.34%	9.14%	11.50%	14.20%
FULSHEAR	BRAZOS	FORT BEND	0	1	3	3	3	4	5	50	50	50	48	48	48	48	0.00%	1.58%	5.09%	6.02%	7.06%	8.42%	9.96%
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	0	1	2	2	2	3	3	71	71	67	47	47	47	47	0.00%	0.73%	2.48%	4.02%	4.71%	5.61%	6.65%
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	0	9	23	32	41	54	68	428	428	428	428	428	428	428	0.00%	2.15%	5.31%	7.37%	9.63%	12.59%	15.97%
KATY	SAN JACINTO	FORT BEND	0	2	5	6	7	8	9	169	131	69	42	42	42	42	0.00%	1.18%	7.35%	13.58%	15.79%	18.68%	21.98%
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	0	11	31	38	47	58	71	699	699	699	516	516	516	516	0.00%	1.54%	4.48%	7.43%	9.09%	11.28%	13.79%
KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	0	0	1	1	2	2	3	22	22	22	18	18	18	18	0.00%	1.91%	5.53%	8.26%	10.14%	12.58%	15.37%
MEADOWS	SAN JACINTO	FORT BEND	0	4	18	17	17	17	17	1311	1089	749	426	426	426	426	0.00%	0.39%	2.43%	3.95%	3.95%	3.95%	3.95%
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	0	0	2	2	2	2	2	103	89	66	39	39	39	39	0.00%	0.47%	2.74%	4.28%	4.28%	4.29%	4.29%
MISSOURI CITY	BRAZOS	FORT BEND	0	3	8	9	11	12	15	1055	636	493	413	406	400	396	0.00%	0.53%	1.66%	2.28%	2.71%	3.02%	3.69%
MISSOURI CITY	SAN JACINTO	FORT BEND	0	27	67	77	90	99	120	2073	2948	3778	3716	3738	3742	3774	0.00%	0.93%	1.77%	2.07%	2.40%	2.64%	3.17%
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	0	124	303	349	407	447	541	18733	15887	16543	16339	16352	16323	16401	0.00%	0.78%	1.83%	2.13%	2.49%	2.74%	3.30%
NEEDVILLE	BRAZOS	FORT BEND	0	2	6	7	8	9	11	51	51	51	51	51	51	51	0.00%	3.63%	12.37%	13.47%	15.35%	17.81%	20.61%
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	0	16	43	57	73	94	117	504	504	504	504	504	504	504	0.00%	3.24%	8.45%	11.25%	14.41%	18.55%	23.29%
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	0	0	1	1	1	1	1	11	10	8	5	5	5	5	0.00%	2.07%	9.17%	15.68%	17.56%	19.95%	22.71%
PECAN GROVE MUD #1	BRAZOS	FORT BEND	0	10	43	41	42	43	45	815	773	679	468	468	468	468	0.00%	1.33%	6.26%	8.66%	8.90%	9.22%	9.59%
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	0	3	11	11	11	11	12	468	414	314	187	187	187	187	0.00%	0.66%	3.60%	5.76%	5.92%	6.14%	6.38%

Table 4A-10
Clothes Washer Conversion Supply Reduction

4A-10 Clothes Washer Conversion Supply Reduction																							
			Savings, acft/yr							Water Supply by wug, acft/yr								% Decrease in Supply						
wug_name	wug_basin	wug_county	S2000	S2010	S2020	S2030	S2040	S2050	S2060	WS2000	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	2000	2010	2020	2030	2040	2050	2060
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	0	4	17	16	16	16	16	417	369	269	156	156	156	156	0.00%	1.17%	6.24%	9.96%	9.96%	9.96%	9.96%
RICHMOND	BRAZOS	FORT BEND	0	15	54	55	61	68	76	675	675	636	471	471	471	471	0.00%	2.15%	8.42%	11.74%	12.88%	14.37%	16.07%
ROSENBERG	BRAZOS	FORT BEND	0	38	129	141	161	187	217	1215	1215	1215	974	974	974	974	0.00%	3.12%	10.63%	14.47%	16.51%	19.19%	22.25%
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	0	14	27	26	26	26	26	407	407	407	389	389	389	389	0.00%	3.32%	6.69%	6.77%	6.77%	6.77%	6.77%
SIMONTON	BRAZOS	FORT BEND	0	1	3	3	3	3	3	113	106	113	113	113	113	113	0.00%	0.65%	2.60%	2.40%	2.41%	2.41%	2.42%
WHCRWA	SAN JACINTO	FORT BEND	0	27	78	96	118	147	181	1731	2294	2404	2244	2400	2588	2770	0.00%	1.18%	3.23%	4.28%	4.92%	5.69%	6.52%
		FORT BEND Total	0	642	1850	2354	2948	3727	4617	42585	40203	40447	37478	37662	37819	38107	0.00%	1.60%	4.57%	6.28%	7.83%	9.86%	12.12%
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	0	2	7	8	8	8	8	134	134	134	134	134	134	134	0.00%	1.69%	5.55%	5.60%	5.74%	5.86%	5.93%
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	0	5	14	15	15	16	16	78	78	78	78	78	78	78	0.00%	5.98%	18.07%	18.75%	19.41%	19.90%	20.21%
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	0	73	242	243	249	254	257	3776	3777	3777	3777	3777	3777	3777	0.00%	1.94%	6.39%	6.43%	6.60%	6.72%	6.80%
		GALVESTON Total	0	80	263	265	272	277	281	3988	3989	3989	3989	3989	3989	3989	0.00%	2.01%	6.59%	6.64%	6.82%	6.95%	7.04%
BELLAIRE	SAN JACINTO	HARRIS	0	21	76	77	83	88	94	2000	2000	2000	1972	1972	1972	1972	0.00%	1.04%	3.79%	3.90%	4.19%	4.49%	4.78%
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	0	2	11	10	10	10	10	581	377	169	87	87	87	87	0.00%	0.65%	6.25%	11.22%	11.22%	11.22%	11.22%
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	0	3	10	11	12	13	15	390	311	165	97	97	97	97	0.00%	0.98%	5.89%	10.95%	12.40%	13.83%	15.27%
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	0	4	15	14	14	14	14	931	918	931	865	865	865	865	0.00%	0.41%	1.64%	1.63%	1.63%	1.63%	1.63%
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	0	3	11	12	13	15	16	368	297	159	95	95	95	95	0.00%	1.13%	6.64%	12.26%	13.96%	15.66%	17.35%
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	0	10	26	24	24	24	24	983	866	620	523	523	523	523	0.00%	1.12%	4.15%	4.62%	4.62%	4.62%	4.62%
CINCO MUD #6	SAN JACINTO	HARRIS	0	2	6	7	9	10	12	92	92	74	50	50	50	50	0.00%	2.44%	7.53%	14.19%	17.53%	20.84%	24.13%
CINCO MUD #9	SAN JACINTO	HARRIS	0	2	6	8	10	11	13	123	123	95	63	63	63	63	0.00%	1.99%	6.49%	12.36%	15.19%	18.01%	20.82%
CONSUMERS WATER INC	SAN JACINTO	HARRIS	0	8	23	27	33	39	44	269	262	157	102	102	102	102	0.00%	3.22%	14.39%	26.89%	32.41%	37.89%	43.34%
CORNERSTONES MUD	SAN JACINTO	HARRIS	0	7	21	24	29	34	38	530	510	302	193	193	193	193	0.00%	1.46%	6.79%	12.67%	15.10%	17.52%	19.94%
COUNTY-OTHER	SAN JACINTO	HARRIS	0	51	153	143	253	367	474	11295	11225	8984	8350	8593	8664	8690	0.00%	0.46%	1.70%	1.71%	2.95%	4.23%	5.45%
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	0	0	1	1	2	2	2	15	14	8	5	5	5	5	0.00%	3.14%	15.13%	28.73%	34.12%	39.52%	44.91%
DEER PARK	SAN JACINTO	HARRIS	0	12	49	47	48	49	51	1732	1731	1732	1720	1721	1722	1725	0.00%	0.70%	2.82%	2.72%	2.79%	2.87%	2.95%
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	0	19	75	72	74	76	78	2655	2648	2655	2632	2631	2630	2627	0.00%	0.70%	2.82%	2.72%	2.80%	2.89%	2.97%
EL DORADO UD	SAN JACINTO	HARRIS	0	4	15	16	17	18	20	427	427	427	423	423	423	423	0.00%	1.00%	3.51%	3.66%	4.00%	4.33%	4.67%
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	0	3	13	12	12	12	12	299	256	225	202	183	169	158	0.00%	1.13%	5.57%	5.73%	6.32%	6.85%	7.32%
FALLBROOK UD	SAN JACINTO	HARRIS	0	11	35	39	44	49	54	673	526	274	158	158	158	158	0.00%	2.10%	12.88%	24.38%	27.59%	30.78%	33.96%
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	0	4	14	15	17	19	21	290	225	117	69	69	69	69	0.00%	1.93%	11.95%	21.97%	24.76%	27.54%	30.30%
GALENA PARK	SAN JACINTO	HARRIS	0	12	47	45	47	49	51	1076	1070	1076	1051	1051	1051	1051	0.00%	1.11%	4.36%	4.33%	4.50%	4.67%	4.84%
GREEN TRAILS MUD	SAN JACINTO	HARRIS	0	4	12	13	14	16	17	791	604	311	180	180	180	180	0.00%	0.61%	3.97%	7.25%	8.05%	8.83%	9.62%
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	0	4	17	16	16	16	16	375	368	370	349	349	349	349	0.00%	1.10%	4.73%	4.63%	4.63%	4.63%	4.63%
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	0	23	76	71	71	71	71	2008	2008	2008	1920	1920	1920	1920	0.00%	1.16%	3.80%	3.70%	3.70%	3.70%	3.70%
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	0	6	18	19	22	24	27	216	216	216	216	216	216	216	0.00%	2.57%	8.15%	8.91%	10.11%	11.29%	12.47%
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	0	4	13	14	16	18	19	364	274	141	82	82	82	82	0.00%	1.47%	9.50%	17.43%	19.43%	21.43%	23.42%
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	0	12	35	33	33	33	33	750	579	276	140	140	140	140	0.00%	2.02%	12.65%	23.46%	23.46%	23.46%	23.46%
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	0	16	47	53	62	71	80	1334	1157	653	401	401	401	401	0.00%	1.37%	7.16%	13.34%	15.54%	17.72%	19.90%
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	0	13	43	45	50	54	59	1123	822	411	230	230	230	230	0.00%	1.53%	10.55%	19.68%	21.63%	23.56%	25.48%
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	0	14	29	28	28	28	28	882	840	380	196	196	196	196	0.00%	1.64%	7.73%	14.20%	14.20%	14.20%	14.20%
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	0	11	31	36	43	50	56	560	519	304	191	191	191	191	0.00%	2.11%	10.08%	18.95%	22.48%	26.00%	29.51%
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	0	14	37	45	55	64	74	769	769	501	328	328	328	328	0.00%	1.82%	7.39%	13.83%	16.74%	19.63%	22.51%
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	0	11	32	37	43	49	55	525	445	249	151	151	151	151	0.00%	2.45%	12.91%	24.35%	28.37%	32.36%	36.34%
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	0	10	28	26	26	26	26	780	731	590	503	503	503	503	0.00%	1.31%	4.68%	5.25%	5.25%	5.25%	5.25%
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	0	9	26	30	34	39	44	483	406	222	135	135	135	135	0.00%	2.15%	11.79%	21.95%	25.41%	28.86%	32.29%
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	0	11	32	37	42	48	54	634	530	291	176	176	176	176	0.00%	2.03%	11.10%	20.80%	24.09%	27.36%	30.62%
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	0	37	93	117	144	170	197	1119	1119	832	553	553	553	553	0.00%	3.29%	11.23%	21.22%	26.02%	30.80%	35.56%
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	0	1	6	5	5	5	5	946	643	324	200	200	200	200	0.00%	0.20%	1.73%	2.59%	2.59%	2.59%	2.59%
HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	0	8	26	28	31	34	37	881	659	333	190	190	190	190	0.00%	1.18%	7.93%	14.64%	16.18%	17.72%	19.25%
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	0	9	21	20	20	20	20	1056	933	421	219	219	219	219	0.00%	0.96%	5.01%	9.08%	9.08%	9.08%	9.08%
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	0	12	25	24	24	24	24	566	551	247	126	126	126	126	0.00%	2.20%	10.17%	18.90%	18.90%	18.90%	18.90%
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	0	4	17	15	15	15	15	673	432	193	98	98	98	98	0.00%	0.89%	8.58%	15.61%	15.61%	15.61%	15.61%
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	0	4	15	15	16	17	18	116	116	116	108	108	108	108	0.00%	3.40%	12.55%	13.54%	14.49%	15.42%	16.36%
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	0	30	89	102	120	137	153	1134	1134	1134	1134	1134	1134	1134	0.00%	2.68%	7.88%	9.04%	10.54%	12.04%	13.53%
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	0	8	28	29	32	34	37	547	547	547	546	546	546	546	0.00%	1.46%	5.10%	5.30%	5.79%	6.28%	6.77%
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	0	2	8	8	8	9	10	530	383	191	107	107	107	107	0.00%	0.55%	3.94%	7.18%	7.77%	8.35%	8.94%
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	0	5	15	16	18	20	22	371	281	145	84	84	84	84	0.00%	1.64%	10.43%	19.34%	21.66%	23.98%	26.28%
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	0	14	45	48	54	60	66	1638	1405	1049	890	890	890	890	0.00%	0.98%	4.29%	5.44%	6.11%	6.77%	7.43%
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	0	5	19	18	18	18	18	756	496	225	116	116	116	116	0.00%	0.91%	8.41%	15.34%	15.58%	15.83%	15.83%
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	0	11	43	43	45	47	49	1050	1047	1050	1031	1031	1031	1031	0.00%	1.08%	4.13%	4.13%	4.35%	4.56%	4.77%
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	0	13	46	48	52	56	60	1050	1050	1050	1042	1042	1042	1042	0.00%	1.25%	4.43%	4.58%	4.97%	5.36%	5.75%
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	0	6	21	22	24	26	28	55	55	55	55	55	55	55	0.00%	11.12%	38.50%	40.10%	43.99%	47.86%	51.71%
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	0	2	7	7	7	7	7	304	195	87	44	44	44	44	0.00%	0.87%	8.39%	15.30%	15.30%	15.30%	15.30%
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	0	2	10	10	10	10	10	370	366	370	357	357	357	357	0.00%	0.67%	2.77%	2.70%	2.75%	2.79%	2.84%
HEDWIG VILLAGE	SAN JACINTO	HARRIS	0	2	10	9	9	9	9	388	317	319	274	266	259	253	0.00%	0.69%	2.98%	3.21%	3.30%	3.39%	3.47%
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	0	1	3	3	3	3	3	299	243	173	146	146	146	146	0.00%	0.36%	1.81%	1.98%	1.98%	1.98%	1.98%

Table 4A-10
Clothes Washer Conversion Supply Reduction

4A-10 Clothes Washer Conversion Supply Reduction																								
			Savings, acft/yr							Water Supply by wug, acft/yr								% Decrease in Supply						
wug_name	wug_basin	wug_county	S2000	S2010	S2020	S2030	S2040	S2050	S2060	WS2000	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	2000	2010	2020	2030	2040	2050	2060
HUMBLE	SAN JACINTO	HARRIS	0	22	76	80	88	96	104	3280	2461	1266	740	740	740	740	0.00%	0.91%	6.03%	10.82%	11.92%	13.01%	14.10%
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	0	6	21	21	22	23	25	654	664	673	664	672	680	687	0.00%	0.84%	3.07%	3.11%	3.28%	3.44%	3.60%
JACINTO CITY	SAN JACINTO	HARRIS	0	13	48	48	51	55	58	1367	1364	1367	1340	1340	1340	1340	0.00%	0.95%	3.55%	3.61%	3.84%	4.07%	4.30%
JERSEY VILLAGE	SAN JACINTO	HARRIS	0	13	42	46	53	60	66	2119	1884	1404	1178	1178	1178	1178	0.00%	0.72%	2.98%	3.94%	4.51%	5.07%	5.62%
KATY	SAN JACINTO	HARRIS	0	22	66	74	86	98	109	1920	1628	897	547	547	547	547	0.00%	1.34%	7.31%	13.57%	15.72%	17.85%	19.98%
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	0	2	6	7	8	9	10	177	142	77	45	45	45	45	0.00%	1.45%	8.38%	15.84%	18.05%	20.24%	22.44%
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	0	0	1	1	1	1	1	8	7	7	7	7	7	7	0.00%	2.15%	8.60%	8.15%	8.33%	8.60%	8.78%
LONGHORN TOWN UD	SAN JACINTO	HARRIS	0	4	11	13	17	20	23	327	327	327	327	327	327	327	0.00%	1.30%	3.27%	4.13%	5.08%	6.02%	6.96%
MASON CREEK UD	SAN JACINTO	HARRIS	0	10	37	34	34	34	34	2273	1549	696	356	356	356	356	0.00%	0.63%	5.28%	9.57%	9.57%	9.57%	9.57%
MISSOURI CITY	SAN JACINTO	HARRIS	0	10	33	36	41	46	51	1502	3141	2088	1700	1672	1703	1597	0.00%	0.33%	1.57%	2.12%	2.45%	2.70%	3.19%
NHCRWA	SAN JACINTO	HARRIS	0	815	2518	2790	3186	3579	3972	81404	101257	70763	56279	56279	56279	56279	0.00%	0.80%	3.56%	4.96%	5.66%	6.36%	7.06%
NORTH BELT UD	SAN JACINTO	HARRIS	0	7	20	24	29	34	38	317	303	180	114	114	114	114	0.00%	2.44%	11.32%	21.32%	25.44%	29.53%	33.61%
NORTH GREEN MUD	SAN JACINTO	HARRIS	0	5	16	16	18	20	21	319	229	114	63	63	63	63	0.00%	1.99%	13.83%	26.05%	28.56%	31.06%	33.53%
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	0	8	22	26	30	35	39	442	387	218	136	136	136	136	0.00%	2.00%	10.31%	19.09%	22.37%	25.64%	28.88%
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	0	14	49	51	56	60	65	1216	877	433	240	240	240	240	0.00%	1.60%	11.37%	21.21%	23.15%	25.08%	27.00%
PARKWAY UD	SAN JACINTO	HARRIS	0	3	12	11	11	11	11	31	28	30	22	22	22	22	0.00%	10.01%	39.81%	50.52%	50.90%	51.24%	51.58%
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	0	3	11	12	13	15	16	543	377	349	336	330	322	315	0.00%	0.91%	3.17%	3.56%	4.08%	4.64%	5.21%
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	0	8	27	28	30	32	34	654	654	654	646	646	646	646	0.00%	1.15%	4.16%	4.28%	4.62%	4.96%	5.29%
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	0	4	15	15	15	16	16	494	487	491	456	456	455	454	0.00%	0.78%	3.06%	3.19%	3.32%	3.46%	3.60%
ROLLING FORK PUD	SAN JACINTO	HARRIS	0	3	10	10	11	11	11	682	465	219	118	118	118	118	0.00%	0.57%	4.75%	8.58%	8.96%	9.33%	9.71%
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	0	18	57	63	72	81	90	1073	1114	1144	1166	1184	1198	1209	0.00%	1.64%	4.99%	5.41%	6.08%	6.75%	7.42%
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	0	2	7	7	8	8	9	395	395	395	391	391	391	391	0.00%	0.50%	1.86%	1.88%	2.01%	2.14%	2.26%
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	0	9	29	31	35	38	42	627	467	239	137	137	137	137	0.00%	1.89%	12.23%	22.76%	25.38%	27.99%	30.58%
SPRING VALLEY	SAN JACINTO	HARRIS	0	4	16	16	16	17	18	858	585	275	147	147	147	147	0.00%	0.71%	5.89%	10.74%	11.22%	11.70%	12.17%
SUNBELT FWSD	SAN JACINTO	HARRIS	0	36	114	124	141	157	173	4227	3442	2054	1407	1407	1407	1407	0.00%	1.04%	5.54%	8.84%	10.01%	11.17%	12.32%
TOMBALL	SAN JACINTO	HARRIS	0	20	61	68	86	100	119	2016	1726	990	598	598	598	598	0.00%	1.14%	6.15%	11.42%	14.45%	16.71%	19.92%
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	0	30	43	41	41	41	41	549	549	413	213	213	213	213	0.00%	5.42%	10.31%	19.38%	19.38%	19.38%	19.38%
WALLER	SAN JACINTO	HARRIS	0	1	3	4	4	5	6	80	78	46	29	29	29	29	0.00%	1.42%	6.64%	12.57%	14.99%	17.39%	19.79%
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	0	8	14	13	13	13	13	301	301	168	87	87	87	87	0.00%	2.72%	8.17%	15.14%	15.14%	15.14%	15.14%
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	0	18	67	66	71	75	79	2639	2637	2639	2588	2588	2588	2588	0.00%	0.67%	2.53%	2.57%	2.73%	2.89%	3.05%
WHCRWA	SAN JACINTO	HARRIS	0	369	1413	1631	1819	2016	2217	41559	50708	36946	30242	30086	29898	29716	0.00%	0.73%	3.83%	5.39%	6.05%	6.74%	7.46%
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	0	3	15	14	14	14	14	681	438	196	100	100	100	100	0.00%	0.79%	7.62%	13.79%	13.79%	13.79%	13.79%
WINDFERN FOREST UD	SAN JACINTO	HARRIS	0	12	34	32	32	32	32	643	597	380	228	228	228	228	0.00%	2.03%	8.91%	14.23%	14.23%	14.23%	14.23%
WOODCREEK MUD	SAN JACINTO	HARRIS	0	7	19	22	27	31	35	426	409	245	155	155	155	155	0.00%	1.67%	7.66%	14.44%	17.22%	19.99%	22.75%
		HARRIS Total	0	2024	6562	7170	8139	9111	10083	205975	227795	164337	133977	134029	133935	133666	0.00%	0.89%	3.99%	5.35%	6.07%	6.80%	7.54%
CONROE	SAN JACINTO	MONTGOMERY	0	83	228	274	340	429	531	7175	7175	6589	6662	6849	6979	7080	0.00%	1.15%	3.45%	4.11%	4.97%	6.14%	7.50%
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	0	4	10	13	16	20	25	164	164	147	151	154	159	162	0.00%	2.34%	7.03%	8.33%	10.25%	12.59%	15.38%
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	0	309	780	1083	1473	2017	2648	14688	14688	14688	14688	14688	14688	14688	0.00%	2.10%	5.31%	7.37%	10.03%	13.73%	18.03%
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	0	13	30	40	53	69	89	368	368	368	368	368	368	368	0.00%	3.45%	8.19%	10.84%	14.29%	18.84%	24.13%
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	0	2	7	8	10	12	15	169	169	169	169	169	169	169	0.00%	1.44%	4.08%	4.81%	5.91%	7.37%	9.06%
EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	0	4	11	14	19	24	31	284	284	284	284	284	284	284	0.00%	1.58%	3.80%	4.98%	6.52%	8.56%	10.93%
H M W SUD	SAN JACINTO	MONTGOMERY	0	18	50	59	72	89	110	1268	1268	1133	1136	1149	1164	1169	0.00%	1.38%	4.40%	5.16%	6.25%	7.67%	9.38%
MAGNOLIA	SAN JACINTO	MONTGOMERY	0	2	6	7	8	10	12	233	233	233	233	233	233	233	0.00%	0.84%	2.57%	2.88%	3.42%	4.12%	4.95%
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	0	16	33	48	67	92	122	720	720	720	720	720	720	720	0.00%	2.24%	4.54%	6.70%	9.34%	12.83%	16.88%
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	0	3	13	12	12	12	12	477	382	280	227	187	152	124	0.00%	0.79%	4.66%	5.31%	6.44%	7.92%	9.71%
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	0	8	21	26	33	43	54	651	651	651	651	651	651	651	0.00%	1.25%	3.21%	4.02%	5.15%	6.62%	8.34%
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	0	6	15	20	26	35	45	522	522	522	522	522	522	522	0.00%	1.22%	2.86%	3.81%	5.04%	6.66%	8.55%
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	0	5	12	11	11	11	11	369	369	323	259	213	173	142	0.00%	1.48%	3.62%	4.27%	5.19%	6.39%	7.79%
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	0	5	16	17	19	23	26	425	393	308	280	262	247	237	0.00%	1.21%	5.12%	6.04%	7.41%	9.19%	11.18%
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	0	9	19	18	18	18	18	645	645	567	456	375	305	250	0.00%	1.35%	3.29%	3.87%	4.70%	5.78%	7.06%
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	0	5	18	19	22	26	30	435	405	318	288	270	256	247	0.00%	1.33%	5.54%	6.60%	8.11%	10.05%	12.20%
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	0	27	68	87	112	146	185	965	965	965	965	965	965	965	0.00%	2.81%	7.02%	8.98%	11.62%	15.10%	19.14%
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	0	6	17	19	23	28	34	563	563	464	453	448	443	440	0.00%	1.00%	3.61%	4.24%	5.16%	6.39%	7.80%
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	0	4	11	13	15	15	15	605	605	537	534	484	393	321	0.00%	0.66%	2.14%	2.52%	3.04%	3.75%	4.59%
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	0	3	8	9	10	13	15	76	76	76	76	76	76	76	0.00%	3.36%	10.10%	11.48%	13.76%	16.75%	20.23%
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	0	8	17	23	32	44	57	334	334	334	334	334	334	334	0.00%	2.32%	4.95%	7.03%	9.63%	13.05%	17.03%
PORTER WSC	SAN JACINTO	MONTGOMERY	0	25	66	81	102	102	102	1391	1391	1306	1340	1388	1119	917	0.00%	1.78%	5.08%	6.05%	7.34%	9.10%	11.11%
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	0	41	65	62	62	62	62	999	999	999	999	865	704	577	0.00%	4.08%	6.48%	6.24%	7.20%	8.85%	10.80%
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	0	3	13	12	12	12	12	811	689	507	408	334	270	222	0.00%	0.50%	2.64%	3.03%	3.70%	4.58%	5.57%
ROMAN FOREST	SAN JACINTO	MONTGOMERY	0	3	7	8	10	13	15	168	168	168	168	168	168	168	0.00%	1.49%	4.35%	5.03%	6.10%	7.51%	9.15%
SHENANDOAH	SAN JACINTO	MONTGOMERY	0	1	6	6	6	6	6	517	426	315	253	209	169	138	0.00%	0.33%	1.95%	2.24%	2.71%	3.35%	4.10%
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	0	21	50	48	48	48	48	1163	1163	1163	1072	885	721	590	0.00%	1.77%	4.29%	4.46%	5.40%	6.63%	8.11%
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	0	4	10	12	15	20	24	181	181	170	174	179	181	181	0.00%	2.07%	5.87%	7.02%	8.60%	10.82%	13.50%
SPLENDORA	SAN JACINTO	MONTGOMERY	0	4	10	13	17	22	28	126	126	126	126	126	126	126	0.00%	3.17%	7.70%	10.03%	13.10%	17.16%	21.88%
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	0	10	24	31	40	53	67	339	339	339	339	339	339	339	0.00%	2.88%	7.05%	9.15%	11.92%	15.58%	19.83%

Table 4A-10
Clothes Washer Conversion Supply Reduction

4A-10 Clothes Washer Conversion Supply Reduction																								
			Savings, acft/yr							Water Supply by wug, acft/yr							% Decrease in Supply						
wug_name	wug_basin	wug_county	S2000	S2010	S2020	S2030	S2040	S2050	S2060	WS2000	WS2010	WS2020	WS2030	WS2040	WS2050	WS2060	2000	2010	2020	2030	2040	2050	2060
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	0	9	20	19	19	19	19	367	367	367	367	361	294	241	0.00%	2.45%	5.32%	5.14%	5.23%	6.42%	7.83%
THE WOODLANDS	SAN JACINTO	MONTGOMERY	0	69	437	449	449	449	449	13714	12212	13714	13714	11837	9599	7859	0.00%	0.57%	3.19%	3.27%	3.79%	4.68%	5.71%
WILLIS	SAN JACINTO	MONTGOMERY	0	10	27	33	42	54	67	424	424	403	413	424	424	424	0.00%	2.40%	6.60%	8.00%	9.90%	12.68%	15.91%
WOODBRANCH	SAN JACINTO	MONTGOMERY	0	1	5	5	5	5	5	156	151	147	142	138	135	135	0.00%	0.81%	3.62%	3.46%	3.56%	3.64%	3.64%
		MONTGOMERY Total	0	740	2127	2598	3219	4038	4989	51492	49615	49400	48971	46654	43530	41099	0.00%	1.49%	4.30%	5.31%	6.90%	9.28%	12.14%
BROOKSHIRE	BRAZOS	WALLER	0	5	18	19	22	25	29	522	522	522	522	522	522	522	0.00%	0.97%	3.45%	3.70%	4.21%	4.82%	5.51%
COUNTY-OTHER	BRAZOS	WALLER	0	19	58	70	86	106	128	675	675	675	675	675	675	675	0.00%	2.80%	8.58%	10.37%	12.79%	15.67%	18.97%
COUNTY-OTHER	SAN JACINTO	WALLER	0	19	60	72	89	109	132	695	695	695	695	695	695	695	0.00%	2.80%	8.58%	10.37%	12.78%	15.66%	18.96%
HEMPSTEAD	BRAZOS	WALLER	0	8	28	31	37	44	52	946	946	946	946	946	946	946	0.00%	0.88%	2.92%	3.31%	3.91%	4.63%	5.45%
KATY	SAN JACINTO	WALLER	0	1	3	3	3	3	3	153	97	44	22	22	22	22	0.00%	0.78%	7.46%	13.77%	13.77%	13.77%	13.77%
PINE ISLAND	BRAZOS	WALLER	0	2	6	7	8	10	12	95	95	95	95	95	95	95	0.00%	1.85%	5.84%	6.88%	8.35%	10.10%	12.12%
PRAIRIE VIEW	BRAZOS	WALLER	0	5	19	19	21	23	26	1055	1055	1055	1055	1055	1055	1055	0.00%	0.47%	1.80%	1.83%	2.01%	2.22%	2.45%
PRAIRIE VIEW	SAN JACINTO	WALLER	0	1	2	2	2	3	3	116	116	116	116	116	116	116	0.00%	0.48%	1.80%	1.83%	2.01%	2.22%	2.46%
WALLER	SAN JACINTO	WALLER	0	3	10	11	13	15	18	353	353	353	353	353	353	353	0.00%	0.82%	2.78%	3.11%	3.66%	4.30%	5.04%
		WALLER Total	0	63	203	235	282	337	401	4610	4554	4501	4479	4479	4479	4479	0.00%	1.38%	4.51%	5.24%	6.28%	7.53%	8.96%
		Grand Total	0	3847	12006	13693	16048	18801	21811	662,648	698,696	571,817	504,287	500,121	494,003	489,183	0.00%	0.55%	2.10%	2.72%	3.21%	3.81%	4.46%

Appendix 4B

Management Strategies

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REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: MUNICIPAL WATER CONSERVATION
DATE: February 16, 2005

SUMMARY

STRATEGY DESCRIPTION: Implementation of "Water Conservation" management practices for Municipal WUG's.

SUPPLY QUANTITY: Potential Municipal demand reductions of

29,505	ac-ft in 2000
41,128	ac-ft in 2010
60,634	ac-ft in 2020
70,901	ac-ft in 2030
79,741	ac-ft in 2040
89,628	ac-ft in 2050
100,987	ac-ft in 2060

SUPPLY SOURCE: Savings from existing groundwater and surface water supplies

TOTAL STRATEGY COST:

$4,734,481 in 2000
$6,586,232 in 2010
$9,719,353 in 2020
$11,360,780 in 2030
$12,771,452 in 2040
$14,345,683 in 2050
$16,154,066 in 2060

UNIT WATER COST: WUGs with Population < 3,301 - $154 per acre foot
WUGs with 3,300 < Population < 10,001 - $156 per acre foot
WUGs with Population > 10,000 - $161 per acre foot

Water Management Strategy Analysis Description

INTRODUCTION

Water conservation is a demand management strategy that pro-actively causes a decrease of future water needs. Conservation facilitates more efficient use of existing water supplies by allowing existing supplies to serve demands for a longer period of time and/or to delay the need to develop new supplies. The current Region H water demands have an embedded quantity of conservation savings. This quantity has been determined based on the assumption that water will be saved as a result of the 1991 State Water-Efficient Plumbing Act.
The use of water conservation strategies/BMPs will accomplish a higher degree of conservation than is already contained within the current demand projections. This technical memorandum illustrates the application of water conservation to Municipal and Municipal County-Other WUG's that have projected water shortages.

The City of Houston volunteered to apply conservation as a management strategy even though they have no water shortage through the planning period. Based on information provided by the City of Houston, conservation for the City was estimated at 7 percent of the total projected demand for each planning decade. The City's voluntary municipal water conservation added approximately 41,517 acre-feet of water savings in the year 2060 for the region as compared to the 2060 estimated water savings resulting from water conservation for only those WUGs with projected shortages. This additional conservation savings, as a result of the City's voluntary program, equals approximately 40 percent of the total projected municipal water conservation savings for the region.

Water conservation is achieved through the use of various water conservation measures. There are in excess of 200 different types of conservation measures in use by public utilities within the United States. The Region H water demands are lower than they would otherwise have been because of anticipated water savings as a result of the 1991 State Water-Efficient Plumbing Act.

WUGs with water supply shortages reported in Chapter 3 of this report will be required to have a management strategy identified to meet this shortage. The Texas Water Development Board requires that the Region H Planning Group consider water conservation as a management strategy for WUGs with identified shortages. If the planning group determines that water conservation is not feasible, for any reason, it must be documented. The following sections discuss the application of municipal conservation as a management strategy within Region H.

TWDB WATER CONSERVATION BMPs AND ANALYSIS APPROACH

The Texas Water Development Board (TWDB) created the Water Conservation Implementation Task Force to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The Water Conservation Implementation Task Force consists of a volunteer group of persons with experience in and commitment to using water more efficiently. The task force developed TWDB Report 362 – Water Conservation Best Management Practices Guide, which outlines specific water conservation best management practices (BMPs) for various water uses. Various BMPs from this report are discussed and outlined in this strategy.

The list of those municipal water conservation BMPs/strategies outlined in the TWDB Report 362 is as follows:

- System Water Audit and Water Loss
- Water Conservation Pricing
- Prohibition on Wasting Water
- Showerhead, Aerator and Toilet Flapper Retrofit
- Residential Ultra Low Flow Toilet Replacement Programs
- Residential Clothes Washer Incentive Program
- School Education
- Water Survey for Single-Family and Multi-Family Customers
- Landscape Irrigation Conservation and Incentives
- Water Wise Landscape Design and Conversion Programs
- Athletic Field Conservation

- Golf Course Conservation
- Metering of All New Connections and Retrofit of Existing Connections
- Wholesale Agency Assistance Programs
- Conservation Coordinator
- Water Reuse
- Public Information BMP
- Rainwater Harvesting and Condensate Reuse
- New Construction Graywater BMP
- Park Conservation BMP
- Conservation Programs for Industrial, Commercial, and Institutional Accounts

In order to apply water conservation as a management strategy within Region H, an approach to develop estimates of savings and costs needed to be developed. The following paragraphs discuss the approach utilized to apply conservation.

For those WUGs with identified water shortages, a letter discussing conservation was mailed to each WUG. The conservation letter essentially ascertained whether or not the WUG currently has a conservation plan and requested information related to the effectiveness of existing conservation measures. The letter also contained a survey to determine which conservation BMPs (those identified by the Conservation Task Force) the WUGs currently use and those they would consider in the future.

To aid in the development of costs and savings associated with this strategy the TWDB Report 362 was supplemented with savings and costs identified in the COH water conservation plan.

Water conservation was applied prior to expanding contracts for those WUGs with existing contracts with wholesale water providers. This strategy was only applied to those WUGs with shortages as identified in Chapter 3. The WUGs were classified into three groups for purposes of applying this strategy. The three classifications were based on WUG population and consisted of population less than 3,301 persons, population greater than 3,300 persons but less than 10,001 persons, and population greater than 10,000 persons. These three WUG size classifications were developed to recognize and account for the various degree by which WUGs of different sizes will likely implement advanced conservation measures. Larger WUGs with greater resources are more likely to be able to implement a comprehensive conservation program than a smaller WUG with lesser resources. Therefore, the expected water savings and costs for the region are also likely to differ depending on the relative size of the WUG.

WATER CONSERVATION BMP SURVEY

The results of the survey were compiled to evaluate which conservation BMPs were currently being performed and which BMPs will most likely be evaluated by the WUGs for future use.

The evaluation of the returned surveys yielded the most-likely conservation BMPs to be considered for conservation management strategy. The WUGs were classified into three groups consisting of:

- Population less than 3,301 persons
- Population greater than 3,300 persons but less than 10,001 persons
- Population greater than 10,000 persons

Approximately 60 surveys were returned out of the 165 conservation letters mailed. The WUGs with populations less than 3,301 persons consisted of approximately 18 percent of the return. WUGs with populations greater than 3,300 persons but less than 10,001 persons consisted of approximately 42 percent of the return. The remaining 40 percent was from WUGs with populations greater than 10,000 persons.

The results of the survey are provided in Table 1 below. Based on the results of this survey it appears that the majority of the recommended BMPs are either currently being utilized in the region and/or would be considered in the future. Therefore, based on the survey conducted, it is recommended that all of the listed municipal conservation BMPs be considered by individual WUGs within Region H in the development of future water conservation plans.

Table 1 – Potential Water Conservation Strategies

Water Conservation Strategy	Currently Use	Future Consideration
System Water Audit and Water Loss	52%	25%
Water Conservation Pricing	53%	25%
Prohibition on Wasting Water	23%	23%
Showerhead, Aerator and Toilet Flapper Retrofit	3%	35%
Residential Ultra Low Flow Toilet Replacement Programs	2%	33%
Residential Clothes Washer Incentive Program	0%	28%
School Education	33%	33%
Water Survey for Single-Family and Multi-Family Customers	7%	35%
Landscape Irrigation Conservation and Incentives	10%	27%
Water Wise Landscape Design and Conversion Programs	5%	27%
Athletic Field Conservation	3%	32%
Golf Course Conservation	8%	23%
Metering of All New Connections and Retrofit of Existing Connections	70%	3%
Wholesale Agency Assistance Programs	2%	22%
Conservation Coordinator	5%	23%
Water Reuse	20%	32%
Public Information BMP	18%	23%
Rainwater Harvesting and Condensate Reuse	0%	27%
New Construction Graywater BMP	2%	22%
Park Conservation BMP	2%	37%
Conservation Programs for Industrial, Commercial, and Institutional Accounts	15%	27%
Others (Please Specify) – Seasonal Water Use Surcharge		

Note: The above results are based on 60 returned surveys.

DEVELOPMENT OF COSTS AND SAVINGS FOR THE REGION

In general, Water Conservation practices, which are not linked to the 1991 State Water-Efficient Plumbing Act, are those that are more aggressive in terms of the timing of their usage (pro-actively managed to occur sooner in time) or the application of additional specific conservation practices. An estimate of water savings and expected costs is required to be developed for the region as a means to compare water conservation to other water management strategies. The TWDB Report 362, which provides detail information for the municipal conservation BMPs in Table 1, does not provide sufficient detail relating to projected water savings and costs for all the BMPs provided.

To aid in the development of costs and savings associated with this strategy the TWDB Report 362 was supplemented with savings and costs identified in the COH water conservation plan. For reference purposes, Figure 1 has been included to summarize the conservation practices contained within the current City of Houston water conservation program and the current estimated costs and savings. The BMPs identified in the COH conservation plan were then used to assist in estimating savings and costs for the Region. This set of ten practices identified in the COH conservation plan is projected to result in an overall savings of approximately 7 percent of total water use by year 2005 and then be sustained at an annual level of approximately 7 percent. It can be anticipated that these and other similar practices could be used to accomplish similar conservation savings proposed for the Region H Municipal WUG's. The total projected water savings reduction by year for all of the Municipal WUG's with shortages is shown in Table 2.

The per unit cost of each of the COH conservation measures identified for estimating savings and costs for the region is shown below. For specific information used to estimate conservation BMP costs and savings, refer to Figure 1.

Cost Per Municipal Conservation Measure

1. Water Audits ($488 per acre-foot)
2. Commercial Indoor Audits ($218 per acre-foot)
3. Cooling Tower Audits ($144 per acre-foot)
4. Indoor/Exterior Audits ($162 per acre-foot)
5. Pool/Fountain Standards ($43 per acre-foot)
6. Pool/Fountain Audits ($83 per acre-foot)
7. COH In-House Programs ($5 per acre-foot)
8. Unaccounted-for-water ($72 per acre-foot)
9. Public Education ($273 per acre-foot)
10. Water Wise Program ($118 per acre-foot)

It is recommended that all the conservation BMPs outlined in TWDB Report 362 be utilized within Region H for those WUGs with shortages to meet conservation goals. However, for purposes of estimating water savings and costs for Region H the above COH BMPs were used as a basis for analysis. The following sections outline the COH BMPs utilized to estimate potential savings and costs.

RESULTS

Estimates of potential savings and costs for WUGs with shortages are presented below by population over the sixty-year planning period.

Population < 3,301

For those WUGs with populations less than 3,301 persons over the sixty-year planning cycle, the following COH conservation BMPs were chosen to estimate savings and costs:

- Unaccounted-for-water
- Public Education
- Water Wise Program

As shown, a large range of potential costs exists. A weighting of these per unit costs applied produces an average cost of $154 per acre-feet per year. This cost is proposed for use for the water conservation management strategy for the WUGs with populations less than 3,301 persons.

3,300 < Population < 10,001

For those WUGs with populations greater than 3,300 persons and less than 10,001 persons, the following COH conservation BMPs were chosen to estimate savings and costs:

- Unaccounted-for-water
- Public Education
- Water Wise Program
- Indoor/Exterior Audits

As shown, a large range of potential costs exists. A weighting of these per unit costs produces an average cost of $156 per acre-feet per year. This WUG classification includes additional public auditing water conservation measures than smaller (less than 3,301 population) WUGs. This cost is proposed for use for the water conservation management strategy for the WUGs with populations greater than 3,300 and less than 10,001 persons.

Population > 10,000

For those WUGs with populations greater than 10,000 persons, the following COH conservation BMPs were chosen to estimate savings and costs:

- Water Audits
- Commercial Indoor Audits
- Cooling Tower Audits
- Indoor/Exterior Audits
- Pool/Fountain Standards
- Pool/Fountain Audits
- COH In-House Programs
- Unaccounted-for-water
- Public Education
- Water Wise Program

As shown, a large range of potential costs exists. A weighting of these per unit costs produces an average cost of $161 per acre-feet per year. This WUG classification includes additional

public and commercial BMPs when compared to the BMPs outlined for WUGs with population ranging from 3,300 to 10,000 persons. This cost is proposed for use for the water conservation management strategy for the WUGs with populations greater than 10,000 persons.

Water User Group Application

Table 2 provides a listing of all of the Municipal and Municipal County-Other WUG's with shortages within Region H. This table shows the water demands as a result of the 1991 State Water-Efficient Plumbing Act, the expected conservation savings from implementing Strategies/BMPs, and the remaining shortage, if any. As shown, conservation savings as a percentage of total demand generally ranges up to approximately 7 percent. Based on this analysis, usage of Water Conservation could eliminate all projected shortages for the following WUGs.

WUG Name	County	Basin
Deer Park	Harris	San Jacinto
Deer Park	Harris	San Jacinto-Brazos
El Lago	Harris	San Jacinto-Brazos
Harris County FWSD #47	Harris	San Jacinto
Cut and Shoot	Montgomery	San Jacinto
Patton Village	Montgomery	San Jacinto
Roman Forest	Montgomery	San Jacinto
Splendora	Montgomery	San Jacinto
Woodbranch	Montgomery	San Jacinto
County-Other	Waller	San Jacinto
Prairie View	Waller	San Jacinto
Waller	Waller	San Jacinto

The remaining WUGs in Region H with projected shortages will require a combination of municipal conservation and some other water management strategy to meet shortages for each planning decade.

ISSUES AND CONSIDERATIONS

Accomplishing the water conservation demand reductions, as described herein, requires pro-active implementation. Identification of an appropriate utility or political subdivision to manage or legislate use of the conservation measures to the municipal WUG's is one of the critical issues facing the success of this strategy.

It should be noted that some of the WUG's are collections of small systems either publicly or privately owned. These systems are the least likely to have any type of coordinated effort to reduce water consumption. Certainly the individual systems themselves will have varying attitudes toward conservation, with some moving forward with conservation plans and others concerned solely with revenue generated to support system operations.

The implementation of conservation measures for collective groupings of small systems is problematic from the fact that there is no single point of accountability. These savings may or may not accrue, depending upon the efforts or lack thereof of many different utilities. For these systems, there is no leverage to encourage conservation, there is no incentive for them to implement and pay for conservation education, and there is no economic incentive for them to reduce billings as it reduces the potential sale value of their systems.

There are no negative environmental impacts associated with the conservation strategies outlined herein or that may results from implementation of the conservation management strategy. Large-scale structural modifications (constructing physical facilities) are not necessary to implement the water conservation management strategy. Therefore, the resultant type of construction impacts is not anticipated. However, conservation may create various types of social impacts. Notably, water conservation has the potential to increase water rates to compensate for a loss of revenue from water sales by each water utility. For instance, the City of Houston Water Conservation Plan discussed this issue and concluded that the rate of reduced water use from their anticipated program would have a minimal impact (1.5 percent) on the price of water to the customer. That report went on to state that reduced water sales would be offset from the positive impact of deferred capital cost expenditures of water and wastewater facilities that would have been required at an earlier date without water conservation.

Figure 1: City of Houston Conservation Alternatives

Residential	***Description***	***Savings (% of Total Water Demand)***	***Cost per Acre-Foot***
• Water Audits[1,8]	Local officials would offer indoor/outdoor water audits to existing single-family & multi-family residential customers w/ high water use.	0.14%	$488.00
Commercial[21]	***Description***	***Savings (% of Total Water Demand)***	***Cost per Acre-Foot***
• Indoor Audits	Local officials would offer on-site interior inspection & produce a customized report describing fixture inspections, leak tests, retrofit possibilities, cooling tower operation & improvements, etc.	0.39%	$218.00
• Cooling Tower Audits	Local officials would offer audits to measure the number of cycles of concentration and to suggest improvements in operations, such as addition of a chemical feed system to increase the cycles of concentration.	0.16%	$144.00
Public	***Description***	***Savings (% of Total Water Demand)***	***Cost per Acre-Foot***
• Indoor/Exterior Audits[9,11,12,21]	Local officials would perform water audits at all public buildings focusing on indoor plumbing fixtures & irrigation water uses.	0.41%	$162.00
• Pool/Fountain Audits	Local officials would provide audits on-site & produce a customized report that describes fixture & valve inspections, leak tests, retrofit possibilities, pool/fountain cleaning & backwashing operation & improvements, & recycling opportunities for each site. Leak detection by a private contractor would be provided if warranted.	0.08%	$83.00
• Pool/Fountain Standards	All new publicly owned pools and fountains would be required to meet water efficiency minimum standards as established.	0.09%	$43.00
• In-House Programs	Targets all local government departments not currently charged for water. Directors/managers of these would receive an "in-house" bill, detailing their water usage. A goal of 20% water usage (by a specific time period) would be established.	0.07%	$5.00

Other Programs	*Description*	*Savings (% of Total Water Demand)*	*Cost per Acre-Foot*
• Unaccounted-for-Water[1]	Local officials would increase its leak protection & repair program w/ goal of reducing "lost-and-unaccounted-for" water to 10% (from current average of 17%).	3.90%	$72.00
• Public Education[7]	Local officials would offer water conservation education to all schools, civic associations, Girl Scout & Boy Scout troops, etc.	1.51%	$273.00
• *Waterwise & Energy Efficient* Program[4,7,17]	Local officials would maintain a partner w/ the Harris-Galveston Coastal Subsidence District to provide 5th grade students in the area w/ a 2-week conservation education program that provides retrofit devices (low-flow shower head, kitchen aerator, bathroom aerator, etc.).	0.14%	$118.00

As identified above the following notes relate portions of the TWDB Conservation Task Force identified water conservation measures to those utilized in the City of Houston's water conservation plan. They do not correlate directly, but an end user could if feasible utilize all or parts of the TWDB Conservation Task Force identified measures or other known BMPs or strategies.

[1]System Water Audit and Water Loss
[4]Showerhead, Aerator and Toilet Flapper Retrofit
[7]School Education
[8]Water Survey for Single-Family and Multi-Family Customers
[9]Landscape Irrigation Conservation and Incentives
[11]Athletic Field Conservation
[12]Golf Course Irrigation
[17]Public Information BMP
[21]Conservation Practices for Industrial, Commercial, and Institutional Accounts

Table 2

County:	Brazoria		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Angleton	San Jacinto-Brazos	Population	18130	18951	19805	20623	21377	22176	23010
		Demand	2071	2102	2108	2125	2131	2186	2268
		Shortage	-161	-162	-153	-175	-193	-246	-323
		Potential Conservation	143	145	145	147	147	151	156
		Applied Conservation	143	145	145	147	147	151	156
		Remaining Shortage	-18	-17	-8	-28	-46	-95	-167
Clute	San Jacinto-Brazos	Population	10424	11217	12043	12834	13563	14335	15141
		Demand	1133	1181	1214	1265	1291	1349	1425
		Shortage	-8	-34	-49	-82	-104	-152	-217
		Potential Conservation	78	81	84	87	89	93	98
		Applied Conservation	8	34	49	82	89	93	98
		Remaining Shortage	0	0	0	0	-15	-59	-119
County-Other	Brazos	Population	500	539	580	619	655	693	733
		Demand	125	133	141	149	156	164	173
		Shortage	-95	-121	-133	-143	-151	-160	-170
		Potential Conservation	7	7	8	8	9	9	10
		Applied Conservation	7	7	8	8	9	9	10
		Remaining Shortage	-88	-114	-125	-135	-142	-151	-160
County-Other	Brazos-Colorado	Population	15963	17213	18514	19759	20907	22124	23394
		Demand	4005	4242	4500	4759	4965	5229	5529
		Shortage	-1837	-1990	-2134	-2312	-2468	-2692	-2948
		Potential Conservation	222	236	250	264	276	290	307
		Applied Conservation	222	236	250	264	276	290	307
		Remaining Shortage	-1615	-1754	-1884	-2048	-2192	-2402	-2641
County-Other	San Jacinto-Brazos	Population	48803	43405	49911	56948	63403	70271	77465
		Demand	12245	10696	12132	13715	15056	16609	18309
		Shortage	-9301	-7397	-7482	-8865	-10298	-12161	-14213
		Potential Conservation	680	594	674	761	836	922	1017
		Applied Conservation	680	594	674	761	836	922	1017
		Remaining Shortage	-8621	-6803	-6808	-8104	-9462	-11239	-13196
Freeport	Brazos	Population	1173	1173	1173	1173	1173	1173	1173
		Demand	147	140	135	132	130	129	129
		Shortage	0	0	-17	-30	-39	-48	-56
		Potential Conservation	10	10	9	9	9	9	9
		Applied Conservation	0	0	9	9	9	9	9
		Remaining Shortage	0	0	-8	-21	-30	-39	-47
Freeport	San Jacinto-Brazos	Population	11535	14621	17833	20909	23744	26749	29886
		Demand	1447	1752	2057	2366	2633	2936	3281
		Shortage	0	0	-157	-333	-513	-750	-1043
		Potential Conservation	100	121	142	163	182	203	226
		Applied Conservation	0	0	142	163	182	203	226
		Remaining Shortage	0	0	-15	-170	-331	-547	-817
Lake Jackson	San Jacinto-Brazos	Population	26386	29383	32502	35488	38241	41159	44205
		Demand	3754	4015	4332	4611	4883	5210	5595
		Shortage	0	0	0	-110	-382	-709	-1094
		Potential Conservation	259	277	299	318	337	359	386
		Applied Conservation	0	0	0	110	337	359	386
		Remaining Shortage	0	0	0	0	-45	-350	-708

Table 2

County:	Brazoria		Decade						
WUG Name	**Basin**		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Oyster Creek	San Jacinto-Brazos	**Population**	1192	1424	1666	1897	2110	2336	2572
		Demand	146	166	188	210	229	251	277
		Shortage	-25	-34	-43	-59	-75	-96	-122
		Potential Conservation	8	9	10	12	13	14	15
		Applied Conservation	8	9	10	12	13	14	15
		Remaining Shortage	-17	-25	-33	-47	-62	-82	-107
Pearland	San Jacinto-Brazos	**Population**	35696	63685	80689	96167	110461	125585	141358
		Demand	5358	9202	11479	13465	15343	17443	19634
		Shortage	0	0	-685	-1857	-3148	-4814	-6725
		Potential Conservation	370	635	792	929	1058	1203	1354
		Applied Conservation	0	0	685	929	1058	1203	1354
		Remaining Shortage	0	0	0	-928	-2090	-3611	-5371
Richwood	San Jacinto-Brazos	**Population**	3012	3244	3486	3717	3930	4156	4392
		Demand	304	313	324	333	339	354	374
		Shortage	-26	-28	-32	-40	-46	-60	-79
		Potential Conservation	18	19	19	20	20	21	22
		Applied Conservation	18	19	19	20	20	21	22
		Remaining Shortage	-8	-9	-13	-20	-26	-39	-57

Table 2

County:	Chambers		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Beach City	Trinity	Population	204	292	391	483	562	643	726
		Demand	28	39	51	62	72	82	93
		Shortage	-23	-32	-42	-52	-61	-69	-79
		Potential Conservation	2	2	3	4	4	5	6
		Applied Conservation	2	2	3	4	4	5	6
		Remaining Shortage	-21	-30	-39	-48	-57	-64	-73
Beach City	Trinity-San Jacinto	Population	1441	2066	2762	3409	3970	4539	5122
		Demand	200	275	362	439	507	580	654
		Shortage	-133	-193	-258	-322	-381	-446	-514
		Potential Conservation	12	16	22	26	30	35	39
		Applied Conservation	12	16	22	26	30	35	39
		Remaining Shortage	-121	-177	-236	-296	-351	-411	-475
County-Other	Neches-Trinity	Population	415	410	403	397	394	388	381
		Demand	52	50	48	46	44	43	42
		Shortage	-50	-48	-46	-44	-42	-41	-40
		Potential Conservation	3	3	3	3	2	2	2
		Applied Conservation	3	3	3	3	2	2	2
		Remaining Shortage	-47	-45	-43	-41	-40	-39	-38
County-Other	Trinity	Population	2083	2054	2022	1992	1966	1940	1913
		Demand	261	251	240	230	220	213	210
		Shortage	-212	-207	-200	-193	-185	-180	-178
		Potential Conservation	14	14	13	13	12	12	12
		Applied Conservation	14	14	13	13	12	12	12
		Remaining Shortage	-198	-193	-187	-180	-173	-168	-166
County-Other	Trinity-San Jacinto	Population	1343	1324	1303	1284	1267	1250	1233
		Demand	168	162	155	148	142	137	135
		Shortage	-112	-113	-110	-108	-107	-105	-106
		Potential Conservation	9	9	9	8	8	8	7
		Applied Conservation	9	9	9	8	8	8	7
		Remaining Shortage	-103	-104	-101	-100	-99	-97	-99
Mont Belvieu	Trinity	Population	1582	2195	2878	3513	4063	4621	5193
		Demand	489	669	870	1055	1215	1382	1553
		Shortage	-397	-553	-725	-883	-1022	-1167	-1316
		Potential Conservation	29	40	52	63	72	82	93
		Applied Conservation	29	40	52	63	72	82	93
		Remaining Shortage	-368	-513	-673	-820	-950	-1085	-1223
Mont Belvieu	Trinity-San Jacinto	Population	742	1029	1349	1647	1905	2167	2435
		Demand	229	314	408	494	570	648	728
		Shortage	-153	-220	-291	-362	-428	-498	-572
		Potential Conservation	14	19	24	29	34	39	43
		Applied Conservation	14	19	24	29	34	39	43
		Remaining Shortage	-139	-201	-267	-333	-394	-459	-529
Old River-Winfree	Trinity	Population	1364	1482	1613	1735	1841	1948	2058
		Demand	186	194	206	216	223	233	247
		Shortage	-151	-160	-172	-181	-188	-197	-209
		Potential Conservation	10	11	11	12	12	13	14
		Applied Conservation	10	11	11	12	12	13	14
		Remaining Shortage	-141	-149	-161	-169	-176	-184	-195

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Arcola	San Jacinto-Brazos	Population	1048	2500	2750	3025	3328	3661	4026
		Demand	175	403	434	474	514	566	622
		Shortage	-40	-130	-213	-331	-371	-423	-479
		Potential Conservation	10	24	26	28	31	34	37
		Applied Conservation	10	24	26	28	31	34	37
		Remaining Shortage	-30	-106	-187	-303	-340	-389	-442
Beasley	Brazos	Population	52	62	72	84	97	114	133
		Demand	7	8	9	10	12	14	16
		Shortage	-5	-5	-5	-5	-7	-9	-11
		Potential Conservation	0	0	0	1	1	1	1
		Applied Conservation	0	0	0	1	1	1	1
		Remaining Shortage	-5	-5	-5	-4	-6	-8	-10
Big Oaks MUD	San Jacinto	Population	2055	4215	6453	9190	12004	15695	19913
		Demand	292	581	875	1246	1614	2110	2677
		Shortage	-9	-106	-375	-837	-1205	-1701	-2268
		Potential Conservation	20	40	60	86	111	146	185
		Applied Conservation	9	40	60	86	111	146	185
		Remaining Shortage	0	-66	-315	-751	-1094	-1555	-2083
Cinco MUD #2	San Jacinto	Population	3971	8145	12471	17760	23198	30330	38480
		Demand	1085	2190	3325	4735	6158	8052	10215
		Shortage	-32	-400	-1426	-3180	-4603	-6497	-8660
		Potential Conservation	75	151	229	327	425	555	705
		Applied Conservation	32	151	229	327	425	555	705
		Remaining Shortage	0	-249	-1197	-2853	-4178	-5942	-7955
Cinco MUD #6	San Jacinto	Population	1139	2336	3577	5094	6654	8700	11038
		Demand	204	406	613	873	1133	1481	1879
		Shortage	-6	-74	-263	-587	-847	-1195	-1593
		Potential Conservation	14	28	42	60	78	102	130
		Applied Conservation	6	28	42	60	78	102	130
		Remaining Shortage	0	-46	-221	-527	-769	-1093	-1463
Cinco MUD #7	San Jacinto	Population	2711	5560	8513	12124	15837	20706	26270
		Demand	531	1065	1612	2295	2980	3897	4944
		Shortage	-16	-195	-692	-1541	-2226	-3143	-4190
		Potential Conservation	37	73	111	158	206	269	341
		Applied Conservation	16	73	111	158	206	269	341
		Remaining Shortage	0	-122	-581	-1383	-2020	-2874	-3849
Cinco MUD #8	San Jacinto	Population	2395	3500	3500	3500	3500	3500	3500
		Demand	322	455	447	447	443	443	443
		Shortage	-10	-83	-192	-300	-296	-296	-296
		Potential Conservation	19	27	27	27	26	26	26
		Applied Conservation	10	27	27	27	26	26	26
		Remaining Shortage	0	-56	-165	-273	-270	-270	-270
Cinco MUD #9	San Jacinto	Population	3373	6918	10592	15085	19704	25762	32685
		Demand	691	1387	2100	2991	3885	5079	6444
		Shortage	-21	-253	-901	-2009	-2903	-4097	-5462
		Potential Conservation	48	96	145	206	268	350	445
		Applied Conservation	21	96	145	206	268	350	445
		Remaining Shortage	0	-157	-756	-1803	-2635	-3747	-5017

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Cornerstone MUD	San Jacinto	Population	1623	2236	2610	3342	4193	5316	6620
		Demand	164	210	237	299	366	464	578
		Shortage	-11	-103	-334	-704	-978	-1346	-1766
		Potential Conservation	11	14	16	21	25	32	40
		Applied Conservation	11	14	16	21	25	32	40
		Remaining Shortage	0	-89	-318	-683	-953	-1314	-1726
County-Other	Brazos	Population	22415	45838	77762	116908	157164	210218	270499
		Demand	3796	7498	12784	19094	25150	33407	43056
		Shortage	-2447	-4978	-9044	-15272	-21328	-29585	-39234
		Potential Conservation	211	416	710	1060	1396	1855	2390
		Applied Conservation	211	416	710	1060	1396	1855	2390
		Remaining Shortage	-2236	-4562	-8334	-14212	-19932	-27730	-36844
County-Other	San Jacinto	Population	2352	2471	6326	11972	17825	27606	35966
		Demand	398	404	1040	1955	2852	4387	5726
		Shortage	-12	-74	-446	-1313	-2210	-3745	-5084
		Potential Conservation	22	22	58	109	158	244	318
		Applied Conservation	12	22	58	109	158	244	318
		Remaining Shortage	0	-52	-388	-1204	-2052	-3501	-4766
County-Other	San Jacinto-Brazos	Population	8353	10952	31676	62882	95148	147078	193702
		Demand	1415	1791	5207	10270	15226	23373	30832
		Shortage	-217	-469	-2443	-7074	-12030	-20177	-27636
		Potential Conservation	79	99	289	570	845	1298	1712
		Applied Conservation	79	99	289	570	845	1298	1712
		Remaining Shortage	-138	-370	-2154	-6504	-11185	-18879	-25924
Fairchilds	Brazos	Population	678	929	1189	1507	1834	2263	2754
		Demand	300	406	515	650	787	971	1182
		Shortage	-193	-270	-300	-325	-462	-646	-857
		Potential Conservation	17	23	29	36	44	54	66
		Applied Conservation	17	23	29	36	44	54	66
		Remaining Shortage	-176	-247	-271	-289	-418	-592	-791
First Colony MUD #9	Brazos	Population	6171	8561	8561	8561	8561	8561	8561
		Demand	1085	1467	1448	1438	1429	1429	1429
		Shortage	-699	-974	-1024	-1150	-1141	-1141	-1141
		Potential Conservation	65	87	86	86	85	85	85
		Applied Conservation	65	87	86	86	85	85	85
		Remaining Shortage	-634	-887	-938	-1064	-1056	-1056	-1056
Fort Bend County MUD #106	Brazos	Population	2562	3285	3285	3285	3285	3285	3285
		Demand	766	968	960	960	957	957	957
		Shortage	-494	-643	-679	-768	-765	-765	-765
		Potential Conservation	43	54	53	53	53	53	53
		Applied Conservation	43	54	53	53	53	53	53
		Remaining Shortage	-451	-589	-626	-715	-712	-712	-712
Fort Bend County MUD #108	Brazos	Population	2490	2817	2817	2817	2817	2817	2817
		Demand	533	587	577	574	571	571	571
		Shortage	-344	-390	-408	-459	-456	-456	-456
		Potential Conservation	30	33	32	32	32	32	32
		Applied Conservation	30	33	32	32	32	32	32
		Remaining Shortage	-314	-357	-376	-427	-424	-424	-424

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Fort Bend County MUD #111	Brazos	Population	3315	3315	3315	3315	3315	3315	3315
		Demand	798	780	772	772	769	769	769
		Shortage	-514	-518	-546	-617	-614	-614	-614
		Potential Conservation	48	46	46	46	46	46	46
		Applied Conservation	48	46	46	46	46	46	46
		Remaining Shortage	-466	-472	-500	-571	-568	-568	-568
Fort Bend County MUD #2	San Jacinto	Population	1807	2130	2130	2130	2130	2130	2130
		Demand	287	329	320	315	310	308	308
		Shortage	-9	-60	-137	-212	-207	-205	-205
		Potential Conservation	17	20	19	19	18	18	18
		Applied Conservation	9	20	19	19	18	18	18
		Remaining Shortage	0	-40	-118	-193	-189	-187	-187
Fort Bend County MUD #2	San Jacinto-Brazos	Population	6501	7662	7662	7662	7662	7662	7662
		Demand	1034	1184	1150	1133	1116	1107	1107
		Shortage	-239	-383	-564	-793	-776	-767	-767
		Potential Conservation	62	71	69	68	67	66	66
		Applied Conservation	62	71	69	68	67	66	66
		Remaining Shortage	-177	-312	-495	-725	-709	-701	-701
Fort Bend County MUD #23	San Jacinto-Brazos	Population	2961	5968	9084	12895	16813	21952	27824
		Demand	338	675	1018	1444	1883	2459	3117
		Shortage	-78	-218	-499	-1010	-1449	-2025	-2683
		Potential Conservation	23	47	70	100	130	170	215
		Applied Conservation	23	47	70	100	130	170	215
		Remaining Shortage	-55	-171	-429	-910	-1319	-1855	-2468
Fort Bend County MUD #25	San Jacinto-Brazos	Population	6700	11336	16141	22016	28057	35979	45032
		Demand	976	1587	2224	3009	3803	4877	6104
		Shortage	-226	-513	-1090	-2104	-2898	-3972	-5199
		Potential Conservation	67	109	153	208	262	336	421
		Applied Conservation	67	109	153	208	262	336	421
		Remaining Shortage	-159	-404	-937	-1896	-2636	-3636	-4778
Fort Bend County MUD #30	San Jacinto	Population	2937	3962	5024	6323	7658	9409	11410
		Demand	382	493	608	751	901	1096	1329
		Shortage	-11	-90	-260	-505	-655	-850	-1083
		Potential Conservation	26	34	42	52	62	76	92
		Applied Conservation	11	34	42	52	62	76	92
		Remaining Shortage	0	-56	-218	-453	-593	-774	-991
Fort Bend County MUD #37	San Jacinto	Population	1367	2362	3394	4655	5952	7653	9597
		Demand	377	640	912	1246	1587	2040	2559
		Shortage	-11	-117	-392	-837	-1178	-1631	-2150
		Potential Conservation	22	38	54	74	95	122	153
		Applied Conservation	11	38	54	74	95	122	153
		Remaining Shortage	0	-79	-338	-763	-1083	-1509	-1997
Fort Bend County MUD #41	Brazos	Population	3453	6144	8933	12343	15849	20447	25701
		Demand	445	764	1101	1507	1917	2474	3109
		Shortage	-287	-507	-779	-1205	-1615	-2172	-2807
		Potential Conservation	31	53	76	104	132	171	214
		Applied Conservation	31	53	76	104	132	171	214
		Remaining Shortage	-256	-454	-703	-1101	-1483	-2001	-2593

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Fort Bend County MUD #67	Brazos	Population	3306	3306	3306	3306	3306	3306	3306
		Demand	748	730	722	718	715	715	715
		Shortage	-482	-485	-511	-574	-571	-571	-571
		Potential Conservation	45	44	43	43	43	43	43
		Applied Conservation	45	44	43	43	43	43	43
		Remaining Shortage	-437	-441	-468	-531	-528	-528	-528
Fort Bend County MUD #68	Brazos	Population	3717	3717	3717	3717	3717	3717	3717
		Demand	604	604	600	600	600	600	600
		Shortage	-389	-401	-424	-480	-480	-480	-480
		Potential Conservation	36	36	36	36	36	36	36
		Applied Conservation	36	36	36	36	36	36	36
		Remaining Shortage	-353	-365	-388	-444	-444	-444	-444
Fort Bend County MUD #69	Brazos	Population	1701	1701	1701	1701	1701	1701	1701
		Demand	394	391	391	389	389	389	389
		Shortage	-254	-260	-276	-311	-311	-311	-311
		Potential Conservation	22	22	22	22	22	22	22
		Applied Conservation	22	22	22	22	22	22	22
		Remaining Shortage	-232	-238	-254	-289	-289	-289	-289
Fort Bend County MUD #81	Brazos	Population	1371	2054	2762	3628	4518	5685	7019
		Demand	524	773	1033	1349	1675	2108	2602
		Shortage	-338	-513	-731	-1079	-1405	-1838	-2332
		Potential Conservation	31	46	62	80	100	126	155
		Applied Conservation	31	46	62	80	100	126	155
		Remaining Shortage	-307	-467	-669	-999	-1305	-1712	-2177
Fulshear	Brazos	Population	433	534	639	767	899	1072	1269
		Demand	141	170	201	240	279	331	392
		Shortage	-91	-113	-142	-192	-231	-283	-344
		Potential Conservation	8	9	11	13	15	18	22
		Applied Conservation	8	9	11	13	15	18	22
		Remaining Shortage	-83	-104	-131	-179	-216	-265	-322
Fulshear	San Jacinto-Brazos	Population	283	349	417	501	587	700	829
		Demand	92	111	131	157	182	216	256
		Shortage	-21	-36	-64	-110	-135	-169	-209
		Potential Conservation	5	6	7	9	10	12	14
		Applied Conservation	5	6	7	9	10	12	14
		Remaining Shortage	-16	-30	-57	-101	-125	-157	-195
Grand Lakes MUD #4	San Jacinto	Population	1874	3844	5885	8381	10947	14313	18159
		Demand	441	887	1345	1915	2489	3255	4129
		Shortage	-13	-162	-577	-1286	-1860	-2626	-3500
		Potential Conservation	30	61	93	132	172	225	285
		Applied Conservation	13	61	93	132	172	225	285
		Remaining Shortage	0	-101	-484	-1154	-1688	-2401	-3215
Houston	San Jacinto	Population	19597	23433	27408	32268	37266	43820	51309
		Demand	3490	4068	4667	5386	6136	7166	8391
		Shortage	0	0	0	0	0	0	0
		Potential Conservation	244	285	327	377	430	502	587
		Applied Conservation	244	285	327	377	430	502	587
		Remaining Shortage	0	0	0	0	0	0	0

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Houston	San Jacinto-Brazos	Population	13763	16457	19249	22663	26173	30776	36036
		Demand	2451	2857	3277	3782	4310	5033	5893
		Shortage	0	0	0	0	0	0	0
		Potential Conservation	172	200	229	265	302	352	413
		Applied Conservation	172	200	229	265	302	352	413
		Remaining Shortage	0	0	0	0	0	0	0
Katy	San Jacinto	Population	889	1078	1274	1514	1761	2084	2453
		Demand	169	199	230	270	312	366	431
		Shortage	0	-68	-161	-228	-270	-324	-389
		Potential Conservation	12	14	16	19	22	25	30
		Applied Conservation	0	14	16	19	22	25	30
		Remaining Shortage	0	-54	-145	-209	-248	-299	-359
Kingsbridge MUD	San Jacinto	Population	4377	6133	7953	10179	12468	15469	18899
		Demand	721	976	1247	1573	1899	2357	2879
		Shortage	-22	-178	-535	-1057	-1383	-1841	-2363
		Potential Conservation	50	67	86	109	131	163	199
		Applied Conservation	22	67	86	109	131	163	199
		Remaining Shortage	0	-111	-449	-948	-1252	-1678	-2164
Kingsbridge MUD	San Jacinto-Brazos	Population	170	238	309	395	484	601	734
		Demand	28	38	48	61	74	92	112
		Shortage	-6	-12	-23	-43	-56	-74	-94
		Potential Conservation	2	3	3	4	5	6	8
		Applied Conservation	2	3	3	4	5	6	8
		Remaining Shortage	-4	-9	-20	-39	-51	-68	-86
Meadows	San Jacinto	Population	4469	4469	4469	4469	4469	4468	4468
		Demand	1352	1332	1312	1297	1282	1276	1276
		Shortage	-41	-243	-563	-871	-856	-850	-850
		Potential Conservation	81	79	78	77	76	76	76
		Applied Conservation	41	79	78	77	76	76	76
		Remaining Shortage	0	-164	-485	-794	-780	-774	-774
Meadows	San Jacinto-Brazos	Population	443	443	443	443	443	444	444
		Demand	134	132	130	129	127	127	127
		Shortage	-31	-43	-64	-90	-88	-88	-88
		Potential Conservation	8	8	8	8	8	8	8
		Applied Conservation	8	8	8	8	8	8	8
		Remaining Shortage	-23	-35	-56	-82	-80	-80	-80
Missouri City	Brazos	Population	1025	1659	2088	2499	2917	3206	3880
		Demand	198	315	390	466	545	603	733
		Shortage	0	0	0	-46	-131	-195	-328
		Potential Conservation	14	22	27	32	38	42	51
		Applied Conservation	0	0	0	32	38	42	51
		Remaining Shortage	0	0	0	-14	-93	-153	-277
Missouri City	San Jacinto	Population	8395	13589	17102	20468	23885	26256	31779
		Demand	1625	2577	3195	3817	4460	4938	6004
		Shortage	0	0	0	-207	-829	-1303	-2339
		Potential Conservation	112	178	220	263	308	341	414
		Applied Conservation	0	0	0	207	308	341	414
		Remaining Shortage	0	0	0	0	-521	-962	-1925

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Missouri City	San Jacinto-Brazos	Population	37999	61510	77411	92650	108116	118851	143849
		Demand	7353	11664	14464	17280	20186	22351	27175
		Shortage	0	0	0	-1441	-4335	-6527	-11277
		Potential Conservation	507	805	998	1192	1392	1542	1875
		Applied Conservation	0	0	0	1192	1392	1542	1875
		Remaining Shortage	0	0	0	-249	-2943	-4985	-9402
Needville	Brazos	Population	1181	1376	1578	1825	2079	2412	2793
		Demand	144	162	179	200	224	257	297
		Shortage	-93	-108	-104	-100	-124	-157	-197
		Potential Conservation	8	9	10	11	12	14	16
		Applied Conservation	8	9	10	11	12	14	16
		Remaining Shortage	-85	-99	-94	-89	-112	-143	-181
North Mission Glen MUD	San Jacinto	Population	4340	7587	10952	15066	19296	24844	31184
		Demand	520	867	1239	1688	2140	2755	3458
		Shortage	-16	-158	-532	-1134	-1586	-2201	-2904
		Potential Conservation	36	60	85	116	148	190	239
		Applied Conservation	16	60	85	116	148	190	239
		Remaining Shortage	0	-98	-447	-1018	-1438	-2011	-2665
Orbit Systems Inc	San Jacinto-Brazos	Population	144	163	183	207	232	264	301
		Demand	14	15	16	18	20	22	25
		Shortage	-3	-5	-8	-13	-15	-17	-20
		Potential Conservation	1	1	1	1	1	1	1
		Applied Conservation	1	1	1	1	1	1	1
		Remaining Shortage	-2	-4	-7	-12	-14	-16	-19
Pecan Grove MUD #1	Brazos	Population	9985	10220	10464	10762	11068	11470	11929
		Demand	2293	2301	2321	2339	2368	2441	2539
		Shortage	-1478	-1528	-1642	-1871	-1900	-1973	-2071
		Potential Conservation	158	159	160	161	163	168	175
		Applied Conservation	158	159	160	161	163	168	175
		Remaining Shortage	-1320	-1369	-1482	-1710	-1737	-1805	-1896
Pecan Grove MUD #1	San Jacinto-Brazos	Population	2654	2716	2781	2860	2941	3048	3170
		Demand	609	612	617	622	629	649	675
		Shortage	-141	-198	-303	-435	-442	-462	-488
		Potential Conservation	42	42	43	43	43	45	47
		Applied Conservation	42	42	43	43	43	45	47
		Remaining Shortage	-99	-156	-260	-392	-399	-417	-441
Plantation MUD	San Jacinto-Brazos	Population	3972	4130	4130	4130	4130	4130	4130
		Demand	543	546	527	518	509	504	504
		Shortage	-126	-177	-258	-362	-353	-348	-348
		Potential Conservation	32	33	31	31	30	30	30
		Applied Conservation	32	33	31	31	30	30	30
		Remaining Shortage	-94	-144	-227	-331	-323	-318	-318
Richmond	Brazos	Population	11081	12173	13305	14689	16112	17978	20110
		Demand	1899	2032	2176	2353	2527	2799	3131
		Shortage	-1224	-1349	-1540	-1882	-2056	-2328	-2660
		Potential Conservation	131	140	150	162	174	193	216
		Applied Conservation	131	140	150	162	174	193	216
		Remaining Shortage	-1093	-1209	-1390	-1720	-1882	-2135	-2444

Table 2

County:	Fort Bend		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Rosenberg	Brazos	Population	24043	28100	32305	37446	42732	49665	57587
		Demand	3420	3872	4306	4866	5457	6286	7289
		Shortage	-2205	-2570	-3046	-3892	-4483	-5312	-6315
		Potential Conservation	236	267	297	336	376	434	503
		Applied Conservation	236	267	297	336	376	434	503
		Remaining Shortage	-1969	-2303	-2749	-3556	-4107	-4878	-5812
Sienna Plantation MUD #2	San Jacinto-Brazos	Population	2763	5667	7000	7000	7000	7000	7000
		Demand	529	1060	1294	1294	1286	1286	1286
		Shortage	-122	-343	-634	-905	-897	-897	-897
		Potential Conservation	32	63	77	77	77	77	77
		Applied Conservation	32	63	77	77	77	77	77
		Remaining Shortage	-90	-280	-557	-828	-820	-820	-820
Simonton	Brazos	Population	718	719	720	721	722	724	726
		Demand	318	316	314	312	310	309	310
		Shortage	-205	-210	-183	-156	-154	-153	-154
		Potential Conservation	18	18	17	17	17	17	17
		Applied Conservation	18	18	17	17	17	17	17
		Remaining Shortage	-187	-192	-166	-139	-137	-136	-137
WHCRWA	San Jacinto	Population	10553	15078	19767	25501	31397	39129	47964
		Demand	1785	2500	3188	4056	4959	6136	7522
		Shortage	-54	0	-694	-1812	-2559	-3548	-4752
		Potential Conservation	123	172	220	280	342	423	519
		Applied Conservation	54	0	220	280	342	423	519
		Remaining Shortage	0	0	-474	-1532	-2217	-3125	-4233

Table 2

County:	Galveston		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Galveston County WCID #12	San Jacinto-Brazos	Population	1386	1641	1861	1992	2045	2084	2110
		Demand	231	267	296	312	316	320	324
		Shortage	-97	-133	-162	-178	-182	-186	-190
		Potential Conservation	13	15	16	17	18	18	18
		Applied Conservation	13	15	16	17	18	18	18
		Remaining Shortage	-84	-118	-146	-161	-164	-168	-172
Kemah	San Jacinto-Brazos	Population	2330	2985	3550	3885	4021	4122	4188
		Demand	227	278	322	348	356	360	366
		Shortage	-149	-195	-235	-258	-265	-269	-274
		Potential Conservation	14	17	19	21	21	21	22
		Applied Conservation	14	17	19	21	21	21	22
		Remaining Shortage	-135	-178	-216	-237	-244	-248	-252
League City	San Jacinto-Brazos	Population	45306	53403	60392	64532	66207	67454	68265
		Demand	6597	7477	8253	8674	8751	8840	8947
		Shortage	-2821	-3612	-4311	-4690	-4759	-4839	-4935
		Potential Conservation	455	516	569	598	604	610	617
		Applied Conservation	455	516	569	598	604	610	617
		Remaining Shortage	-2366	-3096	-3742	-4092	-4155	-4229	-4318

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Bellaire	San Jacinto	Population	15642	17272	18859	20420	21965	23500	25029
		Demand	3452	3734	3993	4254	4527	4817	5131
		Shortage	-1452	-1721	-1884	-2282	-2555	-2845	-3159
		Potential Conservation	238	258	275	293	312	332	354
		Applied Conservation	238	258	275	293	312	332	354
		Remaining Shortage	-1214	-1463	-1609	-1989	-2243	-2513	-2805
Blue Bell Manor Utility Company	San Jacinto	Population	2592	2592	2592	2592	2592	2592	2592
		Demand	581	572	563	555	546	540	540
		Shortage	0	-195	-394	-468	-459	-453	-453
		Potential Conservation	32	32	31	31	30	30	30
		Applied Conservation	0	32	31	31	30	30	30
		Remaining Shortage	0	-163	-363	-437	-429	-423	-423
Britmoore Utilities	San Jacinto	Population	1668	2061	2444	2821	3194	3565	3934
		Demand	390	471	550	626	705	783	864
		Shortage	0	-160	-385	-529	-608	-686	-767
		Potential Conservation	23	28	33	37	42	47	51
		Applied Conservation	0	28	33	37	42	47	51
		Remaining Shortage	0	-132	-352	-492	-566	-639	-716
Bunker Hill Village	San Jacinto	Population	3654	3750	3750	3750	3750	3750	3750
		Demand	1478	1504	1491	1479	1466	1462	1462
		Shortage	-547	-586	-558	-614	-601	-597	-597
		Potential Conservation	88	90	89	88	87	87	87
		Applied Conservation	88	90	89	88	87	87	87
		Remaining Shortage	-459	-496	-469	-526	-514	-510	-510
Candlelight Hills Subdivision	San Jacinto	Population	1758	2213	2656	3092	3523	3952	4379
		Demand	368	451	530	610	691	770	853
		Shortage	0	-154	-371	-515	-596	-675	-758
		Potential Conservation	22	27	32	36	41	46	51
		Applied Conservation	0	27	32	36	41	46	51
		Remaining Shortage	0	-127	-339	-479	-555	-629	-707
Chimney Hill MUD	San Jacinto	Population	5128	6412	6412	6412	6412	6412	6412
		Demand	557	668	646	625	618	611	611
		Shortage	0	0	-26	-102	-95	-88	-88
		Potential Conservation	33	40	39	37	37	36	36
		Applied Conservation	0	0	26	37	37	36	36
		Remaining Shortage	0	0	0	-65	-58	-52	-52
Cinco MUD #6	San Jacinto	Population	515	982	1437	1884	2327	2767	3205
		Demand	92	170	246	323	396	471	546
		Shortage	0	-58	-172	-273	-346	-421	-496
		Potential Conservation	6	12	17	22	27	32	38
		Applied Conservation	0	12	17	22	27	32	38
		Remaining Shortage	0	-46	-155	-251	-319	-389	-458
Cinco MUD #9	San Jacinto	Population	599	1100	1588	2068	2543	3015	3485
		Demand	123	221	315	410	501	594	687
		Shortage	0	-75	-220	-347	-438	-531	-624
		Potential Conservation	8	15	22	28	35	41	47
		Applied Conservation	0	15	22	28	35	41	47
		Remaining Shortage	0	-60	-198	-319	-403	-490	-577

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Consumers Water Inc	San Jacinto	Population	2667	4243	5778	7288	8782	10267	11746
		Demand	269	399	524	653	767	897	1026
		Shortage	0	-137	-367	-551	-665	-795	-924
		Potential Conservation	19	28	36	45	53	62	71
		Applied Conservation	0	28	36	45	53	62	71
		Remaining Shortage	0	-109	-331	-506	-612	-733	-853
Conrnerstone MUD	San Jacinto	Population	2628	3947	5231	6494	7744	8986	10224
		Demand	530	774	1008	1244	1475	1711	1947
		Shortage	0	-264	-706	-1051	-1282	-1518	-1754
		Potential Conservation	78	81	84	87	89	93	98
		Applied Conservation	0	81	84	87	89	93	98
		Remaining Shortage	0	-183	-622	-964	-1193	-1425	-1656
County-Other	San Jacinto	Population	39060	42884	37347	37978	67303	97478	125821
		Demand	6869	7350	6275	6254	10856	15614	20154
		Shortage	0	0	0	0	-2263	-6950	-11464
		Potential Conservation	22	22	58	109	158	244	318
		Applied Conservation	0	0	0	0	158	244	318
		Remaining Shortage	0	0	0	0	-2105	-6706	-11146
Crystal Springs Water Company	San Jacinto	Population	3162	3162	3162	3162	3162	3162	3162
		Demand	613	599	588	577	567	560	560
		Shortage	0	-7	-19	-28	-34	-40	-46
		Potential Conservation	1	1	2	2	3	3	4
		Applied Conservation	0	1	2	2	3	3	4
		Remaining Shortage	0	-6	-17	-26	-31	-37	-42
Deer Park	San Jacinto	Population	11258	11650	12032	12408	12780	13149	13517
		Demand	1702	1723	1725	1737	1746	1782	1832
		Shortage	0	0	0	-17	-25	-60	-107
		Potential Conservation	117	119	119	120	120	123	126
		Applied Conservation	0	0	0	17	25	60	107
		Remaining Shortage	0	0	0	0	0	0	0
Deer Park	San Jacinto-Brazos	Population	17262	17863	18448	19024	19594	20160	20724
		Demand	2610	2641	2645	2664	2678	2732	2809
		Shortage	0	0	0	-27	-40	-90	-162
		Potential Conservation	180	182	182	184	185	188	194
		Applied Conservation	0	0	0	27	40	90	162
		Remaining Shortage	0	0	0	0	0	0	0
El Dorado UD	San Jacinto	Population	2952	3350	3737	4118	4495	4870	5243
		Demand	427	465	507	544	584	627	675
		Shortage	0	-28	0	-121	-161	-204	-252
		Potential Conservation	25	28	30	32	35	37	40
		Applied Conservation	0	28	0	32	35	37	40
		Remaining Shortage	0	0	0	-89	-126	-167	-212
El Lago	San Jacinto-Brazos	Population	3075	3075	3075	3075	3075	3075	3075
		Demand	548	534	524	513	503	496	496
		Shortage	-249	-278	-299	-311	-320	-327	-338
		Potential Conservation	30	30	29	28	28	28	28
		Applied Conservation	30	30	29	28	28	28	28
		Remaining Shortage	-219	-248	-270	-283	-292	-299	-310

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Fallbrook UD	San Jacinto	Population	6065	7487	8872	10234	11582	12922	14257
		Demand	673	797	914	1020	1142	1259	1389
		Shortage	0	-271	-640	-862	-984	-1101	-1231
		Potential Conservation	46	55	63	70	79	87	96
		Applied Conservation	0	55	63	70	79	87	96
		Remaining Shortage	0	-216	-577	-792	-905	-1014	-1135
Fountainview Subdivision	San Jacinto	Population	2444	2984	3510	4027	4539	5048	5555
		Demand	290	341	389	438	483	532	585
		Shortage	0	-116	-272	-369	-414	-463	-516
		Potential Conservation	17	20	23	26	29	32	35
		Applied Conservation	0	20	23	26	29	32	35
		Remaining Shortage	0	-96	-249	-343	-385	-431	-481
Galena Park	San Jacinto	Population	10592	11099	11592	12077	12557	13034	13510
		Demand	1222	1231	1234	1245	1252	1285	1332
		Shortage	-146	-161	-157	-194	-201	-234	-281
		Potential Conservation	84	85	85	86	86	89	92
		Applied Conservation	84	85	85	86	86	89	92
		Remaining Shortage	-62	-76	-72	-108	-115	-145	-189
Green Trails MUD	San Jacinto	Population	2293	2694	3084	3468	3848	4225	4601
		Demand	791	917	1036	1158	1276	1396	1520
		Shortage	0	-313	-725	-978	-1096	-1216	-1340
		Potential Conservation	47	55	62	69	76	83	91
		Applied Conservation	0	55	62	69	76	83	91
		Remaining Shortage	0	-258	-663	-909	-1020	-1133	-1249
Harris County FWSD #47	San Jacinto	Population	4290	4290	4290	4290	4290	4290	4290
		Demand	437	423	408	394	380	370	370
		Shortage	-62	-55	-38	-45	-31	-21	-21
		Potential Conservation	26	25	24	23	23	22	22
		Applied Conservation	26	25	24	23	23	21	21
		Remaining Shortage	-36	-30	-14	-22	-8	0	0
Harris County FWSD #51	San Jacinto	Population	16884	18866	18866	18866	18866	18866	18866
		Demand	2345	2536	2473	2451	2409	2409	2409
		Shortage	-337	-520	-439	-531	-489	-489	-489
		Potential Conservation	162	175	171	169	166	166	166
		Applied Conservation	162	175	171	169	166	166	166
		Remaining Shortage	-175	-345	-268	-362	-323	-323	-323
Harris County FWSD #6	San Jacinto	Population	3000	3722	4424	5115	5799	6479	7156
		Demand	292	346	396	441	494	544	601
		Shortage	-76	-126	-169	-220	-273	-323	-380
		Potential Conservation	17	21	24	26	29	32	36
		Applied Conservation	17	21	24	26	29	32	36
		Remaining Shortage	-59	-105	-145	-194	-244	-291	-344
Harris County MUD #11	San Jacinto	Population	2444	2905	3354	3796	4233	4668	5101
		Demand	364	417	470	523	574	627	686
		Shortage	0	-143	-329	-441	-492	-545	-604
		Potential Conservation	22	25	28	31	34	37	41
		Applied Conservation	0	25	28	31	34	37	41
		Remaining Shortage	0	-118	-301	-410	-458	-508	-563

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Harris County MUD #119 Inwood North	San Jacinto	Population	6633	8079	8725	8725	8725	8725	8725
		Demand	750	878	919	899	880	870	870
		Shortage	0	-299	-643	-759	-740	-730	-730
		Potential Conservation	45	52	55	54	52	52	52
		Applied Conservation	0	52	55	54	52	52	52
		Remaining Shortage	0	-247	-588	-705	-688	-678	-678
Harris County MUD #132	San Jacinto	Population	6963	9436	11844	14212	16556	18885	21206
		Demand	1334	1755	2176	2579	2986	3385	3801
		Shortage	0	-598	-1523	-2178	-2585	-2984	-3400
		Potential Conservation	92	121	150	178	206	234	262
		Applied Conservation	0	121	150	178	206	234	262
		Remaining Shortage	0	-477	-1373	-2000	-2379	-2750	-3138
Harris County MUD #150	San Jacinto	Population	8352	9606	10827	12028	13216	14397	15573
		Demand	1123	1248	1370	1482	1599	1726	1867
		Shortage	0	-426	-959	-1252	-1369	-1496	-1637
		Potential Conservation	77	86	95	102	110	119	129
		Applied Conservation	0	86	95	102	110	119	129
		Remaining Shortage	0	-340	-864	-1150	-1259	-1377	-1508
Harris County MUD #151	San Jacinto	Population	4986	7392	7392	7392	7392	7392	7392
		Demand	882	1275	1267	1259	1250	1250	1250
		Shortage	0	-435	-887	-1063	-1054	-1054	-1054
		Potential Conservation	53	76	76	75	75	75	75
		Applied Conservation	0	76	76	75	75	75	75
		Remaining Shortage	0	-359	-811	-988	-979	-979	-979
Harris County MUD #152	San Jacinto	Population	4062	5956	7800	9614	11410	13195	14973
		Demand	560	787	1014	1228	1444	1670	1895
		Shortage	0	-268	-710	-1037	-1253	-1479	-1704
		Potential Conservation	39	54	70	85	100	115	131
		Applied Conservation	0	54	70	85	100	115	131
		Remaining Shortage	0	-214	-640	-952	-1153	-1364	-1573
Harris County MUD #153	San Jacinto	Population	4212	6887	9491	12053	14589	17109	19619
		Demand	769	1227	1669	2106	2533	2971	3406
		Shortage	0	-419	-1168	-1778	-2205	-2643	-3078
		Potential Conservation	53	85	115	145	175	205	235
		Applied Conservation	0	85	115	145	175	205	235
		Remaining Shortage	0	-334	-1053	-1633	-2030	-2438	-2843
Harris County MUD #154	San Jacinto	Population	4785	6485	8141	9769	11381	12983	14579
		Demand	525	676	830	974	1122	1265	1421
		Shortage	0	-231	-581	-823	-971	-1114	-1270
		Potential Conservation	36	47	57	67	77	87	98
		Applied Conservation	0	47	57	67	77	87	98
		Remaining Shortage	0	-184	-524	-756	-894	-1027	-1172
Harris County MUD #158	San Jacinto	Population	3918	5487	7015	7015	7015	7015	7015
		Demand	369	486	597	589	574	574	574
		Shortage	0	0	-7	-86	-71	-71	-71
		Potential Conservation	22	29	36	35	34	34	34
		Applied Conservation	0	0	7	35	34	34	34
		Remaining Shortage	0	0	0	-51	-37	-37	-37

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Harris County MUD #180	San Jacinto	Population	4027	5339	6616	7872	9115	10351	11582
		Demand	483	616	741	864	990	1113	1245
		Shortage	0	-210	-519	-729	-855	-978	-1110
		Potential Conservation	33	42	51	60	68	77	86
		Applied Conservation	0	42	51	60	68	77	86
		Remaining Shortage	0	-168	-468	-669	-787	-901	-1024
Harris County MUD #189	San Jacinto	Population	4965	6588	8169	9724	11263	12792	14316
		Demand	634	804	970	1133	1299	1462	1636
		Shortage	0	-274	-679	-957	-1123	-1286	-1460
		Potential Conservation	44	55	67	78	90	101	113
		Applied Conservation	0	55	67	78	90	101	113
		Remaining Shortage	0	-219	-612	-879	-1033	-1185	-1347
Harris County MUD #200	San Jacinto	Population	9339	16788	24041	31175	38236	45253	52244
		Demand	1119	1956	2774	3562	4369	5170	5969
		Shortage	0	-668	-1942	-3009	-3816	-4617	-5416
		Potential Conservation	77	135	191	246	301	357	412
		Applied Conservation	0	135	191	246	301	357	412
		Remaining Shortage	0	-533	-1751	-2763	-3515	-4260	-5004
Harris County MUD #261	San Jacinto	Population	1374	1374	1374	1374	1374	1374	1374
		Demand	876	870	867	867	865	865	865
		Shortage	0	-224	-543	-667	-665	-665	-665
		Potential Conservation	49	48	48	48	48	48	48
		Applied Conservation	0	48	48	48	48	48	48
		Remaining Shortage	0	-176	-495	-619	-617	-617	-617
Harris County MUD #33	San Jacinto	Population	4977	5800	6601	7389	8169	8944	9716
		Demand	881	1001	1109	1225	1336	1453	1578
		Shortage	0	-342	-776	-1035	-1146	-1263	-1388
		Potential Conservation	53	60	66	73	80	87	94
		Applied Conservation	0	60	66	73	80	87	94
		Remaining Shortage	0	-282	-710	-962	-1066	-1176	-1294
Harris County MUD #345	San Jacinto	Population	3879	5285	5285	5285	5285	5285	5285
		Demand	1056	1415	1403	1403	1397	1397	1397
		Shortage	0	-482	-982	-1184	-1178	-1178	-1178
		Potential Conservation	63	84	84	84	83	83	83
		Applied Conservation	0	84	84	84	83	83	83
		Remaining Shortage	0	-398	-898	-1100	-1095	-1095	-1095
Harris County MUD #46	San Jacinto	Population	4140	6326	6326	6326	6326	6326	6326
		Demand	566	836	822	808	801	801	801
		Shortage	0	-285	-575	-682	-675	-675	-675
		Potential Conservation	34	50	49	48	48	48	48
		Applied Conservation	0	50	49	48	48	48	48
		Remaining Shortage	0	-235	-526	-634	-627	-627	-627
Harris County MUD #5	San Jacinto	Population	4062	4062	4062	4062	4062	4062	4062
		Demand	673	655	642	628	614	605	605
		Shortage	0	-223	-449	-530	-516	-507	-507
		Potential Conservation	40	39	38	37	37	36	36
		Applied Conservation	0	39	38	37	37	36	36
		Remaining Shortage	0	-184	-411	-493	-479	-471	-471

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Harris County MUD #50	San Jacinto	Population	3048	3334	3612	3885	4156	4425	4693
		Demand	580	620	655	696	731	773	820
		Shortage	-464	-503	-524	-588	-623	-665	-712
		Potential Conservation	35	37	39	41	44	46	49
		Applied Conservation	35	37	39	41	44	46	49
		Remaining Shortage	-429	-466	-485	-547	-579	-619	-663
Harris County MUD #53	San Jacinto	Population	13181	17972	22637	27225	31767	36281	40778
		Demand	1491	1933	2384	2806	3238	3658	4111
		Shortage	-357	-733	-1071	-1535	-1967	-2387	-2840
		Potential Conservation	103	133	164	194	223	252	284
		Applied Conservation	103	133	164	194	223	252	284
		Remaining Shortage	-254	-600	-907	-1341	-1744	-2135	-2556
Harris County MUD #8	San Jacinto	Population	5469	6225	6961	7685	8402	9114	9823
		Demand	637	697	756	809	866	929	1001
		Shortage	-90	-146	-185	-263	-320	-383	-455
		Potential Conservation	38	42	45	48	52	55	60
		Applied Conservation	38	42	45	48	52	55	60
		Remaining Shortage	-52	-104	-140	-215	-268	-328	-395
Harris County UD #14	San Jacinto	Population	1522	1699	1871	2040	2208	2375	2541
		Demand	530	582	635	686	737	790	845
		Shortage	0	-199	-444	-579	-630	-683	-738
		Potential Conservation	29	32	35	38	41	44	47
		Applied Conservation	0	32	35	38	41	44	47
		Remaining Shortage	0	-167	-409	-541	-589	-639	-691
Harris County UD #15	San Jacinto	Population	2712	3259	3792	4316	4835	5351	5865
		Demand	371	427	484	541	596	653	716
		Shortage	0	-146	-339	-457	-512	-569	-632
		Potential Conservation	22	25	29	32	36	39	43
		Applied Conservation	0	25	29	32	36	39	43
		Remaining Shortage	0	-121	-310	-425	-476	-530	-589
Harris County WCID #1	San Jacinto	Population	8004	9665	11283	12874	14449	16014	17573
		Demand	968	1115	1264	1413	1554	1704	1870
		Shortage	0	0	-215	-523	-664	-814	-980
		Potential Conservation	67	77	87	97	107	118	129
		Applied Conservation	0	0	87	97	107	118	129
		Remaining Shortage	0	0	-128	-426	-557	-696	-851
Harris County WCID #133	San Jacinto	Population	4502	4577	4652	4727	4802	4877	4877
		Demand	756	754	750	747	737	743	743
		Shortage	0	-258	-525	-631	-621	-627	-627
		Potential Conservation	45	45	45	45	44	44	44
		Applied Conservation	0	45	45	45	44	44	44
		Remaining Shortage	0	-213	-480	-586	-577	-583	-583
Harris County WCID #21	San Jacinto	Population	9500	10120	10724	11318	11906	12490	13072
		Demand	1373	1417	1466	1509	1547	1609	1684
		Shortage	-323	-370	-406	-478	-516	-578	-653
		Potential Conservation	95	98	101	104	107	111	116
		Applied Conservation	95	98	101	104	107	111	116
		Remaining Shortage	-228	-272	-305	-374	-409	-467	-537

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Harris County WCID #36	San Jacinto	Population	9300	10451	11572	12674	13765	14849	15929
		Demand	1240	1346	1452	1547	1650	1763	1891
		Shortage	-190	-291	-360	-505	-608	-721	-849
		Potential Conservation	86	93	100	107	114	122	130
		Applied Conservation	86	93	100	107	114	122	130
		Remaining Shortage	-104	-198	-260	-398	-494	-599	-719
Harris County WCID #50	San Jacinto	Population	4100	4700	5284	5859	6428	6993	7556
		Demand	547	605	663	715	770	830	897
		Shortage	-492	-548	-597	-659	-714	-774	-841
		Potential Conservation	33	36	40	43	46	49	53
		Applied Conservation	33	36	40	43	46	49	53
		Remaining Shortage	-459	-512	-557	-616	-668	-725	-788
Harris County WCID #76	San Jacinto	Population	1788	1788	1788	1788	1788	1788	1788
		Demand	304	296	290	284	278	274	274
		Shortage	0	-101	-203	-240	-234	-230	-230
		Potential Conservation	17	16	16	16	15	15	15
		Applied Conservation	0	16	16	16	15	15	15
		Remaining Shortage	0	-85	-187	-224	-219	-215	-215
Harris County WCID #84	San Jacinto	Population	2430	2475	2519	2562	2605	2648	2691
		Demand	599	602	604	606	604	611	621
		Shortage	-229	-236	-234	-249	-247	-254	-264
		Potential Conservation	33	33	34	34	34	34	34
		Applied Conservation	33	33	34	34	34	34	34
		Remaining Shortage	-196	-203	-200	-215	-213	-220	-230
Hedwig Village	San Jacinto	Population	2334	2334	2334	2334	2334	2334	2334
		Demand	839	831	824	816	808	803	803
		Shortage	-501	-514	-505	-542	-542	-544	-550
		Potential Conservation	47	46	46	45	45	45	45
		Applied Conservation	47	46	46	45	45	45	45
		Remaining Shortage	-454	-468	-459	-497	-497	-499	-505
Hillshire Village	San Jacinto	Population	722	744	767	789	810	832	855
		Demand	124	125	126	126	127	130	133
		Shortage	0	0	-15	-39	-37	-36	-36
		Potential Conservation	7	7	7	7	7	7	7
		Applied Conservation	0	0	7	7	7	7	7
		Remaining Shortage	0	0	-8	-32	-30	-29	-29
Houston	San Jacinto	Population	1818471	2083856	2342251	2596403	2847979	3097992	3347056
		Demand	323875	361804	398796	433343	468951	506649	547381
		Shortage	0	0	0	0	0	0	0
		Potential Conservation	22671	25326	27916	30334	32827	35465	38317
		Applied Conservation	22671	25326	27916	30334	32827	35465	38317
		Remaining Shortage	0	0	0	0	0	0	0
Houston	San Jacinto-Brazos	Population	101342	116132	130532	144696	158716	172649	186529
		Demand	18049	20163	22225	24150	26134	28235	30505
		Shortage	0	0	0	0	0	0	0
		Potential Conservation	1263	1411	1556	1691	1829	1976	2135
		Applied Conservation	1263	1411	1556	1691	1829	1976	2135
		Remaining Shortage	0	0	0	0	0	0	0

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Humble	San Jacinto	Population	14579	16862	19085	21272	23436	25587	27730
		Demand	3233	3664	4062	4456	4857	5274	5715
		Shortage	0	-1203	-2796	-3716	-4117	-4534	-4975
		Potential Conservation	223	253	280	307	335	364	394
		Applied Conservation	0	253	280	307	335	364	394
		Remaining Shortage	0	-950	-2516	-3409	-3782	-4170	-4581
Hunters Creek Village	San Jacinto	Population	4374	4755	5126	5491	5852	6211	6568
		Demand	1627	1747	1866	1981	2091	2212	2340
		Shortage	-973	-1079	-1145	-1317	-1419	-1532	-1653
		Potential Conservation	97	104	111	118	125	132	139
		Applied Conservation	97	104	111	118	125	132	139
		Remaining Shortage	-876	-975	-1034	-1199	-1294	-1400	-1514
Jacinto City	San Jacinto	Population	10302	11171	12017	12849	13673	14492	15308
		Demand	1235	1301	1346	1410	1455	1526	1612
		Shortage	0	0	0	-70	-115	-186	-272
		Potential Conservation	85	90	93	97	100	105	111
		Applied Conservation	0	0	0	70	100	105	111
		Remaining Shortage	0	0	0	0	-15	-81	-161
Jersey Village	San Jacinto	Population	6880	8742	10555	12338	14103	15857	17604
		Demand	1279	1586	1880	2170	2464	2753	3056
		Shortage	0	0	-476	-992	-1286	-1575	-1878
		Potential Conservation	88	109	130	150	170	190	211
		Applied Conservation	0	0	130	150	170	190	211
		Remaining Shortage	0	0	-346	-842	-1116	-1385	-1667
Katy	San Jacinto	Population	10082	13372	16576	19727	22846	25946	29034
		Demand	1920	2471	2989	3513	4043	4563	5106
		Shortage	0	-843	-2092	-2966	-3496	-4016	-4559
		Potential Conservation	132	170	206	242	279	315	352
		Applied Conservation	0	170	206	242	279	315	352
		Remaining Shortage	0	-673	-1886	-2724	-3217	-3701	-4207
Kingsbridge MUD	San Jacinto	Population	1074	1353	1625	1892	2157	2420	2682
		Demand	177	215	255	292	329	369	409
		Shortage	0	-73	-178	-247	-284	-324	-364
		Potential Conservation	12	15	18	20	23	25	28
		Applied Conservation	0	15	18	20	23	25	28
		Remaining Shortage	0	-58	-160	-227	-261	-299	-336
League City	San Jacinto-Brazos	Population	138	143	147	151	155	159	163
		Demand	20	20	20	20	20	21	21
		Shortage	-12	-13	-13	-14	-14	-14	-15
		Potential Conservation	1	1	1	1	1	1	1
		Applied Conservation	1	1	1	1	1	1	1
		Remaining Shortage	-11	-12	-12	-13	-13	-13	-14
Longhorn Town UD	San Jacinto	Population	1038	1907	2753	3585	4409	5228	6044
		Demand	327	596	857	1112	1368	1622	1875
		Shortage	0	-35	0	-247	-503	-757	-1010
		Potential Conservation	19	36	51	66	82	97	112
		Applied Conservation	0	35	0	66	82	97	112
		Remaining Shortage	0	0	0	-181	-421	-660	-898

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Mason Creek UD	San Jacinto	Population	8600	9050	9050	9050	9050	9050	9050
		Demand	2273	2352	2321	2291	2271	2261	2261
		Shortage	0	-803	-1625	-1935	-1915	-1905	-1905
		Potential Conservation	135	140	138	137	135	135	135
		Applied Conservation	0	140	138	137	135	135	135
		Remaining Shortage	0	-663	-1487	-1798	-1780	-1770	-1770
Missouri City	San Jacinto	Population	5494	6887	8243	9577	10898	12210	13517
		Demand	1063	1306	1540	1786	2035	2296	2554
		Shortage	0	0	0	-135	-411	-643	-1002
		Potential Conservation	73	90	106	123	140	158	176
		Applied Conservation	0	0	0	123	140	158	176
		Remaining Shortage	0	0	0	-12	-271	-485	-826
NHCRWA	San Jacinto	Population	410523	524304	634767	741167	846439	951057	1055278
		Demand	81393	101015	120164	138646	157390	175778	195040
		Shortage	0	0	-49401	-82367	-101111	-119499	-138761
		Potential Conservation	5615	6968	8289	9564	10857	12125	13454
		Applied Conservation	0	0	8289	9564	10857	12125	13454
		Remaining Shortage	0	0	-41112	-72803	-90254	-107374	-125307
North Belt UD	San Jacinto	Population	2600	3916	5197	6457	7705	8945	10180
		Demand	317	461	600	731	863	1002	1140
		Shortage	0	-158	-420	-617	-749	-888	-1026
		Potential Conservation	22	32	41	50	60	69	79
		Applied Conservation	0	32	41	50	60	69	79
		Remaining Shortage	0	-126	-379	-567	-689	-819	-947
North Green MUD	San Jacinto	Population	3060	3503	3935	4359	4779	5197	5613
		Demand	319	349	379	405	434	466	503
		Shortage	0	-120	-265	-342	-371	-403	-440
		Potential Conservation	19	21	23	24	26	28	30
		Applied Conservation	0	21	23	24	26	28	30
		Remaining Shortage	0	-99	-242	-318	-345	-375	-410
Northwest Harris County MUD #23	San Jacinto	Population	3231	4482	5700	6898	8084	9262	10436
		Demand	442	587	728	873	1005	1152	1298
		Shortage	0	-200	-510	-737	-869	-1016	-1162
		Potential Conservation	30	40	50	60	69	79	90
		Applied Conservation	0	40	50	60	69	79	90
		Remaining Shortage	0	-160	-460	-677	-800	-937	-1072
Northwest Park MUD	San Jacinto	Population	9693	10999	12271	13522	14760	15990	17216
		Demand	1216	1331	1443	1545	1653	1773	1909
		Shortage	0	-454	-1010	-1305	-1413	-1533	-1669
		Potential Conservation	84	92	100	107	114	122	132
		Applied Conservation	0	92	100	107	114	122	132
		Remaining Shortage	0	-362	-910	-1198	-1299	-1411	-1537
Parkway UD	San Jacinto	Population	2889	2911	2932	2953	2974	2994	3014
		Demand	311	303	296	288	280	275	277
		Shortage	-280	-275	-266	-266	-258	-253	-255
		Potential Conservation	17	17	16	16	16	15	15
		Applied Conservation	17	17	16	16	16	15	15
		Remaining Shortage	-263	-258	-250	-250	-242	-238	-240

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Pearland	San Jacinto-Brazos	Population	1944	2364	2773	3175	3573	3968	4362
		Demand	292	342	394	445	496	551	606
		Shortage	0	0	-23	-62	-101	-152	-208
		Potential Conservation	20	24	27	31	34	38	42
		Applied Conservation	0	0	23	31	34	38	42
		Remaining Shortage	0	0	0	-31	-67	-114	-166
Pine Trails Utility	San Jacinto	Population	5553	6166	6763	7350	7931	8508	9083
		Demand	871	939	1008	1070	1137	1210	1292
		Shortage	-217	-282	-326	-424	-491	-564	-646
		Potential Conservation	52	56	60	64	68	72	77
		Applied Conservation	52	56	60	64	68	72	77
		Remaining Shortage	-165	-226	-266	-360	-423	-492	-569
Piney Point Village	San Jacinto	Population	3380	3546	3708	3867	4024	4180	4336
		Demand	1230	1275	1317	1360	1402	1451	1506
		Shortage	-736	-788	-809	-904	-946	-996	-1052
		Potential Conservation	73	76	79	81	84	86	90
		Applied Conservation	73	76	79	81	84	86	90
		Remaining Shortage	-663	-712	-730	-823	-862	-910	-962
Rolling Fork PUD	San Jacinto	Population	2334	2453	2571	2689	2808	2926	3044
		Demand	682	706	729	753	777	806	839
		Shortage	0	-241	-510	-635	-659	-688	-721
		Potential Conservation	38	39	40	42	43	45	47
		Applied Conservation	0	39	40	42	43	45	47
		Remaining Shortage	0	-202	-470	-593	-616	-643	-674
Seabrook	San Jacinto-Brazos	Population	9443	11943	14377	16771	19141	21496	23842
		Demand	1967	2421	2867	3288	3731	4166	4620
		Shortage	-894	-1262	-1633	-1990	-2371	-2748	-3146
		Potential Conservation	136	167	198	227	257	287	319
		Applied Conservation	136	167	198	227	257	287	319
		Remaining Shortage	-758	-1095	-1435	-1763	-2114	-2461	-2827
Southside Place	San Jacinto	Population	1546	1686	1822	1956	2088	2220	2351
		Demand	379	406	433	458	482	510	540
		Shortage	0	-11	-27	-67	-91	-119	-149
		Potential Conservation	21	23	24	25	27	28	30
		Applied Conservation	0	11	24	25	27	28	30
		Remaining Shortage	0	0	-3	-42	-64	-91	-119
Southwest Utilities	San Jacinto	Population	5335	6341	7321	8285	9239	10187	11131
		Demand	627	710	795	882	962	1050	1147
		Shortage	0	-243	-556	-745	-825	-913	-1010
		Potential Conservation	43	49	55	61	66	72	79
		Applied Conservation	0	49	55	61	66	72	79
		Remaining Shortage	0	-194	-501	-684	-759	-841	-931
Spring Valley	San Jacinto	Population	3611	3810	4003	4193	4381	4568	4754
		Demand	858	888	915	944	972	1008	1049
		Shortage	0	-303	-640	-797	-825	-861	-902
		Potential Conservation	51	53	55	56	58	60	63
		Applied Conservation	0	53	55	56	58	60	63
		Remaining Shortage	0	-250	-585	-741	-767	-801	-839

Table 2

County:	Harris		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Sunbelt FWSD	San Jacinto	Population	19533	24141	28628	33041	37409	41750	46075
		Demand	3741	4489	5227	5922	6663	7389	8154
		Shortage	0	-1047	-3173	-4515	-5256	-5982	-6747
		Potential Conservation	258	310	361	409	460	510	562
		Applied Conservation	0	310	361	409	460	510	562
		Remaining Shortage	0	-737	-2812	-4106	-4796	-5472	-6185
Tomball	San Jacinto	Population	9089	12059	15429	18150	22954	26554	31650
		Demand	2016	2621	3301	3842	4834	5562	6630
		Shortage	0	-895	-2311	-3244	-4236	-4964	-6032
		Potential Conservation	139	181	228	265	333	384	457
		Applied Conservation	0	181	228	265	333	384	457
		Remaining Shortage	0	-714	-2083	-2979	-3903	-4580	-5575
Trail of the Lakes Mud	San Jacinto	Population	4086	10970	10970	10970	10970	10970	10970
		Demand	549	1413	1376	1364	1339	1339	1339
		Shortage	0	-482	-963	-1151	-1126	-1126	-1126
		Potential Conservation	38	97	95	94	92	92	92
		Applied Conservation	0	97	95	94	92	92	92
		Remaining Shortage	0	-385	-868	-1057	-1034	-1034	-1034
Waller	San Jacinto	Population	388	586	778	967	1154	1340	1525
		Demand	80	119	154	190	225	260	296
		Shortage	0	-41	-108	-161	-196	-231	-267
		Potential Conservation	5	7	9	11	13	15	18
		Applied Conservation	0	7	9	11	13	15	18
		Remaining Shortage	0	-34	-99	-150	-183	-216	-249
West Harris County MUD #6	San Jacinto	Population	1769	3500	3500	3500	3500	3500	3500
		Demand	301	565	561	561	549	541	541
		Shortage	0	-192	-393	-474	-462	-454	-454
		Potential Conservation	18	34	33	33	33	32	32
		Applied Conservation	0	34	33	33	33	32	32
		Remaining Shortage	0	-158	-360	-441	-429	-422	-422
West University Place	San Jacinto	Population	14211	15381	16520	17641	18750	19852	20950
		Demand	2929	3101	3275	3438	3591	3780	3989
		Shortage	-290	-464	-567	-850	-1003	-1192	-1401
		Potential Conservation	202	214	226	237	248	261	275
		Applied Conservation	202	214	226	237	248	261	275
		Remaining Shortage	-88	-250	-341	-613	-755	-931	-1126
WHCRWA	San Jacinto	Population	245708	282352	355073	433235	483377	535519	589071
		Demand	41559	46809	57274	68911	76345	83980	92378
		Shortage	0	0	-20328	-38669	-46259	-54082	-62662
		Potential Conservation	2867	3229	3951	4754	5266	5793	6372
		Applied Conservation	0	0	3951	4754	5266	5793	6372
		Remaining Shortage	0	0	-16377	-33915	-40993	-48289	-56290
Willow Run Subdivision	San Jacinto	Population	3663	3663	3663	3663	3663	3663	3663
		Demand	681	665	652	640	628	620	620
		Shortage	0	-227	-456	-540	-528	-520	-520
		Potential Conservation	41	40	39	38	37	37	37
		Applied Conservation	0	40	39	38	37	37	37
		Remaining Shortage	0	-187	-417	-502	-491	-483	-483

Table 2

County:	Montgomery		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Conroe	San Jacinto	Population	36811	49602	57413	72685	90440	113860	141060
		Demand	7175	9334	10611	13190	16310	20406	25281
		Shortage	0	-1565	-4022	-6528	-9461	-13427	-18201
		Potential Conservation	495	644	732	910	1125	1408	1744
		Applied Conservation	0	644	732	910	1125	1408	1744
		Remaining Shortage	0	-921	-3290	-5618	-8336	-12019	-16457
Consumers Water Inc	San Jacinto	Population	1623	2236	2610	3342	4193	5316	6620
		Demand	164	210	237	299	366	464	578
		Shortage	0	-35	-90	-148	-212	-305	-416
		Potential Conservation	11	14	16	21	25	32	40
		Applied Conservation	0	14	16	21	25	32	40
		Remaining Shortage	0	-21	-74	-127	-187	-273	-376
County-Other	San Jacinto	Population	99788	156912	198870	287661	391340	535846	703682
		Demand	14307	21619	26954	38344	51726	70827	93011
		Shortage	0	-3242	-9834	-18594	-29625	-46222	-66583
		Potential Conservation	794	1200	1496	2129	2872	3932	5164
		Applied Conservation	0	1200	1496	2129	2872	3932	5164
		Remaining Shortage	0	-2042	-8338	-16465	-26753	-42290	-61419
Crystal Springs Water Company	San Jacinto	Population	3781	6212	7696	10598	13972	18422	23591
		Demand	368	564	681	914	1189	1568	2008
		Shortage	0	-95	-259	-453	-690	-1032	-1445
		Potential Conservation	25	39	47	63	82	108	139
		Applied Conservation	0	39	47	63	82	108	139
		Remaining Shortage	0	-56	-212	-390	-608	-924	-1306
Cut and Shoot	San Jacinto	Population	1158	1515	1733	2159	2655	3309	4068
		Demand	169	210	235	285	348	430	529
		Shortage	0	-1	-1	-2	-2	-3	-3
		Potential Conservation	10	13	14	17	21	26	32
		Applied Conservation	0	1	1	2	2	3	3
		Remaining Shortage	0	0	0	0	0	0	0
East Plantation UD	San Jacinto	Population	1400	2240	2753	3756	4922	6460	8246
		Demand	284	439	533	719	937	1230	1570
		Shortage	0	-73	-202	-356	-543	-810	-1131
		Potential Conservation	17	26	32	43	56	73	94
		Applied Conservation	0	26	32	43	56	73	94
		Remaining Shortage	0	-47	-170	-313	-487	-737	-1037
Houston	San Jacinto	Population	458	1096	1486	2248	3134	4303	5661
		Demand	82	190	253	375	516	704	926
		Shortage	0	0	0	0	0	0	0
		Potential Conservation	6	13	18	26	36	49	65
		Applied Conservation	6	13	18	26	36	49	65
		Remaining Shortage	0	0	0	0	0	0	0
H M W SUD	San Jacinto	Population	8450	10987	12536	15565	19086	23731	29126
		Demand	1268	1625	1825	2249	2737	3403	4176
		Shortage	0	-272	-692	-1113	-1588	-2239	-3007
		Potential Conservation	87	112	126	155	189	235	288
		Applied Conservation	0	112	126	155	189	235	288
		Remaining Shortage	0	-160	-566	-958	-1399	-2004	-2719

Table 2

County:	Montgomery		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Montgomery County MUD #18	San Jacinto	Population	2601	6243	8467	12815	17870	24538	32282
		Demand	720	1685	2276	3431	4784	6569	8642
		Shortage	0	-282	-862	-1698	-2775	-4322	-6221
		Potential Conservation	50	116	157	237	330	453	596
		Applied Conservation	0	116	157	237	330	453	596
		Remaining Shortage	0	-166	-705	-1461	-2445	-3869	-5625
Montgomery County MUD #19	San Jacinto	Population	3200	3200	3200	3200	3200	3200	3200
		Demand	477	459	452	448	444	444	444
		Shortage	0	-77	-172	-221	-257	-292	-320
		Potential Conservation	26	25	25	25	25	25	25
		Applied Conservation	0	25	25	25	25	25	25
		Remaining Shortage	0	-52	-147	-196	-232	-267	-295
Montgomery County MUD #8	San Jacinto	Population	3042	4439	5292	6960	8900	11458	14429
		Demand	651	920	1085	1411	1785	2297	2893
		Shortage	0	-155	-411	-698	-1035	-1512	-2083
		Potential Conservation	45	63	75	97	123	158	200
		Applied Conservation	0	63	75	97	123	158	200
		Remaining Shortage	0	-92	-336	-601	-912	-1354	-1883
Montgomery County MUD #9	San Jacinto	Population	1827	3058	3810	5279	6987	9240	11857
		Demand	522	856	1058	1455	1917	2536	3254
		Shortage	0	-143	-401	-720	-1112	-1668	-2342
		Potential Conservation	36	59	73	100	132	175	224
		Applied Conservation	0	59	73	100	132	175	224
		Remaining Shortage	0	-84	-328	-620	-980	-1493	-2118
Montgomery County UD #2	San Jacinto	Population	1986	2937	2937	2937	2937	2937	2937
		Demand	369	526	520	513	507	507	507
		Shortage	0	-89	-197	-254	-294	-334	-365
		Potential Conservation	20	29	29	28	28	28	28
		Applied Conservation	0	29	29	28	28	28	28
		Remaining Shortage	0	-60	-168	-226	-266	-306	-337
Montgomery County UD #3	San Jacinto	Population	3160	3636	3927	4495	5156	6028	7040
		Demand	425	472	497	554	624	722	844
		Shortage	0	-79	-189	-274	-362	-475	-607
		Potential Conservation	25	28	30	33	37	43	50
		Applied Conservation	0	28	30	33	37	43	50
		Remaining Shortage	0	-51	-159	-241	-325	-432	-557
Montgomery County UD #4	San Jacinto	Population	3165	4686	4686	4686	4686	4686	4686
		Demand	645	924	913	903	892	892	892
		Shortage	0	-155	-346	-447	-517	-587	-642
		Potential Conservation	38	55	54	54	53	53	53
		Applied Conservation	0	55	54	54	53	53	53
		Remaining Shortage	0	-100	-292	-393	-464	-534	-589
Montgomery County WCID #1	San Jacinto	Population	3500	4053	4391	5051	5819	6832	8008
		Demand	435	486	512	571	645	750	879
		Shortage	0	-81	-194	-283	-375	-494	-632
		Potential Conservation	26	29	31	34	38	45	52
		Applied Conservation	0	29	31	34	38	45	52
		Remaining Shortage	0	-52	-163	-249	-337	-449	-580

Table 2

County:	Montgomery		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
New Caney	San Jacinto	Population	9363	14237	17213	23032	29797	38720	49084
		Demand	965	1371	1600	2116	2670	3470	4398
		Shortage	0	-229	-607	-1047	-1549	-2283	-3166
		Potential Conservation	67	95	110	146	184	239	303
		Applied Conservation	0	95	110	146	184	239	303
		Remaining Shortage	0	-134	-497	-901	-1365	-2044	-2863
Oak Ridge North	San Jacinto	Population	2991	3743	4202	5100	6144	7521	9120
		Demand	563	683	748	897	1067	1297	1573
		Shortage	0	-114	-284	-444	-619	-854	-1133
		Potential Conservation	34	41	45	53	64	77	94
		Applied Conservation	0	41	45	53	64	77	94
		Remaining Shortage	0	-73	-239	-391	-555	-777	-1039
Panorama Village	San Jacinto	Population	1965	2538	2888	3572	3913	3913	3913
		Demand	605	768	864	1056	1153	1148	1148
		Shortage	0	-129	-327	-522	-669	-755	-827
		Potential Conservation	36	46	51	63	69	68	68
		Applied Conservation	0	46	51	63	69	68	68
		Remaining Shortage	0	-83	-276	-459	-600	-687	-759
Patton Village	San Jacinto	Population	1391	1721	1923	2318	2777	3382	4085
		Demand	76	87	88	101	115	136	165
		Shortage	0	-1	-1	-1	-1	-1	-1
		Potential Conservation	5	5	5	6	7	8	10
		Applied Conservation	0	1	1	1	1	1	1
		Remaining Shortage	0	0	0	0	0	0	0
Point Aquarius MUD	San Jacinto	Population	1587	3246	4259	6240	8543	11581	15109
		Demand	334	669	873	1272	1732	2348	3063
		Shortage	0	-112	-331	-630	-1004	-1545	-2205
		Potential Conservation	23	46	60	88	119	162	211
		Applied Conservation	0	46	60	88	119	162	211
		Remaining Shortage	0	-66	-271	-542	-885	-1383	-1994
Porter WSC	San Jacinto	Population	10348	14336	16771	21532	27067	27067	27067
		Demand	1391	1847	2104	2653	3305	3274	3274
		Shortage	0	-309	-798	-1313	-1917	-2155	-2357
		Potential Conservation	96	127	145	183	228	226	226
		Applied Conservation	0	127	145	183	228	226	226
		Remaining Shortage	0	-182	-653	-1130	-1689	-1929	-2131
Rayford Road MUD	San Jacinto	Population	7625	16556	16556	16556	16556	16556	16556
		Demand	999	2096	2077	2059	2059	2059	2059
		Shortage	0	-350	-788	-1019	-1194	-1355	-1482
		Potential Conservation	69	145	143	142	142	142	142
		Applied Conservation	0	145	143	142	142	142	142
		Remaining Shortage	0	-205	-645	-877	-1052	-1213	-1340
River Plantation MUD	San Jacinto	Population	3160	3286	3286	3286	3286	3286	3286
		Demand	811	828	817	806	795	791	791
		Shortage	0	-139	-310	-398	-461	-521	-569
		Potential Conservation	45	46	45	45	44	44	44
		Applied Conservation	0	46	45	45	44	44	44
		Remaining Shortage	0	-93	-265	-353	-417	-477	-525

Table 2

County:	Montgomery		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Roman Forest	San Jacinto	Population	1279	1623	1833	2244	2722	3353	4085
		Demand	168	202	222	266	317	387	471
		Shortage	0	-1	-1	-2	-2	-2	-3
		Potential Conservation	10	12	13	16	19	23	28
		Applied Conservation	0	1	1	2	2	2	3
		Remaining Shortage	0	0	0	0	0	0	0
Shenandoah	San Jacinto	Population	1503	1503	1503	1503	1503	1503	1503
		Demand	517	512	507	502	497	493	493
		Shortage	0	-86	-192	-249	-288	-324	-355
		Potential Conservation	29	28	28	28	28	27	27
		Applied Conservation	0	28	28	28	28	27	27
		Remaining Shortage	0	-58	-164	-221	-260	-297	-328
Southern Montgomery County MUD	San Jacinto	Population	6529	10365	12708	12708	12708	12708	12708
		Demand	1163	1776	2149	2121	2107	2107	2107
		Shortage	0	-298	-815	-1049	-1222	-1386	-1517
		Potential Conservation	80	123	148	146	145	145	145
		Applied Conservation	0	123	148	146	145	145	145
		Remaining Shortage	0	-175	-667	-903	-1077	-1241	-1372
Southwest Utilities	San Jacinto	Population	1541	2149	2520	3245	4088	5201	6493
		Demand	181	241	274	345	426	536	669
		Shortage	0	-40	-104	-171	-247	-353	-482
		Potential Conservation	12	17	19	24	29	37	46
		Applied Conservation	0	17	19	24	29	37	46
		Remaining Shortage	0	-23	-85	-147	-218	-316	-436
Splendora	San Jacinto	Population	1275	2017	2470	3356	4386	5745	7323
		Demand	126	188	224	297	383	502	640
		Shortage	0	-1	-1	-2	-2	-3	-4
		Potential Conservation	8	11	13	18	23	30	38
		Applied Conservation	0	1	1	2	2	3	4
		Remaining Shortage	0	0	0	0	0	0	0
Spring Creek UD	San Jacinto	Population	3186	4987	6087	8237	10736	14033	17862
		Demand	339	503	593	784	1010	1320	1681
		Shortage	0	-85	-225	-388	-586	-869	-1210
		Potential Conservation	23	35	41	54	70	91	116
		Applied Conservation	0	35	41	54	70	91	116
		Remaining Shortage	0	-50	-184	-334	-516	-778	-1094
Stanley Lake MUD	San Jacinto	Population	2025	3903	5015	5015	5015	5015	5015
		Demand	367	682	871	865	859	859	859
		Shortage	0	-114	-330	-428	-498	-565	-618
		Potential Conservation	22	41	52	52	51	51	51
		Applied Conservation	0	41	52	52	51	51	51
		Remaining Shortage	0	-73	-278	-376	-447	-514	-567
The Woodlands	San Jacinto	Population	55649	60080	111470	119300	119300	119300	119300
		Demand	13714	14671	26596	28330	28197	28063	28063
		Shortage	0	-2459	-10081	-14022	-16360	-18464	-20204
		Potential Conservation	946	1012	1835	1954	1945	1936	1936
		Applied Conservation	0	1012	1835	1954	1945	1936	1936
		Remaining Shortage	0	-1447	-8246	-12068	-14415	-16528	-18268

Table 2

County:	Montgomery		Decade						
WUG Name	**Basin**		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Willis	San Jacinto	**Population**	3985	5695	6739	8780	11153	14283	17918
		Demand	424	568	649	816	1024	1296	1626
		Shortage	0	-95	-246	-403	-594	-853	-1171
		Potential Conservation	29	39	45	56	71	89	112
		Applied Conservation	0	39	45	56	71	89	112
		Remaining Shortage	0	-56	-201	-347	-523	-764	-1059
Woodbranch	San Jacinto	**Population**	1305	1305	1305	1305	1305	1305	1305
		Demand	156	152	148	143	139	136	136
		Shortage	0	-1	-1	-1	-1	-1	-1
		Potential Conservation	9	8	8	8	8	8	8
		Applied Conservation	0	1	1	1	1	1	1
		Remaining Shortage	0	0	0	0	0	0	0

Table 2

County:	Waller		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Brookshire	Brazos	Population	3450	3930	4499	5133	5838	6678	7642
		Demand	522	572	635	707	791	898	1027
		Shortage	0	0	0	0	0	-20	-103
		Potential Conservation	31	34	38	42	47	54	61
		Applied Conservation	0	0	0	0	0	20	61
		Remaining Shortage	0	0	0	0	0	0	-42
County-Other	Brazos	Population	8257	11210	14708	18602	22936	28096	34023
		Demand	675	866	1087	1354	1619	1983	2401
		Shortage	0	0	0	0	0	-45	-241
		Potential Conservation	37	48	60	75	90	110	133
		Applied Conservation	0	0	0	0	0	45	133
		Remaining Shortage	0	0	0	0	0	0	-108
County-Other	San Jacinto	Population	8498	11536	15136	19145	23604	28914	35015
		Demand	695	892	1119	1394	1666	2040	2471
		Shortage	0	0	0	0	0	0	-69
		Potential Conservation	39	50	62	77	92	113	137
		Applied Conservation	0	0	0	0	0	0	69
		Remaining Shortage	0	0	0	0	0	0	0
Hempstead	Brazos	Population	4691	5724	6947	8309	9825	11630	13703
		Demand	946	1128	1346	1582	1860	2189	2579
		Shortage	0	0	0	0	0	-50	-259
		Potential Conservation	65	78	93	109	128	151	178
		Applied Conservation	0	0	0	0	0	50	178
		Remaining Shortage	0	0	0	0	0	0	-81
Katy	San Jacinto	Population	804	804	804	804	804	804	804
		Demand	153	149	145	143	142	141	141
		Shortage	0	-52	-101	-121	-120	-119	-119
		Potential Conservation	11	10	10	10	10	10	10
		Applied Conservation	0	10	10	10	10	10	10
		Remaining Shortage	0	-42	-91	-111	-110	-109	-109
Pine Island	Brazos	Population	849	1102	1402	1736	2107	2549	3057
		Demand	95	117	146	177	210	254	305
		Shortage	0	0	0	0	0	-6	-31
		Potential Conservation	5	6	8	10	12	14	17
		Applied Conservation	0	0	0	0	0	6	17
		Remaining Shortage	0	0	0	0	0	0	-14
Prairie View	Brazos	Population	3973	4306	4700	5139	5628	6210	6878
		Demand	1055	1129	1211	1307	1418	1558	1726
		Shortage	0	0	0	0	0	-36	-173
		Potential Conservation	63	67	72	78	85	93	103
		Applied Conservation	0	0	0	0	0	36	103
		Remaining Shortage	0	0	0	0	0	0	-70
Prairie View	San Jacinto	Population	437	474	517	565	619	683	756
		Demand	116	124	133	144	156	171	190
		Shortage	0	0	0	0	0	0	-5
		Potential Conservation	7	7	8	9	9	10	11
		Applied Conservation	0	0	0	0	0	0	5
		Remaining Shortage	0	0	0	0	0	0	0

Table 2

County:	Waller		Decade						
WUG Name	Basin		2000	2010	2020	2030	2040	2050	2060
Waller	San Jacinto	Population	1704	2051	2462	2919	3428	4034	4730
		Demand	353	416	488	572	668	782	917
		Shortage	0	0	0	0	0	0	-26
		Potential Conservation	21	25	29	34	40	47	55
		Applied Conservation	0	0	0	0	0	0	26
		Remaining Shortage	0	0	0	0	0	0	0

Reductions in Demand																								
			Savings, acft/yr							Water Demand by wug							% Decrease in Demand						
wug_name	wug_basin	wug_county	S2000	S2010	S2020	S2030	S2040	S2050	S2060	TWD2000	TWD2010	TWD2020	TWD2030	TWD2040	TWD2050	TWD2060	2000	2010	2020	2030	2040	2050	2060
ANGLETON	SAN JACINTO-BRAZOS	BRAZORIA	0	20	80	78	80	83	87	2071	2165	2263	2356	2442	2534	2629	0.00%	0.93%	3.55%	3.29%	3.29%	3.29%	3.29%
CLUTE	SAN JACINTO-BRAZOS	BRAZORIA	0	13	49	48	51	54	57	1133	1219	1309	1394	1474	1558	1645	0.00%	1.05%	3.71%	3.47%	3.46%	3.46%	3.46%
COUNTY-OTHER	BRAZOS	BRAZORIA	0	1	2	2	2	3	3	125	135	146	155	164	174	184	0.00%	0.46%	1.60%	1.51%	1.50%	1.50%	1.50%
COUNTY-OTHER	BRAZOS-COLORADO	BRAZORIA	0	20	75	74	79	83	88	4005	4319	4645	4958	5246	5551	5870	0.00%	0.46%	1.61%	1.50%	1.50%	1.50%	1.50%
COUNTY-OTHER	SAN JACINTO-BRAZOS	BRAZORIA	0	26	203	214	239	264	292	12245	10891	12523	14289	15909	17632	19437	0.00%	0.24%	1.62%	1.50%	1.50%	1.50%	1.50%
FREEPORT	BRAZOS	BRAZORIA	0	1	5	4	4	4	4	147	147	147	147	147	147	147	0.00%	0.75%	3.26%	3.00%	3.00%	3.00%	3.00%
FREEPORT	SAN JACINTO-BRAZOS	BRAZORIA	0	22	71	79	89	101	112	1447	1834	2237	2623	2979	3356	3749	0.00%	1.23%	3.16%	3.00%	3.00%	3.00%	3.00%
LAKE JACKSON	SAN JACINTO-BRAZOS	BRAZORIA	0	36	131	134	144	155	166	3754	4180	4624	5048	5440	5855	6289	0.00%	0.86%	2.82%	2.65%	2.65%	2.65%	2.65%
OYSTER CREEK	SAN JACINTO-BRAZOS	BRAZORIA	0	2	7	7	8	9	10	146	174	203	232	258	285	314	0.00%	1.15%	3.28%	3.08%	3.08%	3.09%	3.08%
PEARLAND	SAN JACINTO-BRAZOS	BRAZORIA	0	139	315	362	416	473	532	5358	9559	12111	14435	16580	18850	21218	0.00%	1.45%	2.60%	2.51%	2.51%	2.51%	2.51%
RICHWOOD	SAN JACINTO-BRAZOS	BRAZORIA	0	4	14	14	15	16	17	304	327	351	375	396	419	443	0.00%	1.13%	4.01%	3.73%	3.74%	3.73%	3.73%
		BRAZORIA Total	0	283	951	1017	1127	1245	1367	30735	34950	40559	46012	51035	56361	61925	0.00%	0.81%	2.34%	2.21%	2.21%	2.21%	2.21%
BEACH CITY	TRINITY	CHAMBERS	0	1	2	2	2	2	3	28	41	54	67	78	89	101	0.00%	1.29%	2.85%	2.72%	2.72%	2.72%	2.71%
BEACH CITY	TRINITY-SAN JACINTO	CHAMBERS	0	4	11	13	15	17	19	200	287	384	474	551	630	711	0.00%	1.29%	2.83%	2.71%	2.71%	2.71%	2.71%
COUNTY-OTHER	NECHES-TRINITY	CHAMBERS	0	0	2	1	1	1	1	52	51	51	50	49	49	48	0.00%	0.74%	3.23%	3.00%	3.03%	2.98%	2.99%
COUNTY-OTHER	TRINITY	CHAMBERS	0	2	8	8	7	7	7	261	258	254	250	247	243	240	0.00%	0.72%	3.25%	3.00%	3.00%	3.00%	3.00%
COUNTY-OTHER	TRINITY-SAN JACINTO	CHAMBERS	0	1	5	5	5	5	5	168	166	163	161	159	157	155	0.00%	0.72%	3.27%	3.00%	3.00%	3.00%	2.99%
MONT BELVIEU	TRINITY	CHAMBERS	0	4	11	13	15	17	20	489	679	890	1086	1256	1429	1605	0.00%	0.56%	1.27%	1.22%	1.22%	1.22%	1.22%
MONT BELVIEU	TRINITY-SAN JACINTO	CHAMBERS	0	2	5	6	7	8	9	229	318	417	509	589	670	753	0.00%	0.56%	1.27%	1.22%	1.22%	1.22%	1.22%
OLD RIVER-WINFREE	TRINITY	CHAMBERS	0	2	6	7	7	7	8	186	203	220	237	252	266	281	0.00%	0.85%	2.95%	2.76%	2.75%	2.76%	2.76%
		CHAMBERS Total	0	15	51	54	60	66	72	1613	2003	2433	2834	3181	3533	3894	0.00%	0.75%	2.09%	1.92%	1.89%	1.86%	1.84%
ARCOLA	SAN JACINTO-BRAZOS	FORT BEND	0	6	11	11	13	14	15	175	417	459	505	555	611	672	0.00%	1.55%	2.33%	2.25%	2.26%	2.26%	2.26%
BEASLEY	BRAZOS	FORT BEND	0	0	0	0	0	0	1	7	9	10	12	13	16	18	0.00%	0.98%	2.89%	2.67%	2.85%	2.71%	2.79%
BIG OAKS MUD	SAN JACINTO	FORT BEND	0	10	25	35	45	59	75	292	600	918	1307	1708	2233	2833	0.00%	1.68%	2.72%	2.65%	2.65%	2.65%	2.65%
CINCO MUD #2	SAN JACINTO	FORT BEND	0	19	48	67	87	114	145	1085	2226	3409	4854	6340	8290	10517	0.00%	0.87%	1.41%	1.38%	1.38%	1.38%	1.38%
CINCO MUD #6	SAN JACINTO	FORT BEND	0	6	14	19	25	33	42	204	419	641	913	1193	1559	1978	0.00%	1.33%	2.16%	2.10%	2.10%	2.10%	2.10%
CINCO MUD #7	SAN JACINTO	FORT BEND	0	13	33	46	60	78	99	531	1090	1669	2377	3104	4059	5150	0.00%	1.22%	1.97%	1.92%	1.92%	1.92%	1.92%
CINCO MUD #8	SAN JACINTO	FORT BEND	0	6	14	13	13	13	13	322	470	470	470	470	470	470	0.00%	1.37%	2.96%	2.80%	2.80%	2.80%	2.80%
CINCO MUD #9	SAN JACINTO	FORT BEND	0	17	41	57	74	97	123	691	1418	2171	3092	4039	5281	6700	0.00%	1.16%	1.89%	1.84%	1.84%	1.84%	1.84%
CORNERSTONES MUD	SAN JACINTO	FORT BEND	0	6	16	21	26	33	42	351	579	815	1103	1400	1790	2234	0.00%	1.02%	1.93%	1.87%	1.87%	1.87%	1.87%
COUNTY-OTHER	BRAZOS	FORT BEND	0	109	300	440	592	791	1018	3796	7753	13153	19774	26583	35557	45753	0.00%	1.41%	2.28%	2.23%	2.23%	2.23%	2.23%
COUNTY-OTHER	SAN JACINTO	FORT BEND	0	3	25	45	67	104	135	398	418	1070	2025	3015	4669	6083	0.00%	0.64%	2.29%	2.23%	2.23%	2.23%	2.23%
COUNTY-OTHER	SAN JACINTO-BRAZOS	FORT BEND	0	18	122	237	358	554	729	1415	1852	5358	10636	16093	24877	32763	0.00%	0.95%	2.27%	2.23%	2.23%	2.23%	2.23%
FAIRCHILDS	BRAZOS	FORT BEND	0	2	5	6	7	9	10	300	411	526	667	811	1001	1219	0.00%	0.39%	0.89%	0.85%	0.85%	0.85%	0.85%
FIRST COLONY MUD #9	BRAZOS	FORT BEND	0	15	34	32	32	32	32	1085	1506	1506	1506	1506	1506	1506	0.00%	0.98%	2.27%	2.14%	2.14%	2.14%	2.14%
FORT BEND COUNTY MUD #106	BRAZOS	FORT BEND	0	5	13	12	12	12	12	766	982	982	982	982	982	982	0.00%	0.52%	1.34%	1.26%	1.26%	1.26%	1.26%
FORT BEND COUNTY MUD #108	BRAZOS	FORT BEND	0	4	11	11	11	11	11	533	603	603	603	603	603	603	0.00%	0.59%	1.89%	1.76%	1.76%	1.76%	1.76%
FORT BEND COUNTY MUD #111	BRAZOS	FORT BEND	0	3	14	12	12	12	12	798	798	798	798	798	798	798	0.00%	0.39%	1.69%	1.56%	1.56%	1.56%	1.56%
FORT BEND COUNTY MUD #2	SAN JACINTO	FORT BEND	0	3	9	8	8	8	8	287	339	339	339	339	339	339	0.00%	0.86%	2.53%	2.36%	2.36%	2.36%	2.36%
FORT BEND COUNTY MUD #2	SAN JACINTO-BRAZOS	FORT BEND	0	10	31	29	29	29	29	1034	1219	1219	1219	1219	1219	1219	0.00%	0.86%	2.53%	2.37%	2.37%	2.37%	2.37%
FORT BEND COUNTY MUD #23	SAN JACINTO-BRAZOS	FORT BEND	0	14	35	49	63	83	105	338	682	1038	1473	1921	2508	3179	0.00%	2.07%	3.38%	3.29%	3.29%	3.29%	3.29%
FORT BEND COUNTY MUD #25	SAN JACINTO-BRAZOS	FORT BEND	0	24	63	83	106	135	169	976	1651	2350	3206	4086	5239	6558	0.00%	1.44%	2.67%	2.58%	2.58%	2.58%	2.58%
FORT BEND COUNTY MUD #30	SAN JACINTO	FORT BEND	0	7	20	24	29	35	43	382	515	653	822	995	1223	1483	0.00%	1.29%	3.04%	2.90%	2.90%	2.90%	2.90%
FORT BEND COUNTY MUD #37	SAN JACINTO	FORT BEND	0	5	13	18	22	29	36	377	651	935	1283	1640	2109	2645	0.00%	0.77%	1.41%	1.37%	1.37%	1.37%	1.37%
FORT BEND COUNTY MUD #41	BRAZOS	FORT BEND	0	13	35	46	60	77	97	445	791	1151	1590	2042	2634	3311	0.00%	1.69%	3.02%	2.92%	2.92%	2.92%	2.92%
FORT BEND COUNTY MUD #67	BRAZOS	FORT BEND	0	3	13	12	12	12	12	748	748	748	748	748	748	748	0.00%	0.42%	1.80%	1.66%	1.66%	1.66%	1.66%
FORT BEND COUNTY MUD #68	BRAZOS	FORT BEND	0	4	15	14	14	14	14	604	604	604	604	604	604	604	0.00%	0.58%	2.51%	2.32%	2.32%	2.32%	2.32%
FORT BEND COUNTY MUD #69	BRAZOS	FORT BEND	0	2	7	6	6	6	6	394	394	394	394	394	394	394	0.00%	0.41%	1.76%	1.63%	1.63%	1.63%	1.63%
FORT BEND COUNTY MUD #81	BRAZOS	FORT BEND	0	4	11	14	17	21	26	524	785	1055	1386	1726	2171	2681	0.00%	0.49%	1.03%	0.99%	0.99%	0.99%	0.99%
FULSHEAR	BRAZOS	FORT BEND	0	1	3	3	3	4	5	141	174	208	250	293	349	414	0.00%	0.45%	1.22%	1.16%	1.16%	1.16%	1.15%
FULSHEAR	SAN JACINTO-BRAZOS	FORT BEND	0	1	2	2	2	3	3	92	114	136	163	191	228	270	0.00%	0.46%	1.22%	1.16%	1.16%	1.16%	1.16%
GRAND LAKES MUD #4	SAN JACINTO	FORT BEND	0	9	23	32	41	54	68	441	904	1384	1971	2575	3367	4272	0.00%	1.02%	1.64%	1.60%	1.60%	1.60%	1.60%
KATY	SAN JACINTO	FORT BEND	0	2	5	6	7	8	9	169	205	243	288	335	397	467	0.00%	0.76%	2.09%	1.98%	1.98%	1.98%	1.98%
KINGSBRIDGE MUD	SAN JACINTO	FORT BEND	0	11	31	38	47	58	71	721	1010	1310	1676	2053	2547	3112	0.00%	1.06%	2.39%	2.29%	2.29%	2.29%	2.29%

KINGSBRIDGE MUD	SAN JACINTO-BRAZOS	FORT BEND	0	0	1	1	2	2	3	28	39	51	65	80	99	121	0.00%	1.08%	2.39%	2.29%	2.28%	2.29%	2.29%
MEADOWS	SAN JACINTO	FORT BEND	0	4	18	17	17	17	17	1352	1352	1352	1352	1352	1351	1351	0.00%	0.31%	1.35%	1.24%	1.24%	1.24%	1.24%
MEADOWS	SAN JACINTO-BRAZOS	FORT BEND	0	0	2	2	2	2	2	134	134	134	134	134	134	134	0.00%	0.31%	1.35%	1.25%	1.25%	1.25%	1.25%
MISSOURI CITY	BRAZOS	FORT BEND	0	3	8	9	11	12	15	198	321	405	484	565	621	752	0.00%	1.05%	2.02%	1.94%	1.94%	1.94%	1.94%
MISSOURI CITY	SAN JACINTO	FORT BEND	0	27	67	77	90	99	120	1625	2633	3314	3966	4629	5088	6158	0.00%	1.04%	2.02%	1.94%	1.94%	1.94%	1.94%
MISSOURI CITY	SAN JACINTO-BRAZOS	FORT BEND	0	124	303	349	407	447	541	7353	11920	15001	17954	20951	23032	27876	0.00%	1.04%	2.02%	1.94%	1.94%	1.94%	1.94%
NEEDVILLE	BRAZOS	FORT BEND	0	2	6	7	8	9	11	144	168	193	223	254	294	341	0.00%	1.10%	3.27%	3.08%	3.08%	3.09%	3.08%
NORTH MISSION GLEN MUD	SAN JACINTO	FORT BEND	0	16	43	57	73	94	117	520	909	1313	1806	2313	2978	3738	0.00%	1.79%	3.24%	3.14%	3.14%	3.14%	3.14%
ORBIT SYSTEMS INC	SAN JACINTO-BRAZOS	FORT BEND	0	0	1	1	1	1	1	14	16	18	20	23	26	29	0.00%	1.29%	4.08%	3.92%	3.82%	3.84%	3.92%
PECAN GROVE MUD #1	BRAZOS	FORT BEND	0	10	43	41	42	43	45	2293	2347	2403	2471	2542	2634	2739	0.00%	0.44%	1.77%	1.64%	1.64%	1.64%	1.64%
PECAN GROVE MUD #1	SAN JACINTO-BRAZOS	FORT BEND	0	3	11	11	11	11	12	609	624	639	657	675	700	728	0.00%	0.44%	1.77%	1.64%	1.64%	1.64%	1.64%
PLANTATION MUD	SAN JACINTO-BRAZOS	FORT BEND	0	4	17	16	16	16	16	543	564	564	564	564	564	564	0.00%	0.77%	2.98%	2.76%	2.76%	2.76%	2.76%
RICHMOND	BRAZOS	FORT BEND	0	15	54	55	61	68	76	1899	2086	2280	2517	2761	3081	3446	0.00%	0.70%	2.35%	2.20%	2.20%	2.20%	2.20%
ROSENBERG	BRAZOS	FORT BEND	0	38	129	141	161	187	217	3420	3997	4596	5327	6079	7065	8192	0.00%	0.95%	2.81%	2.65%	2.65%	2.65%	2.65%
SIENNA PLANTATION MUD #2	SAN JACINTO-BRAZOS	FORT BEND	0	14	27	26	26	26	26	529	1085	1341	1341	1341	1341	1341	0.00%	1.25%	2.03%	1.96%	1.96%	1.96%	1.96%
SIMONTON	BRAZOS	FORT BEND	0	1	3	3	3	3	3	318	318	319	319	319	320	321	0.00%	0.22%	0.92%	0.85%	0.85%	0.85%	0.85%
WHCRWA	SAN JACINTO	FORT BEND	0	27	78	96	118	147	181	1785	2550	3343	4313	5311	6618	8113	0.00%	1.06%	2.32%	2.23%	2.23%	2.23%	2.23%
		FORT BEND Total	0	642	1850	2354	2948	3727	4617	43186	63400	85591	112549	140267	176324	217919	0.00%	1.01%	2.16%	2.09%	2.10%	2.11%	2.12%
GALVESTON COUNTY WCID #12	SAN JACINTO-BRAZOS	GALVESTON	0	2	7	8	8	8	8	231	274	311	332	341	348	352	0.00%	0.83%	2.39%	2.26%	2.26%	2.25%	2.26%
KEMAH	SAN JACINTO-BRAZOS	GALVESTON	0	5	14	15	15	16	16	227	291	346	379	392	402	408	0.00%	1.60%	4.07%	3.86%	3.86%	3.86%	3.86%
LEAGUE CITY	SAN JACINTO-BRAZOS	GALVESTON	0	73	242	243	249	254	257	6597	7776	8794	9397	9641	9823	9941	0.00%	0.94%	2.75%	2.58%	2.58%	2.58%	2.58%
		GALVESTON Total	0	80	263	265	272	277	281	7055	8341	9451	10108	10374	10573	10701	0.00%	0.96%	2.78%	2.62%	2.62%	2.62%	2.62%
BELLAIRE	SAN JACINTO	HARRIS	0	21	76	77	83	88	94	3452	3811	4162	4506	4847	5186	5523	0.00%	0.55%	1.82%	1.71%	1.71%	1.71%	1.71%
BLUE BELL MANOR UTILITY COMPANY	SAN JACINTO	HARRIS	0	2	11	10	10	10	10	581	581	581	581	581	581	581	0.00%	0.42%	1.82%	1.68%	1.68%	1.68%	1.68%
BRITMOORE UTILITIES	SAN JACINTO	HARRIS	0	3	10	11	12	13	15	390	483	572	660	748	835	921	0.00%	0.63%	1.70%	1.61%	1.61%	1.61%	1.61%
BUNKER HILL VILLAGE	SAN JACINTO	HARRIS	0	4	15	14	14	14	14	1478	1516	1516	1516	1516	1516	1516	0.00%	0.25%	1.01%	0.93%	0.93%	0.93%	0.93%
CANDLELIGHT HILLS SUBDIVISION	SAN JACINTO	HARRIS	0	3	11	12	13	15	16	368	464	556	648	738	828	917	0.00%	0.73%	1.90%	1.80%	1.80%	1.80%	1.80%
CHIMNEY HILL MUD	SAN JACINTO	HARRIS	0	10	26	24	24	24	24	557	697	697	697	697	697	697	0.00%	1.39%	3.69%	3.46%	3.46%	3.46%	3.46%
CINCO MUD #6	SAN JACINTO	HARRIS	0	2	6	7	9	10	12	92	176	258	338	417	496	574	0.00%	1.28%	2.16%	2.10%	2.10%	2.10%	2.10%
CINCO MUD #9	SAN JACINTO	HARRIS	0	2	6	8	10	11	13	123	225	326	424	521	618	714	0.00%	1.09%	1.89%	1.84%	1.84%	1.84%	1.84%
CONSUMERS WATER INC	SAN JACINTO	HARRIS	0	8	23	27	33	39	44	269	428	582	735	885	1035	1184	0.00%	1.97%	3.88%	3.73%	3.74%	3.73%	3.73%
CORNERSTONES MUD	SAN JACINTO	HARRIS	0	7	21	24	29	34	38	530	796	1055	1309	1561	1812	2061	0.00%	0.93%	1.94%	1.87%	1.87%	1.87%	1.87%
COUNTY-OTHER	SAN JACINTO	HARRIS	0	51	153	143	253	367	474	6869	7542	6568	6679	11836	17143	22127	0.00%	0.68%	2.33%	2.14%	2.14%	2.14%	2.14%
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	HARRIS	0	0	1	1	2	2	2	15	23	30	37	44	51	58	0.00%	1.91%	4.04%	3.88%	3.88%	3.87%	3.87%
DEER PARK	SAN JACINTO	HARRIS	0	12	49	47	48	49	51	1702	1762	1819	1876	1933	1988	2044	0.00%	0.68%	2.68%	2.49%	2.49%	2.49%	2.49%
DEER PARK	SAN JACINTO-BRAZOS	HARRIS	0	19	75	72	74	76	78	2610	2701	2790	2877	2963	3049	3134	0.00%	0.69%	2.68%	2.49%	2.49%	2.49%	2.49%
EL DORADO UD	SAN JACINTO	HARRIS	0	4	15	16	17	18	20	427	484	540	595	650	704	758	0.00%	0.88%	2.78%	2.61%	2.60%	2.60%	2.60%
EL LAGO	SAN JACINTO-BRAZOS	HARRIS	0	3	13	12	12	12	12	548	548	548	548	548	548	548	0.00%	0.53%	2.29%	2.11%	2.11%	2.11%	2.11%
FALLBROOK UD	SAN JACINTO	HARRIS	0	11	35	39	44	49	54	673	830	984	1135	1284	1433	1581	0.00%	1.33%	3.59%	3.39%	3.40%	3.39%	3.39%
FOUNTAINVIEW SUBDIVISION	SAN JACINTO	HARRIS	0	4	14	15	17	19	21	290	354	417	478	539	599	660	0.00%	1.22%	3.35%	3.17%	3.17%	3.17%	3.17%
GALENA PARK	SAN JACINTO	HARRIS	0	12	47	45	47	49	51	1222	1281	1337	1393	1449	1504	1559	0.00%	0.93%	3.51%	3.26%	3.26%	3.26%	3.26%
GREEN TRAILS MUD	SAN JACINTO	HARRIS	0	4	12	13	14	16	17	791	929	1064	1196	1328	1458	1587	0.00%	0.40%	1.16%	1.09%	1.09%	1.09%	1.09%
HARRIS COUNTY FWSD #47	SAN JACINTO	HARRIS	0	4	17	16	16	16	16	437	437	437	437	437	437	437	0.00%	0.92%	4.00%	3.69%	3.69%	3.69%	3.69%
HARRIS COUNTY FWSD #51	SAN JACINTO	HARRIS	0	23	76	71	71	71	71	2345	2620	2620	2620	2620	2620	2620	0.00%	0.89%	2.91%	2.71%	2.71%	2.71%	2.71%
HARRIS COUNTY FWSD #6	SAN JACINTO	HARRIS	0	6	18	19	22	24	27	292	363	431	498	565	631	697	0.00%	1.53%	4.08%	3.87%	3.86%	3.87%	3.86%
HARRIS COUNTY MUD #11	SAN JACINTO	HARRIS	0	4	13	14	16	18	19	364	433	500	566	631	695	760	0.00%	0.93%	2.68%	2.52%	2.53%	2.53%	2.53%
HARRIS COUNTY MUD #119 INWOOD NORTH	SAN JACINTO	HARRIS	0	12	35	33	33	33	33	750	914	987	987	987	987	987	0.00%	1.28%	3.54%	3.33%	3.33%	3.33%	3.33%
HARRIS COUNTY MUD #132	SAN JACINTO	HARRIS	0	16	47	53	62	71	80	1334	1807	2269	2722	3171	3617	4062	0.00%	0.88%	2.06%	1.97%	1.97%	1.97%	1.96%
HARRIS COUNTY MUD #150	SAN JACINTO	HARRIS	0	13	43	45	50	54	59	1123	1291	1455	1617	1776	1935	2093	0.00%	0.97%	2.98%	2.80%	2.80%	2.80%	2.80%
HARRIS COUNTY MUD #151	SAN JACINTO	HARRIS	0	14	29	28	28	28	28	882	1308	1308	1308	1308	1308	1308	0.00%	1.05%	2.25%	2.13%	2.13%	2.13%	2.13%
HARRIS COUNTY MUD #152	SAN JACINTO	HARRIS	0	11	31	36	43	50	56	560	821	1075	1325	1572	1818	2063	0.00%	1.33%	2.85%	2.73%	2.73%	2.73%	2.73%
HARRIS COUNTY MUD #153	SAN JACINTO	HARRIS	0	14	37	45	55	64	74	769	1257	1733	2201	2664	3124	3582	0.00%	1.12%	2.14%	2.06%	2.06%	2.06%	2.06%
HARRIS COUNTY MUD #154	SAN JACINTO	HARRIS	0	11	32	37	43	49	55	525	712	894	1072	1249	1425	1600	0.00%	1.53%	3.60%	3.43%	3.43%	3.43%	3.43%
HARRIS COUNTY MUD #158	SAN JACINTO	HARRIS	0	10	28	26	26	26	26	369	516	660	660	660	660	660	0.00%	1.86%	4.19%	4.00%	4.00%	4.00%	4.00%
HARRIS COUNTY MUD #180	SAN JACINTO	HARRIS	0	9	26	30	34	39	44	483	640	793	944	1092	1241	1388	0.00%	1.36%	3.30%	3.14%	3.14%	3.14%	3.14%
HARRIS COUNTY MUD #189	SAN JACINTO	HARRIS	0	11	32	37	42	48	54	634	841	1043	1242	1438	1633	1828	0.00%	1.28%	3.10%	2.95%	2.95%	2.95%	2.95%
HARRIS COUNTY MUD #200	SAN JACINTO	HARRIS	0	37	93	117	144	170	197	1119	2012	2881	3736	4583	5424	6262	0.00%	1.83%	3.24%	3.14%	3.14%	3.14%	3.14%
HARRIS COUNTY MUD #261	SAN JACINTO	HARRIS	0	1	6	5	5	5	5	876	876	876	876	876	876	876	0.00%	0.15%	0.64%	0.59%	0.59%	0.59%	0.59%

HARRIS COUNTY MUD #33	SAN JACINTO	HARRIS	0	8	26	28	31	34	37	881	1026	1168	1308	1446	1583	1720	0.00%	0.76%	2.26%	2.13%	2.13%	2.13%	2.13%
HARRIS COUNTY MUD #345	SAN JACINTO	HARRIS	0	9	21	20	20	20	20	1056	1439	1439	1439	1439	1439	1439	0.00%	0.62%	1.47%	1.38%	1.38%	1.38%	1.38%
HARRIS COUNTY MUD #46	SAN JACINTO	HARRIS	0	12	25	24	24	24	24	566	864	864	864	864	864	864	0.00%	1.40%	2.91%	2.76%	2.76%	2.76%	2.76%
HARRIS COUNTY MUD #5	SAN JACINTO	HARRIS	0	4	17	15	15	15	15	673	673	673	673	673	673	673	0.00%	0.57%	2.46%	2.27%	2.27%	2.27%	2.27%
HARRIS COUNTY MUD #50	SAN JACINTO	HARRIS	0	4	15	15	16	17	18	580	635	688	740	791	843	894	0.00%	0.62%	2.12%	1.98%	1.98%	1.98%	1.98%
HARRIS COUNTY MUD #53	SAN JACINTO	HARRIS	0	30	89	102	120	137	153	1491	2033	2561	3080	3594	4105	4613	0.00%	1.50%	3.49%	3.33%	3.33%	3.33%	3.33%
HARRIS COUNTY MUD #8	SAN JACINTO	HARRIS	0	8	28	29	32	34	37	637	725	811	895	979	1062	1144	0.00%	1.10%	3.44%	3.23%	3.23%	3.23%	3.23%
HARRIS COUNTY UD #14	SAN JACINTO	HARRIS	0	2	8	8	8	9	10	530	592	652	711	769	827	885	0.00%	0.35%	1.15%	1.08%	1.08%	1.08%	1.08%
HARRIS COUNTY UD #15	SAN JACINTO	HARRIS	0	5	15	16	18	20	22	371	445	518	590	661	731	801	0.00%	1.04%	2.92%	2.75%	2.75%	2.76%	2.76%
HARRIS COUNTY WCID #1	SAN JACINTO	HARRIS	0	14	45	48	54	60	66	968	1169	1365	1557	1748	1937	2126	0.00%	1.18%	3.29%	3.11%	3.11%	3.11%	3.11%
HARRIS COUNTY WCID #133	SAN JACINTO	HARRIS	0	5	19	18	18	18	18	756	769	782	794	807	819	819	0.00%	0.59%	2.42%	2.24%	2.24%	2.24%	2.24%
HARRIS COUNTY WCID #21	SAN JACINTO	HARRIS	0	11	43	43	45	47	49	1373	1462	1550	1635	1720	1805	1889	0.00%	0.77%	2.80%	2.61%	2.61%	2.60%	2.60%
HARRIS COUNTY WCID #36	SAN JACINTO	HARRIS	0	13	46	48	52	56	60	1240	1393	1543	1689	1835	1979	2123	0.00%	0.94%	3.01%	2.82%	2.82%	2.82%	2.82%
HARRIS COUNTY WCID #50	SAN JACINTO	HARRIS	0	6	21	22	24	26	28	547	626	704	781	857	932	1007	0.00%	0.98%	3.01%	2.82%	2.82%	2.82%	2.82%
HARRIS COUNTY WCID #76	SAN JACINTO	HARRIS	0	2	7	7	7	7	7	304	304	304	304	304	304	304	0.00%	0.56%	2.40%	2.21%	2.21%	2.21%	2.21%
HARRIS COUNTY WCID #84	SAN JACINTO	HARRIS	0	2	10	10	10	10	10	599	610	621	631	642	653	663	0.00%	0.40%	1.65%	1.53%	1.53%	1.53%	1.53%
HEDWIG VILLAGE	SAN JACINTO	HARRIS	0	2	10	9	9	9	9	839	839	839	839	839	839	839	0.00%	0.26%	1.13%	1.05%	1.05%	1.05%	1.05%
HILSHIRE VILLAGE	SAN JACINTO	HARRIS	0	1	3	3	3	3	3	182	195	195	195	195	195	195	0.00%	0.44%	1.60%	1.49%	1.49%	1.49%	1.49%
HUMBLE	SAN JACINTO	HARRIS	0	22	76	80	88	96	104	3233	3740	4233	4718	5198	5675	6150	0.00%	0.60%	1.80%	1.70%	1.70%	1.70%	1.70%
HUNTERS CREEK VILLAGE	SAN JACINTO	HARRIS	0	6	21	21	22	23	25	1627	1768	1906	2042	2176	2310	2443	0.00%	0.31%	1.08%	1.01%	1.01%	1.01%	1.01%
JACINTO CITY	SAN JACINTO	HARRIS	0	13	48	48	51	55	58	1235	1339	1440	1540	1639	1737	1835	0.00%	0.97%	3.37%	3.14%	3.14%	3.14%	3.14%
JERSEY VILLAGE	SAN JACINTO	HARRIS	0	13	42	46	53	60	66	1279	1626	1963	2294	2622	2949	3273	0.00%	0.83%	2.13%	2.02%	2.02%	2.02%	2.02%
KATY	SAN JACINTO	HARRIS	0	22	66	74	86	98	109	1920	2546	3156	3757	4350	4941	5529	0.00%	0.86%	2.08%	1.98%	1.98%	1.98%	1.98%
KINGSBRIDGE MUD	SAN JACINTO	HARRIS	0	2	6	7	8	9	10	177	223	268	312	355	398	442	0.00%	0.93%	2.41%	2.28%	2.29%	2.29%	2.28%
LEAGUE CITY	SAN JACINTO-BRAZOS	HARRIS	0	0	1	1	1	1	1	20	21	21	22	23	23	24	0.00%	0.72%	2.87%	2.59%	2.54%	2.62%	2.56%
LONGHORN TOWN UD	SAN JACINTO	HARRIS	0	4	11	13	17	20	23	327	600	867	1128	1388	1646	1902	0.00%	0.71%	1.23%	1.20%	1.20%	1.20%	1.20%
MASON CREEK UD	SAN JACINTO	HARRIS	0	10	37	34	34	34	34	2273	2392	2392	2392	2392	2392	2392	0.00%	0.41%	1.54%	1.42%	1.42%	1.42%	1.42%
MISSOURI CITY	SAN JACINTO	HARRIS	0	10	33	36	41	46	51	1063	1335	1597	1856	2112	2366	2619	0.00%	0.78%	2.05%	1.94%	1.94%	1.94%	1.94%
NHCRWA	SAN JACINTO	HARRIS	0	815	2518	2790	3186	3579	3972	81393	103951	125852	146948	167820	188562	209225	0.00%	0.78%	2.00%	1.90%	1.90%	1.90%	1.90%
NORTH BELT UD	SAN JACINTO	HARRIS	0	7	20	24	29	34	38	317	478	635	788	941	1092	1243	0.00%	1.55%	3.21%	3.08%	3.08%	3.08%	3.08%
NORTH GREEN MUD	SAN JACINTO	HARRIS	0	5	16	16	18	20	21	319	365	410	454	498	541	585	0.00%	1.25%	3.85%	3.61%	3.61%	3.62%	3.61%
NORTHWEST HARRIS COUNTY MUD #23	SAN JACINTO	HARRIS	0	8	22	26	30	35	39	442	612	779	943	1105	1266	1426	0.00%	1.27%	2.88%	2.75%	2.75%	2.75%	2.75%
NORTHWEST PARK MUD	SAN JACINTO	HARRIS	0	14	49	51	56	60	65	1216	1380	1539	1696	1852	2006	2160	0.00%	1.02%	3.20%	3.00%	3.00%	3.00%	3.00%
PARKWAY UD	SAN JACINTO	HARRIS	0	3	12	11	11	11	11	311	313	315	318	320	322	324	0.00%	0.90%	3.79%	3.50%	3.50%	3.50%	3.50%
PEARLAND	SAN JACINTO-BRAZOS	HARRIS	0	3	11	12	13	15	16	292	355	416	477	536	596	655	0.00%	0.96%	2.66%	2.51%	2.51%	2.51%	2.51%
PINE TRAILS UTILITY	SAN JACINTO	HARRIS	0	8	27	28	30	32	34	871	967	1061	1153	1244	1334	1424	0.00%	0.78%	2.56%	2.40%	2.40%	2.40%	2.40%
PINEY POINT VILLAGE	SAN JACINTO	HARRIS	0	4	15	15	15	16	16	1230	1291	1350	1408	1465	1522	1579	0.00%	0.29%	1.11%	1.03%	1.03%	1.03%	1.03%
ROLLING FORK PUD	SAN JACINTO	HARRIS	0	3	10	10	11	11	11	682	717	752	786	821	855	890	0.00%	0.37%	1.38%	1.29%	1.29%	1.29%	1.29%
SEABROOK	SAN JACINTO-BRAZOS	HARRIS	0	18	57	63	72	81	90	1967	2488	2995	3494	3988	4479	4967	0.00%	0.74%	1.91%	1.81%	1.81%	1.81%	1.81%
SOUTHSIDE PLACE	SAN JACINTO	HARRIS	0	2	7	7	8	8	9	379	414	447	480	512	545	577	0.00%	0.48%	1.64%	1.53%	1.54%	1.53%	1.53%
SOUTHWEST UTILITIES	SAN JACINTO	HARRIS	0	9	29	31	35	38	42	627	746	861	974	1087	1198	1309	0.00%	1.18%	3.40%	3.20%	3.20%	3.20%	3.20%
SPRING VALLEY	SAN JACINTO	HARRIS	0	4	16	16	16	17	18	858	905	951	996	1040	1085	1129	0.00%	0.46%	1.70%	1.58%	1.59%	1.58%	1.59%
SUNBELT FWSD	SAN JACINTO	HARRIS	0	36	114	124	141	157	173	3741	4624	5484	6329	7165	7997	8825	0.00%	0.77%	2.08%	1.96%	1.97%	1.96%	1.97%
TOMBALL	SAN JACINTO	HARRIS	0	20	61	68	86	100	119	2016	2675	3422	4025	5091	5889	7020	0.00%	0.74%	1.78%	1.70%	1.70%	1.70%	1.70%
TRAIL OF THE LAKES MUD	SAN JACINTO	HARRIS	0	30	43	41	41	41	41	549	1475	1475	1475	1475	1475	1475	0.00%	2.02%	2.89%	2.80%	2.80%	2.80%	2.80%
WALLER	SAN JACINTO	HARRIS	0	1	3	4	4	5	6	80	121	161	200	239	278	316	0.00%	0.92%	1.90%	1.82%	1.82%	1.81%	1.82%
WEST HARRIS COUNTY MUD #6	SAN JACINTO	HARRIS	0	8	14	13	13	13	13	301	596	596	596	596	596	596	0.00%	1.37%	2.30%	2.21%	2.21%	2.21%	2.21%
WEST UNIVERSITY PL.	SAN JACINTO	HARRIS	0	18	67	66	71	75	79	2929	3170	3405	3636	3864	4092	4318	0.00%	0.56%	1.96%	1.83%	1.83%	1.83%	1.83%
WHCRWA	SAN JACINTO	HARRIS	0	369	1413	1631	1819	2016	2217	41559	47758	60058	73278	81759	90579	99636	0.00%	0.77%	2.35%	2.23%	2.23%	2.23%	2.23%
WILLOW RUN SUBDIVISION	SAN JACINTO	HARRIS	0	3	15	14	14	14	14	681	681	681	681	681	681	681	0.00%	0.51%	2.19%	2.02%	2.02%	2.02%	2.02%
WINDFERN FOREST UD	SAN JACINTO	HARRIS	0	12	34	32	32	32	32	573	841	1101	1101	1101	1101	1101	0.00%	1.44%	3.08%	2.95%	2.95%	2.95%	2.95%
WOODCREEK MUD	SAN JACINTO	HARRIS	0	7	19	22	27	31	35	426	642	852	1059	1263	1466	1669	0.00%	1.06%	2.20%	2.11%	2.11%	2.11%	2.11%
		HARRIS Total	0	2024	6562	7170	8139	9111	10083	206355	251433	297082	343120	389595	436096	482704	0.00%	0.81%	2.21%	2.09%	2.09%	2.09%	2.09%
CONROE	SAN JACINTO	MONTGOMERY	0	83	228	274	340	429	531	7175	9668	11190	14167	17627	22192	27493	0.00%	0.86%	2.03%	1.93%	1.93%	1.93%	1.93%
CONSUMERS WATER INC	SAN JACINTO	MONTGOMERY	0	4	10	13	16	20	25	164	225	263	337	423	536	667	0.00%	1.71%	3.93%	3.73%	3.73%	3.73%	3.74%
COUNTY-OTHER	SAN JACINTO	MONTGOMERY	0	309	780	1083	1473	2017	2648	14307	22498	28514	41244	56110	76829	100893	0.00%	1.37%	2.73%	2.63%	2.62%	2.62%	2.63%
CRYSTAL SPRNGS WATER COMPANY	SAN JACINTO	MONTGOMERY	0	13	30	40	53	69	89	368	605	750	1033	1362	1795	2299	0.00%	2.10%	4.02%	3.86%	3.86%	3.86%	3.86%
CUT AND SHOOT	SAN JACINTO	MONTGOMERY	0	2	7	8	10	12	15	169	221	252	314	387	482	592	0.00%	1.10%	2.73%	2.59%	2.58%	2.58%	2.59%

EAST PLANTATION UD	SAN JACINTO	MONTGOMERY	0	4	11	14	19	24	31	284	454	558	762	998	1310	1672	0.00%	0.99%	1.94%	1.86%	1.86%	1.86%	1.86%
H M W SUD	SAN JACINTO	MONTGOMERY	0	18	50	59	72	89	110	1268	1649	1882	2336	2865	3562	4372	0.00%	1.06%	2.65%	2.51%	2.51%	2.51%	2.51%
MAGNOLIA	SAN JACINTO	MONTGOMERY	0	2	6	7	8	10	12	233	283	313	373	443	535	641	0.00%	0.69%	1.91%	1.80%	1.80%	1.80%	1.80%
MONTGOMERY COUNTY MUD #18	SAN JACINTO	MONTGOMERY	0	16	33	48	67	92	122	720	1727	2343	3546	4944	6789	8932	0.00%	0.94%	1.40%	1.36%	1.36%	1.36%	1.36%
MONTGOMERY COUNTY MUD #19	SAN JACINTO	MONTGOMERY	0	3	13	12	12	12	12	477	477	477	477	477	477	477	0.00%	0.63%	2.74%	2.52%	2.52%	2.52%	2.52%
MONTGOMERY COUNTY MUD #8	SAN JACINTO	MONTGOMERY	0	8	21	26	33	43	54	651	950	1132	1489	1904	2451	3087	0.00%	0.86%	1.84%	1.76%	1.76%	1.76%	1.76%
MONTGOMERY COUNTY MUD #9	SAN JACINTO	MONTGOMERY	0	6	15	20	26	35	45	522	873	1088	1508	1996	2639	3387	0.00%	0.73%	1.37%	1.32%	1.32%	1.32%	1.32%
MONTGOMERY COUNTY UD #2	SAN JACINTO	MONTGOMERY	0	5	12	11	11	11	11	369	546	546	546	546	546	546	0.00%	1.00%	2.14%	2.03%	2.03%	2.03%	2.03%
MONTGOMERY COUNTY UD #3	SAN JACINTO	MONTGOMERY	0	5	16	17	19	23	26	425	489	528	604	693	810	946	0.00%	0.97%	2.99%	2.80%	2.80%	2.80%	2.80%
MONTGOMERY COUNTY UD #4	SAN JACINTO	MONTGOMERY	0	9	19	18	18	18	18	645	955	955	955	955	955	955	0.00%	0.91%	1.95%	1.85%	1.85%	1.85%	1.85%
MONTGOMERY COUNTY WCID #1	SAN JACINTO	MONTGOMERY	0	5	18	19	22	26	30	435	504	546	628	724	849	996	0.00%	1.07%	3.23%	3.03%	3.03%	3.03%	3.03%
NEW CANEY MUD	SAN JACINTO	MONTGOMERY	0	27	68	87	112	146	185	965	1467	1774	2374	3071	3990	5058	0.00%	1.85%	3.82%	3.65%	3.65%	3.65%	3.65%
OAK RIDGE NORTH	SAN JACINTO	MONTGOMERY	0	6	17	19	23	28	34	563	704	791	960	1156	1415	1716	0.00%	0.80%	2.12%	2.00%	2.00%	2.00%	2.00%
PANORAMA VILLAGE	SAN JACINTO	MONTGOMERY	0	4	11	13	15	15	15	605	782	890	1100	1205	1205	1205	0.00%	0.51%	1.29%	1.22%	1.22%	1.22%	1.22%
PATTON VILLAGE	SAN JACINTO	MONTGOMERY	0	3	8	9	10	13	15	76	94	106	127	152	186	224	0.00%	2.72%	7.24%	6.87%	6.88%	6.85%	6.86%
POINT AQUARIUS MUD	SAN JACINTO	MONTGOMERY	0	8	17	23	32	44	57	334	684	897	1314	1799	2439	3182	0.00%	1.13%	1.84%	1.79%	1.79%	1.79%	1.79%
PORTER WSC	SAN JACINTO	MONTGOMERY	0	25	66	81	102	102	102	1391	1927	2254	2894	3638	3638	3638	0.00%	1.28%	2.94%	2.80%	2.80%	2.80%	2.80%
RAYFORD ROAD MUD	SAN JACINTO	MONTGOMERY	0	41	65	62	62	62	62	999	2170	2170	2170	2170	2170	2170	0.00%	1.88%	2.98%	2.87%	2.87%	2.87%	2.87%
RIVER PLANTATION MUD	SAN JACINTO	MONTGOMERY	0	3	13	12	12	12	12	811	843	843	843	843	843	843	0.00%	0.41%	1.58%	1.47%	1.47%	1.47%	1.47%
ROMAN FOREST	SAN JACINTO	MONTGOMERY	0	3	7	8	10	13	15	168	213	240	294	357	439	535	0.00%	1.18%	3.04%	2.87%	2.87%	2.87%	2.87%
SHENANDOAH	SAN JACINTO	MONTGOMERY	0	1	6	6	6	6	6	517	517	517	517	517	517	517	0.00%	0.27%	1.19%	1.09%	1.09%	1.09%	1.09%
SOUTHERN MONTGOMERY COUNTY MUD	SAN JACINTO	MONTGOMERY	0	21	50	48	48	48	48	1163	1846	2263	2263	2263	2263	2263	0.00%	1.11%	2.20%	2.11%	2.11%	2.11%	2.11%
SOUTHWEST UTILITIES	SAN JACINTO	MONTGOMERY	0	4	10	12	15	20	24	181	253	296	382	481	612	764	0.00%	1.48%	3.37%	3.20%	3.20%	3.20%	3.20%
SPLENDORA	SAN JACINTO	MONTGOMERY	0	4	10	13	17	22	28	126	199	243	331	432	566	722	0.00%	2.01%	3.99%	3.82%	3.82%	3.82%	3.82%
SPRING CREEK UD	SAN JACINTO	MONTGOMERY	0	10	24	31	40	53	67	339	531	648	877	1142	1493	1901	0.00%	1.84%	3.69%	3.54%	3.54%	3.54%	3.54%
STANLEY LAKE MUD	SAN JACINTO	MONTGOMERY	0	9	20	19	19	19	19	367	708	910	910	910	910	910	0.00%	1.27%	2.14%	2.07%	2.07%	2.07%	2.07%
THE WOODLANDS	SAN JACINTO	MONTGOMERY	0	69	437	449	449	449	449	13714	14806	27470	29399	29399	29399	29399	0.00%	0.47%	1.59%	1.53%	1.53%	1.53%	1.53%
WILLIS	SAN JACINTO	MONTGOMERY	0	10	27	33	42	54	67	424	606	717	934	1187	1520	1907	0.00%	1.68%	3.71%	3.54%	3.54%	3.54%	3.54%
WOODBRANCH	SAN JACINTO	MONTGOMERY	0	1	5	5	5	5	5	156	156	156	156	156	156	156	0.00%	0.79%	3.41%	3.15%	3.15%	3.15%	3.15%
		MONTGOMERY Total	0	740	2127	2598	3219	4038	4989	51111	70630	94522	118164	143332	176518	215065	0.00%	1.05%	2.25%	2.20%	2.25%	2.29%	2.32%
BROOKSHIRE	BRAZOS	WALLER	0	5	18	19	22	25	29	522	594	680	776	883	1010	1156	0.00%	0.85%	2.65%	2.49%	2.49%	2.49%	2.49%
COUNTY-OTHER	BRAZOS	WALLER	0	19	58	70	86	106	128	675	917	1203	1521	1875	2297	2782	0.00%	2.06%	4.82%	4.60%	4.60%	4.60%	4.60%
COUNTY-OTHER	SAN JACINTO	WALLER	0	19	60	72	89	109	132	695	943	1238	1565	1930	2364	2863	0.00%	2.06%	4.82%	4.60%	4.60%	4.60%	4.60%
HEMPSTEAD	BRAZOS	WALLER	0	8	28	31	37	44	52	946	1154	1401	1675	1981	2345	2763	0.00%	0.72%	1.97%	1.87%	1.87%	1.87%	1.87%
KATY	SAN JACINTO	WALLER	0	1	3	3	3	3	3	153	153	153	153	153	153	153	0.00%	0.50%	2.14%	1.98%	1.98%	1.98%	1.98%
PINE ISLAND	BRAZOS	WALLER	0	2	6	7	8	10	12	95	123	157	194	236	286	342	0.00%	1.43%	3.53%	3.37%	3.36%	3.36%	3.37%
PRAIRIE VIEW	BRAZOS	WALLER	0	5	19	19	21	23	26	1055	1143	1248	1364	1494	1649	1826	0.00%	0.44%	1.52%	1.42%	1.42%	1.42%	1.42%
PRAIRIE VIEW	SAN JACINTO	WALLER	0	1	2	2	2	3	3	116	126	137	150	164	181	201	0.00%	0.44%	1.52%	1.42%	1.42%	1.42%	1.42%
WALLER	SAN JACINTO	WALLER	0	3	10	11	13	15	18	353	425	510	605	710	836	980	0.00%	0.68%	1.92%	1.82%	1.82%	1.82%	1.82%
		WALLER Total	0	63	203	235	282	337	401	4610	5578	6727	8003	9426	11121	13066	0.00%	1.12%	3.02%	2.93%	2.99%	3.03%	3.07%
		Grand Total	0	3847	12006	13693	16048	18801	21811	684720	867092	1066003	1273577	1484994	1729931	1997482	0.00%	0.44%	1.13%	1.08%	1.08%	1.09%	1.09%

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Potential Reservoir Sites
DATE: February 3, 2005

Introduction

Although Region H is projected to have a net water supply surplus throughout the majority of the planning period, the surplus is predominantly located in the northern and eastern portions of the region. The projected supply shortages are located in the western and southern portions of the region. Texas law allows for establishment of groundwater planning districts. Within Region H, the Harris-Galveston Coastal Subsidence District requires by 2010 that no more than 20% of the water supply can be from groundwater within those counties. The Fort Bend subsidence District requires that by 2025 no more than 40% of their Area A's supply can be from groundwater. The reduction in groundwater use must be made up by increase in surface water. Constructing new reservoirs is one potential strategy to meet the projected shortages.

Analysis

A review of previously published reservoir studies and basin master plans was conducted to identify potential water supply reservoirs which could serve Region H. These reports are summarized in the attached Potential Reservoir Site Descriptions. The water quantities shown reflect the firm yield of the proposed reservoir.

The development of any new reservoir project will involve extensive technical planning, environmental studies, and permitting (state and federal) prior to construction. The locations of potential reservoir sites are shown in Figure 1. The planning upon which the following technical memos are based is at an initial conceptual level to simply compare and contrast multiple potential projects. No detailed environmental analysis has been performed at this time except for the Allens Creek Reservoir project. Additional engineering and environmental investigations will be performed on any of the projects which are selected for further analysis.

The Texas Water Code offers an opportunity to designate sites of unique value for use as surface water supply reservoirs within a planning region. Three surface water reservoir projects were recommended in the 2001 Regional Water Plan, and recommended as Sites of Unique Value. These three are Allens Creek Reservoir, Bedias Reservoir, and Little River Reservoir.

ALLENS CREEK RESERVOIR

DESCRIPTION: The Allens Creek Reservoir site is located on Allens Creek, a tributary to the Brazos River in Austin County, 1 mile north of the City of Wallis (see Figure 1). The site was originally permitted by Houston Lighting and Power as a cooling water reservoir for a proposed nuclear power plant. The site was later jointly purchased by the Brazos River Authority and the City of Houston. A water right permit has been issued for this project to the Texas Water Development Board, Brazos River Authority (BRA) and the City of Houston for use of 99,650 acre-feet per year for municipal, industrial and irrigation purposes. The water is permitted for inter-basin transfer to the San Jacinto and San Jacinto-Brazos basins. 70% of the permit (69,750 acre-feet per year) is owned by the City of Houston, and 30% of the permit (29,900 acre-feet per year) is owned by the BRA. The maximum dam height is 53-feet, and the conservation storage is approximately 145,500 acre-feet at an elevation of 121.0 feet msl.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $170.0 million (2002).

QUANTITY OF WATER: 99,650 acre-feet per year

LAND IMPACTED: 7,000 acres

PURPOSE: Municipal, Industrial, and Irrigation Water Supply and Recreation

ENVIRONMENTAL IMPACT: The dam face has been configured to minimize wetlands associated impacts. No endangered species have been found on the site. Environmental impacts can be rated as moderate to small. A more recent detailed study has been completed and additional data can be provided as required.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: This project has been designated as a unique reservoir site by the Texas Legislature. The project sponsors have initiated the water rights permitting process.

Description	Cost*
Total Project Cost	$170,040,000
Annual Cost (6%, 40 Years)	$11,301,000
Annual O&M	$1,722,000
Total Annual Cost	$13,023,000
Unit Cost of Water (per acre-foot)	$131

* Cost data from TNRCC Permit Application for Allens Creek Reservoir.

BEDIAS RESERVOIR

DESCRIPTION: This site is located principally within Madison County about 3.5 miles west of Hwy. 75 crossing. The site includes Bedias and Caney Creeks. This site exists within the Trinity River Basin and is in Regions G and H. The upstream drainage area is approximately of 395 square miles. The dam is proposed with a maximum height of 45 feet and a normal pool elevation of 230.0 feet msl. The reservoir would have conservation storage of 181,000 acre-feet and would inundate about 13,000 acres. This project is currently included within the TRA Trinity River Basin Master Plan. As planned, the Trinity River Authority and the San Jacinto River Authority would jointly develop this project for their water users within the lower Trinity and San Jacinto river basins, respectively.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $142.7 million (2002).

QUANTITY OF WATER: 90,700 acre-feet per year.

LAND IMPACTED: 27,400 acres

PURPOSE: Municipal Water Supply and Flood Control

ENVIRONMENTAL IMPACT: Some endangered species have been identified. There are about 7,300 acres of bottomland hardwoods, 7,000 acres of grasslands, and 7,000 acres of post oak-elm-hackberry forest. Probable moderate to high impacts on wildlife habitats.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: This project requires an interbasin transfer to the San Jacinto Basin.

Description	Cost*
Total Project Cost	$142,690,000
Annual Cost (6%, 40 Years)	$9,483,000
Annual O&M	$1,445,000
Total Annual Cost	$10,928,000
Unit Cost of Water (per acre-foot)	$120

* Cost data from Water for Texas, A Concensus-Based Update to the State Water Plan, TWDB, 1997

LITTLE RIVER RESERVOIR

DESCRIPTION: This site is located on the main stem of the Little River just upstream from its confluence with the Brazos River. It would be near the City of Cameron, Texas, within Milam County. It is located within the Brazos River basin within Region G. The site would have a surface area of 35,000 acres and a storage volume of about 930,000 acre-feet. The approximately 7,500 square mile upstream drainage area is uncontrolled which produces a significant yield. The fully developed site would have a yield of about 129,000 acre-feet per year. The Brazos River Authority and the Gulf Coast Water Authority propose this project for joint development for their water customers within the Brazos and the San Jacinto-Brazos river basins. Brazos River Authority customers would exist within both Regions G and H, making this project truly regional in scope.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $ 423.3 million (2002)

QUANTITY OF WATER: 129,000 acre-feet per year

LAND IMPACTED: 35,000 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: Probable moderate to high impacts on environmental water needs and instream flows on the Little River. Reservoir would conflict with a Potential Unique Stream Segment on Little River in Milam County. Possible low to moderate impacts on fish and wildlife habitat, including possible low impact on one federally listed bird species and an endangered amphibian species. Probable high impact on cultural resources, especially near the City of Cameron.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: Opposition to the project has arisen among landowners and citizens in Bell and Milam Counties because of the inundation of prime farmland, anticipated condemnation of land for the reservoir, disruption of riparian habitat, and social and economic impacts in the area of the proposed reservoir.

Description	Cost *
Total Project Cost	$383,755,000
Annual Cost (6%, 40 Years)	$25,505,000
Annual O&M	$3,886,000
Total Annual Cost	$29, 391,000
Unit Cost of Water (per acre-foot)	$228

* Cost data from most recent study: Brazos G Water Plan, January 2001.

(LOWER) LAKE CREEK RESERVOIR

DESCRIPTION: Approximately 5 miles southwest of Conroe on Lake Creek within southern Montgomery County. The site is located within the San Jacinto River Basin and is in Region H. The dam is proposed with a maximum height of 69 feet and a normal pool elevation of 194.0 feet msl. The reservoir would have conservation storage of approximately 411,900 acre-feet and would inundate about 13,100 acres. This project was studied by the Bureau of Reclamation in 1988 for the SJRA and deemed the preferred site of all the potential San Jacinto River basin sites. Bureau of Reclamation concluded that this site has a positive benefit-to-cost (B/C) ratio.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $367.0 million (2002)

QUANTITY OF WATER: 67,200 acre-feet per year.

LAND IMPACTED: 19,400 acres.

PURPOSE: Municipal Water Supply and Recreation

ENVIRONMENTAL IMPACT: Some endangered species have been identified. There are about 2,200 acres of bottomland hardwoods, 7,000 acres of oak, hickory, pine forest, and 1,800 acres of shrubland and grasses. Probable high environmental impacts.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: Significant clearing and relocation of utilities and roadways is required.

Description	Cost*
Total Project Cost	$367,006,000
Annual Cost (6%, 40 Years)	$24,392,000
Annual O&M	$3,717,000
Total Annual Cost	$28,109,000
Unit Cost of Water (per acre-foot)	$418

*Information collected from River Authorities, 1999.

MILLICAN RESERVOIR
Panther Creek Dam site

DESCRIPTION: The dam site is located on the Navasota River due east of Bryan-College Station at Highway 30. This site is primarily in Brazos, Grimes, Robertson and Leon counties. It exists within the Brazos basin and is located within Regions G and H. This site was investigated for flood control and water supply and water supply only. The Panther Creek site was evaluated as part of the U.S. Army Corps of Engineers report entitled Millican Lake, Texas Design Memorandum No. 3, General Phase 1 – Plan Formulation. It has an upstream drainage area of approximately 1,821 square miles. The dam is proposed with a maximum height of 283.0 feet msl with a top of conservation pool at 273.0 feet.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $1,337.6 million (2002).

QUANTITY OF WATER: 235,200 ac-ft per year.

LAND IMPACTED: 47,550 acres.

PURPOSE: Municipal and Flood Control

ENVIRONMENTAL IMPACT: Some endangered species have been identified. There are about 26,700 acres of bottomland hardwoods, 7,200 acres of upland woods, 28,400 acres of grassland, and 500 acres of emergent wetland. Probable high environmental impacts.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: Inundation of the Yegua Lignite, Kurten oil and gas field, inundation of marsh areas.

Description	Cost*
Total Project Cost	$1,337,629,000
Annual Cost (6%, 40 Years)	$88,901,000
Annual O&M	$13,546,000
Total Annual Cost	$102,499,000
Unit Cost of Water (per acre-foot)	$436

* Cost data from most recent study: Brazos G Water Plan, January 2001.

MILLICAN RESERVOIR
Bundic Crossing Dam site

DESCRIPTION: The dam site is located on the Navasota River, immediately north of Highway 190, northeast of Bryan-College Station. The site is primarily within Brazos, Madison, Robertson and Leon counties. It exists within the Brazos basin and is located within Regions G and H. The Panther Creek site was evaluated as part of the U.S. Army Corps of Engineers report entitled Millican Lake, Texas Design Memorandum No. 3, General Phase 1 – Plan Formulation. It had historically been titled the Navasota Reservoir project. This site is smaller in configuration than the Millican-Panther Creek site with an upstream drainage area of about 1,418 acres. The dam height is 84.0 feet with a top of conservation pool at 276.0 msl.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $593.1 million (2002).

QUANTITY OF WATER: 73,800 ac-ft per year.

LAND IMPACTED: 34,000 acres.

PURPOSE: Municipal Water Supply and Flood Control

ENVIRONMENTAL IMPACT: Avoids Manning and Yegua lignite, avoids Kurten oil and gas field, avoids the Wilcox lignite in the upper river reaches and avoids significant bottomland hardwood population. Size of lake would be constrained by the Wilcox lignite, and inundation of marsh area upstream of Old San Antonio Road. Probable moderate to high environmental and instream flows impacts.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: Non identified in referenced report.

Description	Cost*
Total Project Cost	$593,145,000
Annual Cost (6%, 40 Years)	$39,421,000
Annual O&M	$6,007,000
Total Annual Cost	$45,428,000
Unit Cost of Water (per acre-foot)	$616

* Cost data from Brazos G Water Plan, January 2001.

TEHUACANA RESERVOIR

DESCRIPTION: This site is located primarily within Freestone County north of Fairfield off FM 488. The site is located on Tehuacana Creek within the Trinity River basin. It exists within Region C. The project would have an upstream drainage basin of about 350 square miles. It is proposed to have conservation storage of about 300,000 acre-feet. The dam height would be 50 feet with a normal pool elevation of 309.0 feet. The reservoir would inundate about 14,900 acres. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $210.9 million (2002).

QUANTITY OF WATER: 64,900 acre-feet per year.

LAND IMPACTED: 19,000 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: Some endangered species have been identified. Major ecological concerns have been expressed. There are approximately 7,000 acres of bottomland hardwoods. Probable moderate to high environmental impacts.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost*
Total Project Cost	$210,900,000
Annual Cost (6%, 40 Years)	$14,016,000
Annual O&M	$2,136,000
Total Annual Cost	$16,153,000
Unit Cost of Water (per acre-foot)	$249

* Cost data from Region C 2001 Water Plan.

TENNESSEE COLONY RESERVOIR

DESCRIPTION: Project is located in Anderson and Freestone Counties, about 22 miles west of Palestine, Texas. It exists within the middle Trinity basin within Regions C and I. This project is on the mainstem of the Trinity River so the upstream drainage area is approximately 12,700 square miles. The reservoir would inundate approximately 80,000 acres at a normal pool elevation of 265.0 msl. The total controlled storage is about 1,290,000 acre-feet. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $2,227.9 million (2002).

QUANTITY OF WATER: 405,800 acre-feet per year.

LAND IMPACTED: 147,200 acres

PURPOSE: Municipal Water Supply and Recreation

ENVIRONMENTAL IMPACT: Some endangered species have been identified. Major ecological concerns have been expressed. A large lignite deposit is located on the reservoir site. There are 34,800 acres of bottomland hardwoods. Probable high environmental and instream flow impacts.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: Development of this project would significantly reduce the current yield of Lake Livingston.

Description	Cost*
Total Project Cost	$2,227,941,000
Annual Cost (6%, 40 Years)	$148,072,000
Annual O&M	$22,563,000
Total Annual Cost	$170,635,000
Unit Cost of Water (per acre-foot)	$420

*Cost data from Water for Texas, A Concensus-Based Update to the State Water Plan, TWDB, 1997

CANEY RESERVOIR

DESCRIPTION: This site is located within Trinity County about 10 miles east of the town of Trinity. The project is on Caney Creek about 5 miles from the confluence of the Trinity River. It is in the Trinity River Basin and exists within Region H. This project would have an upstream drainage area of approximately 68 square miles. The conservation storage is about 31,000 acre-feet. The dam would have a maximum height of about 42 feet and the normal pool elevation is at about 166.0 feet msl. The reservoir would inundate a minimum of about 2,000 acres. This project is included within the TRA Trinity River Basin Master Plan. This project has historically been considered a local project suited for water users within Trinity County.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed.

QUANTITY OF WATER: 15,700 acre-feet.

LAND IMPACTED: 2000 acres.

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

CLEVELAND RESERVOIR

DESCRIPTION: This site is located in San Jacinto County approximately 8 miles northwest of Cleveland on the East Fork of the San Jacinto River. It exists within the San Jacinto River Basin and is located within Region H. The upstream drainage area is about 310 square miles. The dam height is proposed at an elevation of 71.0 feet msl.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $215.1 million (2002).

QUANTITY OF WATER: 65,900 acre-feet per year

LAND IMPACTED: 33,000 acres

PURPOSE: Municipal Water Supply and Flood Control

ENVIRONMENTAL IMPACT: This site is partially located within the Sam Houston National Forest. Some endangered species have been identified. There are about 2,300 acres of bottomland hardwoods, 7,000 acres of oak-hickory-pine forest, 2,000 acres of grassland.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost*
Total Project Cost	$ 215,119,000
Annual Cost (6%, 40 Years)	$ 14,305,000
Annual O&M	$ 2,297,000
Total Annual Cost	$16,475,000
Unit Cost of Water (per acre-foot)	$250

*Cost data from Water for Texas, A Concensus-Based Update to the State Water Plan, TWDB, 1997

HARMONS RESERVOIR

DESCRIPTION: This site is located within Walker County about 6 miles northeast of the City of Huntsville. The project is on Harmons Creek within the Trinity River Basin. It is located within Region H. The upstream drainage area is approximately 43 square miles creating conservation storage of about 20,000 acre-feet. The dam would have a height of about 45 feet and the normal pool elevation would be at about 188.0 feet msl. This reservoir would inundate approximately 1,100 acres. This site has historically been considered for local water supply purposes within Walker County. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 10,100 acre-feet per year.

LAND IMPACTED: 1,100 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

HUMBLE RESERVOIR

DESCRIPTION: This site is located near the confluence of Spring and Cypress creeks about one mile northwest of the City of Humble on the West Fork of the San Jacinto River. This site is located within Harris and Montgomery Counties within the San Jacinto River basin and exists within Region H. This site was studied by Bureau of Reclaimation for the SJRA and eliminated from detailed analysis due to high development costs, per unit costs of water and/or environmental impacts.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER:

LAND IMPACTED: 35,800 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: This site now exists within the backwater of Lake Houston and within highly developed urban landuses.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

HURRICANE BAYOU RESERVOIR

DESCRIPTION: This site is located within Houston County about 6 miles west of the City of Crockett. The project exists on Hurricane Bayou about four miles east of its confluence with the Trinity River. It exists within the Trinity River basin and within Region I. This project has an upstream drainage basin of about 109 square miles and it would have conservation storage of about 50,000 acre-feet. The dam would have a proposed height of about 40 feet and the normal pool elevation would be at elevation 210.0 feet msl. The reservoir would inundate about 3,200 acres. This project has historically been viewed to serve local municipal water supply users within Houston County. This project is currently included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 17,900 acre-feet per year.

LAND IMPACTED:

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

LONG KING RESERVOIR

DESCRIPTION: This site is located within Polk County about 6 miles north of the City of Livingston. The project is on Long King Creek within the Trinity River basin and exists within Region H. The upstream drainage basin is about 96 square miles, which would produce conservation storage of about 44,000 acre-feet. The dam would have a maximum height of about 40 feet. This site would inundate about 3,200 acres. This project has been historically viewed to serve local municipal water users within Polk County. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 20,200 acre-feet per year.

LAND IMPACTED:

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

LOWER KEECHIE RESERVOIR

DESCRIPTION: This site is located in Leon County about 10 miles southeast of Centerville. This site exists on Lower Keechi creek within the Trinity River basin and it is within Region H. The dam site is about 4 miles upstream from the confluence of Lower Keechi Creek and the Trinity River. The upstream drainage area is about 160 square miles and it would have conservation storage of approximately 74,000 acre-feet. The dam would have a height of about 55 feet with a normal pool elevation of about 225.0 feet msl. This reservoir would inundate approximately 4,000 acres. This project has historically been viewed to serve local municipal water supply users within Leon County. This project is currently included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed.

QUANTITY OF WATER: 25,800 acre-feet per year.

LAND IMPACTED:

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

MUSTANG RESERVOIR

DESCRIPTION: This site is located in Houston County about 12 miles southeast of Crockett. The dam site is on Mustang Creek within the Trinity River basin. The project exists within Regions H and I. The upstream drainage basin is about 70 square miles and would create conservation storage of about 32,000 acre-feet. The dam is proposed with a height of about 48 feet and the normal pool elevation would be at about 233.0 feet msl. The reservoir would inundate about 2,900 acres. This site has historically been viewed to serve local municipal water users within Houston County. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 15,700 acre-feet per year.

LAND IMPACTED: 2,900 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

NELSONS RESERVOIR

DESCRIPTION: This site is located in Walker County about 8 miles due north of the City of Huntsville. The project exists on Nelsons Creek within the Trinity River basin about 4 miles upstream of the confluence with the Trinity River. This site is within Region H. The upstream drainage basin is about 77 square miles and would create conservation storage of about 35,000 acre-feet. The dam would have a height of 28 feet and the normal pool elevation would be at about 201.0 feet msl. This project would inundate about 3,200 acres. This project has been historically viewed to serve local municipal water users within Walker County. This project is included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 17,900 acre-feet per year.

LAND IMPACTED: 3,200 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

UPPER KEECHI RESERVOIR

DESCRIPTION: This site is located within Freestone County near its boundary with Leon County. The project is on Upper Keechi Creek about 8 miles upstream of its confluence with the Trinity River. The dam site is about 2 miles upstream of Highway 79. It is within the Trinity River basin and within Region C. The upstream drainage basin is about 98 square miles and the project would have about 45,000 acre-feet of conservation storage. The dam height would be about 40 feet and the normal pool elevation would be at 308.0 msl. The reservoir would inundate approximately 3,300 acres. This site has been viewed to serve local municipal water users within Freestone County. The project is currently included within the TRA Trinity River Basin Master Plan.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: Detailed costs have not been developed

QUANTITY OF WATER: 15,700 acre-feet.

LAND IMPACTED: 3,300 acres

PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: None identified in referenced report.

Description	Cost
Total Project Cost	$
Annual Cost (6%, 40 Years)	$
Annual O&M	
Total Annual Cost	
Unit Cost of Water (per acre-foot)	

SPRING CREEK RESERVOIR

DESCRIPTION: This site is located on Spring Creek on the Harris and Montgomery County border, approximately 4 miles southwest of the Woodlands. This site exists within the San Jacinto River basin and is located within Region H. Due to its relatively small yield, it is limited for use within Montgomery County.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $ 24.0 million (2002)

QUANTITY OF WATER: 7,500 acre-feet per year.

LAND IMPACTED: 1,000 acres

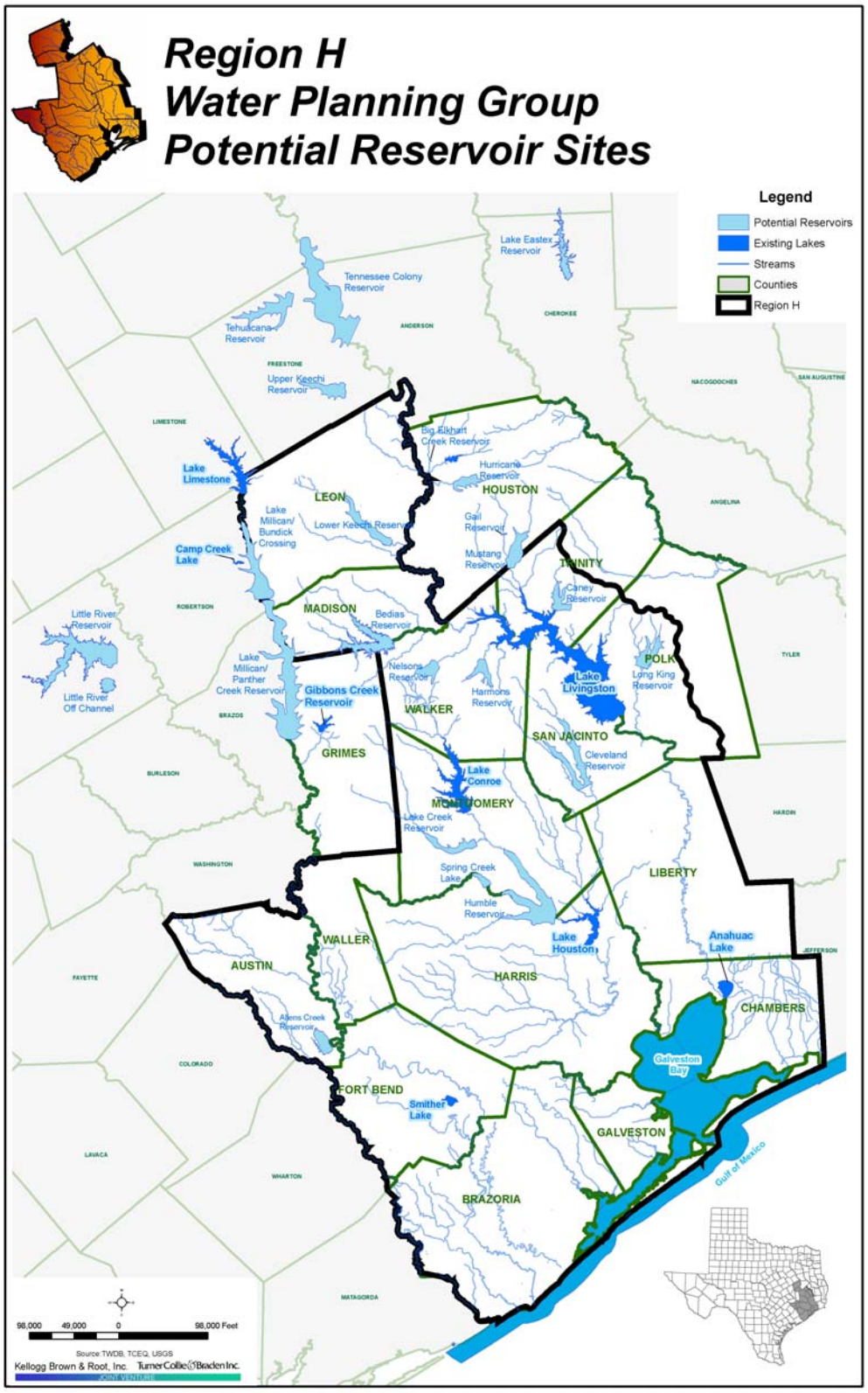
PURPOSE: Municipal Water Supply

ENVIRONMENTAL IMPACT: None identified in referenced report.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY:
None identified in referenced report.

Description	Cost
Total Project Cost	$ 23,977,000
Annual Cost (6%, 40 Years)	$1,528,000
Annual O&M	$233,000
Total Annual Cost	$1,761,000
Unit Cost of Water (per acre-foot)	$235

Region H Water Management Strategy Analysis
Potential Reservoir Sites



REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Irrigation Conservation
DATE: March 2, 2004

SUMMARY

STRATEGY DESCRIPTION: Address Irrigation shortages in Brazoria, Chambers, Galveston, Liberty, and Waller Counties through irrigation conservation measures. Although Fort Bend County does not have predicted irrigation shortages, it was assumed that irrigation conservation could potentially occur in order to meet other predicted water use shortages. Conservation measures will reduce water shortages through reduction of projected demands.

SUPPLY QUANTITY: Demand reductions of 18,792 AFY in Brazoria County
24,018 AFY in Chambers County
5,198 AFY in Fort Bend County
2,392 AFY in Galveston County
20,877 AFY in Liberty County
6,606 AFY in Waller County

SUPPLY SOURCE: Savings from groundwater, Brazos River, San Jacinto-Brazos Run-of-River, Neches-Trinity Run-of-River, Trinity River, Sam Rayburn Reservoir, and Lake Livingston water demand reductions

IMPLEMENTATION DECADE: Brazoria County - 2000
Chambers County – 2000
Fort Bend County - 2000
Galveston County - 2000
Liberty County - 2000
Waller County - 2050

TOTAL STRATEGY COST: $1,413,000 annual cost, on-farm methods in Brazoria County
$151,000 capital cost, canal lining in Brazoria County
$1,784,000 annual cost, on-farm methods in Chambers County
$213,000 capital cost, canal lining in Chambers County
$389,000 annual cost, on-farm methods in Fort Bend County
$43,000 capital cost, canal lining in Fort Bend County
$176,000 annual cost, on-farm methods in Galveston County
$22,000 capital cost, canal lining in Galveston County
$1,596,000 annual cost, on-farm methods in Liberty County
$144,000 capital cost, canal lining in Liberty County
$555,000 annual cost, on-farm methods in Waller County

UNIT WATER COST: $75 per acre-foot of savings in Brazoria County
$74 per acre-foot of savings in Chambers County
$74 per acre-foot of savings in Fort Bend County
$73 per acre-foot of savings in Galveston County
$76 per acre-foot of savings in Liberty County
$84 per acre-foot of savings in Waller County

Water Management Strategy Analysis Description

Introduction:

There are 6 counties in Region H with projected non-municipal irrigation WUG shortfalls within the next sixty years: Brazoria, Chambers, Galveston, Liberty, San Jacinto, and Waller Counties. All of these counties except San Jacinto County predominantly grow rice, which requires considerably more water than many other crops and is addressed in more detail within this strategy. San Jacinto County agricultural activities are mainly in the production of timber products, poultry, and livestock. The Trinity River Authority currently has the capability to expand existing contracts to meet the limited irrigation demands within that county. Fort Bend County does not have predicted irrigation shortages through the planning period, but other water user groups within the county will experience shortfalls in water supply. This technical memorandum assumes that irrigation conservation will occur in Fort Bend County for the surface water supply portion of irrigation usage and the estimated savings could potentially be available for use by other water user groups. Therefore, this strategy focuses exclusively on the reduction of rice irrigation demand through conservation.

The Texas Water Development Board (TWDB) created the Water Conservation Implementation Task Force to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The Water Conservation Implementation Task Force consists of a volunteer group of persons with experience in and commitment to using water more efficiently. The task force developed TWDB Report 362 – Water Conservation Best Management Practices Guide, which outlines specific water conservation best management practices (BMPs) for various water uses. Various BMPs from this report are discussed and outlined in this strategy.

To supplement the TWDB Report 362, report "Potential Rice Irrigation Water Conservation Measures, Water Planning Group - Region H," James W. Stansel of Texas A&M University (TAMU) proposes several conservation methods to reduce irrigation water demand. The study first addresses on-farm conservation practices. Specifically covered are the benefits of land leveling to reduce the water required for each flush, multiple field inlets to reduce overfilling of the higher cuts, reduced levee spacing to reduce the water required for each flush and replacing irrigation ditches with pipes to reduce seepage and evaporation losses. The study also addresses off-farm conservation, through the lining of irrigation canals to reduce losses.

The conservation methods proposed in the Texas A&M report were evaluated for use in Brazoria, Chambers, Fort Bend, Galveston, Liberty, and Waller Counties.

Analysis:

Both on-farm and off-farm conservation measures for agricultural irrigation are outlined in the TWDB Report 362 and listed below. On-farm conservation measures include, but are not limited to:

- Irrigation Scheduling
- Volumetric Measurement of Irrigation Water use
- Crop Residue Management and Conservation Tillage
- On-Farm Irrigation Audit
- Furrow Dikes
- Land Leveling
- Contour Farming
- Conversion of Supplement Irrigated Farmland to Dry-land Farmland
- Brush Control/Management
- Lining of On-farm Irrigation Ditches
- Replacement of On-farm Irrigation Ditches with Pipelines
- Low Pressure Center Pivot Sprinkler Irrigation Systems
- Drip/Micro-Irrigation System
- Gated and Flexible Pipe for Field Water Distribution Systems
- Surge Flow Irrigation for Field Water Distribution Systems
- Linear Move Sprinkler Irrigation Systems

On-farm conservation was evaluated for all acreage planted in rice. The acreage is based on amounts documented in "Texas Rice Acreage" published by the U. S. Department of Agriculture Statistics Service. On-farm conservation was focused on rice production and therefore conservation measures used to develop savings estimates are specific to the rice industry. Due to local experience and realized savings estimates, the TAMU report was utilized to develop costs and savings for on-farm conservation. The conservation practice modeled was multiple irrigation inlets combined with land leveling. The potential annual irrigation savings associated with multiple irrigation inlets and land leveling are 0.750 acre-feet per acre and 0.583 acre-feet per acre, respectively. This method produces an on-farm conservation savings rate of 1.4 acre-feet per irrigated acre. The TAMU report assumes that on-farm conservation can be applied to 70% of the irrigated acreage. Use of these conservation measures is reported to cost approximately $84 per acre-foot. The potential water savings are shown in Table 1.

The TWDB Report 362 also outlines various off-farm conservation BMPs as listed below:

- Lining of District Canals
- Replacement of Irrigation District Canals and Lateral Canals with Pipelines

Off-farm conservation is applied to all acreage irrigated with surface water. This acreage was determined using TWDB Water Use Survey information. This method was not applied to Waller County, where only groundwater is used. The TWDB report was supplemented with costs and savings identified in the TAMU report specific for Region H. The TAMU

report estimates canal lining conservation savings as 38 acre-feet per canal mile. A ratio of 16.5 feet of irrigation canal per acre of irrigated land is used to calculate canal lengths. Partial canal lining using a 45 mil EPDM (synthetic rubber membrane) is selected from the TAMU report based upon the projected cost of $2916 per canal-mile, or $7 per acre-foot of savings. The potential water savings for Brazoria, Chambers, Fort Bend, Galveston, and Liberty Counties are shown in Table 2.

The average cost of water saved through on-farm conservation is $84 per acre-foot. The average cost of water saved through canal lining is $7 per acre-foot. Because the ratio of on-farm to off-farm conservation varies by county, the average cost of water is also unique to each county. Brazoria County averages $75 per acre-foot, Chambers County averages $74 per acre-foot, Fort Bend County averages $74 per acre-foot, Galveston County averages $73 per acre-foot, Liberty County averages $76 per acre-foot and Waller County averages $84 per acre-foot.

Water User Group Application:

In Brazoria, Chambers, Fort Bend, Galveston, and Liberty Counties, both methods of conservation are recommended for implementation, starting in the year 2000. Additional irrigation WUG shortages will continue even in those counties with existing irrigation shortages after application of both on-farm and off-farm conservation practices, although conservation will delay further irrigation shortages in Liberty County until year 2030.

Irrigation conservation will be applied to the portion of Fort Bend County which receives surface water for irrigation. Due to Fort Bend Subsidence District Regulations, groundwater that potentially could be conserved due to the BMPs identified within this memorandum is not available for other water user groups within the county to utilize; therefore no incentive exists for funding the conservation efforts. Groundwater conservation savings were not included in this technical memorandum for Fort Bend County.

In Waller County, rice irrigation conservation is recommended for implementation beginning in the 2050-decade. Eastern Waller County, which draws water from the Gulf Coast Aquifer, has the potential to reduce irrigation demand with on-farm conservation and offset the projected shortages through year 2060.

The projected irrigation demand, supply and conservation savings for these counties are shown in Table 3.

Issues and Considerations:

In those counties served by wholesale water providers with surplus supplies, irrigation contracts potentially could be expanded to aid in meeting the projected shortages. The current costs of contract irrigation water from various wholesale water providers are approximately $77 per acre-foot from Chocolate Bayou Water Company, $39.75 per acre-foot from Brazos River Authority, $87 per acre-foot from Gulf Coast Water Authority, and $85 per acre-foot from Chambers-Liberty Counties Navigation District. The cost per acre-

foot of water saved due to irrigation conservation is similar to the cost of contracting additional irrigation water from the above wholesale water providers and therefore it currently appears that minimal motivation exists for implementing extensive irrigation conservation measures. However, as contract water supplies become more scarce and expensive to acquire, irrigation conservation may become more cost effective.

Interruptible supplies, where available, could potentially be a cost-effective strategy to meet irrigation demands in counties where shortages occur. In Waller County, the groundwater supply conserved by irrigation conservation could potentially be used to meet other WUG shortages within the County including municipal WUGs. However, the use of conservation as opposed to interruptible supplies has positive environmental impacts. Although there are no quantifiable negative environmental impacts, it is difficult to estimate the potential beneficial environmental impacts. Although specific on-farm and off-farm conservation BMPs were outlined in this strategy, irrigators that identify other BMPs specific (such as those listed in TWDB Report 362) to their irrigation conservation needs should utilize those measures.

References:

Texas Water Development Board Report 362 – Water Conservation Best Management Practices Guide, November 2004.

Potential Rice Irrigation Water Conservation Measures, Water Planning Group - Region H, James W. Stansel, Texas A&M University System, July 2000

Texas Water Development Board Report 347 - Surveys of Irrigation in Texas 1958, 1964, 1969, 1974, 1979, 1984, 1989, 1994, and 2000, August 2001.

Table 1: Rice Irrigation Conservation

Brazoria	Irrigated Acres	18,910	acres	
	Rice Acres	17,163	acres	
	70% to be improved	12,014	acres	
	Savings @ 1.4 ac-ft / acre	16,820	ac-ft	
	Annual Cost @ $84 / ac-ft	$1,412,858	$/yr	
Chambers	Irrigated Acres	23,400	acres	
	Rice Acres	21,672	acres	
	70% to be improved	15,170	acres	
	Savings @ 1.4 ac-ft / acre	21,239	ac-ft	
	Annual Cost @ $84 / ac-ft	$1,784,039	$/yr	
Fort Bend	SW Irrigated Acres	4,731	acres	
	SW Rice Acres	4,731	acres	
	70% to be improved	3,312	acres	
	Savings @ 1.4 ac-ft / acre	4,636	ac-ft	
	Annual Cost @ $84 / ac-ft	$389,456	$/yr	
Galveston	Irrigated Acres	2,530	acres	
	Rice Acres	2,144	acres	
	70% to be improved	1,501	acres	
	Savings @ 1.4 ac-ft / acre	2,101	ac-ft	
	Annual Cost @ $84 / ac-ft	$176,494	$/yr	
Liberty	Irrigated Acres	19,775	acres	
	Rice Acres	19,386	acres	
	70% to be improved	13,570	acres	
	Savings @ 1.4 ac-ft / acre	18,998	ac-ft	
	Annual Cost @ $84 / ac-ft	$1,595,856	$/yr	
Waller	Irrigated Acres	7,031	acres	San Jacinto Basin only
	Rice Acres	6,741	acres	
	70% to be improved	4,719	acres	
	Savings @ 1.4 ac-ft / acre	6,606	ac-ft	
	Annual Cost @ $84 / ac-ft	$554,919	$/yr	

San Jacinto - Not a Rice Producing County

Note 1: Waller County has a surplus of potential irrigation water in the Brazos Basin. However, the surplus is in the Brazos River Aluvium and not the Gulf Coast Aquifer, and therefore not considered available in the San Jacinto Basin.

Table 2: Conservation from Lining Irrigation Canals

	Brazoria	Chambers	Fort Bend	Galveston	Liberty
SW Acres (Includes rice & row crops) (acres)	16,603	23,400	4,731	2,454	15,820
Canal length @ 16.5 feet/acre (miles)	51.9	73.1	14.8	7.7	49.4
Conservation Savings Rate (ac-ft/mile)	38	38	38	38	38
Partial lining saves (ac-ft)	1,972	2,779	562	291	1,879
Capital Cost @ $2916 / mile	$151,295	$213,233	43,111	$22,362	$144,160
Annual Cost (20-year 6%) ($/yr)	($13,190.57)	($18,590.58)	($3758.63)	($1,949.63)	($12,568.50)
Average Annual Water Cost per ac-ft ($/ac-ft)	$7.00	$7.00	$7.00	$7.00	$7.00

Table 3: Projected Implementation Dates and Balances

Brazoria	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	149,188	135,033	123,115	118,544	115,788	115,788	115,788
Supply	104,731	102,522	98,957	95,246	92,557	90,743	89,092
Rice Consv.	16,820	16,820	16,820	16,820	16,820	16,820	16,820
Canal Consv.	1,972	1,972	1,972	1,972	1,972	1,972	1,972
Balance w/o Cons.	-44,457	-32,511	-24,158	-23,298	-23,231	-25,045	-26,696
Balance w/ Cons.	-25,666	-13,720	-5,367	-4,507	-4,440	-6,254	-7,905

Chambers	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	117,777	117,777	117,777	117,777	117,777	117,777	117,777
Supply	63,986	62,926	62,409	62,052	61,695	61,315	60,912
Rice Consv.	21,239	21,239	21,239	21,239	21,239	21,239	21,239
Canal Consv.	2,779	2,779	2,779	2,779	2,779	2,779	2,779
Balance w/o Cons.	-53,791	-54,851	-55,368	-55,725	-56,082	-56,462	-56,865
Balance w/ Cons.	-29,774	-30,834	-31,351	-31,708	-32,065	-32,445	-32,848

Fort Bend	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	53,455	53,455	53,455	53,455	53,455	53,455	53,455
Supply	80,074	80,074	80,074	80,074	80,074	80,074	80,074
Rice Consv.	4,636	4,636	4,636	4,636	4,636	4,636	4,636
Canal Consv.	562	562	562	562	562	562	562
Balance w/o Cons.	26,619	26,619	26,619	26,619	26,619	26,619	26,619
Balance w/ Cons.	31,817	31,817	31,817	31,817	31,817	31,817	31,817

Galveston	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	10,342	10,342	10,342	10,342	10,342	10,342	10,342
Supply	550	199	533	1078	1081	1065	1038
Rice Consv.	2,101	2,101	2,101	2,101	2,101	2,101	2,101
Canal Consv.	291	291	291	291	291	291	291
Balance w/o Cons.	-9,792	-10,143	-9,809	-9,264	-9,261	-9,277	-9,304
Balance w/ Cons.	-7,399	-7,750	-7,416	-6,871	-6,868	-6,884	-6,911

Liberty	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	82,901	82,901	82,901	82,901	82,901	82,901	82,901
Supply	68,217	64,977	63,127	61,812	60,343	58,598	56,496
Rice Consv.	18,998	18,998	18,998	18,998	18,998	18,998	18,998
Canal Consv.	1,879	1,879	1,879	1,879	1,879	1,879	1,879
Balance w/o Cons.	-14,684	-17,924	-19,774	-21,089	-22,558	-24,303	-26,405
Balance w/ Cons.	6,193	2,953	1,103	-212	-1,681	-3,426	-5,528

Table 3 - Continued

Waller	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Demand	22,978	22,978	22,978	22,978	22,978	22,978	22,978
Supply	22,978	22,978	22,978	22,978	22,978	22,786	21,845
Rice Consv.	6,606	6,606	6,606	6,606	6,606	6,606	6,606
Canal Consv.	0	0	0	0	0	0	0
Balance w/o Cons.	0	0	0	0	0	-192	-1,133
Balance w/ Cons.	6,606	6,606	6,606	6,606	6,606	6,414	5,473

Note 1: Waller County supply surpluses in the Brazos Basin are not included in the supply total. These surpluses exist in the Brazos River Aluvium and are not available to irrigators in the San Jacinto Basin.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Municipal Wastewater Reclamation for Manufacturing Use
DATE: January 7, 2005

SUMMARY

STRATEGY DESCRIPTION: Wastewater reclamation for industrial process water along the Houston Ship Channel using reclaimed wastewater as a source from three City of Houston wastewater treatment plants.

SUPPLY QUANTITY: 67,200 ac-ft per year (60 mgd)

SUPPLY SOURCE: Effluent from three Houston wastewater treatment plants – 69th Street, Sims North, and Sims South.

TOTAL STRATEGY COST: $234,157,636 (See discussion of cost estimate in text.)

UNIT WATER COST: $743 per acre-foot
($2.28 per thousand gallons)

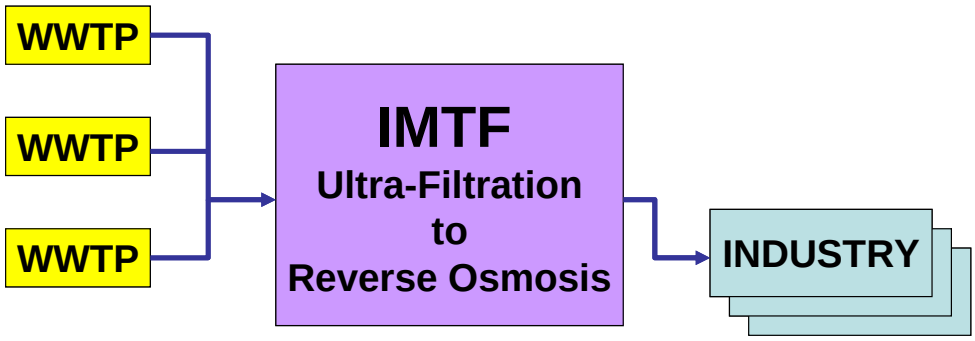
Water Management Strategy Analysis Description

Introduction

The purpose of this analysis is to determine the potential use of reclaimed wastewater to address projected water shortages in Region H. This study investigates using reclaimed wastewater effluent to replace existing surface water supplies that serve industrial demands for process and boiler feed waters. Under this strategy, municipal wastewater currently discharged to Buffalo Bayou will receive further treatment and will be offered as a high quality water supply to industries. Reclaimed wastewater will be superior in quality to the raw water currently supplied, thus allowing industrial consumers to significantly reduce or eliminate their onsite water treatment costs. This strategy is applied within the industrial corridor of State Highway 225 and the Houston Ship Channel (San Jacinto Basin). The raw water saved would then be available to meet other demands in Harris County.

Effluent from three of the City's wastewater treatment plants—Sims North, Sims South and 69th Street—will be used. Secondary effluent will be pumped to an Integrated Membrane Treatment Facility (IMTF). After treatment, the reclaimed water will be piped to the industrial users along the south side of the Houston Ship Channel corridor (see Figures 1 and 2).

Figure 1: Reuse Process



Water User Group Application

This strategy will address projected municipal and manufacturing shortages within Harris County. This shortage begins in year 2010 and ranges to approximately 403,000 acre-feet by year 2060.

This strategy has an interesting cost dynamic. The industries will participate in this strategy only if it can be proven that their specific total water cost can be reduced. Reclamation saves an equivalent quantity of existing City of Houston Trinity River water supplies. The exact cost benefit of this strategy can only be determined through negotiation of firm supply contracts with the industry customers.

Environmental Impact

Environmental Impacts – Effluent currently being discharged to Buffalo Bayou, Sims Bayou, and the Houston Ship Channel would be diverted to the new IMTF. A discharge of brine concentrate from the IMTF into the Houston Ship Channel could affect water quality, although the proposed discharge would be into the dredged channel below the saline elevation. Reclaiming effluent will reduce the impacts of the current WWTP discharges. However, less effluent will be discharged into the receiving stream. Minimal impact to the terrestrial habitats and terrestrial organisms adjacent to these bayous is expected as a result of the reduction of wastewater treatment plant discharges.

Impacts to Water Resources of the State – Current levels of wastewater discharge by industries into the Houston Ship Channel would remain unchanged. There are no water rights on the Houston Ship Channel that would be negatively impacted by this strategy. This strategy will treat 83 mgd of effluent to produce 60 mgd of delivered high-quality water (the other 23 mgd being brine discharge). This will offset an existing raw water demand which is currently met from other City of Houston surface sources in the Trinity and San Jacinto basins.

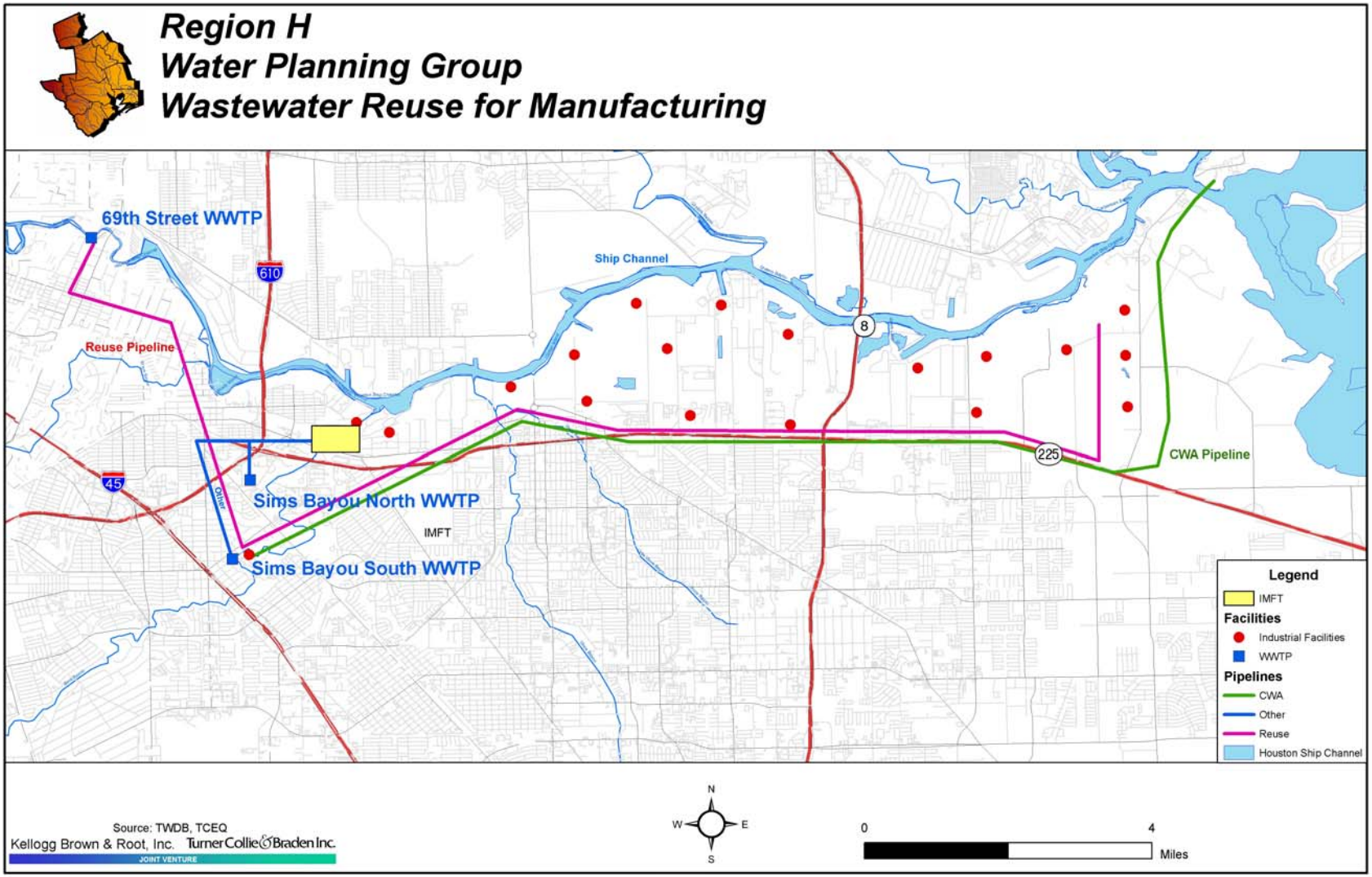
Impacts to Agriculture and Other Natural Resources of the State – Proposed reclamation would not impact agriculture since there are no agriculture surface water users downstream of the proposed facility.

Issues and Considerations

Impacts to Manufacturing—Substitution of reclaimed wastewater will increase the industries' cost of water. However, the reclaimed water will save the industries money since reclaimed water will require less treatment (and in many cases no additional treatment) after it is delivered to the industrial consumers. It appears that the use of reclaimed municipal wastewater may be an economical alternative to current supplies.

Cost estimate—Project costs of this strategy, both capital and O&M, have been taken from the cost estimates developed for the ongoing Wastewater Reclamation and Reuse Feasibility Study funded by the City of Houston, the Gulf Coast Waste Disposal Authority and the Texas Water Development Board. The WWRRFS work used recent comparable contract unit prices to estimate construction costs for all facilities except the wastewater reclamation plant. Construction and O&M costs for the plant were developed using the WTCost software package provided by the US Bureau of Reclamation.

Figure 1:


Region H
Water Planning Group
Wastewater Reuse for Manufacturing
69th Street WWTP
610
Ship Channel
8
Reuse Pipeline
225
CWA Pipeline
45
Other
Sims Bayou North WWTP
IMFT
Sims Bayou South WWTP
Legend
IMFT
Facilities
Industrial Facilities
WWTP
Pipelines
CWA
Other
Reuse
Houston Ship Channel
Source: TWDB, TCEQ
Kellogg Brown & Root, Inc.
Turner Collie & Braden Inc.
JOINT VENTURE
N
W
E
S
0
4
Miles

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

WASTEWATER RECLAMATION

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 164,528,982	$ 164,528,982
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 49,358,695	$ 49,358,695
3	LAND & EASEMENTS	1	LS	$ 5,150,000	$ 5,150,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 400,000	$ 400,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 14,719,959	$ 14,719,959
	PROJECT COST				**$ 234,157,636**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**
1	DEBT SERVICE		$ 20,414,930	$ 20,414,930	$ -	$ -	$ -
2	OPERATION & MAINTENANCE (O&M)		$ 18,756,443	$ 18,756,443	$ 18,756,443	$ 18,756,443	$ 18,756,443
3	PUMPING ENERGY COSTS		$ 5,962,179	$ 5,962,179	$ 5,962,179	$ 5,962,179	$ 5,962,179
4	REBATE OF CWA DEBT SERVICE COSTS		$ 4,818,000	$ 4,818,000	$ 4,818,000	$ 4,818,000	$ 4,818,000
	TOTAL ANNUAL COST		**$ 49,951,552**	**$ 49,951,552**	**$ 29,536,622**	**$ 29,536,622**	**$ 29,536,622**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 14,606,088	$ 14,606,088
2a	PIPELINES	1	LS	$ 21,924,800	$ 21,924,800
2b	PIPELINE CROSSINGS	1	LS	$ 11,885,000	$ 11,885,000
3	WATER TREATMENT PLANTS	1	LS		$ -
4	WATER STORAGE TANKS	1	LS		$ -
5	OFF-CHANNEL RESERVOIRS	1	LS		$ -
6	WELL FIELDS	1	LS		$ -
7	DAMS & RESERVOIRS	1	LS		$ -
8	RELOCATIONS	1	LS		$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	1	LS		$ -
10	STILLING BASINS	1	LS		$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ 116,113,094	$ 116,113,094
12	OTHER ITEMS	1	LS		$ -
	PROJECT COST				**$ 164,528,982**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

WASTEWATER RECLAMATION

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
WWRRFS Estimate & WT Cost (Bureau of Reclamation Software)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 14,606,088	$ 365,152
2a	PIPELINES	0.010	%	$ 21,924,800	$ 219,248
2b	PIPELINE CROSSINGS	0.010	%	$ 11,885,000	$ 118,850
3	WATER TREATMENT PLANTS (see page before previous)	1	LS		$ -
4	WATER STORAGE TANKS	0.010	%		
5	OFF-CHANNEL RESERVOIRS	0.010	%		$ -
6	WELL FIELDS	0.010	%		$ -
7	DAMS & RESERVOIRS	0.015	%		$ -
8	RELOCATIONS	0.010	%		$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%		$ -
10	STILLING BASINS	0.010	%		$ -
11	WASTEWATER RECLAMATION PLANTS (see previous page)	1	LS	$ 18,053,193	$ 18,053,193
12	OTHER ITEMS	0.010	%	$ -	$ -
	ANNUAL OPERATION & MAINTENANCE COST				**$ 18,756,443**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
WWRRFS Estimate

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Stations	1	LS	$ 14,606,088	$ 14,606,088
	PUMP STATIONS TOTAL COST				**$ 14,606,088**

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating
WWRRFS Cost Estimate

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
1	Urban Pipeline	Various	1	LS	$ 21,924,800	$ 21,924,800
	PIPELINES TOTAL COST					**$ 21,924,800**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

WASTEWATER RECLAMATION

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

Formula Basis for Estimating (not used)
WWRRFS Cost Estimate

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Pipeline Crossing	Various	1	LS	$ 11,885,000	$ 11,885,000
	PIPELINE CROSSINGS TOTAL COST					**$ 11,885,000**

WASTEWATER RECLAMATION PLANTS
CONSTRUCTION COSTS

Table Basis for Estimating
WT Cost (BuRec Software)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
WASTEWATER RECLAMATION PLANT COST SUMMARY					
1	Wastewater Reclamation Plant	1	LS	$ 116,113,094	$ 116,113,094
	WASTEWATER RECLAMATION PLANT TOTAL COST				**$ 116,113,094**

WATER TREATMENT PLANTS
OPERATIONS & MAINTENANCE (O&M) COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
WATER TREATMENT PLANT ANNUAL O&M SUMMARY					
1	Groundwater Chlorination Treatment Plant	100	MGD	$ 14,600,000	$ 14,600,000
2	Direct Filtration Treatment Plant	100	MGD	$ 15,600,000	$ 15,600,000
3	Conventional Filtration Treatment Plant	100	MGD	$ 19,500,000	$ 19,500,000
	WATER TREATMENT PLANT ANNUAL O&M TOTAL COST				**$ 49,700,000**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

WASTEWATER RECLAMATION

WASTEWATER RECLAMATION PLANTS
OPERATIONS & MAINTENANCE (O&M) COSTS

Table Basis for Estimating
WT Cost (BuRec Software)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
WASTEWATER RECLAMATION PLANT ANNUAL O&M SUMMARY					
1	Wastewater Reclamation Plant	1	LS	$ 18,053,193	$ 18,053,193
	WASTEWATER RECLAMATION PLANT ANNUAL O&M TOTAL COST				**$ 18,053,193**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * kW-hr
Quantity is from WWRRFS Cost Estimate

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pumping and Treatment Energy Costs	99,369,645	kW-hr	$ 0.06	$ 5,962,179
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 5,962,179**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: City Of Houston/Trinity River Authority Contract Agreement
DATE: JANUARY 7, 2005

SUMMARY

STRATEGY DESCRIPTION: Surface water agreement by the City of Houston of some portion of the Trinity River Authority's water supplies from the Lake Livingston-Wallisville Salt Water Barrier system.

SUPPLY QUANTITY: Up to 200,000 acre-feet per year

SUPPLY SOURCE: Lake Livingston-Wallisville Salt Water Barrier System

TOTAL STRATEGY COST: Unknown

UNIT WATER COST: Unknown

Water Management Strategy Analysis Description

Introduction

Based on the Region H analysis, the Trinity River Authority (TRA) is projected to have uncommitted surface water supplies (approximately 325,000 acre-feet per year) from their water rights within the Lake Livingston-Wallisville Salt Water Barrier system through year 2060. This water supply exists as stored water located within Lake Livingston. According to the Region H water projections, there is no projected need for this water through year 2060 within the TRA service area.

Through financial considerations associated with the 1964 construction contract for the Lake Livingston-Wallisville Salt Water Barrier Project, the City of Houston (City) has a preferred position relative to purchase of uncommitted water supplies from TRA's share of the Livingston-Wallisville system. To date, the City has funded the cost of Lake Livingston including the TRA share. This strategy consists of defining that quantity of available water that could be purchased from the TRA and conveyed by the City of Houston into the San Jacinto River basin.

Analysis

The City of Houston has sufficient water supplies to meet its own demand and current contracts through year 2060. Based on the regional planning analysis, the City will require additional supply in 2030 to meet project growth in customer WUG demands.

Acquisition of some portion of the uncommitted TRA water supplies can occur through a water supply agreement executed between the City and TRA. An agreement of this type requires two willing parties. Additionally, the terms of a water agreement must be acceptable to both parties. The City of Houston and TRA have initiated discussions to determine whether a water agreement can be formulated. Based on preliminary discussions, the TRA is willing to consider the transfer of up to 200,000 acre-feet per year to the City. Specific terms of the contract agreement have not been formulated at this time.

Assuming consummation of the agreement, the City of Houston has to determine how to convey these water supplies into their water supply system. Diversion of these water supplies can occur either directly from Lake Livingston or at any point downstream of Lake Livingston. Two potential diversion points and conveyance routes include use of the existing Coastal Water Authority (CWA) canal system at the Trinity River Pump Station and/or a new potential route from the Trinity River to Lake Houston via Luce Bayou.

If the Luce Bayou route is utilized, then new facilities would have to be constructed which would include; a diversion structure on the Trinity River, a raw water pump station, and a conveyance pipeline and canal system. Definition of these facilities is discussed within the Luce Bayou water management strategy technical memorandum. Alternatively, it can be assumed that the Luce Bayou system is required just to provide supply to the Northeast Water Purification Plant, as is discussed within the Luce Bayou management strategy. The CWA canal system would then have sufficient excess capacity because previously utilized Lake Livingston flows would be diverted into a new Luce Bayou thereby freeing up capacity to convey up to the potential additional 200,000 acre-feet per year of supply.

Water User Group Application

This management strategy will provide supply to meet the post-2020 demand growth for Houston's customer WUGs in Harris, Montgomery and Galveston counties.

Environmental Impact

Additional transfer of Trinity River water supplies into the San Jacinto River basin will decrease freshwater inflows into the upper Trinity Bay estuary. Riverine flows should remain unchanged between Lake Livingston and the Coastal Water Authority diversion point. Downstream of the CWA diversion point, instream flows will decrease by

approximately 3% (based upon full diversion at 276 cfs, compared to a 20-year average flow of 9100 cfs). This reduction potentially affects White-faced Ibis, Wood Stork and Alligator Snapping Turtle habitats. Increased use of stored water from Lake Livingston may result in more frequent level fluctuations and prolonged low lake levels, which may adversely impact wetland areas along the lake perimeter. These fluctuations may also adversely affect property values and recreational revenues in Walker, Trinity, San Jacinto and Polk Counties.

The blending of Trinity and San Jacinto river supplies in Lake Houston will affect the water quality, and could potentially introduce invasive species to Lake Houston.

Return flows from this supply (typically 60% of the total diverted) will return to Galveston Bay via the San Jacinto River and Houston Ship Channel, affecting the spatial distribution of freshwater inflows to the bay. If the transfer were to occur instantly at its full amount, the impact on estuary species might be severe, particularly to oyster beds located in Trinity Bay. However, the full transition of this supply from the Trinity Basin to the San Jacinto basin is projected to occur gradually over a 40-year period, allowing sufficient time for species to migrate within the 20-mile width of Galveston Bay. Additionally, the size of the target diversion (276 cfs) is well within the current range of variation in annual flows (standard deviation over the last 20-years is just over 4100 cfs).

The Dallas-Fort Worth Metroplex is also projected to grow throughout the planning period. Wastewater return flows from that area flow into the Upper Trinity River. The Region C Water Plan recommends wastewater reuse as a management strategy for the upper basin, but it is anticipated that the upper basin will continue to provide flows to the Trinity, which will further off-set the impacts of this strategy.

Issues and Considerations

Although the supply infrastructure (Lake Livingston) is in place, the conveyance required for this transfer is not. The Luce Bayou transfer or a similar inter-basin pipeline must be constructed to move this supply into the San Jacinto Basin. See the Luce Bayou Transfer technical memorandum for a discussion of those costs and impacts.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Luce Bayou Interbasin Transfer
DATE: January 7, 2005

SUMMARY

STRATEGY DESCRIPTION: Construction of a raw water pumping station, pipelines, canal, and rectification of the Luce Bayou channel to convey a portion of the City of Houston's Trinity River water supply to Lake Houston to supply demands in northern and western Harris County.

SUPPLY QUANTITY: 540,000 acre-feet per year (movement of existing supply) by 2020
1,232,000 acre-feet per year (movement of existing supply) ultimate capacity

SUPPLY SOURCE: Trinity River

IMPLEMENTATION DECADE: 2020 for 540,000 acre-ft per year
2050 for 1,232,000 acre-ft per year (ultimate capacity)

TOTAL STRATEGY COST: $126,000,000 in 2020
$113,000,000 in 2050

UNIT WATER COST: $30 per acre-foot in 2020
$17 per acre-foot in 2050

Water Management Strategy Analysis Description

Introduction

The City of Houston (City) is a major water provider in Region H and will provide treated surface water to numerous municipalities, districts and areas outside of its current corporate limits. Many of these WUG's, as well as a significant amount of the City's own growth in surface water demand, are located in northern and northwestern Harris County. The North Harris County Regional Water Authority (NHCRWA) was created in 1999 and the West Harris County Regional Water Authority (WHCRWA) was created in 2001 to serve this area. The Northeast Water Purification Plant (NEWPP) supplies the northern part of Harris County, including contracts with NHCRWA and WHCRWA. The NEWPP takes its raw water directly from Lake Houston. The City's East Water Purification Plant (EWPP) and a group of industries also draw raw water supplies from Lake Houston. By year 2020,

demands for this customer base will exceed the City's raw water supplies currently available in Lake Houston.

Supplies owned by the City in the Trinity River basin are sufficient to meet the demands of this customer base. The City's permit for Lake Livingston allows for the inter-basin transfer of supply via Luce Bayou. However, this conveyance system has not yet been constructed. The Luce Bayou strategy will supply Trinity River water to the upstream end of Luce Bayou. From there, the water will flow to and be available from Lake Houston.

Analysis

Sizing of the Luce Bayou project depends on several elements:

- Water demands located within the NEWPP service area,
- Demands for Lake Houston water by the EWPP and by West Canal industries,
- The availability of groundwater in the NEWPP service area, and
- The yield of the City's San Jacinto basin reservoirs (i.e., Lakes Conroe and Houston).

Beginning in year 2010, regulations will constrain groundwater withdrawals in the areas served by the NEWPP. Demands from the NEWPP are projected to increase from 80 mgd in 2010 to 360 mgd in 2030[1]. The EWPP and industrial consumers are assumed to take 225 mgd from Lake Houston via the West Canal throughout the planning period, bringing the total projected demand to 585 mgd in 2030. The City can currently take a maximum of 221,400 acre-feet per year (197 mgd) from Lake Houston (see Table 1).

Table 1: Houston San Jacinto River Water Rights

Source	2000 Yield (ac-ft/yr)	2030 Yield (ac-ft/yr)	2060 Yield (ac-ft/yr)
Lake Conroe*	53,400	51,200	49,000
Lake Houston**	168,000	168,000	168,000
Total Supply at NEWPP	221,400	217,000	217,000
Total Supply as mgd	197 mgd	392 mgd	193 mgd

* Yield declines over time due to sedimentation of reservoirs

** Lake Houston yield exceeds permit

Based on these parameters, the additional Trinity water supply required at Lake Houston in 2030 is approximately 439,000 acre-feet per year (392 mgd). To account for in-channel and evaporative losses (3%) and seasonal variations (20%), the Luce Bayou facilities should be sized to convey approximately 539,800 acre-feet per year (482 mgd). The maximum diversion rate allowed in the existing Houston permit is 1700 cfs (1100 mgd). Because the City diverts supply at the CWA Trinity River Pump Station for use below Lake Houston, supply would need to be purchased from the Trinity River Authority to reach this peak diversion rate.

The Luce Bayou project will be implemented in two stages. Luce Bayou diversion facilities will consist of a pumping station with river intake at Capers Ridge on the west bank of the

[1] City of Houston Water Production Optimization Study, Camp Dresser McKee, 2002

Trinity River approximately 11 miles north of the town of Liberty. A pipeline segment followed by an earthen canal will carry the flow from the pumping station to the upstream end of Luce Bayou. To accommodate the increased flow, the Luce Bayou channel will be widened, deepened and straightened from its headwaters to its confluence with Tarkington Bayou. The remainder of the Luce Bayou channel will remain unchanged downstream to Lake Houston. See Figure 1 for project location and routing. When the project is expanded to ultimate capacity, a second pipeline will be constructed parallel to the first and the pump station will be expanded.

The project cost for the Luce Bayou project is estimated to be approximately $126,000,000. Annual costs are projected to range from $16.2 million in 2020 up to $21.5 million in 2060. The average annual cost from 2020 through 2060 is $16.1 million, giving an average per unit water cost of $21 per acre-foot. Estimated costs are detailed in Tables 3 and 4.

Table 2: Summary of Costs

	2020	2030	2040	2050	2060
Phase I (2020 implementation) Capital Improvement Costs	$126,000,000				
Phase I (2020) O&M Costs	$16,100,000	$16,100,000	$16,100,000	$5,220,000	$5,220,000
Phase II (2050 implementation) Capital Improvement Costs				$113,000,000	
Phase II (2050) O&M Costs				$16,230,000	$16,230,000
Total O&M Cost	$16,100,000	$16,100,000	$16,100,000	$21,500,000	$21,500,000
Cost per acre-foot	$30	$30	$30	$17	$17

Water User Group Application

The water supplied by the Luce Bayou strategy will be mixed with the waters of Lake Houston, treated at the NEWPP and supplied to the City of Houston, NHCRWA, WHCRWA, and numerous other WUGs in Harris County.

Environmental Impact

Construction of the Luce Bayou project will require rectification of approximately eight miles of Luce Bayou, altering the ecology in that segment, and possibly in downstream segments. Luce Bayou is narrow and shallow in its upper reaches, but widens and deepens downstream.[2] The bayou provides habitat for diverse biological community of fish and the hardwood forest that lines the banks provides habitat for a variety of mammals such as raccoons and beavers. The mixing of Trinity River water and San Jacinto River water in Lake Houston may have an adverse impact on the lake's ecological balance. Wetlands mitigation may be required to offset losses due to pumping station, pipeline, and canal construction. Placing a constant flow in Luce Bayou (currently an intermittent stream) may

[2] Moring, J., J. Rosendale, S. Ansley, D. Brown. 1998. Fish, Benthic Macroinvertebrate, and Stream Habitat Data From the Houston-Galveston Area Council Service Area, Texas, 1997-1998. United States Geological Survey, Austin, Texas.

have a positive affect on adjoining property values. Increased use of stored water from Lake Livingston may result in periodic or prolonged low lake levels, which may adversely impact property values and recreational revenues in Walker, Trinity, San Jacinto and Polk Counties. Texas Parks and Wildlife Department has designated as ecologically significant the stream segment from the confluence with Lake Houston upstream to its headwaters in Liberty County. Biological function is that of a bottomland forest display significant overall habitat value considering the high biodiversity of fish and macroinvertebrates.[1] Hydrologic function is of bottom land hardwood forest and associated wetlands relating to flood attenuation and water quality.[1]

Alternatively, a pipeline or canal could be constructed parallel to the Luce Bayou to avoid disturbing the channel.

Issues and Considerations

This transfer was originally permitted to convey City of Houston supplies from Lake Livingston to Lake Houston. However, the Trinity River Authority and San Jacinto River Authority also own supplies that are permitted for inter-basin transfer to the San Jacinto Basin. The City of Houston is expanding its Trinity River Pump Station below Livingston to realize the full permitted diversion rate. The addition of the Luce Bayou Diversion would give the City excess capacity, which could be used in conjunction with the Trinity River Pump Station to meet the conveyance needs of the TRA and SJRA.

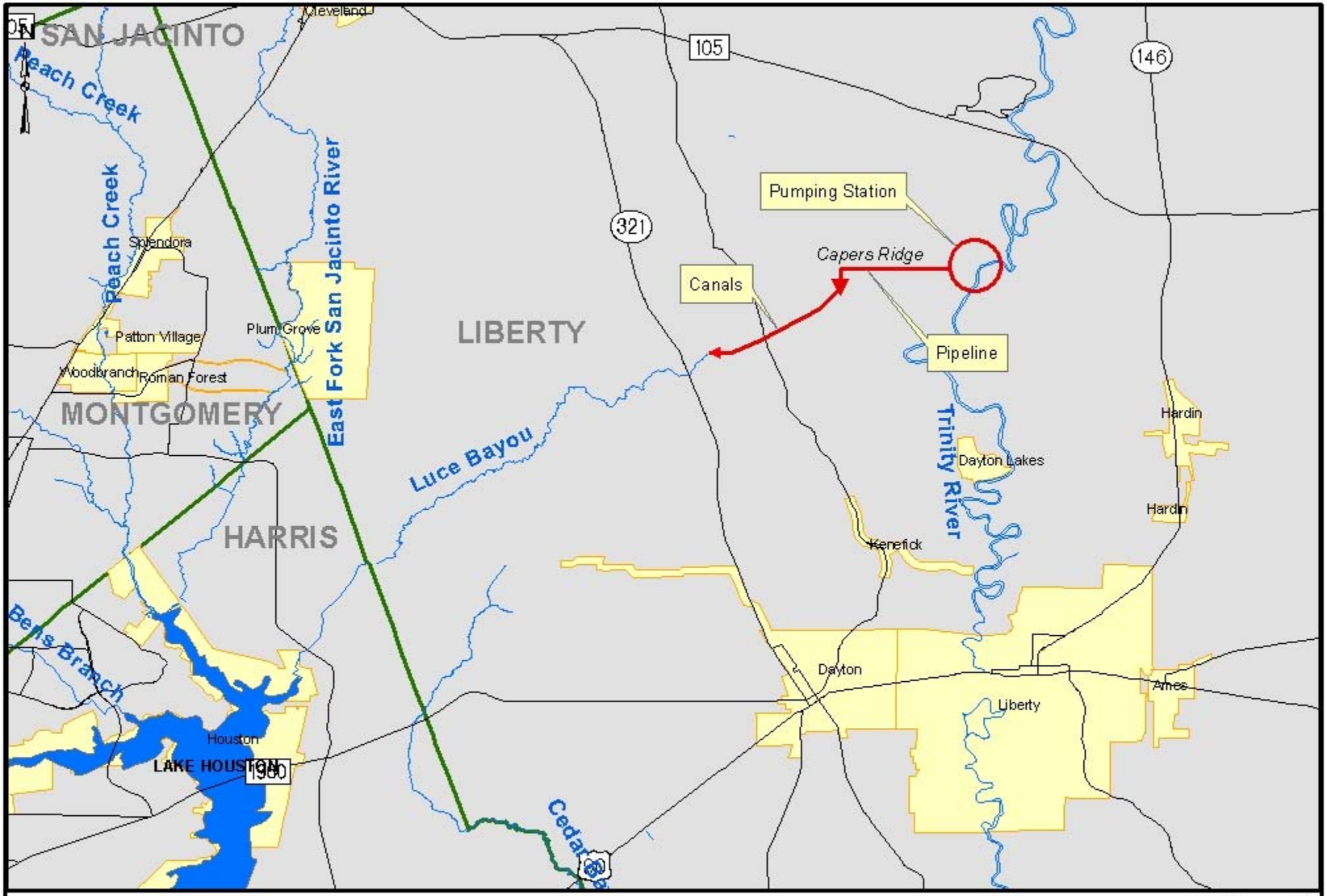


Figure 1

Luce Bayou Interbasin Transfer
Trinity to San Jacinto

Kellogg Brown & Root — Turner Collie & Braden Inc. — JOINT VENTURE

3 1.5 0 3 Miles

C:\Civil\Engineer\cm0184\twdb Report\Task5\Luce Bayou Interbasin Transfer Figure 1.jpg

TABLE 3
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
2020 with 482 MGD

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 78,700,756	$ 78,700,756
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 25,188,725	$ 25,188,725
3	LAND & EASEMENTS	340	AC	$25,000	$ 8,500,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$4,260,000	$ 4,260,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 9,035,964	$ 9,035,964
	PROJECT COST				**$ 125,685,446**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
1	DEBT SERVICE	$ -	$ 10,957,830	$ 10,957,830	$ -	$ -	$ -
2	OPERATION & MAINTENANCE (O&M)	$ -	$ 1,075,900	$ 1,075,900	$ 1,075,900	$ 1,075,900	$ 1,075,900
3	PUMPING ENERGY COSTS	$ -	$ 4,144,764	$ 4,144,764	$ 4,144,764	$ 4,144,764	$ 4,144,764
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ -**	**$ 16,178,495**	**$ 16,178,495**	**$ 5,220,665**	**$ 5,220,665**	**$ 5,220,665**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 19,259,528	$ 19,259,528
2a	PIPELINES	1	LS	$ 47,130,800	$ 47,130,800
2b	PIPELINE CROSSINGS	0	LS	$ -	$ -
3	WATER TREATMENT PLANTS	0	LS	$ -	$ -
4	WATER STORAGE TANKS	0	LS	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0	LS	$ -	$ -
6	WELL FIELDS	0	LS	$ -	$ -
7	DAMS & RESERVOIRS	0	LS	$ -	$ -
8	RELOCATIONS	0	LS	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0	LS	$ -	$ -
10	STILLING BASINS	0	LS	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	0	LS	$ -	$ -
12	CANAL AND CHANNEL RECTIFICATION	1	LS	$12,310,428	$ 12,310,428
	PROJECT COST				**$ 78,700,756**

TABLE 3
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
2020 with 482 MGD

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 19,259,528	$ 481,488
2a	PIPELINES	0.010	%	$ 47,130,800	$ 471,308
2b	PIPELINE CROSSINGS	0.010	%	$ -	$ -
3	WATER TREATMENT PLANTS	1	LS	$ -	$ -
4	WATER STORAGE TANKS	0.010	%	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0.010	%	$ -	$ -
6	WELL FIELDS	0.010	%	$ -	$ -
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ -	$ -
12	OTHER ITEMS	0.010	%	$ 12,310,428	$ 123,104
	ANNUAL OPERATION & MAINTENANCE COST				**$ 1,075,900**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,324,000 * ln (Horsepower+160) - 21,620,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Station #1	5924	HP	$ 16,049,607	$ 16,049,607
2	Pump Station #1 added Intake Structure	1	LS	$ 3,209,921	$ 3,209,921
	PUMP STATIONS TOTAL COST				**$ 19,259,528**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
125	482	10575

TABLE 3
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
2020 with 482 MGD

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
2	Rural Pipeline	144	39440	LF	$ 1,195	$ 47,130,800
	PIPELINES TOTAL COST					**$ 47,130,800**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pump Station #1 Pumping Energy Costs	10575	HP	$ 4,144,764	$ 4,144,764
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 4,144,764**

TABLE 4
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
Ultimate Capacity of 1100 mgd

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 78,700,756	$ 78,700,756
2	AND CONTINGENCIES	1	LS	$ 25,188,725	$ 25,188,725
3	LAND & EASEMENTS	0	AC	$0	$ -
4	ENVIRONMENTAL - STUDIES & MITIGATION	0	LS	$0	$ -
5	INTEREST DURING CONSTRUCTION	1	LS	$ 9,035,964	$ 9,035,964
	PROJECT COST				**$ 112,925,446**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
1	DEBT SERVICE	$ -	$ -	$ -	$ -	$ 9,845,355	$ 9,845,355
2	OPERATION & MAINTENANCE (O&M)	$ -	$ -	$ -	$ -	$ 1,075,900	$ 1,075,900
3	PUMPING ENERGY COSTS	$ -	$ -	$ -	$ -	$ 5,313,921	$ 5,313,921
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ -**	**$ -**	**$ -**	**$ -**	**$ 16,235,176**	**$ 16,235,176**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 19,259,528	$ 19,259,528
2a	PIPELINES	1	LS	$ 47,130,800	$ 47,130,800
2b	PIPELINE CROSSINGS	0	LS	$ -	$ -
3	WATER TREATMENT PLANTS	0	LS	$ -	$ -
4	WATER STORAGE TANKS	0	LS	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0	LS	$ -	$ -
6	WELL FIELDS	0	LS	$ -	$ -
7	DAMS & RESERVOIRS	0	LS	$ -	$ -
8	RELOCATIONS	0	LS	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0	LS	$ -	$ -
10	STILLING BASINS	0	LS	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	0	LS	$ -	$ -
12	CANAL AND CHANNEL RECTIFICATION	1	LS	$12,310,428	$ 12,310,428
	PROJECT COST				**$ 78,700,756**

TABLE 4
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
Ultimate Capacity of 1100 mgd

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 19,259,528	$ 481,488
2a	PIPELINES	0.010	%	$ 47,130,800	$ 471,308
2b	PIPELINE CROSSINGS	0.010	%	$ -	$ -
3	WATER TREATMENT PLANTS	1	LS	$ -	$ -
4	WATER STORAGE TANKS	0.010	%	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0.010	%	$ -	$ -
6	WELL FIELDS	0.010	%	$ -	$ -
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ -	$ -
12	OTHER ITEMS	0.010	%	$ 12,310,428	$ 123,104
	ANNUAL OPERATION & MAINTENANCE COST				**$ 1,075,900**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,324,000 * ln (Horsepower+160) - 21,620,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Station #1	5924	HP	$ 16,049,607	$ 16,049,607
2	Pump Station #1 added Intake Structure	1	LS	$ 3,209,921	$ 3,209,921
	PUMP STATIONS TOTAL COST				**$ 19,259,528**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
125	618	13558

TABLE 4
COST ESTIMATE

Luce Bayou Interbasin Transfer Strategy
Ultimate Capacity of 1100 mgd

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
2	Rural Pipeline	144	39440	LF	$ 1,195	$ 47,130,800
	PIPELINES TOTAL COST					**$ 47,130,800**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pump Station #1 Pumping Energy Costs	13558	HP	$ 5,313,921	$ 5,313,921
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 5,313,921**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Houston to Gulf Coast Water Authority Transfer
DATE: JANUARY 7, 2004

SUMMARY

STRATEGY DESCRIPTION: Development of transfer pipeline from the Bayport Reservoir in the Coastal Water Authority (CWA) system to the Texas City Reservoir in the Gulf Coast Water Authority (GCWA) system.

SUPPLY QUANTITY: 14,000 acre-feet per year to meet shortage in Galveston County by 2010
OR
42,000 acre-feet per year to meet shortage in Galveston County and shortage in subgroup of Fort Bend County (Sugar Land vicinity) ultimate capacity by 2050 in 3 tiered plan

SUPPLY SOURCE: City of Houston (Trinity River water supplies)

TOTAL STRATEGY COST:	$42,700,000 in 2010	(14,000 acre-feet)
	OR	
	$83,700,000 in 2010	(42,000 acre-feet)
	$ 9,341,000 in 2030	
	$ 9,341,000 in 2050	
UNIT WATER COST:	$311 per acre foot in 2010	(14,000 acre-feet)
	OR	
	$495 per acre-foot in 2010	(42,000 acre-feet)
	$303 per acre-foot in 2030	
	$210 per acre-foot in 2050	

Water Management Strategy Analysis Description

Introduction

Galveston County is projected to have a water shortage of approximately 14,000 acre-feet per year in decades 2010 through 2060. This demand is usually met by the Gulf Coast Water Authority, but under drought conditions the GCWA water rights are not fully reliable. To meet these demands, under this strategy the GCWA can purchase Trinity River supplies from the City of Houston, and convey that water from the CWA Bayport Reservoir to the Texas City Reservoir owned by the GCWA. This supply would be used for irrigation and municipal customers in Texas City and Galveston County. See Table 1.

Alternatively, the strategy could be increased to use the entire excess capacity of the Bayport Reservoir of 42,000 acre-feet per year. The GCWA has contracts to supply surface water to several WUGs in eastern Fort Bend County, including Sugar Land and Missouri City. By increasing the amount of water supplied to Galveston County from the east, the GCWA existing supply in the Brazos River may be reallocated to meet demands in eastern Fort Bend County. The area surrounding a possible Sugar Land Regional Plant is projected to have a shortage of 3,000 acre-feet per year starting in 2010, increasing to 28,000 acre-feet per year by 2060. See Table 2 for details.

Table 1: Galveston County Shortages

WUG	2010	2020	2030	2040	2050	2060
Galveston County WCID #12	-117	-144	-159	-163	-167	-171
Irrigation	-10143	-9809	-9264	-9261	-9277	-9304
Kemah	-177	-215	-236	-242	-246	-251
League City	-3078	-3722	-4071	-4135	-4208	-4297
Mining	-16	-23	-26	-29	-33	-36
Mining	-15	-21	-24	-28	-30	-33
TOTAL	-13546	-13934	-13780	-13858	-13961	-14092

Table 2: Fort Bend County WUGs to be served by Possible Sugar Land Regional Plant

	2010	2020	2030	2040	2050	2060
Plantation MUD	-142	-225	-329	-321	-316	-316
Fort Bend County MUD #106	-586	-622	-711	-708	-708	-708
Fort Bend County MUD #108	-355	-374	-425	-422	-422	-422
Arcola	-104	-185	-301	-338	-387	-440
First Colony Mud #9	-881	-932	-1059	-1050	-1050	-1050
Fort Bend County MUD #23	-170	-426	-907	-1315	-1850	-2461
Missouri City – Fort Bend	1084	1059	171	-404	-844	-1802
Sienna Plantation MUD #2	-276	-552	-823	-815	-815	-815
County – Other	-1484	-3241	-6541	-9902	-14964	-20170
Manufacturing – San Jacinto-Brazos Basin (FB)	-181	-877	-1777	-1893	-1969	-1746
Mining – San Jacinto-Brazos Basin (FB)	184	-164	-600	-622	-642	-660
Total	**-2914**	**-5498**	**-10925**	**-15275**	**-21356**	**-28184**

Analysis

Both options for this strategy consist of facilities necessary to convey water supplies from the CWA Bayport Reservoir to the GCWA Texas City Reservoir. For the smaller option, the system would be sized to provide 14,000 acre-feet in 2010. The conveyance system would require:

- A raw water pump station (12 mgd capacity)
- Approximately 16 miles of 20-inch transmission main
- Two channel crossings at Clear Lake and Dickinson Bayou

The transmission main route is generally adjacent to the existing public right-of-way for Highway 146. The proposed route of the transmission pipeline passes through the cities of Seabrook, Bacliff and Kemah before reaching the Texas City Reservoir. A diagram of this conveyance route is shown in Figure 1.

The projected cost of this conveyance system is estimated to be approximately $42,700,000. A detailed estimate of the cost is shown on the attached Table 3. The total annual project cost, which includes debt service and operations and maintenance, is estimated as $4,354,000. The per unit cost of this system, not including the Houston raw water cost, is approximately $311 per acre-foot for water delivered to the GCWA.

For the larger strategy option, initial capacity required in 2010 would be 17,000 acre-feet/year (16 mgd), increasing to a total 42,000 acre-feet/year capacity by year 2050. This system would require:

- A raw water pump station (20 mgd capacity, with planned 10 mgd expansions in 2030 and 2050)
- Approximately 16 miles of 42-inch transmission main
- Two channel crossings at Clear Lake and Dickinson Bayou

The projected cost of this option is estimated to be approximately $83,730,000 in 2010. The per unit cost of this system, not including the Houston raw water cost, is approximately $495 per acre-foot of water delivered to the GCWA in 2010. Detailed cost estimates are shown in Table 4.

Water User Group Application

The water in the smaller version of this strategy will be added to the Gulf Coast Water Authority system for irrigation and municipalities in Galveston County. The larger version of this strategy increases the use of Houston water supply in Galvestion County, allowing the GCWA to allocate more of its Brazos River supplies to eastern Fort Bend County WUG demands.

Environmental Impact

The transfer of Trinity River water into the San Jacinto - Brazos Coastal Basin should be of limited environmental concern in the receiving basin, because the water and any potentially invasive species will be contained in pipelines and canals and not allowed to commingle with other surface water until it has been treated and used by municipalities and industries. Construction related impacts will be limited because all of the necessary infrastructure will occur in public rights-of-way. It is assumed that 6 acres of wetlands might be affected due to three required stream crossings. Freshwater inflows to Galveston Bay will be directly affected. Unused supply that currently flows into Trinity Bay will be transferred to Galveston County, where the return flows (typically 60%) will be discharged into Upper and Lower Galveston Bay. This would be a minor impact if the transfer were phased-in over a period of 20-plus years, so that the species in the bay can

respond to the gradual change in freshwater inflow patterns. In this case, it is expected that the system would initially operate at or near its 12 mgd capacity. The second phase expansion, if added, could be phased in with a lesser discrete impact on the Bay, although it adds to the cumulative affect of the plan.

Issues and Considerations

This strategy is an inter-basin transfer (Trinity basin to San Jacinto-Brazos basin), so the junior water rights limitations may affect this concept. The water rights recommended are previously permitted for inter-basin transfer to Harris County, but not to Galveston.

The majority of the unmet demand in Galveston County is in irrigation, which may not be prepared to pay such a high price for supply, particularly when the GCWA has irrigation water rights that are available under all but drought conditions. If only the unmet municipal demands were to be met, that supply could come from an expansion of the treated water capacity of the City of Houston Southeast Water Purification Plant. The treated water infrastructure to Kemah and League City would be less expensive to construct, but the irrigation demands would either be left unmet. The utility of this strategy is only realized if it is sized to offset Galveston County demands and allow GCWA to reallocate supply to meet Fort Bend County demands.

Figure 1

CWA-Bayport to GCWA Texas City Transfer Route

Kellogg Brown & Root — Turner Collie & Braden Inc. — JOINT VENTURE

C:\Civil\Engineer\cm0184\twdb Report\Task5\Houston to GCWA Figure 1.jpg

TABLE 3
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 14,000 acre-feet ultimate capacity

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 27,363,656	$ 27,363,656
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 8,628,935	$ 8,628,935
3	LAND & EASEMENTS	1	LS	$ 2,522,000	$ 2,522,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 1,000,000	$ 1,000,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 3,141,736	$ 3,141,736
	PROJECT COST				**$ 42,656,327**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
1	DEBT SERVICE	$ 3,718,973	$ 3,718,973	$ -	$ -		$ -
2	OPERATION & MAINTENANCE (O&M)	$ 399,588	$ 399,588	$ 399,588	$ 399,588	$ 399,588	$ 399,588
3	PUMPING ENERGY COSTS	$ 235,164	$ 235,164	$ 235,164	$ 235,164	$ 235,164	$ 235,164
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ 4,353,725**	**$ 4,353,725**	**$ 634,752**	**$ 634,752**	**$ 634,752**	**$ 634,752**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 8,396,776	$ 8,396,776
2a	PIPELINES	1	LS	$ 11,066,880	$ 11,066,880
2b	PIPELINE CROSSINGS	1	LS	$ 7,900,000	$ 7,900,000
12	OTHER ITEMS	1	LS	$ -	$ -
	PROJECT COST				**$ 27,363,656**

TABLE 3
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 14,000 acre-feet ultimate capacity

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 8,396,776	$ 209,919
2a	PIPELINES	0.010	%	$ 11,066,880	$ 110,669
2b	PIPELINE CROSSINGS	0.010	%	$ 7,900,000	$ 79,000
12	OTHER ITEMS	0.010	%	$ -	$ -
	ANNUAL OPERATION & MAINTENANCE COST				**$ 399,588**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,324,000 * ln (Horsepower+160) - 21,620,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Station #1	600	HP	$ 6,997,313	$ 6,997,313
2	Pump Station #1 added Intake Structure	1	LS	$ 1,399,463	$ 1,399,463
3	Pump Station #1 added Standby Power	0	LS	$ 3,362,018	$ -
	PUMP STATIONS TOTAL COST				**$ 8,396,776**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
278	12	586

TABLE 3
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 14,000 acre-feet ultimate capacity

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
1	Urban Pipeline	20	25344	LF	$ 180	$ 4,561,920
2	Rural Pipeline	20	59136	LF	$ 110	$ 6,504,960
	PIPELINES TOTAL COST					**$ 11,066,880**

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Pipeline Crossing	20	10000	LF	$ 790	$ 7,900,000
	PIPELINE CROSSINGS TOTAL COST					**$ 7,900,000**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pump Station #1 Pumping Energy Costs	600	HP	$ 235,164	$ 235,164
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 235,164**

TABLE 4
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 42,000 acre-feet ultimate capacity

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY 2010					
1A	CONSTRUCTION (CAPITAL) COST	1	LS	$ 56,299,699	$ 56,299,699
2A	AND CONTINGENCIES	1	LS	$ 17,447,879	$ 17,447,879
3A	LAND & EASEMENTS	1	LS	$ 2,522,000	$ 2,522,000
4A	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 1,000,000	$ 1,000,000
5A	INTEREST DURING CONSTRUCTION	1	LS	$ 6,464,005	$ 6,464,005
	PROJECT COST				**$ 83,733,583**

PROJECT COST SUMMARY 2030					
1B	CONSTRUCTION (CAPITAL) COST	1	LS	$ 6,376,819	$ 6,376,819
2B	AND CONTINGENCIES	1	LS	$ 2,231,887	$ 2,231,887
3B	LAND & EASEMENTS	1	LS	$ -	$ -
4B	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ -	$ -
5B	INTEREST DURING CONSTRUCTION	1	LS	$ 732,149	$ 732,149
	PROJECT COST				**$ 9,340,855**

PROJECT COST SUMMARY 2050					
1B	CONSTRUCTION (CAPITAL) COST	1	LS	$ 6,376,819	$ 6,376,819
2B	AND CONTINGENCIES	1	LS	$ 2,231,887	$ 2,231,887
3B	LAND & EASEMENTS	1	LS	$ -	$ -
4B	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ -	$ -
5B	INTEREST DURING CONSTRUCTION	1	LS	$ 732,149	$ 732,149
	PROJECT COST				**$ 9,340,855**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
1	DEBT SERVICE	$ 7,300,275	$ 7,300,275	$ 814,378	$ 814,378	$ 814,378	$ 814,378
2	OPERATION & MAINTENANCE (O&M	$ 730,388	$ 730,388	$ 889,808	$ 889,808	$ 1,049,229	$ 1,049,229
3	PUMPING ENERGY COSTS	$ 391,940	$ 391,940	$ 6,768,759	$ 6,768,759	$ 6,964,729	$ 6,964,729
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ 8,422,603**	**$ 8,422,603**	**$ 8,472,945**	**$ 8,472,945**	**$ 8,828,336**	**$ 8,828,336**

TABLE 4
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 42,000 acre-feet ultimate capacity

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY 2010					
1	PUMP STATIONS	1	LS	$ 11,159,379	$ 11,159,379
2a	PIPELINES	1	LS	$ 32,440,320	$ 32,440,320
2b	PIPELINE CROSSINGS	1	LS	$ 12,700,000	$ 12,700,000
3	WATER TREATMENT PLANTS	1	LS	$ -	$ -
4	WATER STORAGE TANKS	1	LS	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	1	LS	$ -	$ -
6	WELL FIELDS	1	LS	$ -	$ -
7	DAMS & RESERVOIRS	1	LS	$ -	$ -
8	RELOCATIONS	1	LS	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	1	LS	$ -	$ -
10	STILLING BASINS	1	LS	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ -	$ -
12	OTHER ITEMS	1	LS	$ -	$ -
	PROJECT COST				**$ 56,299,699**

CONSTRUCTION COST SUMMARY 2010					
1	PUMP STATIONS	1	LS	$ -	$ 6,376,819
	PROJECT COST				**$ 6,376,819**

CONSTRUCTION COST SUMMARY 2030					
1	PUMP STATIONS	1	LS	$ -	$ 6,376,819
	PROJECT COST				**$ 6,376,819**

TABLE 4
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 42,000 acre-feet ultimate capacity

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY 2010					
1	PUMP STATIONS	0.025	%	$ 11,159,379	$ 278,984
2a	PIPELINES	0.010	%	$ 32,440,320	$ 324,403
2b	PIPELINE CROSSINGS	0.010	%	$ 12,700,000	$ 127,000
3	WATER TREATMENT PLANTS (see page before previou	1	LS	$ -	$ -
4	WATER STORAGE TANKS	0.010	%	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0.010	%	$ -	$ -
6	WELL FIELDS	0.010	%	$ -	$ -
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS (see previous	1	LS	$ -	$ -
12	OTHER ITEMS	0.010	%	$ -	$ -
	ANNUAL OPERATION & MAINTENANCE COST				**$ 730,388**

OPERATION & MAINTENANCE (O&M) COST SUMMARY 2030					
1	PUMP STATIONS	0.025	%	$ 6,376,819	$ 159,420
	ANNUAL OPERATION & MAINTENANCE COST				**$ 159,420**

OPERATION & MAINTENANCE (O&M) COST SUMMARY 2050					
1	PUMP STATIONS	0.025	%	$ 6,376,819	$ 159,420
	ANNUAL OPERATION & MAINTENANCE COST				**$ 159,420**

TABLE 4
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 42,000 acre-feet ultimate capacity

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,324,000 * ln (Horsepower+160) - 21,620,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY 2010					
1	Pump Station #1	1000	HP	$ 8,847,985	$ 8,847,985
2	Pump Station #1 added Intake Structure	1	LS	$ 2,311,394	$ 2,311,394
3	Pump Station #1 added Standby Power	0	LS	$ 3,362,018	$ -
	PUMP STATIONS TOTAL COST				**$ 11,159,379**

PUMP STATION COST SUMMARY 2030					
1	Pump Station #1	500	HP	$ 6,376,819	$ 6,376,819
2	Pump Station #1 added Intake Structure	0	LS	$ 2,311,394	$ -
3	Pump Station #1 added Standby Power	0	LS	$ 3,362,018	$ -
	PUMP STATIONS TOTAL COST				**$ 6,376,819**

PUMP STATION COST SUMMARY 2050					
1	Pump Station #1	500	HP	$ 6,376,819	$ 6,376,819
2	Pump Station #1 added Intake Structure	0	LS	$ 2,311,394	$ -
3	Pump Station #1 added Standby Power	0	LS	$ 3,362,018	$ -
	PUMP STATIONS TOTAL COST				**$ 6,376,819**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
278	20	976
278	10	488

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
1	Urban Pipeline	42	25344	LF	$ 265	$ 6,716,160
2	Rural Pipeline	42	59136	LF	$ 435	$ 25,724,160
	PIPELINES TOTAL COST					**$ 32,440,320**

TABLE 4
COST ESTIMATE

TRANSFER FROM HOUSTON/CWA TO GULF COAST WATER AUTHORITY
with 42,000 acre-feet ultimate capacity

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Pipeline Crossing	42	10000	LF	$ 1,270	$ 12,700,000
	PIPELINE CROSSINGS TOTAL COST					**$ 12,700,000**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY 2010					
1	Pump Station #1 Pumping Energy Costs	1000	HP	$ 391,940	$ 391,940
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 391,940**
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY 2030					
1	Pump Station #1 Pumping Energy Costs	500	HP	$ 195,970	$ 195,970
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 195,970**
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY 2050					
1	Pump Station #1 Pumping Energy Costs	500	HP	$ 195,970	$ 195,970
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 195,970**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Non-Municipal Contractual Transfers
DATE: January 14, 2005

SUMMARY

STRATEGY DESCRIPTION: Transfer surplus water supply to meet demands within the same or neighboring counties and basins, using existing conveyance systems when possible.

SUPPLY QUANTITY: 1,000 acre-feet per year (change use from manufacturing to mining)
20,000 acre-feet per year (change of irrigation location)

SUPPLY SOURCE: Gulf Coast Water Authority, Chocolate Bayou Water Company and Richmond Irrigation Company (Brazos Run-of-River) and Phillips Petroleum (San Bernard Run-of-River)

IMPLEMENTATION DECADE: 2000 through 2060

TOTAL STRATEGY COST: No Cost

UNIT WATER COST: Contract dependent

Water Management Strategy Analysis Description

Introduction:

A contractual transfer is a permanent transfer (contract paper) of water supplies, from one party to another, which may or may not involve an exchange of water rights. The primary advantage of contractual transfers is the opportunity to reduce or defer the construction of major new water facilities. This strategy differs from contracting existing, uncommitted supplies from a wholesale water provider, because the subject water is committed by water right or contract to a specific use with a projected surplus. Contractual transfers make the most efficient use of existing water supplies by allocating available supplies to entities needing the water.

Analysis:

In identifying potential contractual transfers, projected water supply surpluses were identified for non-municipal water uses by county and river basin. The analysis consists of reviewing current water supply contracts and permits and comparing projected water demands versus each contract or permit. Any identified water surplus is a potential contractual transfer. All

existing surface water supply contracts with wholesale water providers were considered in effect through the year 2060. Groundwater supplies were not considered available for transfer. Aggregate surpluses under 1,000 acre-feet per year were not considered for transfer, although individual industries or irrigators may choose to pursue these transfers independently.

Table 1 indicates all projected surpluses considered for transfer. As shown, a total of approximately 357,500 acre-feet per year was identified in the year 2000, declining to 175,800 acre-feet per year in 2060. This amount of supply represents water that is held by Non-Municipal WUG's who are not projected to have a demand need for that water through the year 2060.

Review of Table 2 shows that approximately 118,200 acre-feet per year of the total potential surplus (67%) is owned and controlled by manufacturing entities. The second largest category of excess supplies (27,000 acre-feet per year) is controlled by steam electric power entities.

Table 1: Non-Municipal Surpluses

WUG	County, Basin No	Surplus 2000	Surplus 2030	Surplus 2060
		(ac-ft/yr)	(ac-ft/yr)	(ac-ft/yr)
Irrigation	Fort Bend, 12	26,569	26,569	26,569
Irrigation	Harris, 9	1,254	1,254	1,254
Manufacturing	Brazoria, 13	11,009	10,609	10,293
Manufacturing	Galveston, 11	26,903	15,238	6,793
Manufacturing	Harris, 10	184,512	120,455	101,207
S.E. Power	Chambers, 9	26,448	26,970	24,634
S.E. Power	Fort Bend, 12	80,870	57,060	5,086
Total		357,565	258,155	175,836

* Minimum surplus of 1,000 ac-ft/yr in 2060 required for consideration

Table 2: Non-Municipal Surpluses by WWP

WUG	County, Basin No	Provider / WR Holder	Surplus 2000	Surplus 2030	Surplus 2060
			(ac-ft/yr)	(ac-ft/yr)	(ac-ft/yr)
Irrigation	Fort Bend, 12	Richmond Irr. (TX GENCO)	20,944	20,944	20,944
Irrigation	Fort Bend, 12	CBWC	5,625	5,625	5,625
Irrigation	Harris, 9	Private WR	628	628	628
Irrigation	Harris, 9	Private WR	626	626	626
Manufacturing	Brazoria, 13	Phillips Petrol.	8,519	8,519	8,519
Manufacturing	Brazoria, 13	Phillips Petrol.	2,490	2,090	1,774
Manufacturing	Galveston, 11	GCWA	22,479	15,238	6,793
Manufacturing	Harris, 10	CWA (Houston)	152,491	120,455	101,207
S.E. Power	Chambers, 9	Texas GENCO	26,448	26,970	24,634
S.E. Power	Fort Bend, 12	Texas Genco	3,387	3,387	3,387
S.E. Power	Fort Bend, 12	Texas Genco	77,483	53,673	1,699

Water User Group Application - Proposed Transfers

Wholesale water provider contracts and commitments were reviewed to assess the viability of potential transfers. Success of any contractual transfer requires a willing seller and a willing buyer. Potential buyers were identified by shortage area (Table 3). Based on the assessment, the following conclusions can be made:

1. Fort Bend County irrigation has a projected surplus of 26,500 acre-feet per year throughout the planning period. This surplus is Brazos run-of-river supply owned by Richmond Irrigation Company (a subsidiary of Texas Genco) and the Chocolate Bayou Water Company. There is a projected shortage of approximately 20,000 acre-feet per year in Brazoria County irrigation throughout the planning period, which could be met by reallocation of this supply from Fort Bend to Brazoria County. In the case of CBWC, it would be a simple change of contracts between current and potential customers. Richmond Irrigation Company would be required to either (1) expand their current service area to include Brazoria County, or (2) reduce their supply contract from the BRA, allowing BRA to resell that supply in Brazoria County.
2. The Harris County irrigation water supply surpluses exist in two private irrigation water rights on Cedar Bayou, which is the boundary between Harris and Chambers Counties. Although there is a projected Manufacturing demand shortage in this portion of Harris County, these water rights are not large enough to recommend the construction of a transfer pump station and pipeline. However, an individual industrial owner requiring water may wish to contract these water rights holders if his or her facility is located along Cedar Bayou.
3. Brazoria County manufacturing has a projected 2060 surplus of 10,000 acre-feet per year in the Brazos-Colorado basin. This surplus is in two water rights on the San Bernard River owned by Phillips Petroleum. While this water is permitted for multiple uses (manufacturing or mining), it is reflected as a manufacturing supply. There is a projected mining shortage of 970 acre-feet per year in that portion of Brazoria County, and it is recommended that this demand be met by Phillips Petroleum from these existing water rights.
4. Galveston County manufacturing has a projected 2060 surplus of 6,700 acre-feet per year in the San Jacinto-Brazos basin. This surplus is Brazos run-of-river supply provided to industry by the Gulf Coast Water Authority. This supply is permitted for multiple uses (municipal, manufacturing and mining). There is a projected mining shortage of 33 acre-feet per year in that portion of Galveston County, and it is recommended that this demand be met by GCWA from the unused portion of existing water contracts.
5. Harris County manufacturing has a projected 2060 surplus of nearly 96,000 acre-feet per year in the San Jacinto basin. Although represented in Table 2 as a surplus with a single provider, it is spread among numerous contracts from the City of Houston, San Jacinto River Authority, City of Pasadena and North Channel Water Authority to individual industries. These industries enter into long-term contracts based on current and projected peak demands within their facilities, and the aggregation of these peak demands leads to the contracted supply exceeding the projected annual average demand. Although there is a potential to reallocate a portion of this supply to serve manufacturing customers in the adjacent portions of Harris County, it is not guaranteed that any individual industry

would reduce its supply contract if approached. Therefore, reallocation of this supply by the wholesale providers is not recommended as a management strategy, but the verification of demands at the time of the contract renewal is recommended. Any adjustments to the available supply would then be reflected in the cyclic updates to the regional water plan.

6. The surplus supplies associated with the steam electric power entities is not available for transfer due to long-term future objectives of the various power companies.

Table 3: Potential Recipients of Non-Municipal Transfers

WUG	County, Basin No	Shortage 2000	Shortage 2030	Shortage 2060
		(ac-ft/yr)	(ac-ft/yr)	(ac-ft/yr)
Irrigation	Brazoria, 12	-39,714	-19,053	-22,798
Irrigation	Brazoria,11	-1,771	-1,317	-1,268
Manufacturing	Harris, 9	-21,101	-39,401	-46,346
Manufacturing	Harris, 11	4,249	-10,957	-16,732
Mining	Brazoria, 13	0	-555	-969
Mining	Galveston, 11	0	-24	-33

In summary, of the potential contractual transfer opportunities, those recommended are the transfer of 20,000 acre-feet per year of irrigation surplus from Fort Bend County to Brazoria County, the transfers on 970 acre-feet per year of manufacturing supply to mining in Brazoria County, and the transfer of 33 acre-feet per year of manufacturing supply to mining in Galveston County. These transfers would have no associated infrastructure cost to implement and could begin immediately.

Issues and Considerations

When recommending a change of contract use, the economic impact to the water provider may influence their participation in the strategy. Historically, irrigation contracts produce less revenue than municipal or manufacturing contracts. Within this analysis, only transfers between similar non-municipal uses are recommended (irrigation to irrigation, and manufacturing to mining). However, the various water providers may desire to reallocate their supplies to meet municipal demands, particularly those in Fort Bend County.

The recommended transfers involve Brazos run-of-river and San Bernard run-of-river supplies. The transfer of Brazos supplies between manufacturing and mining in Galveston County should have no measurable impact on the environment. This is water that is diverted and transported to Galveston County via the GCWA pump stations and canal network. The change will affect the point of delivery only. The change of use in the San Bernard basin from manufacturing to mining may require a change of diversion point, but the small size of the diversion (less than 5 cubic feet per second) would require a very small diversion structure (less than ¼ acre). The transfer of irrigation supply between Fort Bend and Brazoria County would have the largest impact, mainly due to the volume of water recommended (20,000 acre-feet per year). Diverting this amount of water from the Brazos would have an appreciable affect on in-stream flows (average reduction of 27.6 cfs), particularly during the dry summer months when irrigation diversions are greatest. This is slightly off-set by moving the diversion point downstream into Brazoria County, allowing the

water to remain in a longer segment of the Brazos River. The use of the water for rice irrigation would create seasonal wetland habitat for migratory birds. Neither the San Bernard nor the Brazos Rivers flow into Galveston Bay. Both connect with the Gulf Intracoastal Waterway, and have very small estuaries at their mouths.

This strategy allocates water for use that would otherwise be committed but unused. Full use of existing supplies is preferable to the development of new supplies for many reasons, including lower costs and fewer impacts on the environment caused by the development of new supplies. However, it must be noted that this supply is available because it is currently unused, and the environment has benefited from it being left in the Brazos and San Bernard Rivers. While this is not a new diversion of flows from a permitting standpoint, it will indeed be an increased diversion from an environmental standpoint.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Bedias Reservoir - SJRA Interbasin Transfer
DATE: JANUARY 7, 2005

SUMMARY

STRATEGY DESCRIPTION: Development of Bedias Creek Reservoir in the Trinity Basin and conveyance facilities that will divert a portion of the created supplies into the West Fork of the San Jacinto River for use by the San Jacinto River Authority (SJRA.)

SUPPLY QUANTITY: 90,700 acre-feet per year, total yield

SUPPLY SOURCE: Bedias Creek Reservoir (to be created)

TOTAL STRATEGY COST: $209,650,000

UNIT WATER COST: $201 per acre-foot in 2020 when strategy is implemented
$137 per acre-foot in 2040 when conveyance bonds are paid off
$ 32 per acre-foot in 2060 when reservoir bonds are paid off

Water Management Strategy Analysis Description

Introduction

Montgomery County demands will exceed available groundwater and Lake Conroe supplies beginning in year 2020. These water shortages are projected to grow from 24,500 acre-feet per year in 2020 to 144,500 acre-feet per year in 2060. The shortages and available supply are listed in Exhibit 1. To meet these demands, under this strategy the San Jacinto River Authority (SJRA) will develop Bedias Creek Reservoir, which would be located in the Trinity River Basin. The SJRA would also construct a raw water pump station and pipeline to carry the water south across the basin divide, where it would be released into a tributary of the West Fork of the San Jacinto River, which flows into Lake Conroe. From Lake Conroe, these supplies can either be used to serve the SJRA Northern basin demands or can be conveyed through the SJRA East Canal and Highlands system to meet water needs within the SJRA Southern basin. The State Water Plan recommended the Bedias Reservoir as an unique reservoir site.

Analysis

This strategy consists of defining facilities necessary to impound and transport water supplies from the Trinity River basin to the upper San Jacinto River basin.

The development of Bedias Reservoir was addressed in an earlier management strategy. The reservoir description is included as Exhibit 2, and summarized herein. Bedias

Reservoir has a potential yield of 90,700 acre-feet per year of water at an estimated cost of $142,700,000. The per unit cost of water is estimated at $120 per acre-foot.

The SJRA will require additional facilities to transfer the yield to Lake Conroe. A conveyance system, consisting of the following, was defined to convey the entire yield of 90,700 acre-feet per year:

- A raw water intake at the southeast end of the dam
- A raw water pump station (80 mgd capacity)
- Approximately 15 miles of 60-inch transmission main
- Approximately 2 miles of channel improvements to Mock Branch

The transmission main route is generally adjacent to existing public right-of-ways. The proposed route of the transmission pipeline is southeast from the dam through the town of Mossy Grove, and then south along Highway 75 to the town of Crabbs Prairie. Water will be discharged into a canal or improved stream channel along Mock Branch, which feeds the West Fork of the San Jacinto River. Water will then be conveyed through the bed and banks of the river into Lake Conroe. A diagram of this conveyance route is shown in Figure 1.

The projected cost of the conveyance system is estimated to be approximately $66,961,000. A detailed estimate of the cost is shown on the attached tables. The total annual project cost which includes the Bedias Reservoir cost, debt service and operations and maintenance is estimated as $18,247,000 in 2020, down to $12,409,000 in 2040 when the conveyance system is paid off, and down to $2,926,000 in 2060 when the reservoir is paid off. The per unit cost of this system, including the base water cost, is approximately $201 per acre-foot for water delivered to the SJRA when strategy is first implemented down to $32 per acre foot in 2060 when the system is paid off, which gives an average cost of $142 per acre foot over 50 years.

Water User Group Application

The water impounded and conveyed into the San Jacinto River basin through this strategy would meet all of the projected supply shortfalls of the SJRA until 2050. The SJRA will use this additional water to meet the needs of municipal and non-municipal WUG's in Montgomery County. This strategy still leaves a remaining shortage by 2050 that will need to be met by other sources.

Environmental Impact

The reservoir construction will impact 27,400 acres of land, of which 7,328 acres are bottomland hardwoods. The creation of a new lake will increase some property values and generate additional recreational income in Madison, Walker and Grimes Counties. Environmental concerns related to construction within the upper West Fork of the San Jacinto River channel may be an issue. Rectification of some segment of the river may be required.

Issues and Considerations

As proposed, this strategy is an interbasin transfer of Trinity River supplies and will be subject to the current regulations that would make the transferred supplies junior to all other water rights within the Trinity River basin. The junior water rights provision may prevent any negative impact Bedias Reservoir might have on the Livingston-Wallisville system yield. A yield analysis was performed for the Bedias project that incorporates a provision to provide required environmental flow pass-throughs based on the consensus planning environmental flow criteria established for the State Water Plan. Exhibit 3 illustrates the required pass-through criteria that are established as a function of the reservoir water surface elevation throughout the hydrologic period. Exhibit 3 also shows the required environmental pass-through releases from the reservoir during each month. These environmental flow pass-throughs can be met with a Bedias reservoir project yield of 90,700 acre-feet per year. The impoundment and transfer of water above Lake Livingston may result in periodic or prolonged low lake levels, which may adversely impact property values and recreational revenues in Walker, Trinity, San Jacinto and Polk Counties.

Table1: Water Demands and Supplies for Montgomery County						
WUG	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
CONROE	-1,565	-4,022	-6,528	-9,461	-13,427	-18,201
CONSUMERS WATER INC	-35	-90	-148	-212	-305	-416
COUNTY-OTHER	-3,242	-9,834	-18,594	-29,625	-46,222	-66,583
CRYSTAL SPRNGS WATER COMPANY	-95	-259	-453	-690	-1,032	-1,445
CUT AND SHOOT	-1	-1	-2	-2	-3	-3
EAST PLANTATION UD	-73	-202	-356	-543	-810	-1,131
H M W SUD	-272	-692	-1,113	-1,588	-2,239	-3,007
HOUSTON	0	0	0	0	0	0
IRRIGATION	431	431	431	431	431	431
LIVESTOCK	0	0	0	0	0	0
MAGNOLIA	-2	-2	-2	-2	-3	-4
MANUFACTURING	-343	-884	-1,291	-1,672	-2,056	-2,442
MINING	-80	-193	-261	-315	-368	-413
MONTGOMERY COUNTY MUD #18	-282	-862	-1,698	-2,775	-4,322	-6,221
MONTGOMERY COUNTY MUD #19	-77	-172	-221	-257	-292	-320
MONTGOMERY COUNTY MUD #8	-155	-411	-698	-1,035	-1,512	-2,083
MONTGOMERY COUNTY MUD #9	-143	-401	-720	-1,112	-1,668	-2,342
MONTGOMERY COUNTY UD #2	-89	-197	-254	-294	-334	-365
MONTGOMERY COUNTY UD #3	-79	-189	-274	-362	-475	-607
MONTGOMERY COUNTY UD #4	-155	-346	-447	-517	-587	-642
MONTGOMERY COUNTY WCID #1	-81	-194	-283	-375	-494	-632
NEW CANEY MUD	-229	-607	-1,047	-1,549	-2,283	-3,166
OAK RIDGE NORTH	-114	-284	-444	-619	-854	-1,133
PANORAMA VILLAGE	-129	-327	-522	-669	-755	-827
PATTON VILLAGE	-1	-1	-1	-1	-1	-1
POINT AQUARIUS MUD	-112	-331	-630	-1,004	-1,545	-2,205
PORTER WSC	-309	-798	-1,313	-1,917	-2,155	-2,357
RAYFORD ROAD MUD	-350	-788	-1,019	-1,194	-1,355	-1,482
RIVER PLANTATION MUD	-139	-310	-398	-461	-521	-569
ROMAN FOREST	-1	-1	-2	-2	-2	-3
SHENANDOAH	-86	-192	-249	-288	-324	-355
SOUTHERN MONTGOMERY COUNTY MUD	-298	-815	-1,049	-1,222	-1,386	-1,517
SOUTHWEST UTILITIES	-40	-104	-171	-247	-353	-482
SPLENDORA	-1	-1	-2	-2	-3	-4
SPRING CREEK UD	-85	-225	-388	-586	-869	-1,210
STANLEY LAKE MUD	-114	-330	-428	-498	-565	-618
STEAM ELECTRIC POWER	4,151	1,761	57	-1,815	-4,140	-6,885
THE WOODLANDS	-2,459	-10,081	-14,022	-16,360	-18,464	-20,204
WILLIS	-95	-246	-403	-594	-853	-1,171
WOODBRANCH	-1	-1	-1	-1	-1	-1
TOTAL SHORTAGE*	-6,750	-32,201	-54,944	-79,435	-112,147	-150,616
*Shortages based on sustainable groundwater yield and current surface water contracts.						
Figures do not reflect potential demand reductions through conservation.						
Available Supply in Montgomery County						
Gulf Coast Aquifer	0	0	0	0	0	0
Lake Conroe - SJRA	8,035	7,661	7,287	6,913	6,539	6,165
Livestock Local Supply	0	0	0	0	0	0
TOTAL SUPPLY	8,035	7,661	7,287	6,913	6,539	6,165
REMAINING SHORTAGE	**1,285**	**-24,540**	**-47,657**	**-72,522**	**-105,608**	**-144,451**

Exhibit 2:

BEDIAS RESERVOIR

DESCRIPTION: This site is located principally within Madison County about 3.5 miles west of Hwy. 75 crossing. The site includes Bedias and Caney Creeks. This site exists within the Trinity River Basin and is in Regions G and H. The upstream drainage area is approximately of 395 square miles. The dam is proposed with a maximum height of 45 feet and a normal pool elevation of 230.0 feet msl. The reservoir would have conservation storage of 181,000 acre-feet and would inundate about 13,000 acres. This project is currently included within the TRA Trinity River Basin Master Plan. As planned, the Trinity River Authority and the San Jacinto River Authority would jointly develop this project for their water users within the lower Trinity and San Jacinto river basins, respectively.

FACTORS AFFECTING COST, QUANTITY, AND LAND IMPACTED

COST: $142.7 million (2002).

QUANTITY OF WATER: 90,700 acre-feet per year.

LAND IMPACTED: 27,400 acres

PURPOSE: Municipal Water Supply and Flood Control

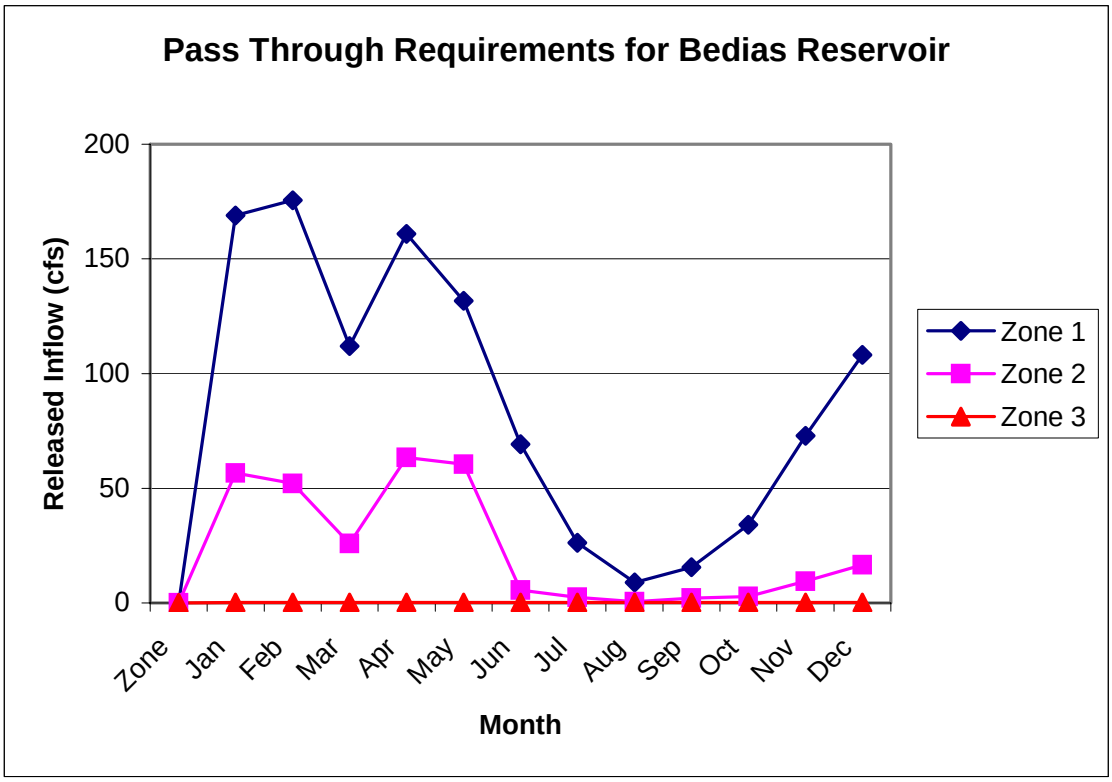
ENVIRONMENTAL IMPACT: Some endangered species have been identified. There are about 7,300 acres of bottomland hardwoods, 7,000 acres of grasslands, and 7,000 acres of post oak-elm-hackberry forest. Probable moderate to high impacts on wildlife habitats.

SIGNIFICANT ISSUES AFFECTING FEASIBILITY: This project requires an interbasin transfer to the San Jacinto Basin.

Description	Cost*
Total Project Cost	$142,690,000
Annual Cost (6%, 40 Years)	$9,483,000
Annual O&M	$1,445,000
Total Annual Cost	$10,928,000
Unit Cost of Water (per acre-foot)	$120

* Cost data from Water for Texas, A Concensus-Based Update to the State Water Plan, TWDB, 1997

Exhibit 3.



Reservoir Zone	Zone 1	Zone 2	Zone 3
Reservoir Storage	> 80% of Capacity	50% to 80% of Capacity	< 50% of Capacity
Pass Through Target (cfs)	Median	25th Percentile	7Q2
January	168.9	56.5	0.1
February	175.5	52.1	0.1
March	112.0	25.9	0.1
April	160.8	63.4	0.1
May	131.7	60.5	0.1
June	69.2	5.6	0.1
July	26.2	2.4	0.1
August	8.9	0.5	0.1
September	15.6	2.2	0.1
October	34.1	2.8	0.1
November	72.8	9.4	0.1
December	108.1	16.7	0.1

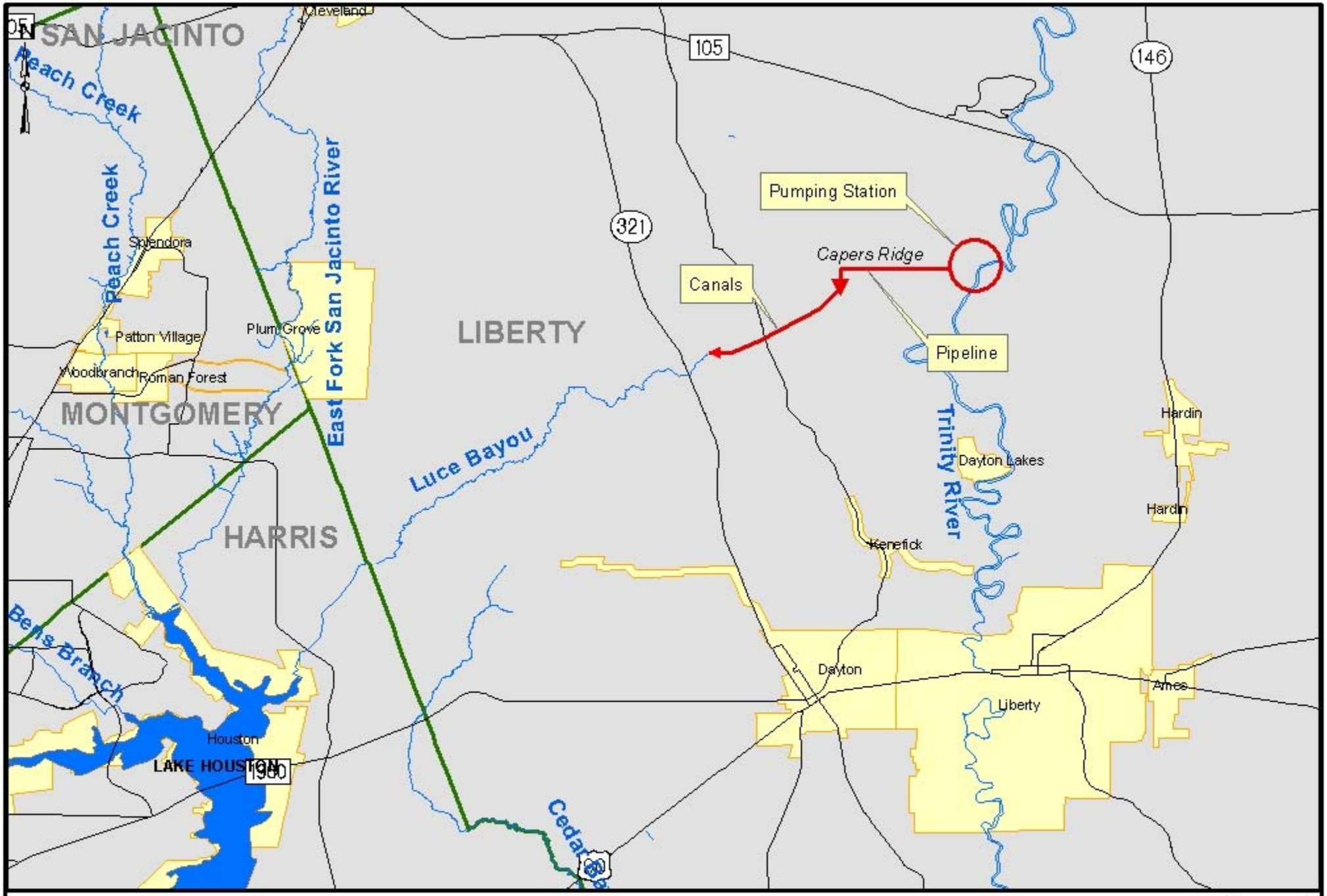


Figure 1

Luce Bayou Interbasin Transfer
Trinity to San Jacinto

Kellogg Brown & Root — Turner Collie & Braden Inc. — JOINT VENTURE

3 1.5 0 3 Miles

C:\Civil\Engineer\cm0184\twdb Report\Task5\Luce Bayou Interbasin Transfer Figure 1.jpg

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE
BEDIAS TO CONROE TRANSFER

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST - CONVEYANCE ONLY	1	LS	$ 47,634,559	$ 47,634,559
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 15,006,121	$ 15,006,121
3	LAND & EASEMENTS	1	LS	$ 2,820,000	$ 2,820,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 1,500,000	$ 1,500,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 5,469,124	$ 5,469,124
	PROJECT COST				**$ 66,960,680**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
2	DEBT SERVICE		$ 5,837,937	$ 5,837,937	$ -	$ -	-
3	OPERATION & MAINTENANCE (O&M)		$ 685,441	$ 685,441	$ 685,441	$ 685,441	$ 685,441
4	PUMPING ENERGY COSTS		$ 795,638	$ 795,638	$ 795,638	$ 795,638	$ 795,638
5	COST OF BEDIAS RESERVOIR WATER		$ 10,928,000	$ 10,928,000	$ 10,928,000	$ 10,928,000	$ 1,445,000
	TOTAL ANNUAL COST	**$ -**	**$ 18,247,016**	**$ 18,247,016**	**$ 12,409,079**	**$ 12,409,079**	**$ 2,926,079**

Price for reservoir water based on 90,700 afy at $120. When debt is paid, price drops to $16 per acre-ft

ALL FACILITIES

CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 13,939,711	$ 13,939,711
2a	PIPELINES	1	LS	$ 32,472,000	$ 32,472,000
2b	PIPELINE CROSSINGS	1	LS	$ 847,500	$ 847,500
7	DAMS & RESERVOIRS	1	LS		$ -
8	RELOCATIONS	1	LS		$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	1	LS		$ -
10	STILLING BASINS	1	LS	$ 375,348	$ 375,348
12	OTHER ITEMS	1	LS		$ -
	PROJECT COST				**$ 47,634,559**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE
BEDIAS TO CONROE TRANSFER

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 13,939,711	$ 348,493
2a	PIPELINES	0.010	%	$ 32,472,000	$ 324,720
2b	PIPELINE CROSSINGS	0.010	%	$ 847,500	$ 8,475
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ 375,348	$ 3,753
12	OTHER ITEMS	0.010	%	$ -	$ -
	ANNUAL OPERATION & MAINTENANCE COST				**$ 685,441**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,324,000 * ln (Horsepower+160) - 21,620,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Station #1	2030	HP	$ 11,616,426	$ 11,616,426
2	Pump Station #1 added Intake Structure	1	LS	$ 2,323,285	$ 2,323,285
3	Pump Station #1 added Standby Power	0	LS	$ 4,395,075	$ -
	PUMP STATIONS TOTAL COST				**$ 13,939,711**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
144	80	2022

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE
BEDIAS TO CONROE TRANSFER

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
1	Urban Pipeline	60	0	LF	$ 685	$ -
2	Rural Pipeline	60	79200	LF	$ 410	$ 32,472,000
	PIPELINES TOTAL COST					**$ 32,472,000**

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Pipeline Crossing	60	500	LF	$ 1,695	$ 847,500
	PIPELINE CROSSINGS TOTAL COST					**$ 847,500**

STILLING BASINS
CONSTRUCTION COSTS

Formula Basis for Estimating
Cost = 3,027 * (Discharge in CFS)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
STILLING BASIN COST SUMMARY					
1	Stilling Basin	124	CFS	$ 375,348	$ 375,348
	STILLING BASIN TOTAL COST				**$ 375,348**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE
BEDIAS TO CONROE TRANSFER

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pump Station #1 Pumping Energy Costs	2030	HP	$ 795,638	$ 795,638
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 795,638**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: COH Wastewater Reclamation for Municipal and Industrial Use
DATE: July 15, 2004

SUMMARY

STRATEGY DESCRIPTION: Wastewater reclamation for municipal and industrial reuse from 35 City of Houston wastewater treatment plants in the City of Houston service area.

SUPPLY QUANTITY: 580,923 ac-ft per year plus any future flows from WWTP facility expansions

SUPPLY SOURCE: Effluent from thirty-five City of Houston wastewater treatment plants as listed below.

TOTAL STRATEGY COST: $0 – Costs associated with this strategy will be developed for the 2006 RWP once additional information is obtained from the City of Houston.

UNIT WATER COST: $0 per acre-foot
($0 per thousand gallons)

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The purpose of this analysis is to address the potential use of reclaimed wastewater to meet projected water shortages in Region H. This study investigates using reclaimed wastewater effluent to supplement existing water supplies that serve municipal and industrial demands within the City of Houston service area. Under this strategy, wastewater currently discharged into 7 area watersheds will receive further treatment and will be offered as an additional supply sources to area municipal and industrial users.

ANALYSIS

A review of the *Application for Authorization to Divert Existing and Future Return Flows* City of Houston Permit Application is the basis for this analysis. The project calls for collecting effluent from 35 of the city's wastewater treatment plants and using bed and banks permits to transmit the water to diversion locations. Both the discharge locations and diversion locations are listed below. Figure 1 provides a graphical representation of the potential reclaimed wastewater system.

The amount of estimated future flows through the 35 WWTPs is unknown, but future plant expansions could increase the amount of water available for reuse downstream.

List of WWTP Facilities (by Watershed):

Brays Bayou Watershed

- Southwest Wastewater Treatment Plant
- Keegans Bayou Wastewater Treatment Plant
- Beltway Wastewater Treatment Plant
- Upper Brays Wastewater Treatment Plant
- WCID 111 Wastewater Treatment Plant

Buffalo Bayou Watershed

- 69th Street Wastewater Treatment Plant
- West District Wastewater Treatment Plant
- Turkey Creek Wastewater Treatment Plant
- Park Ten Wastewater Treatment Plant

Greens Bayou Watershed

- Northeast Wastewater Treatment Plant
- FWSD #23
- Tidwell Timbers Wastewater Treatment Plant
- WCID # 76 Wastewater Treatment Plant
- International Airport Wastewater Treatment Plant
- Northbelt Wastewater Treatment Plant
- Imperial Valley Wastewater Treatment Plant
- Northgate Wastewater Treatment Plant
- Northborough Wastewater Treatment Plant
- MUD #203 Wastewater Treatment Plant
- Willowbrook Wastewater Treatment Plant

Hunting Bayou Watershed

- Homestead Wastewater Treatment Plant

Lake Houston Watershed

- Kingwood Central Wastewater Treatment Plant
- Forest Cove Wastewater Treatment Plant
- MUD #48 Wastewater Treatment Plant

Sims Bayou Watershed

- Sims Bayou Wastewater Treatment Plant
- Sims Bayou South Wastewater Treatment Plant
- WCID #47 Wastewater Treatment Plant
- Easthaven Wastewater Treatment Plant
- Chocolate Bayou Wastewater Treatment Plant
- Almeda Sims Wastewater Treatment Plant
- WCID #51
- Greensridge Wastewater Treatment Plant

White Oak Bayou Watershed

- Northwest Wastewater Treatment Plant
- Westway Wastewater Treatment Plant
- White Oak Wastewater Treatment Plant

Diversion Points (by Watershed):

Brays Bayou Watershed

- Southwest Wastewater Treatment Plant
- Macgregor Park

Buffalo Bayou Watershed

- 69th Street Wastewater Treatment Plant
- Memorial Park

Greens Bayou Watershed

- Northeast Wastewater Treatment Plant
- Brock Park

Hunting Bayou Watershed

- Homestead Wastewater Treatment Plant
- Herman Brown Park

Lake Houston Watershed

- Lake Houston Pump Station
- Northeast Water Purification Plant

Sims Bayou Watershed

- Sims Bayou Wastewater Treatment Plant
- Reveille Park

White Oak Bayou Watershed

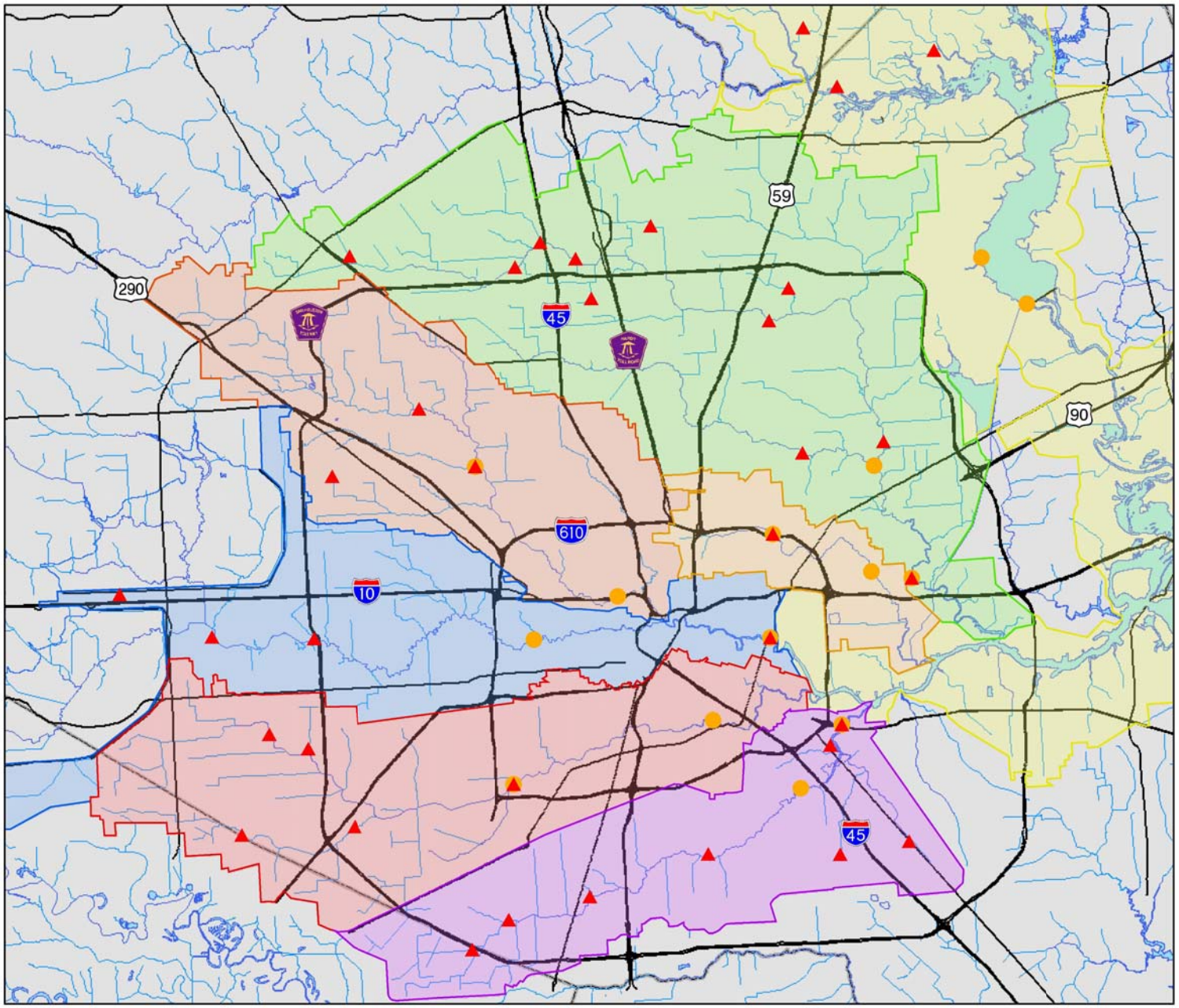
- Northwest Wastewater Treatment Plant
- Stude Park

WATER USER GROUP APPLICATION

This strategy would help to meet the growing municipal and industrial demands of the region in which the City of Houston serves. In particular, the reuse water would serve demands in the seven watersheds listed above. According to the permit application, all water not consumptively used will be returned to the San Jacinto or adjoining coastal basins at wastewater treatment plants in the City's system.

ISSUES AND CONSIDERATIONS

Environmental impacts, impacts to other water rights, and other issues or concerns will be addressed during the permitting process.



Region H Water Planning Group COH Wastewater Reuse

Legend

Watersheds

- BRAYS BAYOU
- BUFFALO BAYOU
- GREENS BAYOU
- HUNTING BAYOU
- SAN JACINTO RIVER
- SIMS BAYOU
- WHITE OAK BAYOU

- COH Wastewater Treatment Facilities
- COH Diversion Points
- Lakes
- Streams
- Counties
- Highways

N
W E
S

5 0 5 Miles

Kellogg, Brown & Root

TurnerCollie&Braden
JOINT VENTURE

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: NHCRWA Wastewater Reclamation for Industrial Use and Municipal and Commercial Irrigation Use

DATE: August 31, 2004

SUMMARY

STRATEGY DESCRIPTION: Wastewater reclamation for industrial reuse and municipal and commercial irrigation reuse from up to 163 municipal utility districts or similar entities within the North Harris County Regional Water Authority (NHCRWA) service area. Under this strategy, entities within the NHCRWA service area which own wastewater may elect individually, collectively or in combination with the NHCRWA (under an agreement authorizing the NHCRWA's participation) to submit a water right permit application for those respective wastewater flows.

SUPPLY QUANTITY: 61,000-, 78,000-, 94,000-, 110,000-, 126,000-, 141,000-, and 157,000-acre-feet per year for Years 2000, 2010, 2020, 2030, 2040, 2050, and 2060, respectively. The NHCRWA, and/or other districts in the Authority service area, may also request permits for any future flows from WWTP facility expansions or additions.

SUPPLY SOURCE: Effluent from up to 163 municipal utility districts or similar entities which own and operate WWTPs.

TOTAL STRATEGY COST: $0 – Costs associated with this strategy will be developed for the 2006 RWP once additional information is obtained from North Harris County Regional Water Authority.

UNIT WATER COST: $0 per acre-foot
($0 per thousand gallons)

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The purpose of this analysis is to address the potential use of reclaimed wastewater to meet projected water shortages in Region H. This study investigates using reclaimed wastewater effluent to supplement existing and future water supplies that serve industrial demands as well as municipal and commercial irrigation demands within NHCRWA's service area.

ANALYSIS

The NHCRWA, and/or other districts within the Authority service area, could submit water right permit applications for return flows from approximately 163 WWTPs from

within the NHCRWA service area. These WWTPs discharge to tributaries of the San Jacinto River and Lake Houston. The applicant(s) can use bed and banks permits to transmit the water to future diversion locations yet to be identified. Figure 1 provides a graphical representation of the NHCRWA service area, WWTP discharge points, and waterways which could potentially be used for the transport of the return flows to diversion locations.

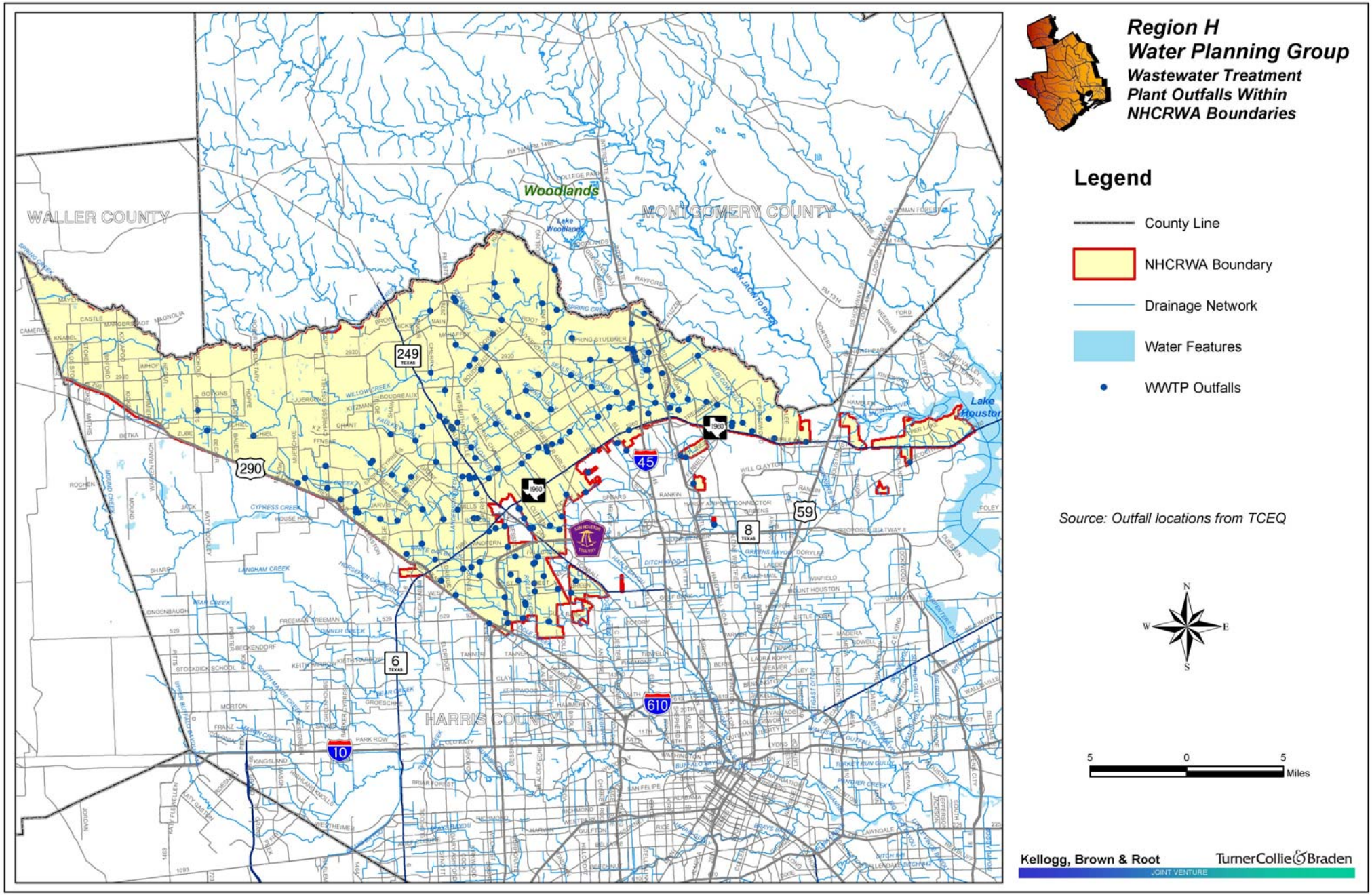
The amount of estimated future flows from the approximately 163 WWTPs is estimated at 61,000-, 78,000-, 94,000-, 110,000-, 126,000-, 141,000-, and 157,000-acre-feet per year for Years 2000, 2010, 2020, 2030, 2040, 2050, and 2060, respectively. These values were estimated using the 2006 Regional Water Plan projected water demands and applying a 75 percent factor (referenced in the *2003 Groundwater Reduction Plan* (GRP) prepared by NHCRWA consultants) to determine the quantity of water that could be expected as return flows through the WWTPs for the 60 year planning period. Future plant expansions and/or additions could increase the amount of water available for reuse downstream.

WATER USER GROUP APPLICATION

This strategy would help to meet the growing industrial demands as well as municipal and commercial irrigation demands of the region in which the NHCRWA serves.

ISSUES AND CONSIDERATIONS

Environmental impacts, impacts to other water rights, and other issues or concerns will be addressed during the TCEQ permitting process.


Region H
Water Planning Group
Wastewater Treatment
Plant Outfalls Within
NHCRWA Boundaries
Legend
County Line
NHCRWA Boundary
Drainage Network
Water Features
WWTP Outfalls
Source: Outfall locations from TCEQ
N
W
E
S
5
0
5
Miles
Kellogg, Brown & Root
TurnerCollie&Braden
JOINT VENTURE
WALLER COUNTY
MONTGOMERY COUNTY
HARRIS COUNTY
Woodlands
Lake Houston
249
290
45
59
8
6
610
10

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: New Water Rights in the San Jacinto Basin
DATE: January 14, 2005

SUMMARY

STRATEGY DESCRIPTION: The City of Houston and the San Jacinto River Authority have applied to the TCEQ for supplies identified in the San Jacinto Basin.

SUPPLY QUANTITY: 32,500 ac-ft per year in Lake Houston (reliable yield)
80,000 ac-ft/yr in the San Jacinto River (not 100% reliable)
160,000 ac-ft/yr in Brays, Buffalo, Sims and White Oak Bayous (not 100% reliable)

SUPPLY SOURCE: San Jacinto River, Brays, Buffalo, Sims and White Oak Bayous

TOTAL STRATEGY COST: $ 0 for Lake Houston and San Jacinto River
$ 9,013,000 for Bayou diversions

UNIT WATER COST: COH / SJRA system rates at Lake Houston
$ 8.24 per acre-foot at the bayou diversion points

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The City of Houston and the San Jacinto River Authority (SJRA) have submitted a joint water right permit application for an additional 32,500 acre-feet per year of yield from Lake Houston and an additional 80,000 acre-feet per year of run-of-river yield in the Upper San Jacinto Basin, shared evenly between the applicants. The run-of-river yield is not 100% reliable, but is requested to allow the use of in-basin supply, when it is available, rather than transferring supply inter-basin. Both the City and SJRA have existing diversion facilities at Lake Houston, which supply municipal and manufacturing customers in Harris County.

The City of Houston has also submitted a water right permit application for 160,000 acre-feet per year of interruptible supply from four bayous in the lower San Jacinto Basin. This is requested to allow the use of in-basin supply, when it is available, rather than City-owned supply in Lake Conroe in the upper San Jacinto basin or Lake Livingston which must be transferred from the Trinity River Basin. The proposed diversion locations for both applications are shown in Figure 1.

Water rights are considered reliable when the full permit amount may be diverted during drought of record conditions. For all but senior water rights, some storage capacity is usually

required to make a water right fully reliable. The TCEQ tests new water rights using the Water Availability Model to determine reliability and the impact on other permits in the basin. It is their practice to only issue water rights for municipal and manufacturing use when the permit will be 100% reliable. Irrigation water rights are issued at a lesser standard of 75% reliable (by volume), 75% of the time. In the case of these applications, only the additional yield in Lake Houston is considered fully reliable. The other permits are for supplies which are available less than 70% of the time. To use these supplies for municipal and manufacturing use, as requested, will require conjunctive use with other, fully reliable supply sources.

WATER USER GROUP APPLICATION

Water diverted at Lake Houston will serve municipal and manufacturing demand growth in Harris County and southeast Montgomery County. The City of Houston Northeast Water Purification Plant on Lake Houston is a 40-mgd facility, with a planned expansion in 2010 to 80-mgd (89,600 acre-feet/year) and a projected 2030 capacity of 360-mgd (403,200 acre-feet/year). Combined with other Lake Houston diversions to serve industry and the East Water Purification Plant, total diversions by the City from Lake Houston will exceed 500-mgd in 2030. The current permitted diversion amount from the reservoir is 150-mgd (168,000 acre-feet/year). The City will augment Lake Houston with water released from Lake Conroe in the upper basin, and with Lake Livingston yield transferred to Lake Houston via Luce Bayou. Using the additional reservoir yield and capturing interruptible supplies at Lake Houston, when available, will reduce the operational costs of transferring supply from Lake Livingston.

Similarly, the SJRA supplies customers in eastern Harris County via their Highlands Canal system, and is expected to begin supplying surface water to municipal WUGs in Montgomery County within the next decade. Realizing additional yield at Lake Houston will allow the SJRA to meet demands using lower-basin supply, reserving Lake Conroe yield for central and northern Montgomery County.

ISSUES AND CONSIDERATIONS

The Lake Houston yield is reliable due to storage capacity in the reservoir not reflected in the current water right. As in most reservoirs, this storage is slowly being reduced due to sedimentation within the reservoir. Based on the sedimentation rates used in the water supply analysis for Chapter 3 of this plan, the additional yield in Lake Houston declines from 32,500 acre-feet/year in 2000 to 2,000 acre-feet/year in 2060. Permitting and using this supply reduces the need to transfer City of Houston and SJRA supplies owned in the Trinity Basin, resulting in a cost savings of $30 per acre foot (based on the Luce Bayou Transfer cost). The San Jacinto River permit application will use existing diversion infrastructure; therefore no additional capital cost is required. Water treatment and municipal distribution facility costs are omitted herein, but included in the WUG infrastructure cost analysis.

Additional diversions made at Lake Houston will reduce the volume of freshwater passing the dam into the tidal portion of the San Jacinto River. There is the potential to increase salinity in the lower river if the run-of-river diversion permit does not include a minimum

river-stage or flow-rate before diversions are allowed. Diverting available flows at Lake Houston reduces the need to transfer supply from Trinity River water rights or release flows from Lake Conroe. Transfers from the Trinity Basin move Galveston Bay inflows from Trinity Bay to Upper Galveston Bay. Historically, inflows have been greatest through Trinity Bay, and the location of oyster beds that are most dependent on the season in-flow of freshwater reflects this. Lake Conroe supply is needed to meet projected growth in Montgomery County. If these permits are granted, a system operations study may increase the overall yield projection for the San Jacinto basin.

The San Jacinto River permit applications are junior to existing irrigation water rights and should not affect those diversions. There are no irrigation water rights along the bayous in the lower basin due to the urbanized topography.

The City of Houston bayous permit application proposes four new diversion points, located within the city limits, listed in Table 1 (below). These locations have a greater potential for adverse environmental impact than the Lake Houston diversions. The requested diversions account for 20% to 40% of the average flow in three bayous, and 40% to 70% in White Oak Bayou (see Table 1). Minimum stream-stage or flow-rate must be determined for each proposed diversion site. Without diversion triggers, the permits would allow most flows to be diverted from the bayous during below average conditions, which would impact aquatic habitats. Next, the diversion facilities must be located and any wetland mitigation conducted. Finally, the conveyance system from the points of diversion to the points of use must be constructed, and any mitigation involved with that constructed.

Table 1: Target Diversions and Historic Streamflows

Stream	Target Diversion (average)	Historic Average* (min/max month)	Percentage of Historic Average
Sims Bayou	20,000 ac-ft/yr	70.4 cfs (min)	40%
at Reveille Park	28 cfs	151.0 cfs (max)	19%
Brays Bayou	40,000 ac-ft/yr	139.0 cfs (min)	40%
at McGregor Park	55 cfs	219.0 cfs (max)	25%
White Oak Bayou	40,000 ac-ft/yr	79.2 cfs (min)	69%
at Stude Park	55 cfs	133.0 cfs (max)	41%
Buffalo Bayou	60,000 ac-ft/yr	202.0 cfs (min)	41%
at Memorial Park	83 cfs	399.0 cfs (max)	21%

* USGS Gage Data, period of record ending September 2003

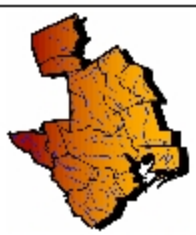
For the purposes of this analysis, only the costs of the four diversion pump stations were estimated (Table 2, below). Once the City determines how and where to use this water, additional infrastructure conveyance and treatment facilities will need to be estimated and included in the water cost. Included on Figure 1 are the locations of the City of Houston East and Southeast Water Purification Plants. The four proposed diversion points range from seven to twelve miles from the East WPP, which is the closest of the three existing plants. Alternately, the City may elect to treat the water at the respective diversion points and feed the water into the treated water distribution system.

Table 2: Potential Bayou Diversion Costs

Location	Diversion Average Rate	Facility Size* and Cost	Cost per Acre-Foot**
Sims Bayou at Reveille Park	28 cfs 18 mgd	100 hp $ 1,127,000	$ 8.24
Brays Bayou at McGregor Park	55 cfs 36 mgd	200 hp $ 2,253,000	$ 8.24
White Oak Bayou at Stude Park	55 cfs 36 mgd	200 hp $ 2,253,000	$ 8.24
Buffalo Bayou at Memorial Park	83 cfs 54 mgd	300 hp $ 3,380,000	$ 8.24

* Assumed 25-ft lift from bayou to plant, 80% system efficiency

** Unit cost reflects 6% interest over 20-years, 2.5% annual O&M and power at $0.06/kWh



Region H
Water Planning Group
New Permits - San Jacinto Basin

City of Houston Northeast WPP

CWA-Lake Houston Pump Station

Lake Houston

Sheldon Reservoir

White Oak Bayou at Stude Park

Buffalo Bayou at Herman Park

City of Houston East WPP

Houston Ship Channel

Brays Bayou at McGregor Park

Sims Bayou at Reveille Park

City of Houston Southeast WPP

Houston

Jacinto City

Galena Park

West University Place

Southside Place

Bellaire

Deer Park

Pasadena

South Houston

8

610

288

90

Legend

- PS — Pump Station
- WTP — WPP
- county
- Freeways
- Major Roads
- Streams
- Bodies of Water
- Cities

Kellogg Brown & Root, Inc.

Turner Collie & Braden Inc.

JOINT VENTURE

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Little River Reservoir
DATE: October 14, 2005

SUMMARY

STRATEGY DESCRIPTION: An on-channel reservoir in Milam County.

SUPPLY QUANTITY: 124,000 ac-ft per year

SUPPLY SOURCE: Little River, Brazos Basin.

TOTAL STRATEGY COST: $ 423,258,000

UNIT WATER COST: $241 per acre-foot

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The Little River reservoir was studied by the Brazos G Water Planning Group and recommended as a long-term water management strategy in the 2001 Region H and Brazos G Regional Water Plans. It is an on-channel reservoir located in Milam County near the City of Cameron. The 2001 Brazos G Water Planning Group analysis of this water management strategy is attached (by permission), and was used in the Region H strategy selection process. The current Brazos G analysis is available in the 2006 Brazos G Regional Water Plan, Section 4B.12.6. The cost and yield data in the summary above reflects the 2nd Quarter 2002 costs, as listed in the 2006 Brazos G Regional Water Plan.

WATER USER GROUP APPLICATION

This strategy would provide supply to WUGs in the Middle and Lower Brazos River Basin, and the adjoining Coastal Basins.

[redacted]

[redacted]

5A.14.6 Little River Reservoir

5A.14.6.1 Description of Option

The proposed new reservoir on the Little River would be located on the main stem of the Little River just upstream from its mouth into the Brazos River, as shown in Figure 5A.14-4. It would be near the City of Cameron, Texas. Two different conservation storage levels were reviewed, one that would provide a yield primarily for the estimated deficits in Williamson County and the other at an approximate full development level. The smaller, at elevation 300, would provide a surface area of 14,000 acres and a storage volume of about 180,000 acft. The larger, full development of the site would represent a surface elevation of 330, with a surface area of 35,000 acres and a storage volume of about 903,000 acft.

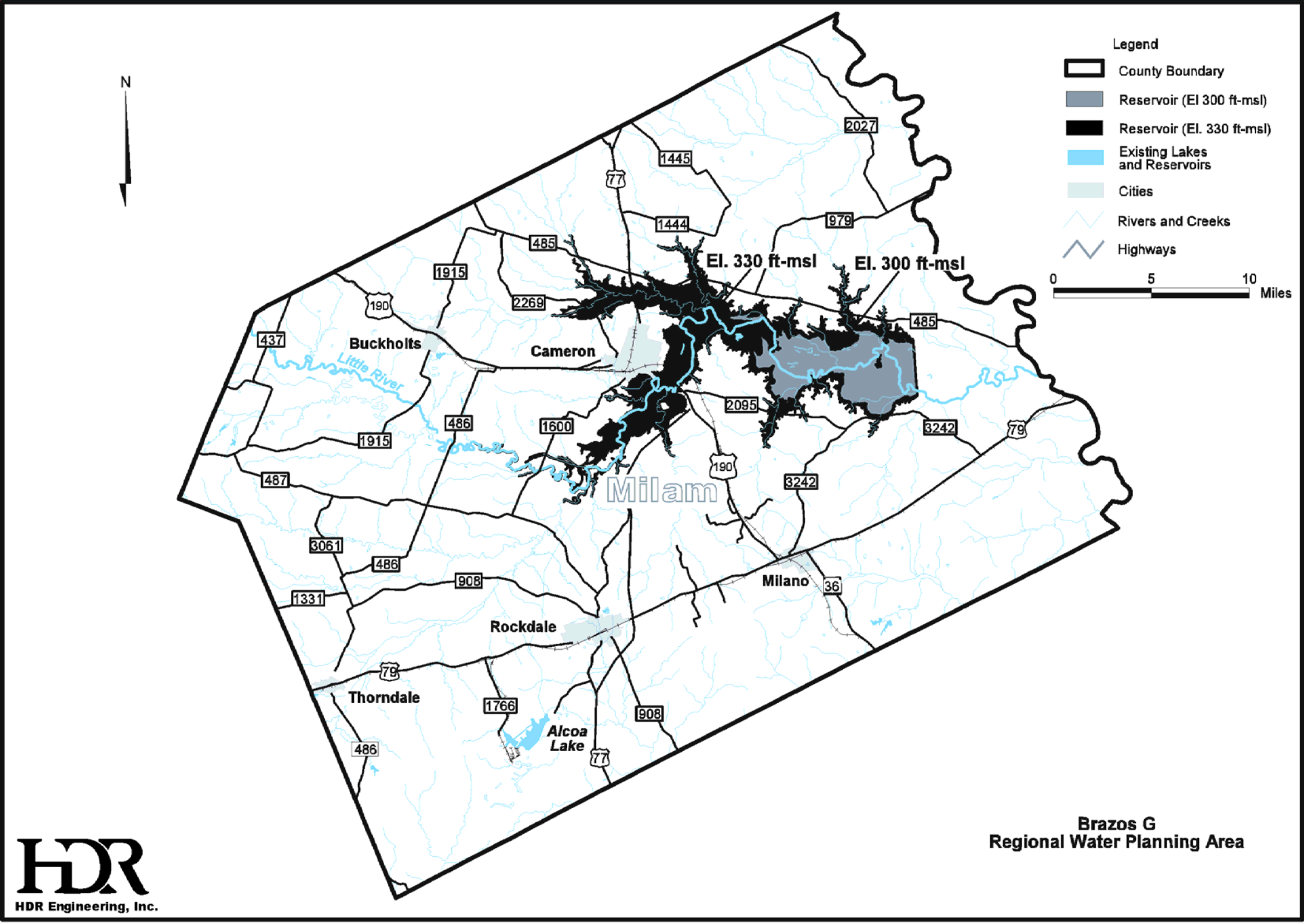


Figure 5A.14-4. Little River Reservoir

The primary water short entities in the area that could benefit from the construction of the reservoir are in Williamson County for municipal, mining, and manufacturing uses in 2050. There is also a water supply deficit in Coryell County for which water trades could possibly be used in conjunction with development of this site. For the fully developed project, the remainder of the water would have its greatest usefulness as part of the BRA system.

5A.14.6.2 Available Yield

The available firm yield of the proposed reservoir is relatively large, since about half of the approximately 7,500 square mile drainage area is uncontrolled. For the smaller size reservoir, the estimated yield is about 56,000 acft/yr. This is more than is needed for the Williamson County area and the remainder could be used within the BRA system. The fully developed site would have a yield of about 129,000 acft/yr. The yields were developed using Consensus Water Planning Environmental Criteria for instream flows and the unappropriated daily flows for the firm yield analyses.

5A.14.6.3 Environmental Issues

A dam and reservoir on the Little River in Milam County covering 35,000 acres would involve:

- Probable moderate to high impacts on environmental water needs and instream flows on the Little River downstream of dam and reservoir.
- Possible low to moderate impacts on fish and wildlife habitat, including possible low impact on one federally listed bird species and one endangered amphibian species.
- Probable high impact on cultural resources, especially near the City of Cameron.

A summary of environmental issues is presented in Table 5A.14-18.

5A.14.6.4 Engineering and Costing

Cost estimates for the two proposed Little River Reservoirs were made based on a comparison with several similar sized reservoirs developed in recent years, updated to current values. Detailed cost summaries for both reservoir size options are presented in Tables 5A.14-19 and 5A.14-20.

Table 5A.14-18.
Environmental Issues: Little River Reservoir

Water Management Option	Little River Reservoir (Little River in Milam County)
Implementation Measures	Dam and reservoir covering 35,000 acres in Milam County
Environmental Water Needs / Instream Flows	Probable moderate to high impact on Little River below dam and reservoir
Bays and Estuaries	Probable cumulative impact to limited areas of coastal marsh;
Fish and Wildlife Habitat	Possible low to moderate impact;
Cultural Resources	Probable high impact; Suburban parts of the City of Cameron may be inundated;
Threatened and Endangered Species	Possible low impact on: Houston toad, Interior least tern;

[1] Texas Parks and Wildlife Department, "An Assessment of Direct Impacts to Wildlife Habitat from Future Water Development Projects," 1990.

For the smaller reservoir size, the total estimated project costs would be $172,852,000. Using the previously estimated yield of 56,000 acft/yr, this translates to a unit cost of raw water at the reservoir of $0.68 per 1,000 gallons, or $221 per acft. The larger, fully developed, reservoir had a total estimated project cost of $361,065,000 and a total unit cost of water of $0.61 per 1,000 gallons, or $197 per acft.

5A.14.6.5 Implementation Issues

This water supply option has been compared to the plan development criteria, as shown in Table 5A.14-21, and the option meets each criterion.

As would be typical in the implementation of any large surface water reservoir, the Little River Reservoir will likely involve significant conflicts and challenges in achieving the needed permits, both water rights and environmental permits. If the smaller project is developed, most of the water would be planned for Williamson County and the entities in that area would have to work to together to fund the regional project, possibly through the Brazos River Authority.

Table 5A.14-19.
Cost Estimate Summary for
Little River Reservoir (180,690 acft)
(Fourth Quarter 1999 Prices)

Item	*Estimated Costs*
Capital Costs	
Dam and Reservoir	62,213,000
Total Capital Cost	**$62,213,000**
Engineering, Legal Costs, and Contingencies	21,000,000
Environmental & Archaeological Studies and Mitigation	25,988,000
Land Acquisition and Surveying	39,809,000
Interest During Construction	23,842,000
Total Project Cost	**$172,852,000**
Annual Costs	
Debt Service	186,000
Reservoir Debt Service	11,317,000
Operation and Maintenance	900,000
Total Annual Cost	**$12,403,000**
Available Project Yield (acft/yr)	**56,000**
Annual Cost of Water ($ per acft)	**$221**
Annual Cost of Water ($ per 1,000 gallons)	**$0.68**

Table 5A.14-20.
Cost Estimate Summary for
Little River Reservoir (930,460 acft)
(Fourth Quarter 1999 Prices)

Item	*Estimated Costs*
Capital Costs	
Dam and Reservoir	110,048,000
Total Capital Cost	**$110,048,000**
Engineering, Legal Costs, and Contingencies	29,750,000
Environmental & Archaeological Studies and Mitigation	67,724,000
Land Acquisition and Surveying	103,740,000
Interest During Construction	49,803,000
Total Project Cost	**$361,065,000**
Annual Costs	
Debt Service	2,111,000
Reservoir Debt Service	22,066,000
Operation and Maintenance	1,275,000
Total Annual Cost	**$25,452,000**
Available Project Yield (acft/yr)	**129,000**
Annual Cost of Water ($ per acft)	**$197**
Annual Cost of Water ($ per 1,000 gallons)	**$0.61**

Table 5A.14-21.
Comparison of Little River Reservoir to Plan Development Criteria

Impact Category	*Comment(s)*	
	180,590 acft	*930,460 acft*
A. Water Supply:		
1. Quantity	1. Sufficient to meet needs	1. Significant quantity[1]
2. Reliability	2. High reliability	2. High reliability
3. Cost	3. Reasonable	3. Reasonable
B. Environmental factors		
1. Environmental Water Needs	1. Moderate to High impact	1. Moderate to High impact
2. Habitat	2. Low to Moderate impact	2. Low to Moderate impact
3. Cultural Resources	3. High impact	3. High impact
4. Bays and Estuaries	4. Low impact	4. Low impact
C. Impact on Other State Water Resources	• No apparent negative impacts on state water resources; no effect on navigation	
D. Threats to Agriculture and Natural Resources	• Potential impact on bottomland farms and habitat in reservoir area	
E. Equitable Comparison of Strategies Deemed Feasible	• Option is considered to meet municipal and industrial shortages	
F. Requirements for Interbasin Transfers	• Not applicable	
G. Third Party Social and Economic Impacts from Voluntary Redistribution	• None	

[1] Significant quantity for regional use and Region H

If the larger, fully developed, reservoir project is developed, a conglomeration of end users in addition to Williamson County would have to be pulled together. This would likely require cooperation from other downstream water users such as those in Region H. Though this would ultimately realize a significantly lower unit cost of the water supply, it would also require more cooperation between multiple entities and also likely result in increased opposition. Both factors would likely lengthen the timeframe needed for development over that needed for the smaller reservoir project.

A summary of the implementation steps for the project is presented below.

1. It will be necessary to obtain these permits:
   a. TNRCC Water Right and Storage permit;
   b. U.S. Army Corps of Engineers Sections 10 and 404 dredge and fill permits for reservoirs and pipelines impacting wetlands or navigable waters of the U.S;
   c. TPWD Sand, Gravel, and Marl Permit for construction in state owned streambeds;
   d. NPDES Storm Water Pollution Prevention Plan;
   e. GLO easement for use of the state-owned streambed; and
   f. Section 404 certification from the TNRCC related to the Clean Water Act.
2. Permitting, at a minimum, will require these studies:
   a. Assessment of changes in instream flows in the Little River.
   b. Habitat mitigation plan.
   c. Environmental studies of potential impact on endangered species.
   d. Cultural resource studies and mitigation.
3. Land will need to be acquired through either negotiations or condemnation.

[redacted]

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Industrial Conservation
DATE: December 27, 2004

SUMMARY

STRATEGY DESCRIPTION: Address Industrial shortages (manufacturing, mining, and steam-electric power) in Brazoria, Chambers, Fort Bend, Harris, Montgomery, and Walker Counties through industrial conservation measures. Conservation measures will reduce water shortages through reduction of projected demands.

SUPPLY QUANTITY: Unknown

SUPPLY SOURCE: Savings from groundwater, Brazos River, San Bernard River, San Jacinto-Brazos Run-of-River, San Jacinto River, Trinity River, Lake Conroe, Lake Houston, and Lake Livingston water demand reductions

IMPLEMENTATION DECADE: Brazoria County - 2000
Chambers County - 2000
Fort Bend County - 2000
Harris County - 2000
Montgomery County - 2010
Walker County - 2000

TOTAL STRATEGY COST: Unknown

UNIT WATER COST: Unknown

Water Management Strategy Analysis Description

Introduction:

There are 6 counties in Region H with projected manufacturing shortfalls within the next sixty years: Brazoria, Chambers, Fort Bend, Harris, Montgomery, and Walker Counties. As part of the regional water planning process, all identified water user group (WUG) shortages must have strategies developed to meet the water supply shortages. Furthermore, conservation is required by the Texas Water Development Board (TWDB) to be considered for all WUGs identified with shortages and should conservation not be chosen as a management strategy, there should be discussion of the reasoning in the text of Report Chapter 4.

The Texas Water Development Board (TWDB) created the Water Conservation Implementation Task Force to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The Water Conservation Implementation Task Force consists of a

group of volunteers with experience in and commitment to using water more efficiently. The task force developed TWDB Report 362 – Water Conservation Best Management Practices Guide, which outlines specific water conservation best management practices (BMPs) for various water uses. Various BMPs from this report are discussed and outlined in this strategy. Industrial water conservation BMPs, discussed in the TWDB Water Conservation BMP Guide, include the following:

- 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 BMP
- Water Treatment
- Boiler and Steam Systems
- Refrigeration (including chilled water)
- Once Through Cooling
- Management and Employee Programs
- Industrial Landscape
- Industrial Site Specific Conservation

Analysis:

The application of the above BMPs to industrial water demands requires site-specific knowledge (i.e., processes used, equipment types, etc.) for the various industrial users in Region H. Currently, all industrial water users are grouped together to form a total "manufacturing" water user group for each county. Therefore, the use of the above BMPs to accurately estimate projected savings and costs for industrial conservation is not currently feasible. Region H is however considering an industrial reuse strategy to meet industrial water shortages in Harris County. This strategy has been in development for several years and is being sponsored by the City of Houston and the individual industrial users represented for this strategy. Much technical information (i.e., specific water needs for specific processes, water quality requirements, demand patterns, etc.) has been assessed and developed for this strategy. However, this reuse strategy is location and industry specific and therefore not feasible to consider for all industrial demand shortages for the region.

Not enough information is currently available on specific industrial processes within the Region to provide meaningful estimates of industrial conservation savings and to develop a conservation strategy that can be applied to manufacturing, mining, and steam-electric power demands across Region H. As industrial conservation strategies are developed in the region and the technical information becomes available, Region H can amend the Regional Water Plan to incorporate these future strategies.

Water User Group Application:

In Brazoria, Chambers, Fort Bend, Harris, and Walker Counties starting in the year 2000 and in year 2010 for Montgomery County.

Issues and Considerations:

In summary, the regional water planning group consultants recommend that the planning group not consider industrial conservation as a management strategy unless specific conservation projects (i.e., City of Houston Industrial Reuse Project) are known to exist at the time of plan preparation. The following additional reasons are provided for not considering conservation on a planning level for industrial water users:

- Various types of manufacturing currently exist within Region H and the location and types of specific operations are currently not known.
- The actual water usage required for specific manufacturing processes is not known.
- Very little guidance on implementation costs for specific conservation measures is available.
- Conservation is currently being practiced by manufacturers, in the form of reuse water in plant processes, due to the high cost of treatment for discharge.
- Industrial conservation may take place as the market dictates. Private entities will initiate conservation measures to save on water usage and/or disposal costs as new technologies/processes are developed and if these measures increase overall profits.
- Private manufacturing does not normally seek state funds/grants and therefore will not have the same impetus to develop conservation as municipal sector.

As industrial conservation strategies are developed in the region and the technical information becomes available, Region H can amend the Regional Water Plan to incorporate these future strategies. Although there are no quantifiable negative environmental impacts, it is difficult to estimate the potential beneficial environmental impacts.

References:

Texas Water Development Board Report 362 – Water Conservation Best Management Practices Guide, November 2004.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Water Right Redesignation
DATE: September 29, 2004

SUMMARY

STRATEGY DESCRIPTION: Amend existing water rights from single-use to multiple-use, to allow local providers flexibility in meeting changing needs.

SUPPLY QUANTITY: 80,000 acre-feet per year (change use type from irrigation to multiple use (municipal, manufacturing or irrigation)

SUPPLY SOURCE: Chambers-Liberty Counties Navigation District

IMPLEMENTATION DECADE: 2000 through 2050

TOTAL STRATEGY COST: No Cost

UNIT WATER COST: No Cost

Water Management Strategy Analysis Description

Introduction:

Although the demand projections used in this regional plan can be assumed accurate on a macro-level, variations will be realized within individual counties and basins for a variety of reasons. Developers and industries do not inform the census bureau of their plans in advance, so there is a time lag between a change in land usage and the reflection of that change in updated demand projections. Water providers who become aware of changes in local market trends or identify changing use patterns should reallocate supplies accordingly. Such reallocations are beneficial because they increase the supply options for new customers within the region.

Analysis:

Water use permits in Texas are granted for beneficial use of surface water. The Texas Water Code, Section 11.023(a), states:

> "State water may be appropriated, stored, or diverted for: (1) domestic and municipal uses, including water for sustaining human life and the life of domestic animals; (2) industrial uses, meaning processes designed to convert materials of a lower order of value into forms having greater usability and commercial value, including the

development of power by means other than hydroelectric; (3) irrigation; (4) mining and recovery of minerals; (5) hydroelectric power; (6) navigation; (7) recreation and pleasure; (8) stock raising; (9) public parks; and (10) game preserves."

The Water Code Section 11.023(e) goes on to state: "The amount of water appropriated for each purpose mentioned in this section shall be specifically appropriated for that purpose, subject to the preferences prescribed in Section 11.024 of this code. The commission may authorize appropriation of a single amount or volume of water for more than one purpose of use. In the event that a single amount or volume of water is appropriated for more than one purpose of use, the total amount of water actually diverted for all of the authorized purposes may not exceed the total amount of water appropriated."

Water rights permits may be amended to change or add purposes for which water is appropriated. The amendment process requires some time to complete, and therefore water rights holders identifying changes in local usage will need to submit amendment applications ahead of the demands being identified in the Regional or State Water Plans. Amending permits to allow multiple beneficial uses allows flexibility to water providers, who must maintain a customer base to pay for existing infrastructure, as well as to water customers. Reallocation of existing supplies is a less costly option than developing new water supply sources.

As water rights holders request permit amendments, potential conflicts of interest may occur if water provider service areas overlap. These issues are site specific, and must be addressed on a case-by-case basis with each amendment.

Water User Group Application

It is recommended that all water providers monitor their local demand patterns, and determine if there is a need to reallocate supply from single to multiple uses. If reallocation is needed, the original use should be maintained in the permit unless a change in land usage precludes the resumption of the original purpose (such as the complete conversion of farmland to residential use).

Chambers-Liberty Counties Navigation District holds 80,000 acre-feet per year of reliable irrigation supply under water right permit number 08-4279. Although the regional water plan shows a future irrigation demand in their service area, the economics of the rice industry are likely to make a portion of this supply available in the future. The District has identified potential growth in non-irrigation water use within Chambers and Liberty Counties, and has requested an amendment to permit number 08-4279 to include multiple use of this supply (municipal, industrial and irrigation) which will allow better flexibility in meeting future in-basin demands.

Issues and Considerations

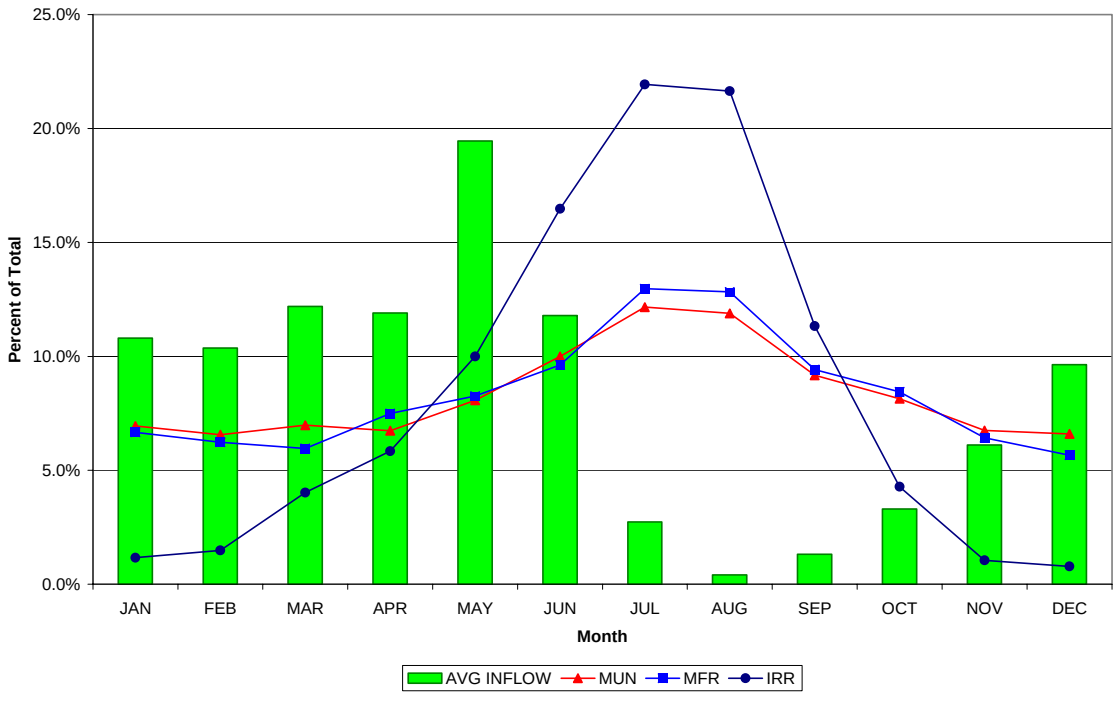
Changing water use has the potential to impact the environment, because the amount and location of return flows are likely to differ. The change may be a net decrease or increase in

instream or bay and estuary flows, depending upon the current and proposed uses, although many water rights permits are written as consumptive rights (i.e., no return flow is required). Those water rights permits that require a minimum return flow to a source body of water would not lose that condition by amending the usage type. Also, a change in usage type would not automatically allow a change in usage location, so return flows would remain within the originally permitted basin.

In the case of CLCND, the current water usage is for irrigation. In the TCEQ Water Availability Model (WAM), all irrigation is estimated to have no return flows. The proposed additional uses are municipal and manufacturing. In the Trinity WAM, return flows for these uses are estimated as 55% and 70%, respectively. If the full 80,000 acre-foot/year water right were used to meet municipal demand, the return flows for the bay would theoretically increase by 44,000 acre-feet/year. This figure is based on an assumption that the water right is currently being fully utilized for irrigation.

A second consideration when changing use type is the change in the monthly diversion pattern. Figure 1 shows the distribution of diversions used in the Trinity WAM for the three use types requested by CLCND. For comparison, the bars show the distribution of flows into Trinity Bay under full permitted use and full return flows. As can be seen, irrigation diversions are highest during the periods of lowest flow. Municipal and manufacturing diversions are also highest during that period, but the magnitude is reduced. The addition of return flows would further dampen the effect of these diversions.

Figure 1 - Diversion Pattern by Use Type



REGION H WATER MANAGEMENT STRATEGY ANALYSIS DRAFT TECHNICAL MEMORANDUM

STRATEGY TITLE: BRA System Operation
DATE: October 25, 2005

SUMMARY

STRATEGY DESCRIPTION: System operation of BRA reservoirs.

SUPPLY QUANTITY: 421,449 acre-feet per year

SUPPLY SOURCE: Brazos River Authority System

IMPLEMENTATION DECADE: 2000

TOTAL STRATEGY COST: $4,500,000

UNIT WATER COST: $2.50 per acre foot [1]

Water Management Strategy Analysis Description[2]

Introduction

Significant additional water supply can be made available throughout the Brazos River Basin by efficiencies available to the Brazos River Authority (BRA). Development of this additional water supply would require permit action by the Texas Commission on Environmental Quality (TCEQ) and implementation of a comprehensive Water Management Plan. No new infrastructure is needed to create the supply.

With the implementation of this water management strategy, the BRA has the potential of the following:

- A new appropriation of state water for multiple uses, including domestic, municipal, agricultural, mining, industrial, and other beneficial uses on a firm basis, as well as the ability to dedicate part of this firm supply to develop interruptible supply.
- Use of current and future return flows to the extent that such return flows continue to be discharged or returned into the bed and banks of the Brazos River, its tributaries, and BRA reservoirs.

[1] $250 is cost to develop permit. Water would be sold at BRA system rate, which was $49.65/ac-ft in 2005.
[2] Technical data and analysis provided by Freese and Nichols, Inc, under contract with the Brazos River Authority, from the Report in Support of the System Operations Permit Application.

- Use of any source of water available to the BRA to satisfy the diversion requirements of senior water rights to the same extent that those water rights would have been satisfied by passing inflows through the BRA's reservoirs on a priority basis.
- Ability to release, pump, and transport water from any of the BRA's reservoirs for subsequent storage, diversion, and use throughout the BRA's service area.

Analysis

The Brazos River Authority (BRA) holds 15 water rights in the Brazos Basin, 13 of which are associated with reservoirs. These permits authorize diversion of 796,551 acre-feet per year and 2,484,491 acre-feet of storage. Lake Alan Henry, Possum Kingdom Lake, Lake Granbury and Lake Limestone are owned and operated by the BRA. The remaining reservoirs are owned by the U.S. Army Corps of Engineers. Of these Corps reservoirs, BRA is the sole water right holder from these reservoirs with the exception of Lake Belton, whose rights it shares with Fort Hood. The two remaining permits are associated with use of excess flows in the Brazos Basin and interbasin transfer of water released from BRA reservoirs. Only the proposed Allens Creek Reservoir is located in Region H.

A key feature of many of the BRA's water rights is the System Operation Order which allows coordinated operation of all the BRA's reservoirs except Lake Alan Henry and Allens Creek Reservoir. The system order allows BRA to:

- Use the bed-and-banks of the Brazos River and its tributaries to deliver water to downstream customers.
- Release or divert water on a non-priority basis from any system reservoir in excess of its priority diversion up to a specified limit in each reservoir.
- Make use of available flows in the lower basin, again on a non-priority basis.

The System Operation Order has several restrictions, including:

- Total diversions are limited to the total priority authorization of the system reservoirs, currently 661,901 acre-feet per year[3].
- Each reservoir has a specified annual limit for the amount of water available for use.
- If a reservoir is less than 30% capacity and other system reservoirs are more than 30% capacity, that reservoir may not be used for system operation until all reservoirs are below 30% capacity.

Non-priority use of available flows is authorized by Certificate of Adjudication 5166, known as the 'Excess Flows' permit. This water right allows the BRA to divert, on a non-priority basis, up to 650,000 acre-feet per year of the available flows in Austin and Fort Bend Counties. Any water diverted under this permit must be assigned to the BRA reservoir

[3] The System Operation Order does not include Lake Alan Henry or Allens Creek Reservoir.

covered by the System Operation Order which has the most senior priority date and still has priority water unused for the calendar year. Water is not actually diverted or released from the reservoir; it is only assigned to that reservoir for accounting purposes. Although this right allows the BRA to make use of available flows, it does not allow any supply benefit for the BRA system by having access to such flows.

The existing System Operation Order allows the BRA some flexibility in the operation of its reservoir system, and the Excess Flows permit allows access to available flows in the lower portion of the basin without actually releasing water from BRA reservoirs. However, the existing water rights do not allow the BRA to utilize the potential operational efficiencies and additional yield available from system operation. With implementation of this water management option, additional yield from the system could be created through more efficient operation without new infrastructure and with negligible impact on other water rights holders in the Brazos Basin. The increased water supply available from this management option accrues primarily due to full utilization of the BRA reservoir system. Only through the use of system storage is there any additional reliable supply available in the Brazos Basin without significant investment in new infrastructure or additional storage.

Through this management strategy, the BRA would be fulfilling its legislative mandate to efficiently manage the limited water resources of the Brazos River Basin. Implementation of this strategy would require many factors to be taken into account when managing these resources and to address these issues the BRA would need to develop a comprehensive Water Management Plan.

Estimated yields available from this strategy are based on hydrologic analyses of the Brazos Basin using the TCEQ Water Availability Model of the Brazos Basin and San Jacinto-Brazos Coastal Basin (Brazos WAM). For the system operation analyses, the Brazos WAM was modified to incorporate system operation of BRA reservoirs. System operation is implemented by coordinating unregulated flows below existing BRA reservoirs with releases of stored water from the BRA reservoirs. During times when unregulated flows are available for diversion and not reserved for senior water rights or instream flows, they will be diverted for use in lieu of water released from reservoirs. When those flows are not available or are insufficient to meet needs, water will be released from BRA reservoirs.

Estimated 2060 return flows were incorporated into the model to evaluate the impact on potential yield. The estimated return flows in 2060 are 260,167 acre-feet. In the model, all water rights in the basin have access to return flows. Water rights with the most senior priority dates have first access to return flows. The System Operation Permit has the most junior priority date of any current water right in the basin, and therefore is limited to return flows remaining after exercise of all other water rights in the model. After senior water rights have diverted water and instream flows are taken into account, approximately 110,000 acre-feet are available for system operation.

All system operation runs apply instream flow criteria using the Lyons method before diverting.

Using this model, it was determined that an additional firm yield of up to 421,449 acre-feet of water can be generated by the BRA system using system operation. The additional yield is the result of a combination of operational efficiency, return flows, and unpermitted yield in BRA reservoirs. Return flows contribute approximately 110,000 acre-feet of the additional yield. This yield is contingent upon return flows being discharged in the river at expected 2060 levels. Approximately 100,000 acre-feet of the system yield can be attributed to unpermitted yield in BRA reservoirs.

Once Allens Creek Reservoir is constructed it will be a key part of the Authority system. The reservoir's location in the lower portion of the basin makes it able to capture and store unappropriated flows and gives the BRA added operational flexibility. Having Allens Creek Reservoir fully participate in this strategy contributes approximately 39,000 acre-feet of yield.

The total yield from implementation of this strategy is dependent upon the location where the supply is used. To illustrate how supply varies with location, water availability was evaluated at three points:

- USGS Gauge 08091000, Brazos River near Glen Rose (Somervell County)
- USGS Gauge 08098290, Brazos River near Highbank (Falls County)
- Brazos River at the Gulf of Mexico (Brazoria County)

Table 1 summarizes the additional water available from system operation at the three analysis points.

Table 1
Additional Water
Available through System Operation [a] by Location
(Values in Acre-Feet per Year)

Location	Additional Firm Supply from System Operation without Interruptible Supplies	Additional Supply from System Operation with Interruptible Supplies [b]		
		Firm Supply	Interruptible Supply	Total Supply
Glen Rose	150,538	60,538	157,000	217,538
Highbank	144,306	54,306	303,000	357,306
Gulf of Mexico	421,449	331,449	670,000	1,001,499

a With 2060 return flow conditions and Lyons bypass criteria
b Interruptible supply meets the 75/75 criteria.

Table 1 shows the potential supplies for both firm and interruptible water. Firm water can be reliably supplied from a reservoir through a repeat of the most hydrologically severe drought in the historical record. Interruptible water may be curtailed during extended dry periods.

For this analysis, it was assumed that BRA would dedicate up to 90,000 acre-feet per year of the firm yield of system operation to generate interruptible supply. The interruptible supplies were evaluated using the "75-75 rule", which is the method primarily used by TCEQ when evaluating interruptible supplies. The 75-75 rule is met if at least 75% of the maximum annual interruptible supply is available at least 75% of the years. By devoting a portion of the system's firm water supply towards development of a larger, interruptible water supply, the BRA can greatly enhance the overall water supply capabilities of the system.

Water User Group Application

Water from the system operation permit may be considered as an alternative or supplement to water available from voluntary redistribution. Implementation of system operation could potentially delay the need for development of other new supplies in the Brazos Basin such as the Little River Reservoir.

Interruptible water is normally used for irrigated agriculture or other purposes that do not require a reliable source of water. However, under some circumstances interruptible water is appropriate for use for municipal or industrial supplies. Interruptible water may be appropriate for municipal and industrial purposes if another surface water source or groundwater source is available to replace the interruptible supplies when they are curtailed.

Issues and Considerations

Because system operation does not involve any new infrastructure or storage there are few major environmental issues associated with the strategy. Any new infrastructure required to deliver water would need to be evaluated on a case-by-case basis. The yield of this strategy increases with the addition of Allens Creek Reservoir to the system. The costs and impacts of this reservoir are addressed separately.

Reservoir elevations during extreme drought could be somewhat lower in some reservoirs. However, it will take many years for demands to reach levels where significant impacts will be seen in most reservoirs. Bay and estuary flows may be reduced because of increased use of unappropriated flows. The Brazos River has a very small estuary and impacts are expected to be minimal.

Because much of the water generated by system operation will be delivered via the bed and banks of the Brazos River, the greatest potential impact is on instream flows. For the Report in Support of the System Operations Permit Application (Freese and Nichols, 2004), instream flow criteria were developed using the Lyons method at the Glen Rose and Highbank yield analysis points, as well as at the Brazos River at Richmond gauge (Fort Bend County). The Lyons method is the default method used by TCEQ when evaluating water rights when no site-specific information is available. The Lyons method sets minimum stream flow bypass levels at 40% of the historical median daily flow for the months of October through February and 60% of the median daily flows for March through September. The permit was modeled with the condition that diversions may not cause flow in the stream to fall below these levels.

Table 2 shows the monthly Lyons bypass criteria for the Glen Rose and Highbank primary diversion points, and for the Brazos River at Richmond USGS stream gauge.

Table 2
Instream Flow Criteria Using the Lyons Method
(Values in Acre-Feet per Month)

Month	Glen Rose	Highbank	Richmond
January	6,272	28,530	85,837
February	4,976	27,102	121,960
March	9,223	42,058	199,589
April	11,211	46,235	184,046
May	24,866	76,737	333,509
June	30,597	66,050	232,602
July	16,712	37,630	82,086
August	15,347	31,617	58,844
September	12,674	25,706	65,514
October	6,788	17,217	46,417
November	5,141	18,696	53,197
December	4,993	24,546	75,999

Figures 1, 2 and 3 compare the frequency of meeting Lyons bypass goals at the Glen Rose, Highbank and Richmond gauges. The bars in each chart shows the percentage of months with flows greater than criteria from the base run (Brazos WAM Run 3), which has all Authority diversions lakeside and no return flows. The line with a square markers shows the same information for the base run incorporating 2060 return flows. The line with the triangle markers shows the percentage of months meeting criteria for the system operation run maximizing the supply at the Glen Rose gauge. The line with the diamond markers and the line with the circle markers show the same information for the yield runs maximizing the supplies at the Highbank Gauge and Gulf of Mexico, respectively. (Although the Richmond Gauge is not a yield location, it is included because of the number of existing instream flow requirements that are based on that particular gauge.) These graphs represent flows measured just downstream of the diversion point.

Figure 1
Frequency of Meeting or Exceeding Lyons Bypass Criteria at the Glen Rose Gauge

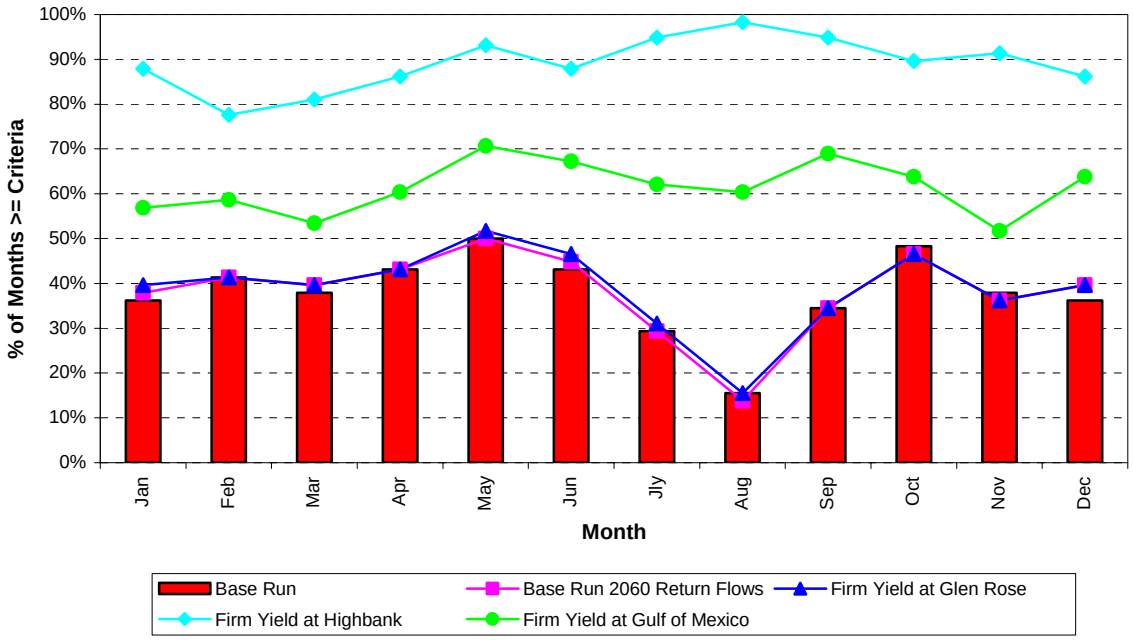


Figure 2
Frequency of Meeting or Exceeding Lyons Bypass Criteria at Highbank Gauge

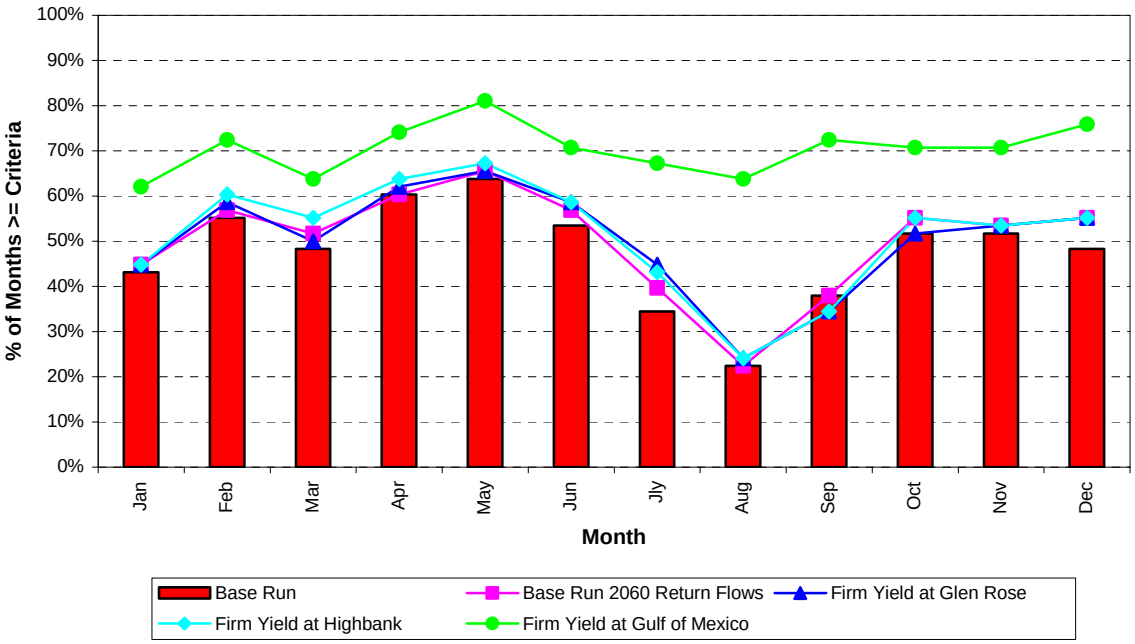
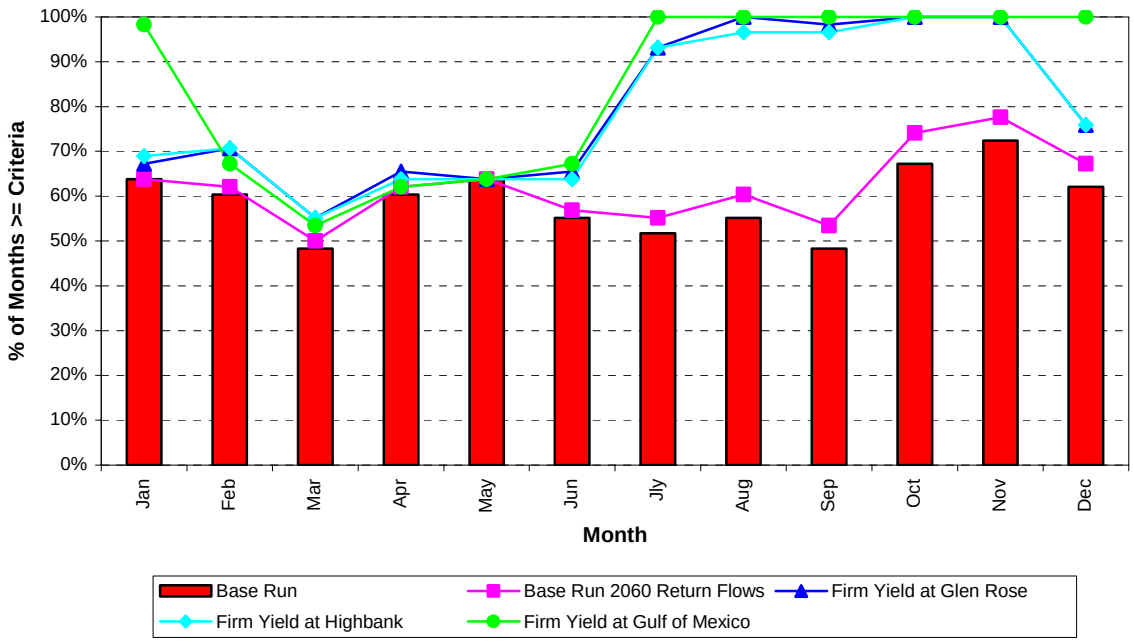


Figure 3
Frequency of Meeting or Exceeding Lyons Bypass Criteria at the Richmond Gauge



Examining these graphs, we can make the following observations:

- Return flows do not significantly increase the frequency of meeting instream criteria at the Glen Rose and Highbank gauges. At the Richmond Gauge, the presence of return flows causes a modest increase in the frequency of meeting instream flow requirements in the latter half of the year.
- When yield is taken at the Glen Rose Gauge, the frequency of meeting instream flow requirements is about the same with and without system operation. If yield is taken downstream, the frequency of meeting instream flow requirements is greater than in the base runs.
- At the Highbank Gauge, the frequency of meeting instream flow requirements is about the same as the base runs when taking yield at either Glen Rose or Highbank. When yield is taken downstream at the Gulf of Mexico, the frequency of meeting instream flow requirements is higher.
- At the Richmond Gauge the frequency of meeting instream flow criteria with system operation is much improved over the base runs. In the months of July through November, the instream flow criteria are exceeded almost all of the time with system operation.

The above graphs show that target instream flows at the diversion points are minimally impacted. The System Operations Permit will reduce peak flows, by diverting flows above the instream targets when available instead of releasing stored water. That stored water is then released for downstream diversion when available flows fall below the instream targets, increasing the net instream flow above the diversion points.

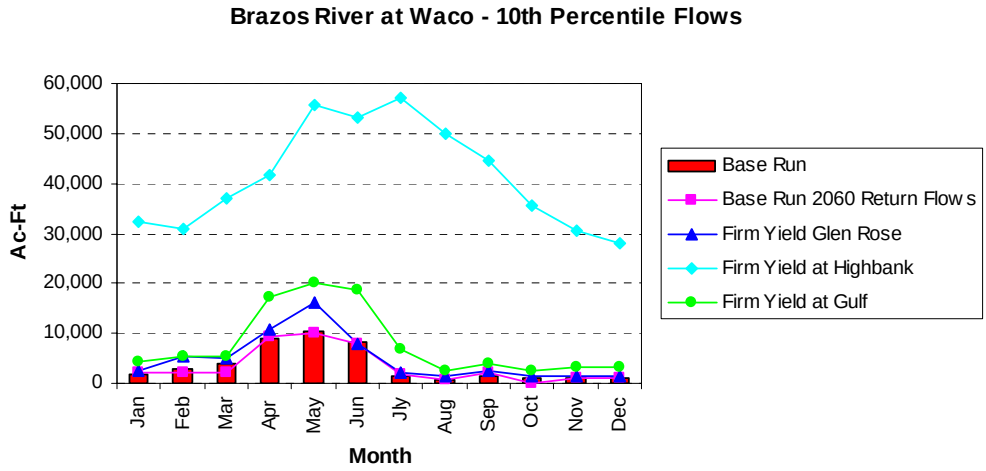
To further illustrate the instream benefits of system operation, Figures 4, 5 and 6 illustrate low flow statistics (flows below the median) for the base and firm yield runs at other locations in the basin. The 10th percentile flows represent extreme low flow conditions, while the 25th percentile flows represent moderate low flow conditions. Figure 4 shows low flow statistics at the Brazos River at Waco Gauge (McLellen County), which is located between the Glen Rose and Highbank yield points. Figure 5 shows the same data for the Little River at Cameron Gauge, which is located on a major tributary of the Brazos River downstream of five of the Authority's reservoirs (Lake Proctor, Lake Belton, Lake Stillhouse Hollow, Lake Georgetown and Lake Granger). Figure 6 shows low flow statistics at the Brazos River at Richmond Gauge, which is a key flow indicator gauge for the lower Brazos Basin. The symbols convention used in these graphs is the same as in Figures 1, 2 and 3.

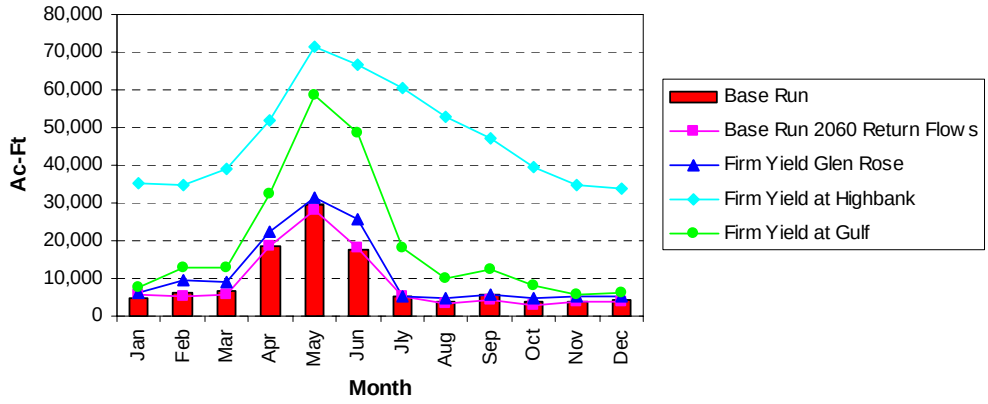
These graphs illustrate several flow trends when comparing system operation with the base runs:

- The inclusion of return flows causes a significant increase in low flows at the Cameron Gauge. Return flows in the base run makes almost no difference in low flows at the Waco Gauge and causes only minor increases at the Richmond Gauge.
- In almost every case low flows are higher with system operation.
  - The least improvement is shown in the Glen Rose runs at the Waco Gauge (Figure 4). Low flows are slightly higher from March through June and about the same the rest of the year.
  - In contrast, looking at the base run at the Waco Gauge, the minimum flow for the 10th percentile with return flows is 115 acre-feet, while the minimum 10th percentile flow in the Highbank run is over 28,000 acre-feet, a substantial increase.

These graphs support the conclusion that downstream reservoir releases and more frequent spills made under the System Operation Permit will improve instream flow conditions in many locations.

Figure 4
Low Flow Statistics at the Brazos River at Waco Gauge





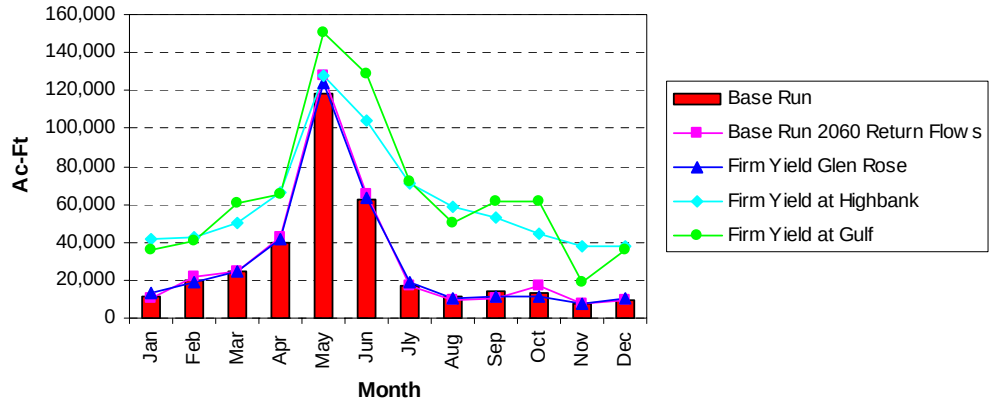
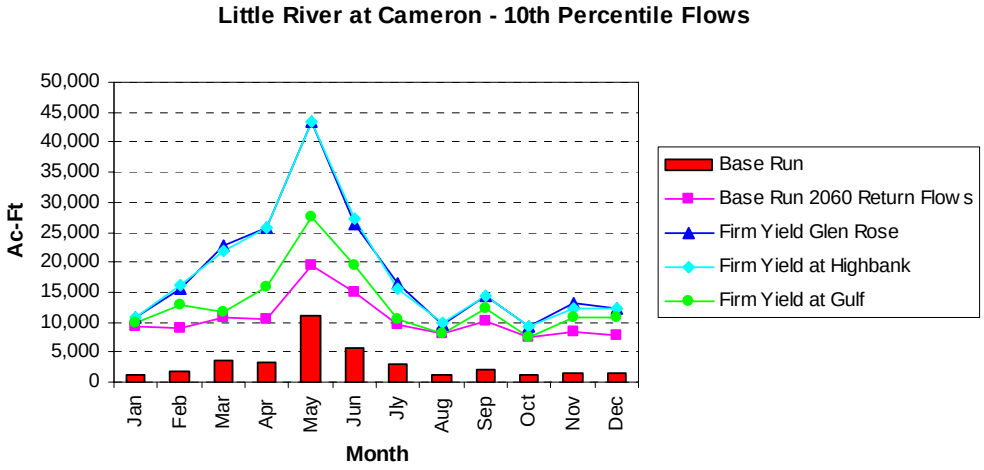
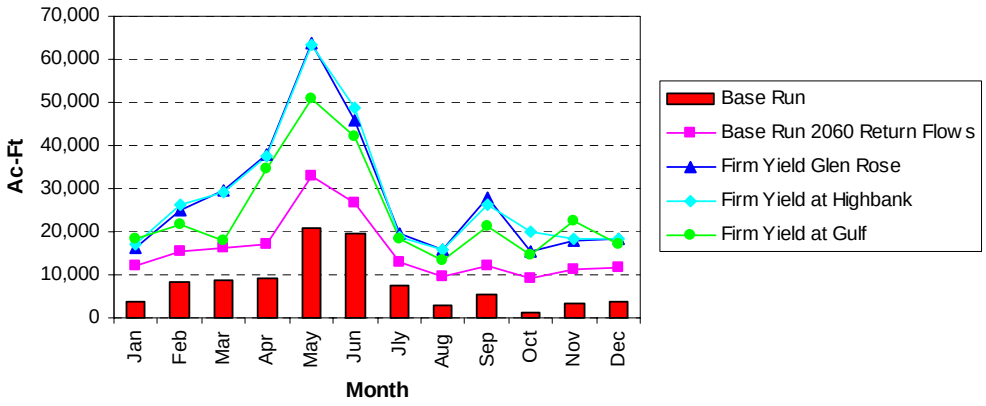


Figure 5
Low Flow Statistics at the Little River at Cameron Gauge





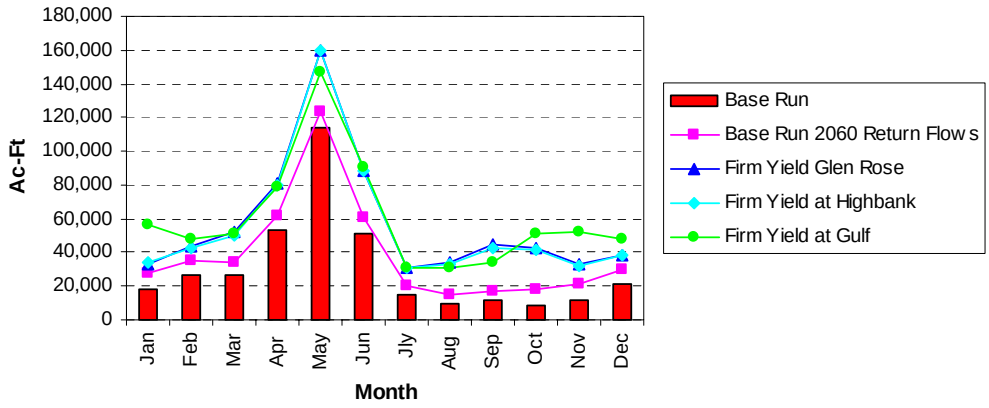
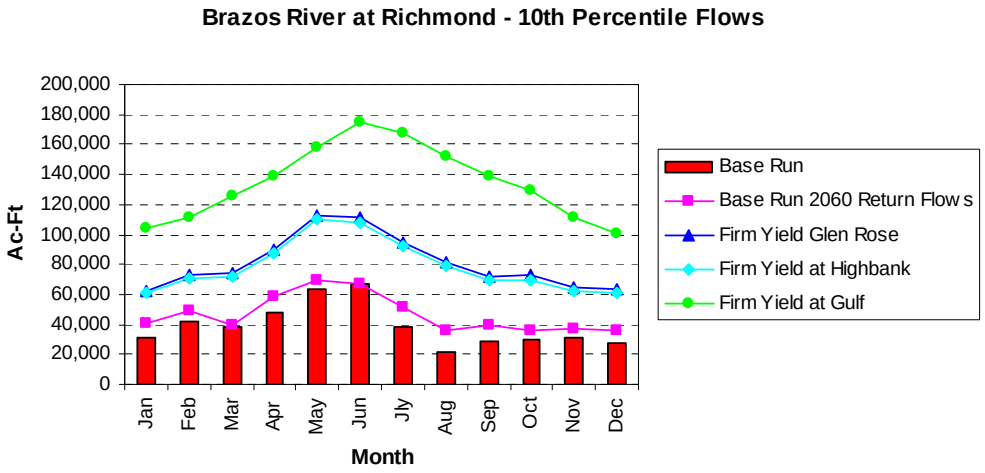
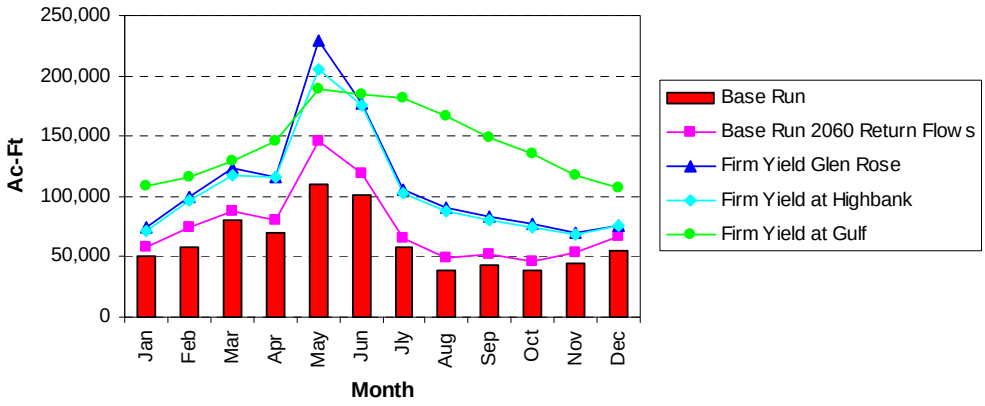
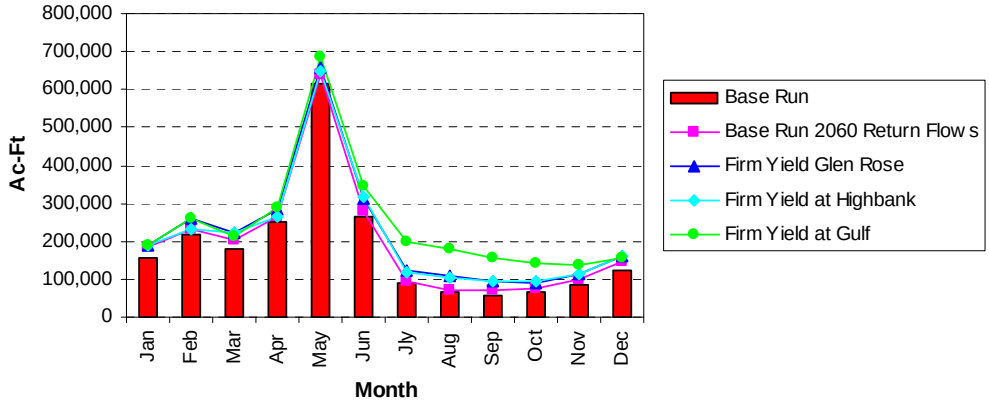


Figure 6
Low Flow Statistics at the Brazos River at Richmond Gauge







REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Expanded Use of Groundwater
DATE: January 14, 2005

SUMMARY

STRATEGY DESCRIPTION: Increased use of existing groundwater supplies, within the limits of the sustainable yield, groundwater reduction plan limitations or groundwater conservation district rules.

SUPPLY QUANTITY:

County (Aquifer):	Projected Increase from 2000 to 2060 (acre-feet/year)
Austin (GC)	860
Fort Bend (GC)	7,000 (in 2010 before GRP cap)
	4,000 (5% temporary overdrafting)
Galveston (GC)	860
Harris (GC)	15,500 (5% temporary overdrafting)
Leon (CW)	900
Liberty (GC)	2,200
Madison (CW, SP)	500
Montgomery (GC)	8,000 (in 2010 to sustainable yield)
Polk (GC)	2,500
San Jacinto	1,700
Walker (GC, YJ)	4,800
Waller (GC)	5,100

SUPPLY SOURCE: Gulf Coast, Carrizo-Wilcox, Sparta and Yegua-Jackson Aquifers.

TOTAL STRATEGY COST: $ 400,000 per typical 1 mgd well (1,000-ft deep)

UNIT WATER COST: $ 141 per acre-foot (typical, treated and delivered)

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The Region H Water Plan anticipates the continued use of available groundwater to meet demands, unless such use is limited by groundwater conservation district rules or local water quality concerns. By fully utilizing this supply, the diversion and movement of surface water can be minimized. Groundwater use from the Gulf Coast, Carrizo-Wilcox, Sparta and Yegua-Jackson Aquifers is projected to increase in certain counties during the planning

period, and this increased use is reflected in Chapter 3, Available Water Supplies. However, the additional wells and related infrastructure required to obtain this water must be reflected in the plan as a management strategy.

WATER USER GROUP APPLICATION

Expanded use of groundwater is recommended as a management strategy in all counties where increased use is projected (Austin, Fort Bend, Galveston, Leon, Liberty, Madison, Montgomery, Polk, San Jacinto, Walker and Waller Counties). Brazoria, Chambers, Harris, and Trinity Counties have reached their sustainable or permitted yields. This expanded use is subject to local subsidence or groundwater conservation district rules and permitting practices. The RHWPG recognizes that Harris, Galveston and Fort Bend Counties have groundwater reduction plans that will result in decreasing groundwater use during the planning period. However, it is anticipated that many existing wells will continue to be used in conjunction with surface water to serve certain areas or to meet peak day demands.

Three counties in the region (Fort Bend, Galveston and Harris) are projected to decrease their use of groundwater during the planning period due to Groundwater Reduction Plans enacted by the local Subsidence Districts. However, within these counties new wells will still be constructed and existing wells maintained or replaced in areas where surface water is not yet available, or where groundwater remains a portion of the overall community supply. To reflect that this use is in compliance with the Regional Water Plan, Temporary Over-Drafting of Groundwater is recommended as a management strategy in Fort Bend County for Municipal County-Other, and in Harris County for Municipal County-Other, the North Harris County Regional Water Authority and the West Harris County Regional Water Authority. The over-drafting should not exceed 5% of the total WUG demand, in those decades where a shortage is projected. This use is only recommended when it is part of an overall groundwater reduction plan and approved by the subsidence district.

ISSUES AND CONSIDERATIONS

This expanded use of groundwater is not anticipated to have significant environmental effects. Groundwater within the region is generally of good quality and available at the point of use, allowing the wells and conveyance systems to be commingled with the supported development, and not requiring substantial additional land for well fields or conveyance systems. Site-specific evaluations of wildlife habitats, wetlands (including mitigation by wetlands off-sets) and cultural resources must be considered in the overall development plan. There are no major springs in Region H, but well pumping supplies return flows to all river basins within the region, and ultimately to Galveston Bay. These flows will increase proportionally with the increased groundwater use, unless or until reuse strategies are implemented. The expanded use is within the estimated sustainable yield of the Gulf Coast, Carrizo-Wilcox, Sparta and Yegua-Jackson Aquifers, making it a preferred alternative to moving and treating additional surface water. Surface water diversions may reduce in-stream flows during drought periods, potentially affecting aquatic and riparian wildlife species.

The costs for expanded use of groundwater will vary slightly from site to site, but it may generally be assumed that a 1 mgd well will cost approximately $400,000 to construct. If the total increase in groundwater demand for a WUG is less than one-quarter mgd (280 acre-feet/year), it can be assumed to be met by increased pumping of existing wells. All wells are assumed local, within a nominal 1-mile radius of the intended point of use, due to the extent of the Gulf Coast Aquifer under the region.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Freeport Seawater Desalination Project[1]

DATE: April 20, 2005

SUMMARY

STRATEGY DESCRIPTION: Desalination of seawater for municipal use therefore enhancing flows for irrigation and manufacturing uses in the lower Brazos River basin.

SUPPLY QUANTITY: [Max 100mgd] 11,200 ac-ft/yr (10 mgd) – 33,600 ac-ft/yr (30 mgd)

SUPPLY SOURCE: Gulf of Mexico Seawater

TOTAL STRATEGY COST[2]: $745,765,000 - $959,710,000

TOTAL CAPITAL COST[3]: $85,233,000 (11,200AF) - $255,699,000 (33,600AF)

UNIT WATER COST: $1,300 - $1,814 per acre-foot (Average unit cost for desalinated water in the years 2010 – 2060 for Options 5 and 1, respectively)

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The purpose of this analysis is to address the potential use of desalinated seawater to meet projected water shortages in Region H. This study investigates desalinated seawater to supplement existing and future water supplies that currently serve municipal demands within the lower Brazos River basin.

ANALYSIS

Desalination is a process that can be used to obtain potable water from water containing high amounts of salts or other solids. This process has been incorporated

[1] This memorandum was prepared using information in the *Freeport Seawater Desalination Project Final Report* prepared by CDM for the Brazos River Authority.

[2] All costs from the Freeport Seawater Desalination Project Final Report have been adjusted from 2004 value to second quarter 2002 value using the Engineering News Record Construction Cost Index, as recommended in TWDB Exhibit B. The total strategy costs are presented in net present value and include costs associated with delivering desalinated water, current and future surface water supplies, administrative fees, and debt defeasance. Groundwater costs are not reflected in the total strategy costs.

[3] The Capital costs were extrapolated from the Texas Water Development Board Report – The Future of Desalination in Texas (Volume 1) Biennial Report on Seawater Desalination dated December 2004. The costs were assumed to be linear with the expansion of the plant.

into several public and private water supplies throughout the state. Several small desalination operations are currently used in Brazoria County.

This water management strategy is a review of the Freeport Seawater Desalination Project proposed as a public-private partnership between the Brazos River Authority (BRA) and Poseidon Resources. The preliminary planning for this project was funded through a $500,000 TWDB grant that was awarded for three proposed desalination projects in Freeport (Region H), Brownsville (Region M), and Corpus Christi (Region N). Of these three projects, the Freeport desalination project was recognized by the TWDB in the December 2002 *Report of Recommendations* to Gov. Perry as the most feasible of the three projects at this time.

Despite historically high operating costs, seawater desalination holds several advantages for Region H, including:

- A drought-proof water supply from a constant supply source.
- Provides a high quality water supply that surpasses most drinking water standards and can support industrial applications requiring very stringent water quality standards.
- Provides a diverse solution for providing water resources to customers as an alternative to typical groundwater and surface water sources.
- Reduces demand for raw surface water that can be used to meet industrial needs that require only low or no quality levels.

A desalination facility located in Freeport would allow the BRA purchase desalinated water from Poseidon and then sell the water wholesale to the Brazosport Water Authority (BWA) and/or the Gulf Coast Water Authority (GCWA). These wholesale water providers (WWPs) would then be able to replace or augment their supplies with a reliable, high-quality water supply from an alternative source that would reduce water-quality issues that have been encountered in the past. Additionally, current BWA and GCWA surface water sources, diversion rights from the Brazos River, could be contracted to provide for industrial raw water demands rather than for use to meet municipal shortages. The proposed service area for the Freeport seawater desalination plant is shown in *Figure 1*.

Table 1 describes five scenarios that were examined for implementing desalinated seawater as a strategy in the Freeport area. In Option 1, desalinated water would be used only to a minimal degree in order to meet water shortages. In Option 2, BWA's current supplies would be replaced with desalinated water and additional capacity would be diverted for use in the northern portion of Brazoria County and Fort Bend County to meet shortages. In Option 3, GCWA supplies to Missouri City, Pearland, and Sugar Land would be replaced with desalinated water and the resulting surplus could be reallocated to meet other needs in the GCWA service area. Option 4 would replace the GCWA supplies described in Option 3 as well as all supplies to BWA. Finally, a hybrid alternative of Option 2 was created to provide for a constant initial demand while still meeting shortages in the upper portion of the study area. This alternative, Option 5, would immediately replace BWA supplies in their entirety and

allow for delivery of desalinated seawater to customers in northern Brazoria County and Fort Bend County when significant shortages begin to develop in 2025.

Table 1: Comparison of Desalination Alternatives

		BRAZOSPORT WATER AUTHORITY (BWA)	
		Use BWA Surface Water to Maximum Capacity	Provide Desalinated Water to BWA Customers for Wholesale Distribution to Customers
GULF COAST WATER AUTHORITY (GCWA)	Use GCWA Surface Water to Maximum Capacity	***Option 1*** Desalinated water used to meet deficits only.	BWA discontinues using its Brazos River surface water supply. ***Option 2*** Desalinated water is supplied to BWA in lieu of using existing surface water. ***Option 5*** Same as Option 2, except infrastructure to convey water to northern part of study area is not constructed in 2025.
	Provide Desalinated Water in Lieu of Raw GCWA Surface Water	***Option 3*** WCID 2 and cities of Missouri City, Pearland, and Sugar Land allow their GCWA option contracts for raw surface water to expire, replacing this supply with desalinated water.	***Option 4*** Desalinated water replaces both BWA and GCWA surface water supplies.

All of the proposed strategies described above call for a 10 MGD reverse osmosis (RO) treatment facility within the Dow Chemical Company complex in Freeport with capability to scale to as much as 100 MGD by the year 2060, depending upon the strategy option chosen. The proposed location of the project benefits the project in several ways that include, but are not limited to:

- Pre-existing infrastructure for supporting large-scale industrial processes to reduce costs and expedite project implementation.
- Access to saline and fresh water sources and discharge points.
- Pre-existing permits for withdrawal and discharge.
- Discharge directly into the Gulf of Mexico and fewer environmental concerns than a system discharging into a bay system.

The proposed facility location allows access to an existing seawater intake, A801, located across from the port of Freeport or raw water from the Brazos River. Brine created from the desalination process with a solids concentration nearly twice that of incoming seawater, would be discharged from the site at outfall No. 001 where it will be diluted and discharged into the Brazos River and, ultimately, the Gulf of Mexico.

The proposed plant processes are described in the following sentences. Pretreatment will be performed by means of high-rate sedimentation, filtration, and chlorination and pH adjustment to reduce impacts on process equipment, incoming seawater will be fed to 8-inch diameter, high rejection seawater membrane elements. Post-processing of the water will include stabilization to make the treated water non-aggressive to the distribution system and provide residual chlorination for disinfection. Fresh water from the Brazos River could be blended with desalinated water to maximize the economic efficiency of the plant.

The distribution system recommended by the Freeport Seawater Desalination Project is shown in *Figure 2* and proposes the incorporation of desalinated water into the BWA supply system as well as new conveyance facilities for delivery outside of the BWA service area. This will include transmission along the approximately 45-mile segment between the Freeport plant and the distribution system in northern Brazoria County. Several of these lines will be constructed in parallel to allow for additional capacity as demands require. The total lengths of pipe required for the aforementioned alternatives range from 110 to 140 miles and vary according to the capacity required by the desalination alternative used. This treated water could be introduced directly to the water distribution systems of the customers without further treatment as would be needed for the GCWA raw water supplies currently available to Fort Bend County WCID Number 2, Missouri City, Pearland, and Sugar Land. A blending analysis demonstrated that water from the Freeport plant would be compatible for use in the water systems of Missouri city, the Brazosport Area, and Pearland for the proposed blending levels of all of the alternatives considered, facilitating use throughout the proposed service area.

The possible scenarios for implementing a seawater desalination facility as a management strategy were examined with the future water demands of the service area in mind. The water demand projections for the majority of WUGs in the potential service area were acquired from the approved population and water demand projections published by TWDB for use in the 2006 Regional Water Plans and are consistent with the values presented in *Chapter 2 – Presentation of Population and Water Demands*. However, due to inconsistencies between the TWDB projections and information provide by the Houston-Galveston Area Council (HGAC) and the cities of Lake Jackson and Pearland, the population and water demands used for evaluating each desalination alternative were adjusted for Lake Jackson, Pearland, and County-Other WUGs in both Brazoria and Fort Bend counties. This method of computing population growth and demands also addressed the issue of the expected annexation of several MUDs and the urbanization of unincorporated land surrounding the larger cities.

Costs were estimated from the amount of water desalinated and distributed for each of these scenarios. The costs and the total amount of desalinated water delivered through the 2060 planning period for each of the seawater desalination alternatives are shown in *Table 2* and include debt defeasance for pre-existing infrastructure improvements conducted by the WWPs. Additionally, Option 5 was considered for further study and a rate analysis. This was conducted for each region of the service area and is shown in *Table 3*. Additional detail regarding the development of the project costs included in *Tables 2* and *3* of this technical memorandum are provided in the *Freeport Seawater Desalination Project Final Report* dated November 1, 2004 and prepared by CDM.

Table 2: Net Costs Associated with Seawater Desalination Options[4]

Option	Net Cost (Adjusted to 2nd Quarter, 2002)					Total Desalianted Water Delivered - 2010 to 2060 (acre-feet)
	Total	Desalinated Water Treatment	Desalinated Water Conveyance	Other Water Sources	Other Costs	
1	$745,765,098	$302,626,451	$141,945,940	$273,121,116	$28,071,591	1,005,763
2	$766,547,117	$330,369,365	$146,088,912	$254,771,910	$35,316,930	1,099,079
3	$924,743,321	$607,221,224	$285,968,573	$18,349,206	$13,204,318	3,076,765
4	$959,710,098	$641,736,864	$297,362,209	$0	$20,611,025	3,167,928
5	$722,112,798	$292,184,503	$123,001,896	$271,790,586	$35,135,813	1,051,614

Table 3: Rate Analysis of Blended Water for Option 5

Year	Water Rate (Adjusted to 2nd Quarter, 2002)		
	Pearland	Ft. Bend County	BWA
2010	$0.65	$0.45	$3.02
2020	$0.85	$0.79	$2.79
2030	$0.91	$1.45	$3.34
2040	$1.04	$1.38	$2.91
2050	$0.88	$1.38	$3.40
2060	$0.96	$1.13	$2.12

WATER USER GROUP APPLICATION

The desalinated seawater would be used to meet municipal demands in the lower Brazos River basin of Brazoria County, therefore enhancing flows for irrigation and manufacturing WUGs in the lower Brazos River basin that are served by the Chocolate Bayou Water Company and the Dow canal system.

ISSUES AND CONSIDERATIONS

The most important factor in the success of a desalination facility in Freeport is the participation of the local WWPs in such a program. Currently, BWA is expected to have an adequate water supply to continue to meet the needs of its customers from Brazos River diversions and does not have a pressing need to explore additional sources of water. In addition, other, more conventional and lower cost alternative strategies exist to meet water deficits for GCWA. Without financial benefit and an immediate need for expanding alternative resources, BWA and GCWA would likely not participate in the Freeport project. For these reasons, it is imperative that final costs for water are developed through the implementation of a pilot plant and proper funding is secured from state and federal entities to subsidize the desalination program.

Permit requirements for the implementation of the project are expected to be minimal, as the facility is located within the Dow industrial complex. This location will minimize further impacts on threatened and endangered species, wetlands, and other environmental factors. Existing Dow permits for seawater withdrawals may be amended to allow for the plant's operation. Also, pipe alignments are expected to follow existing pipelines whenever possible, minimizing environmental issues along these rights-of-way. Waste-stream discharge, though occurring through the existing Dow discharge canal system, will require a separate TPDES discharge permit.

[4] Costs include expenses for surface water sources utilized in the desalination alternatives (i.e. cost of GCWA and BWA surface water). Groundwater usage was the same for each option. Therefore, the cost of groundwater is not reflected.

Figure 1: Proposed Service Area

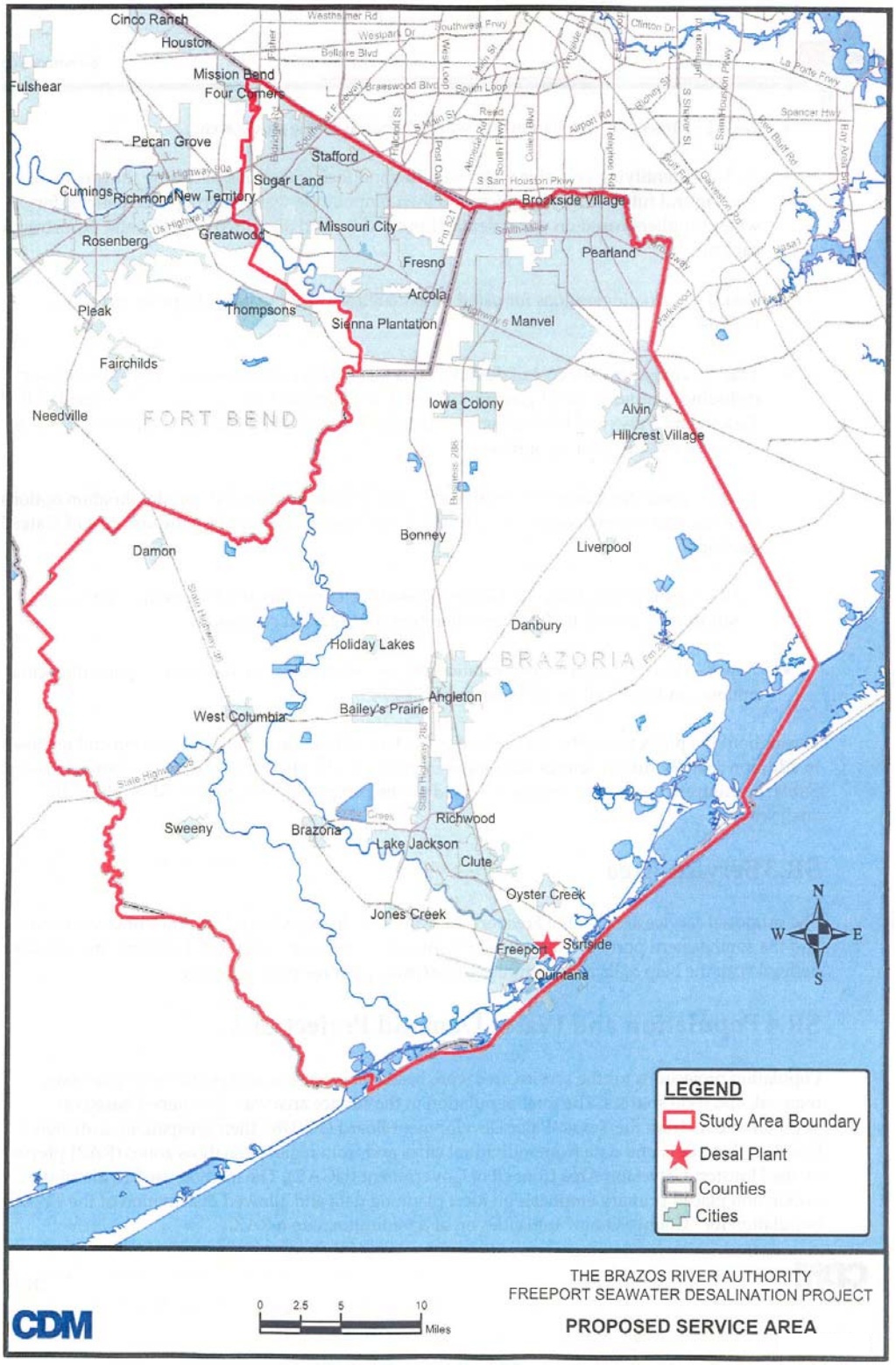
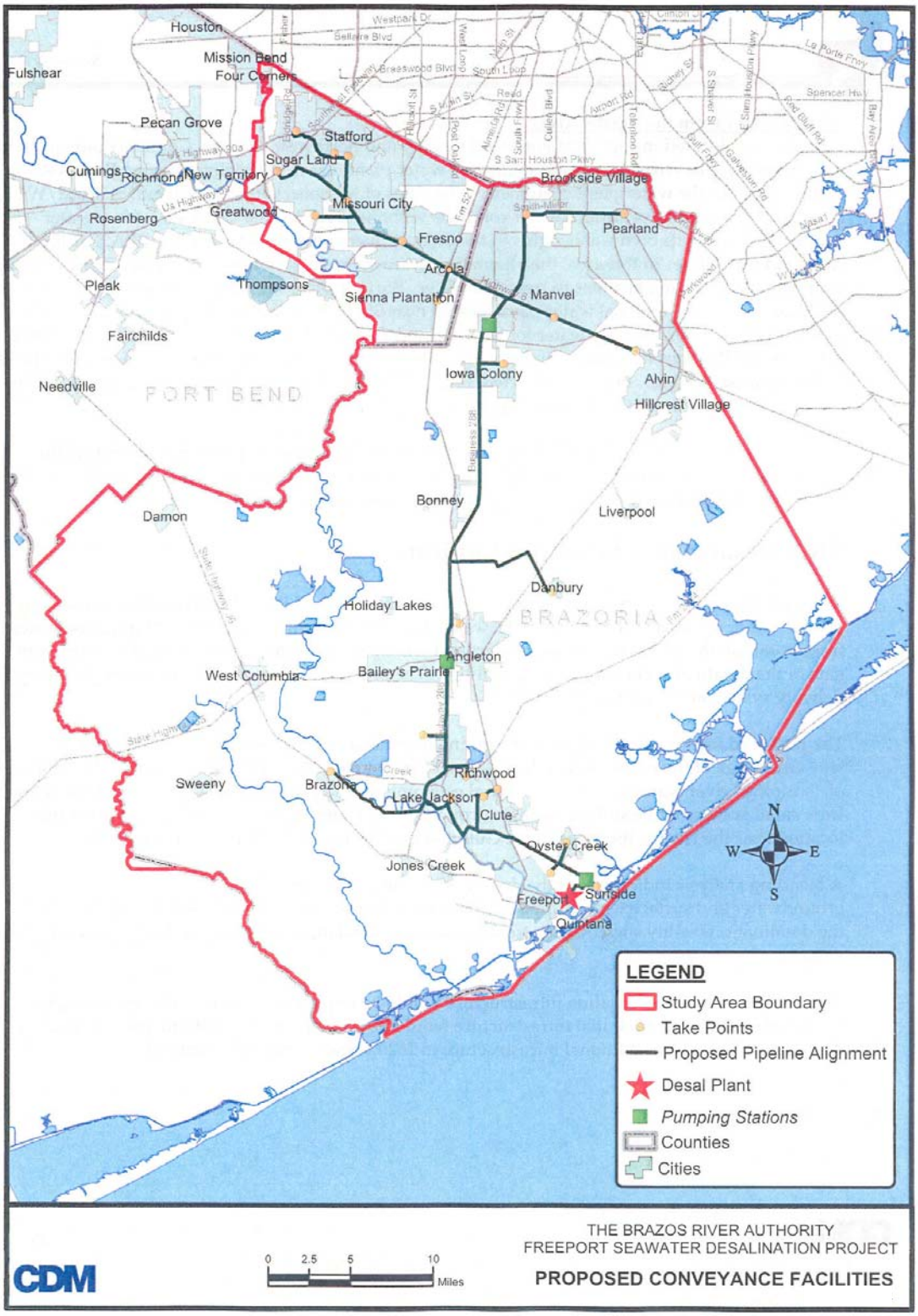


Figure 2: Proposed Conveyance Facilities



REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Brazos Saltwater Barrier
DATE:October 25, 2005

SUMMARY

STRATEGY DESCRIPTION: Lower Brazos Saltwater Barrier – Feasibility Study.

SUPPLY QUANTITY: Improve water supply reliability by potentially confining the salt wedge to downstream of the Brazoria Pump Station.

SUPPLY SOURCE: Brazos River

IMPLEMENTATION DECADE: 2020 to 2030

TOTAL STRATEGY COST: $30,300,000

UNIT WATER COST: n/a - This strategy does not increase yield but does improve water quality

INFLUENCE OF SALT-WATER WEDGE IN THE LOWER BRAZOS RIVER

Introduction

The Lower Brazos River is tidally influenced, with the extent of the area of brackish water fluctuating seasonally. Municipal and industrial water users in the Freeport area face water quality concerns as the saltwater wedge moves upstream of the Brazoria Pump Station during periods of low flow in the Brazos River. The purpose of this feasibility study is as follows:

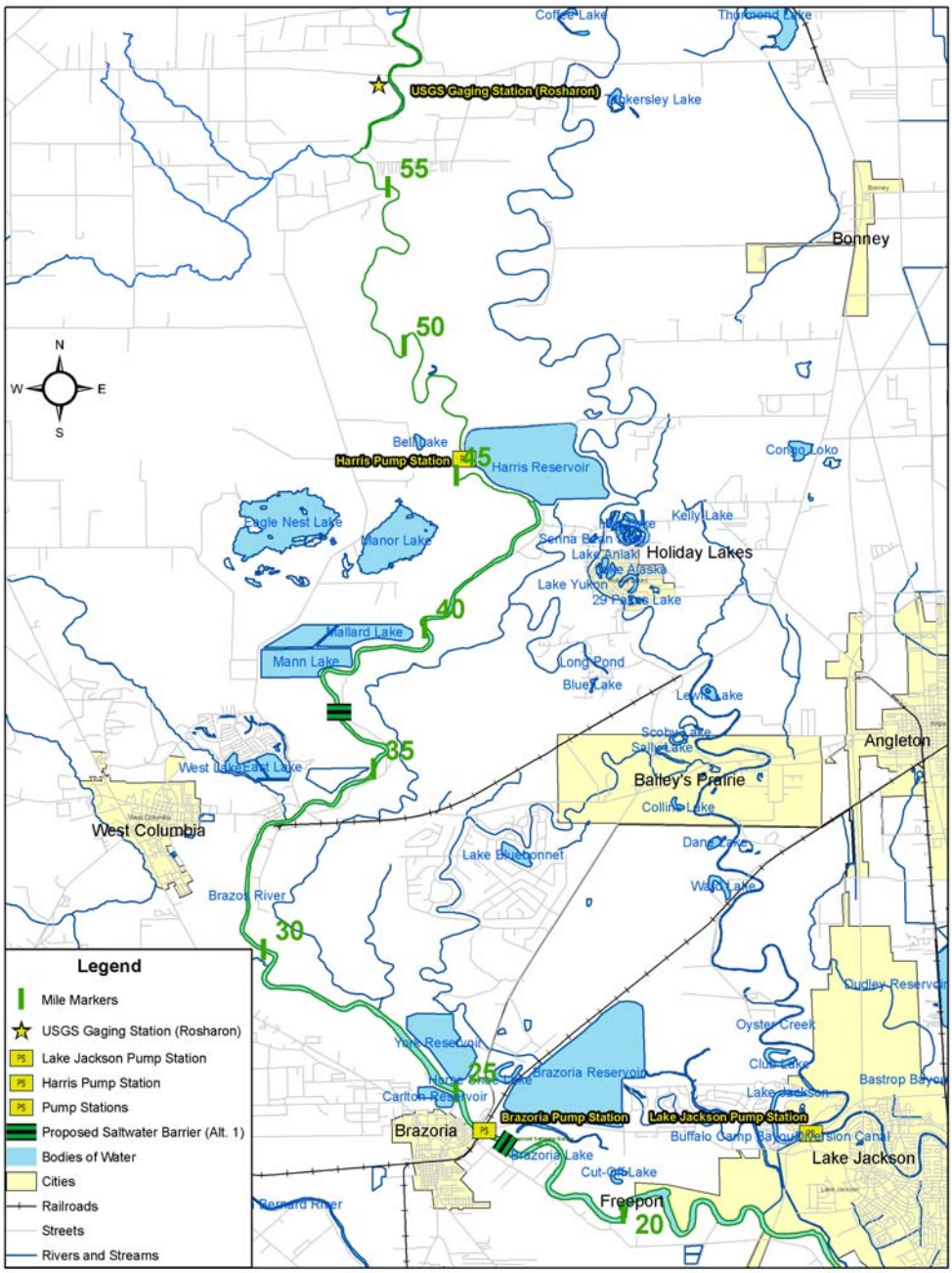
- Quantify the impact on local water users in terms of quality and reliability of fresh water supply.
- Determine the potential size, location and operating requirements for a saltwater barrier in the Brazos River.
- Determine the cost and feasibility of installing a pipeline from Harris Reservoir to Brazoria Reservoir to preserve water quality by avoiding utilizing the bed and banks of Oyster Creek.

Analysis

Background

There are many factors that affect the location of the salt wedge in the Brazos River. Figure 1 illustrates the Brazos River and notes key features that will form the basis of this analysis and discussion.

Figure 1 - Map of Lower Brazos River



The Dow Chemical Company owns water right 12-5328, which authorizes the diversion of 305,656 acre-feet per year from the Brazos River for industrial, municipal and irrigation use. Dow provides a portion of this supply to meet the needs of eight surrounding industries in Brazoria County. The Brazosport Water Authority (BWA) owns water right 12-5366, which authorizes the diversion of 45,000 acre-feet per year from the Brazos River for municipal use. The BWA provides treated water to the cities of Angleton, Brazoria, Clute, Freeport, Lake Jackson, Oyster Creek and Richwood, as well as two TDCJ prison units in Brazoria County. These are the two most-downstream water rights for municipal and industrial demand. The U.S. Department of Energy holds water right 12-5332 downstream at the mouth of the Brazos River, but it is primarily for mining (non-potable) use. Within Brazoria County there are several irrigation water right holders on the Brazos River, but all divert above Dow and BWA. Dow has a 16,000 ac-ft contract with Brazos River Authority for water quality releases.

Dow and the BWA share diversion and storage facilities along the Brazos River. As illustrated in Figure 1, the Brazoria pump station is located at river mile 24, and diverts river flows into the Brazoria Reservoir (off-channel). The reservoir is permitted to store 21,973 acre-feet of water. Water released from the reservoir flows into Buffalo Camp Bayou, and thence to the BWA treatment plant in Lake Jackson and the Dow inlet at their Freeport Plant. The Harris pump station is located at river mile 44, and diverts into Harris Reservoir (also off-channel). The reservoir is permitted to store 10,200 acre-feet of supply. Water released from Harris Reservoir flows into Oyster Creek above the City of Angleton, and is transferred to Buffalo Camp Bayou downstream at the Lake Jackson pump station.

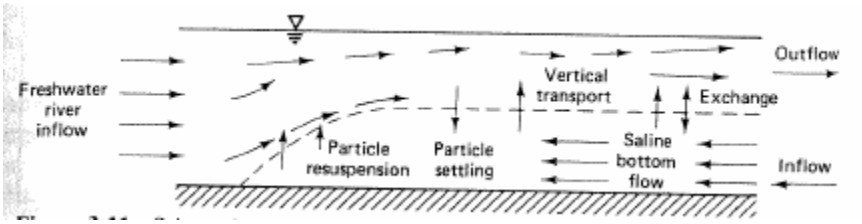
Local Influence of Salt Wedge

The TCEQ Water Quality Inventory defines the Brazos River as tidal below river mile 25, which corresponds to the observed situation at the Harris and Brazoria pump stations. Measured salinities at the Harris pump station range from 50 parts per million (ppm) to 200 ppm, which is typical for river flows. Measured salinities at the Brazoria pump station range from 100 parts per million (ppm) to values in excess of 10,000 ppm. Seawater has a salinity of 3.5%, or 35,000 ppm, causing the tidal reach of the Brazos River to become brackish during lower flows. (For comparison, typical values in Galveston Bay are approximately 15,000 ppm.) This brackish zone decreases in an upstream direction, and also stratifies within the channel, with the denser brackish water below the less-dense fresh water. This forms a triangular zone of brackish water, referred to as a salt wedge (see Figure 2). TCEQ Rule 30 TAC 290 – Public Drinking Water, defines a secondary standard for Total Dissolved Solids (TDS) less than 1,000 ppm. Due to the expense and effort required to desalinate brackish water, Dow and BWA divert at their upstream pump station (Harris) when salinities at Brazoria exceed approximately 500 ppm. Note that while seasonal use of the Harris intake is normal and expected, permanent use of this intake would effectively remove the Brazoria Reservoir from the Dow/BWA system, decreasing the yield due to the loss of storage capacity.

Figure 3 illustrates the salt content in ppm at the Brazoria and Harris pump stations vs. the Brazos River stream flow as recorded by the USGS station at Rosharon and is based upon data from January 1996 through December 2003. Note that the nearest USGS station is at Rosharon (mile marker 57) upstream of both Brazoria and Harris pump stations. The stream flow at Rosharon does not exactly correlate with the stream flow at Brazoria and Harris pump stations due to the distance between the locations and three irrigation water rights diversions which exist in this stretch of the Brazos River. There is, however, satisfactory correlation to conduct statistical trend analysis comparing stream flows to the salinity in the Brazos River at Brazoria and Harris pump stations. During periods of high flow in the Brazos, local streamflow pushes the salt wedge to the lower Brazos, downstream of the Brazoria pump station. The objective of this statistical analysis is to determine:

- What stream flow is required to keep the salt wedge below the Brazoria pump station and;
- What is the historical probability of Brazos stream flows exceeding this limit?

Figure 2 - Schematic of Two-Dimensional Flow in Estuary

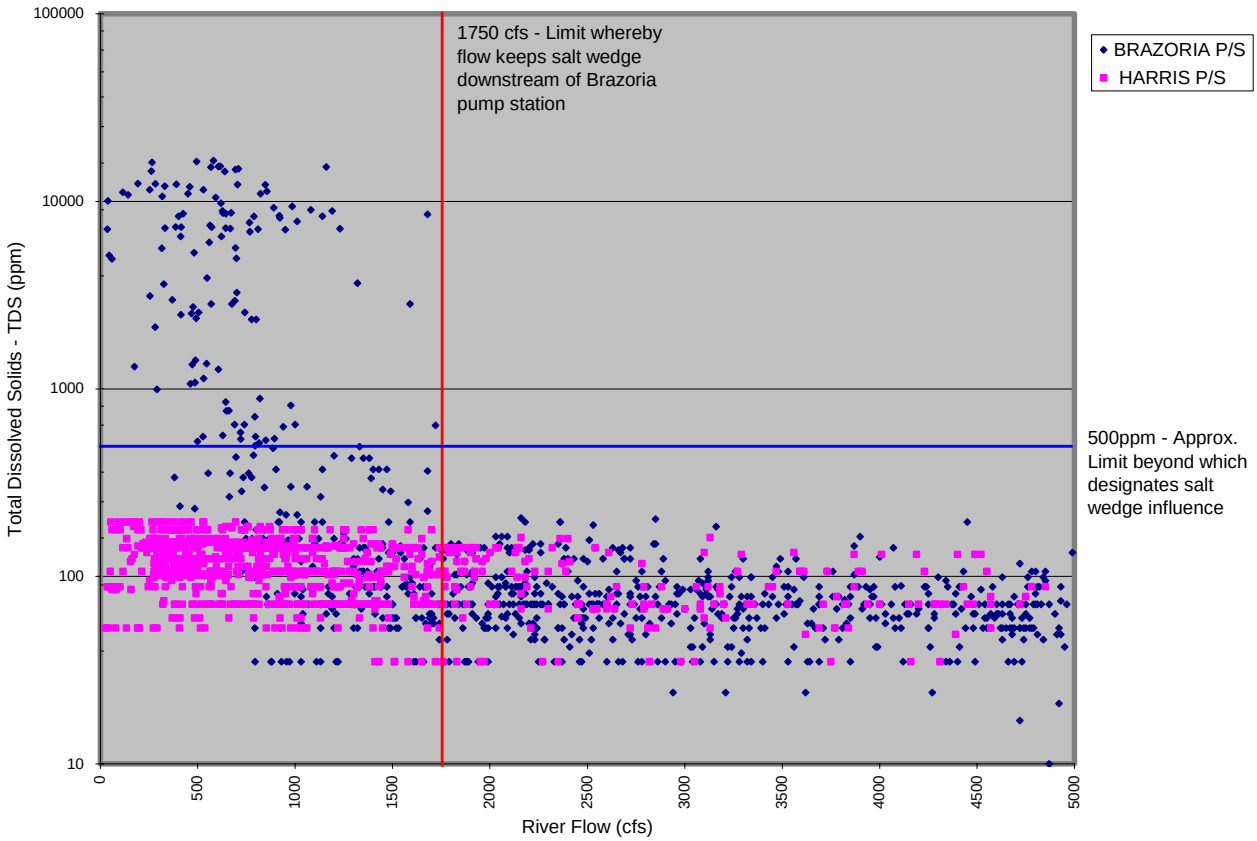


From Thomann, 1987

As illustrated in Figure 3, the salt wedge in the Brazos River does not currently reach the Harris Pump Station. The data also shows that the Brazoria Pump Station is intermittently affected by the salt wedge, particularly during periods when the flow in the Brazos River at Rosharon is less than 1750 cfs. Based on statistical analysis of stream flow data from the USGS Rosharon Gage, it is determined that 1750 cfs corresponds to the 33 percentile mark in the dataset. Therefore, historically the Brazos river stream flow has been insufficient to protect the Brazoria pump station from the salt wedge in a third of cases.

It should also be noted that all reliable flows in the lower Brazos River are fully allocated. That is, during drought of record conditions (and full consumptive use), there is only flow available to meet existing senior water rights. Return and unused flows, which currently maintain the salt wedge position, cannot be expected during drought conditions. Although not all of these flows will be diverted, the net flows in the lower Brazos will be reduced when compared to historical stream flow data, increasing the frequency of the salt wedge affecting the Brazoria pump station. Of particular concern are the Fort Bend Subsidence District groundwater reduction rules. Under the 2003 regulatory plan, communities in Fort Bend County must begin using surface water in 2013. The source of all or most of this water will be the Brazos River.

Figure 3 – Salinity Vs Stream Flow (Brazos River @ USGS Rosharon Gauging Station)

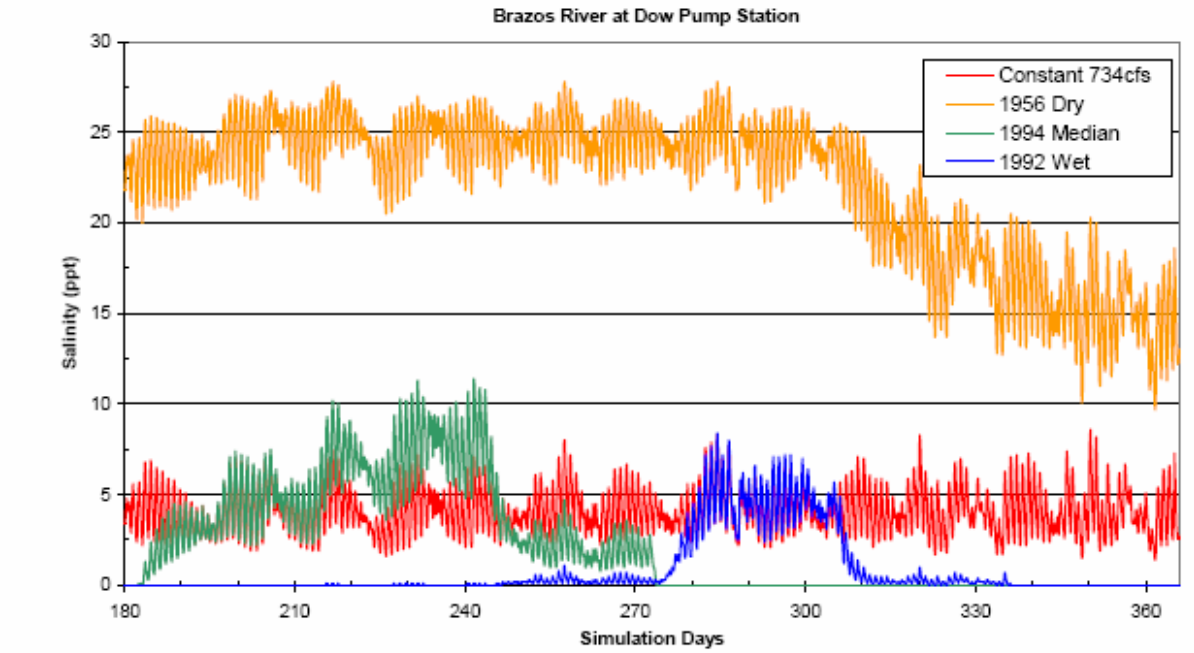


In the Analysis of Instream Flows for the Lower Brazos River (TWDB, 2004), the TXBLEND3D salinity model was created and calibrated for the Brazos River below SH 36. This model was then run using flows from representative years from the TCEQ Water Availability Model Run 3 (0% return flows), and at a constant flow based on the Allens Creek Reservoir permit condition. The results of the simulations are shown in Figure 4. As can be seen, under full-utilization, the salinity at the Brazoria pump station will exceed the 500 ppm limit (0.5 ppt) in all but the wettest months. In the Brazos G WAM used for planning in this report, some return flows are included. However, that only increases the lowest monthly flow in the simulation (July 1956) from 150 acre-feet to 1,260 acre-feet. That flow is equivalent to the flow in November 1956, resulting in a peak salinity of 21,000 ppm.

During the periods when the salt wedge pushes upstream of the Brazoria pump station, the Harris pump station is used to supply raw water to Dow Chemical and the Brazosport Water Authority. Between the Harris Reservoir and the Lake Jackson Pump Station, there are two wastewater plant discharges, and the Justice Scott State Prison Farm. The wastewater plants discharge up to 4.05 mgd of treated effluent into Oyster Creek. A review of the EPA NPDES database shows that both facilities are operating within their permit requirements (no exceedance violations), but there is an increase in nutrient loading nonetheless. The state farm is a potential source of non-point source pollutants, predominantly nitrogen and

phosphorus from fertilizers. These factors reduce the raw water quality of flows conveyed using the bed and banks of Oyster Creek. This reduced water quality increases the treatment cost, making it preferable to use to the Brazoria pump station to the greatest extent possible. It is expected that the majority of this additional cost is associated with the additional filtration needed. This additional filtration requires increased coagulant dosage (alum and other polymers) and a shortened cycle time for sand filters, thereby reducing their efficiency and increasing cost. There may also be additional cost for pathogen controls but this is not anticipated to be significant compared with water from the Brazoria pump station.

Figure 4 - Mid-depth, mid-channel salinity at the Dow Chemical diversion point using four different river flow scenarios



From Analysis of Instream Flows for the Lower Brazos River (TWDB, 2004)

As an alternative to using the Harris pump station, Dow and BWA may purchase stored water from the Brazos River Authority (BRA). The BRA operates a system of reservoirs in the middle and upper basin, and by releasing stored water for diversion downstream, the base flow of the Brazos River can be raised above the 1750 cfs required to hold the salt wedge below the Brazoria diversion point. This strategy has several drawbacks. First, the nearest BRA reservoir is over 100 river miles upstream, making any release subject to channel losses and erroneous diversions by other water rights holders. Second, it requires releasing stored water during the drier periods when the salt water wedge is not already controlled by the stream flows. Finally, the BRA requires payment for this water, with a current system rate of $44 per acre-foot. Using NPV analysis, the cost of additional water is more than the cost of additional treatment and pumping required during periods when the Harris pump station is used (see Table 4 later in this report).

The spring high tide for Freeport on the Brazos River is approximately 2.5-ft and it is evident from Figure 3 that the tidal influence extends beyond the Brazoria pump station. However, to ensure seasonal supply reliability for Dow Chemical and the regional water users, only the Harris pump station must be protected from the salt wedge. While some bathymetry exists from the 1988 FEMA flood study, the limited cross sections across the river only provide a small number of data points within the area of interest. In the section of the Brazos River between the Brazoria and Harris Pump Stations the channel bottom undulates between -33 to -9 feet (Datum - Mean Sea Level). Making a few assumptions, a basic estimation of the salinity at the Harris pump station may be made using the equations below. Based on this analysis (Table 1), the salt wedge clearly exerts no influence at the previously identified threshold of 1750 cfs. However, when the flow is modeled at 734 cfs, the tidal range of salinities at the Harris intake exceeds the desired limit of 500 ppm. It may be inferred that flows between 800 and 900 cfs will reliably protect the upper intake. When the drought-of-record conditions are modeled, the upstream salinities are greater than 90% of the salinity at the Brazoria intake.

$$s_x = s_0 \exp\left(\frac{Ux}{E}\right)$$ From Thomann, Eq. 3.11a

Where: s_x = salinity at a point x, for x<0
s_0 = salinity at a point x = 0
U = net non-tidal velocity = Q/A
x = distance (negative upstream, positive downstream)
E = coefficient of dispersion
A = WD (width x depth)

Assume a uniform channel between the Harris and Brazoria intakes:
W = 500 feet (from FEMA flood study, 1989)
D = 20 feet (from TWDB study, 2004)
A = 10,000 sq-ft
E = 250 m^2/s = 2700 ft^2/s (after Raina, 2004)
x = (25 mi – 44 mi) = -19 mi = -100,320 feet

Table 1 - Estimated salinity at Harris intake based on modeled salinity at Brazoria intake

S_0	Q	A	U	E	x	S_x
ppm	cfs	sq-ft	fps	ft^2/s	ft	ppm
400	1750	10,000	0.175	2,700	-100,320	0.6
5,000	734	10,000	0.073	2,700	-100,320	327.0
9,000	734	10,000	0.073	2,700	-100,320	588.6
27,000	2.4	10,000	0.000	2,700	-100,320	26,760.3
22,000	20.5	10,000	0.002	2,700	-100,320	20,386.5

These estimates are based on an assumption of full mixing, which is not likely to occur given the irregularity of the channel bathymetry. Additionally, both this estimate and the TXBLEND3D model assume uniform flow during the entire monthly period, which is also unlikely. A topic for follow-on study would be extension of the TXBLEND3D model to a

point above the Harris intake, with model runs using actual daily flows during low periods to better determine the relationship between these sites and the actual risk of salt intrusion.

In summary, all available evidence indicates that the salt wedge's influence does not currently extend to the Harris pump station. However, it is projected that future conditions of increased diversions and reduced return flows, coupled with a severe drought would allow the salinity to become unacceptable at the Harris pump station. It is recommended that additional bathymetry data should be obtained for future modeling studies as this project progresses. It should also be noted that the Brazoria Reservoir is important to ensure the yield of the Dow and BWA water rights. There are benefits from installing a saltwater barrier downstream of the Brazoria pump station under the current conditions, simply to decrease the raw-water conveyance and treatment costs, which will be investigated further in this report.

Conceptual Design for Saltwater Barrier

There are multiple differing design concepts for a saltwater barrier in the lower Brazos River. Based upon the influence of the saltwater wedge previously detailed in this report the barrier should be located downstream of the Brazoria pump station as shown in Figure 6.

Alternatively, the saltwater barrier could be located further upstream to protect only the Harris Reservoir. This may be more cost effective if current bathymetry data can be obtained so that a relatively narrower or shallower point in the river can be found, thus reducing the construction costs of a saltwater barrier (Figure 7). However, from the bathymetric data currently available, a location cannot be identified to show any calculable cost savings.

There are a number of issues that need to be considered during conceptual design including:

- Stream navigability.
- Regional flood levels.
- Environmental considerations

With regard to navigation requirements of the Brazos River, pleasure craft are the only known category that utilizes this section of the stream. During the course of this feasibility report the U.S. Corps of Engineers and the Port of Freeport were contacted to evaluate any commercial navigation requirements. They reported that very occasionally a commercial vessel travels up the lower Brazos River, but only to service Dow Chemical, which is downstream of the proposed barrier location and would not be impacted by the structure. For shallow-draft pleasure craft, a submerged barrier (weir or inflatable barrier) may be considered. However, during low flow periods, the depth of flow over a submerged barrier would be minimal and would pose a hazard to navigation. Additionally, an inflatable barrier would be at risk of puncture by debris carried by storm flows. Therefore, it is preferable to have a gated structure to ensure boating safety and navigability. A saltwater barrier recently completed on the Neches River (as shown in Figure 5) offers a conceptual design for this location (note the navigation channel at the upper left end of the structure). However, the

Neches River experiences more commercial traffic and therefore the gated structure for the Brazos is expected to be smaller.

To assess flooding potential, FEMA HEC-2 data and output were obtained for the lower Brazos region. The digital model was not available, but the data and output reports were reviewed with a view to the likely impact and significance of flooding resulting from the proposed saltwater barrier. The flood report details that in this region (between Brazoria and Harris reservoirs), local flooding is mainly influenced by raised local highways and railways crossing through the floodplain, which act as flood retarding structures as illustrated in Figure 8 and Figure 9. The impact from a major flood (1 in 100 years) will be primarily controlled by these retarding structures, but smaller storm events may have a local impact resulting from the proposed saltwater barrier. As the tidal range in the Brazos River is approximately 2.5-feet, the barrier should not be particularly high relative to the river banks, which will significantly limit the impact on upstream flooding. The conditions of sub-critical flow and relatively low barrier mean the local velocity can increase to adjust for reduced cross-sectional area as the water goes over the saltwater barrier, thereby minimizing the impact on upstream flood level. This is a very general overview of the potential flooding impact and detailed analysis of local flooding will need to be investigated for a variety of stream flow cases if this project were to be pursued. This analysis would require additional local survey data, particularly as the community of Brazoria is adjacent to the river in this location and the full range of stream flows in the Brazos will have varying hydraulic impacts as it goes over the proposed saltwater barrier. The existing FEMA study was undertaken in 1989 and reviewed as part of this study. The digital model is not available and therefore this survey, data collection and modeling will need to be undertaken as this project progresses.

Figure 5 – Neches River Saltwater Barrier

Photo by U.S. Army Corps of Engineers

Figure 6 – Proposed Saltwater Barrier Location (Alternate 1)

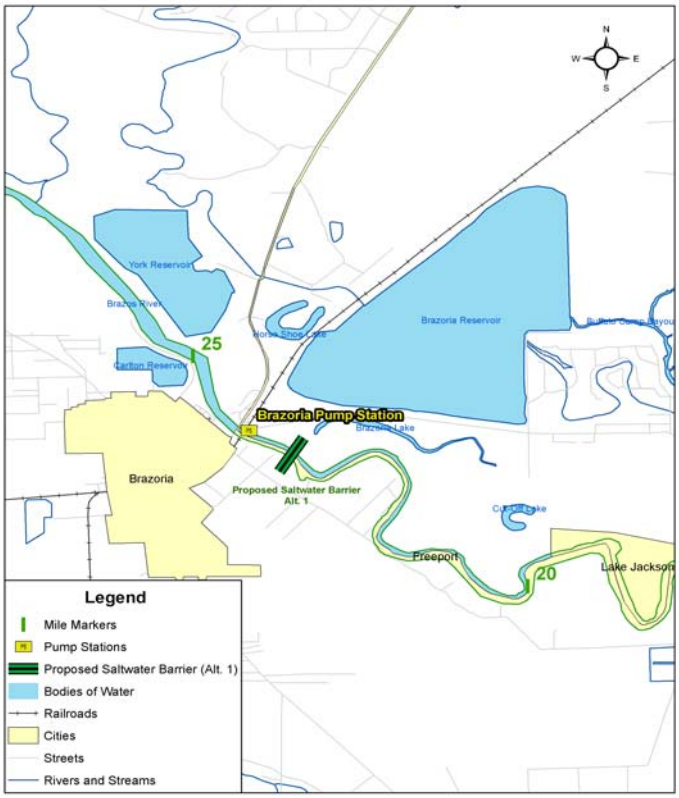


Figure 7 - Proposed Saltwater Barrier Location (Alternate 2)

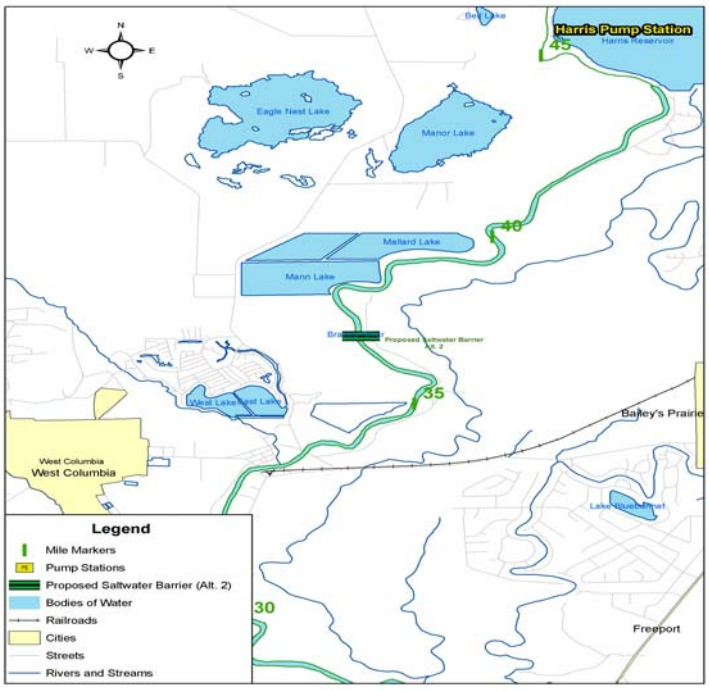


Figure 8 – Photo illustrating elevated highway across Brazos flood plain.

Figure 9– Photo illustrating elevated railway across Brazos flood plain (adjacent to Brazos River).

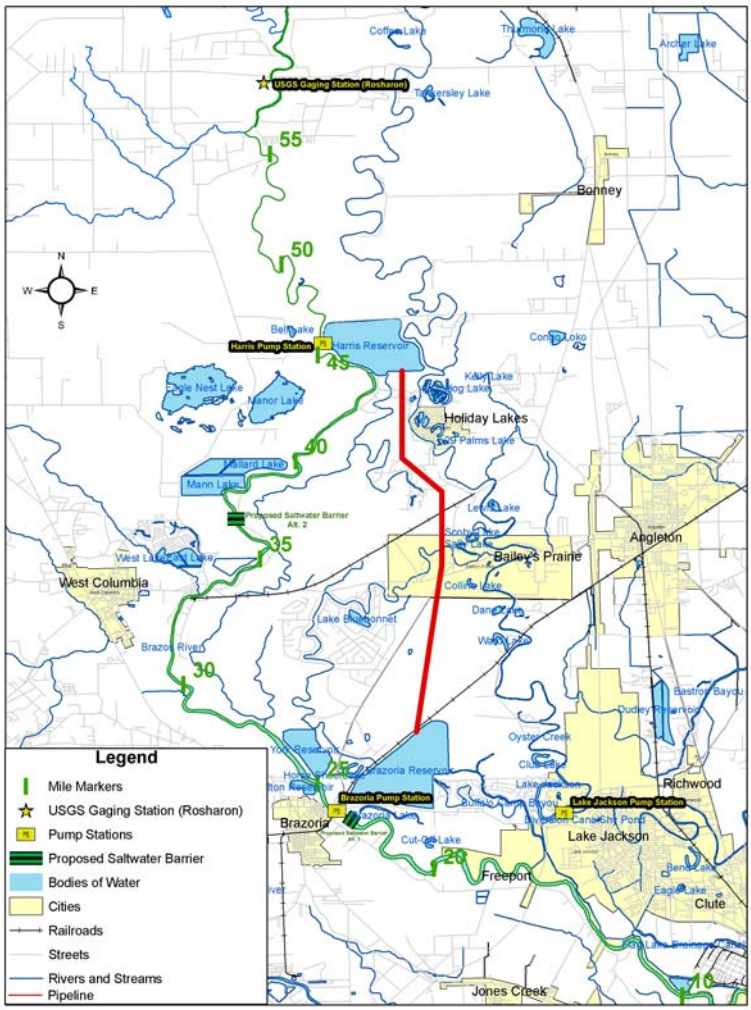
The construction of the proposed Brazos Saltwater Barrier may have both temporary and permanent impacts on the Brazos estuary, and the downstream and immediate upstream reaches of the Brazos River. Temporary construction may include such impacts as increased turbidity, BOD and contaminant loads in the river, depending on the nature of the sediment entering the river due to disturbance of river bottom sediments and adjacent upland areas. These impacts could be expected to occur in the project area and points downstream on the Brazos River to as far south as the Gulf of Mexico and the Brazos River Estuary. Long-term impacts would result from changes to flows in the River as a result of the operation of the barrier. These impacts could include impediments to fish migration, changes (reductions) in the amounts of sediments and nutrients reaching the Gulf of Mexico and Brazos Estuary, localized changes in hydrology of adjacent wetlands downstream of the facility, and increased sedimentation in the river channel immediately upstream of the barrier. It should be noted that the Brazos River Estuary is one of the smallest and least productive in the State. The project may also result in permanent impacts to any upstream reservoirs currently used to flush saltwater from the channel during periods of low flow. These could include more stable water levels in the lake, which in turn would result in higher productivity of the lake fisheries and increased value of the lake as a recreational resource.

Constructing the proposed Brazos Saltwater Barrier would require several state and federal permits. The project would require a Section 404\Section 10 permit from the U.S. Army Corps of Engineers, most likely an individual permit as opposed to one of the Nationwide Permits. If a bridge or other obstruction to navigation would result from the project, a Section 9 bridge permit from the U. S. Coast Guard would be required. Additionally, a Section 401 water quality certification would be required from the Texas Commission on Environmental Quality (as part of the Section 4040 permit). A Texas Pollution Discharge Elimination System general permit for construction would require submittal of a Notice of Intent and development of a Storm Water Pollution Prevention Plan (with monitoring of the construction site). If substantial materials are excavated from the River, a Sand, Marl and Gravel permit must be obtained from the Texas Parks and Wildlife Department and any structures placed in a tidal water of the State of Texas must be granted an easement from the Texas General Land Office unless exempted by law. Many of these permit actions would require secondary reviews, such as archeological and threatened and endangered species investigations of the project site.

Conceptual Design for Pipeline

Another possible solution to consider would be construction of a pipeline and booster pump station to convey Dow and BWA water directly from Harris Reservoir to Brazoria Reservoir without utilizing Oyster Creek. This will maintain water quality to so that treatment costs would be reduced. A 64-inch diameter pipeline would be needed to carry the total yield of both Dow and BWA permitted water rights. A conceptual alignment was chosen to estimate length of pipe (Figure 10). This is discussed as Option C, below.

Figure 10– Conceptual Pipeline Alignment



Economic Overview

To assess the economic viability of this project some comparative analysis was performed between various alternatives including:

- Option A1: Construction of a permanent saltwater barrier downstream of Brazoria Pump Station
  - A preliminary estimate has been prepared for construction of concrete saltwater barrier with a gated structure for pleasure craft navigability as summarized in Table 2.

- Option A2: Construction of a permanent saltwater barrier downstream of Harris Pump Station

- A detailed estimate cannot be prepared at this time without accurate bathymetric data. The available data indicates bathymetry similar to the Brazoria site, so an equal cost capital cost was assumed.

Table 2 – Preliminary Cost Estimate for Brazos River Salt Water Barrier downstream of Brazoria Pump Station

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST - Concrete SWB	1	LS	$ 20,400,000	$ 20,400,000
2	& CONTINGENCIES	1	LS	$ 8,364,000	$ 8,400,000
3	LAND & EASEMENTS	1	LS	$ 500,000	$ 500,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 1,000,000	$ 1,000,000
5	INTEREST DURING CONSTRUCTION - Assume 2 Years	1	LS	$ 2,732,580	$ 2,800,000
	PROJECT COST				**$ 30,300,000**

- Option B: Continue pumping from the Harris pump station when the Brazoria pump station is affected by the saltwater wedge.
  - Based on historical records the Brazoria pump station can be used in two-thirds of all circumstances as the Brazos stream flow is sufficient to contain the saltwater wedge downstream of the Brazoria pump station.
  - The Harris pump station will be used for the remaining third. Note that even though this is based upon historical flows as water users in the upper Brazos use more of their allocation in future years, it is expected that future years may have smaller flows generally in the Lower Brazos and therefore the Harris pump Station may need to be used more often. This has not been included in this option as it is based purely on historical data.
  - During periods when the Harris pump station is used (one third of the time) there are additional operating costs for the Lake Jackson pump station.
  - Both Dow Chemical and Brazosport Water Authority (BWA) are assumed to use their full water right allocation. This may be conservative as these entities may not use their entire allocation within any given year.
  - During periods when the Harris pump station is used there are also additional cost associated with the treatment for the full municipal water right for BWA (45,000 acft/yr). An estimated differential cost of $0.15 /1000gal is estimated based upon previous indirect reuse studies. As noted earlier in this report the majority of this additional cost is associated with the additional filtration needed however there may also be additional cost for pathogen controls but this is not anticipated to be a significant portion of the allocated $0.15 /1000gal cost.

- Option C: Construct a pipeline to avoid using the bed and banks of Oyster Creek and increased treatment cost.

- Based on full use of the Dow Chemical and Brazosport Water Authority (BWA) water rights, a 64-inch pipeline is required.
- The pipeline, booster pump station, and right-of-way acquisition cost is significant (see Table 3)
- As noted earlier in this report, the majority of this additional cost associated with the Harris Reservoir is for additional filtration. The cost of a new pipeline exceeds the additional treatment cost.

Table 3– Preliminary Cost Estimate for 64-Inch Diameter Pipeline and Pump Station

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 42,400,000	$ 42,400,000
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 17,400,000	$ 17,400,000
3	LAND & EASEMENTS	40	AC	$ 20,000	$ 800,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 5,500,000	$ 5,500,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 5,700,000	$ 5,700,000
	PROJECT COST				**$ 71,800,000**

- Option D: Comparison of the economics of releasing stored water to hold the salt wedge below the Brazoria pump station.
  - Currently historical data suggests that the stream flow is sufficient to contain the salt water wedge below the Brazoria pump time in two thirds of all cases. This corresponds to a required flow rate at the Rosharon gauge of 1750 cfs. Based on historical data the 25 percentile stream flow at the Rosharon gauge is 1340 cfs. It is proposed to release water in the upper Brazos when the flow is greater than 1340 cfs but less than 1750 cfs. The net result of this is that the Brazoria pump station can be used more often thereby reducing additional pumping and treatment costs.
  - The BRA requires payment for this released water, with a current system rate of $44 per acre-foot. This is assumed to be the cost of released water.

To set the preface for the comparative economic analysis the following assumptions were made over the four options:

- 4.75% cost of finance over a 30 year period and 1.75% inflation (3% real discount rate) per the published Corps of Engineers real discount rate.
- The operating cost for the Harris and Brazoria pump station is assumed to be equal and therefore economically there is no difference in pumping from either pump station.

Table 4– Net Present Value (NPV) Summary

OPTION	DESCRIPTION	NET PRESENT VALUE
PROJECT NPV SUMMARY		
A	CONSTRUCT SALT WATER BARRIER	$34,900,000
B	ALTERNATE BETWEEN HARRIS & BRAZORIA PUMP STATIONS (AS REQUIRED)	$18,000,000
C	CONSTRUCT PIPELINE & PUMP STATION	$71,800,000
D	RELEASE FROM UPPER BRAZOS TO INCREASE PROPORTION PUMPING AT BRAZORIA PUMP STATION	$36,000,000

As illustrated in Table 4 the Net Present Value for the additional annual operating cost associated with using the Harris pump station when the Brazos pump station is affected by the salt wedge is $18 million. Therefore for the saltwater barrier to be economically viable the construction cost must be less than this cost. The preliminary estimate was undertaken and is illustrated in Table 2. A similar saltwater barrier was constructed in the Neches River which is estimated at $53 million, which was considered when preparing the estimate. It is significantly greater than the current alternative of using the Harris pump station when the Brazoria pump station is affected by the saltwater wedge. The option of releasing stored water from the upper Brazos was significantly more expensive due to the cost of the water released and therefore was not considered further as part of this study. The option of constructing a pipeline to avoid the bed and banks of Oyster Creek to reduce treatment cost is the most costly option. However, the pipeline is sized for the carrying the entire yield of both the Dow and BWA water rights. Whereas the additional cost of pumping and treatment discussed in Option D was only for the amount of the municipal water right.

Conclusion

As is evident from the analysis, it is not economical at this time to install a salt water barrier . However, as upstream water use increases, less water will be available to push the salt wedge below the preferred Brazoria pump station and therefore increase the frequency of pumping from the Harris pump station. This will change the economic picture and it is projected that by the 2020 decade, as population growth and the Fort Bend Subsidence District rules result in greater water use from the Brazos River, the economic break even point will be reached. It will then be economical to install the salt water barrier downstream of the Brazoria pump station. The lead time for such a project is significant given the permit, environmental, design, engineering and construction requirements for a project of this size and sensitivity. Therefore planning and preliminary design work for the project should be undertaken in the near-term for the project to come online as a need arises.

References:

Analysis of Instream Flows for the Lower Brazos River - Hydrology, Hydraulics, and Fish Habitat Utilization, Tim Osting, Ray Mathews and Barney Austin, Surface Water Resources Division, Texas Water Development Board, June 2004

Development of a Cell-Based Streamflow Routing Model (Masters Thesis), Rajeev Raina, Texas A&M University, May 2004

Engineer Manual 1110-2-2602, Planning and Design of Navigation Locks, U.S. Army Corps of Engineers, September 1995

Engineer Manual 1110-2-2607, Planning and Design of Navigation Dams, U.S. Army Corps of Engineers, July 1995

Flood Insurance Study, Brazoria County, Texas, Federal Emergency Management Agency, June 1989, with supporting model information provided by FEMA

Principles of Surface Water Quality Modeling and Control, Robert A. Thomann and John A. Mueller, 1987, Chapter 3 – Estuaries, Bays and Harbors

ECONOMIC ANALYSIS

Paramaters/Assumptions	Option B	Option D	
Finance Rate	4.75%	4.75%	
Inflation Rate	1.75%	1.75%	
Period (years)	30	30	
Lake Jackson - Total Head (ft)	20	20	
Lake Jackson - Total Head (m)	6.10	6.096	
Lake Jackson - Pump Efficiency	75%	75.00%	
Dow Water Right (acreft/day)	837.41	837.41	
BWA Water Right (acreft/day)	123.29	123.29	
Pump Flow (m3/s)	13.72	13.72	
Pump Power (kW)	1090.25	1090.25	
Pump Hours per Day	24	24	
Percentile flow requirement in Brazos	33.33%	25%	
Days Pumped per Year	121.65	91.25	
Electricity Cost ($ per kW/h)	$ 0.06	$ 0.06	
Annual Operating Cost ($)	$ 190,992.94	$ 143,259.03	
Unit Treatment Cost ($/1000gal)	$ 0.15	$ 0.15	
Annual Treatment Cost	$ 733,086.90	$ 549,870.16	
Average Water Release to control salt wedge (cfs)	0	420	From Rosharon Statistical Data
Av time of release / yr (days)	0	30.4045	
Av. annual release (acft)	0	25329	
Cost/ acft	$ 44.00	$ 44.00	
Annual Release Cost	$ -	$ 1,114,471.83	

Option A: Construct SWB		Year							
	NPV	0	1	5	10	15	20	25	29
Capital Cost	$ 30,300,000								
Allowance for O&M - Assume 1% of Civil Cap Co	$4,556,280	$288,000.00	$288,000.00	$288,000.00	$288,000.00	$288,000.00	$288,000.00	$288,000.00	$288,000.00
	$34,900,000.00								

Option B: Pump from Harris 33% of the time (consistent with historical events)		Year							
	NPV	0	1	5	10	15	20	25	29
Lake Jackson Operating Cost	$3,703,820.75	$ 190,992.94	$ 194,335.31	$ 208,300.06	$ 227,175.50	$ 247,761.36	$ 270,212.64	$ 294,698.39	$ 315,875.13
Additional Treatment Cost (for BWA Component)	$14,216,350.03	$ 733,086.90	$ 745,915.92	$ 799,516.71	$ 871,966.17	$ 950,980.75	$ 1,037,155.36	$ 1,131,138.81	$ 1,212,421.35
	$18,000,000.00								

Option D: Pump from Harris 25% of the time (water released upstream to achieve this)		0	1		10	15	20	25	29
Lake Jackson Operating Cost	$2,778,143.38	$ 143,259.03	$ 145,766.06	$ 156,240.67	$ 170,398.66	$ 185,839.60	$ 202,679.75	$ 221,045.89	$ 236,930.04
Additional Treatment Cost (for BWA Component)	$10,663,328.86	$ 549,870.16	$ 559,492.89	$ 599,697.50	$ 654,040.03	$ 713,306.89	$ 777,944.31	$ 848,438.95	$ 909,406.95
Additional Release Cost	$21,612,337.72	$ 1,114,471.83	$ 1,133,975.08	$ 1,215,461.43	$ 1,325,602.37	$ 1,445,723.91	$ 1,576,730.44	$ 1,719,608.33	$ 1,843,177.72
	$36,000,000.00								

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: East Texas Water Transfer

DATE: February 22, 2005

SUMMARY

STRATEGY DESCRIPTION: Transfer surplus raw water supplies in the Sabine and/or Neches Basin to serve WUGs in Harris and Montgomery Counties.

SUPPLY QUANTITY: 26,762 acre-feet per year in 2020, increasing to 486,500 acre-feet per year by 2060

SUPPLY SOURCE: Sabine and/or Neches Rivers

IMPLEMENTATION DECADE: 2020

TOTAL STRATEGY COST: $568,428,000 (Sabine Basin)
$341,561,000 (Neches Basin)

UNIT WATER COST: $118 per acre-foot (Sabine Basin)
$80 per acre-foot (Neches Basin)

Water Management Strategy Analysis Description

Introduction

By 2020, significant shortages will appear within Montgomery County that can not be met by existing strategies. Additionally, Harris County will experience major shortages in the 2030 decade. This strategy evaluates importation of water from the Sabine and/or Neches River Basins to meet the projected shortfalls. Water will either be pumped from the Sabine River above Orange and conveyed via Sabine River Authority (SRA) canals to the Lower Neches Valley Authority (LNVA) canal system at the LNVA First Lift Pumping Station north of Beaumont or pumped from the Neches River to the LNVA canal systems. LNVA canals will carry the flow west and discharge it into the Trinity River where it can be diverted for use by water providers in the lower Trinity basin. Where possible, existing pumping stations and canals belonging to the SRA and the LNVA will be expanded to carry the additional flows. New canals, pumping stations and pipelines will be constructed where it is not feasible to use existing facilities. Attached

Figure 1 shows the pumping stations, pipelines and canals needed to transport water from the Sabine and Neches River to the Trinity River.

With East Texas water supplies to replenish the lower Trinity water, additional withdrawals of Trinity water can be made from Lake Livingston. An integral part of this strategy is a pipeline from Lake Livingston discharging into the West Fork of the San Jacinto River (see Figure 1). This segment ultimately flows into Lake Conroe and then diverted to meet demands throughout the San Jacinto River basin.

Analysis

Table 1 shows the projected shortfall in water supply for the Harris and Montgomery Counties. The Montgomery County shortages developing in 2020 will require the implementation of a significant water management strategy. In 2030, increasing Montgomery County shortages along with Harris County shortages will create a combined deficit of over 100,000 acre-feet per year. Ultimately, as much as 486,000 acre-feet per year of East Texas water will be required to meet shortages. Sufficient supplies of water exist in the Sabine and Neches River watersheds to satisfy all of these demands.

Physical facilities required by this strategy include the following:

- Pumping stations, canals and pipelines to convey Sabine River water to the Neches basin
- Pumping stations and canals to convey Sabine water across the Neches basin into the lower Trinity River
- Pumping stations and pipeline to convey water from Lake Livingston to the San Jacinto basin

Facilities were sized to account for canal losses (assumed to be 85 acre-feet per year per canal-mile) plus 20% for seasonal variations. Losses from the Trinity River and San Jacinto River discharge points to the receiving WWPs have not been included but will require consideration once the take points for those WWPs have been determined.

Sabine-to-Neches Segment: Sabine River water will be pumped from the river at a new pumping station adjacent to the SRA existing river intake. Water will be routed through upgraded SRA canals west to a new pumping station just north of I-10. A new canal will transport water west from this pumping station. A pipeline will carry the flow under the Neches River and deliver the water to the forebay of the LNVA First Lift Pumping Station. These facilities will be needed by 2030 and are estimated to cost $ 226,867,000. Including losses and seasonal peaks, these facilities are sized to deliver 525 mgd to the LNVA pumping station.

Neches-to-Trinity Segment: The existing pumping stations on the LNVA Main Canal have sufficient capacities to carry the added trans-basin flow. Minor upgrades to the Main Canal will be required. A new pumping station will be constructed on the Main Canal near its junction with the Nolte Canal. This facility will pump trans-basin flows

into a new canal extending west to a discharge point on the Trinity River. These facilities will be needed by 2030 and are estimated to cost $ 111,270,000. Including losses and seasonal peaks, these facilities are sized to deliver 521 mgd to the lower Trinity River.

Lake Livingston-to-San Jacinto Segment: All facilities in this segment will be new. A pump station with a lake intake located on the western shore of Lake Livingston near the town of Pointblank will pump the flows required in Montgomery County through a 96-in. pipeline to a booster pump station located west of the City of Huntsville. At this point, water will be discharged into the West Fork of the San Jacinto River and will flow into Lake Conroe. These facilities will be needed beginning in 2020 and are sized to deliver 155 mgd. Costs are estimated at $230,291,000.

A transfer of SRA water would require the use of all three segments and would have a total project cost of $568,428,000. Annual costs would range from $29.2 million in 2020 to $56.9 million in 2030. The average cost per acre-foot delivered over the 2030 to 2060 period is $118.

If water were purchased from the Neches River basin from LNVA supplies the segment between the Sabine and Neches Rivers would be unnecessary. Therefore, the total project cost would be reduced to $341,561,000 with annual costs ranging from $29.2 million in 2020 to $38.5 million in 2030. The cost per acre-foot delivered would also be reduced to $80.

It should be noted that these costs do not include the cost of purchasing the water since it is subject to negotiation between the seller (SRA/LNVA) and future buyers. Informal discussions indicate that the pricing of water will be based on "replacement cost" of alternative water supplies. Additionally, this cost includes no estimate for upgrades to existing conveyances required that would deliver Sabine or Neches River water from the Trinity and San Jacinto Rivers to customers. These costs would be considered by the WWPs sponsoring the East Texas transfer strategy.

It should be recognized that there is a significant difference within the total project cost of various segments. The total facilities cost of the transfer from the Sabine to the Trinity basin is estimated as $338,137,000. The facilities cost of the Trinity to San Jacinto basin transfer is approximately $230,291,000. This comparison suggests that approximately 40% of the total project cost ($568,428,000) is associated with the segment from the Trinity River to the San Jacinto River. Approximately 67% of the total project cost for a transfer of water from the Neches River to the San Jacinto River would be associated with the pipeline between Lake Livingston and the San Jacinto River. The Sabine to Trinity River and Neches to Trinity River routes would have a per unit cost of approximately $58.00 and $20.00 per acre-foot, respectively. In contrast, the Trinity to San Jacinto segment, alone, would have an estimated project cost of $188.00 per acre-foot.

Water User Group Application

This strategy transfers raw water from the Sabine and/or Neches Rivers to meet the projected needs of WUGs within Montgomery County experiencing shortages in 2020 and Harris County WUGs in 2030.

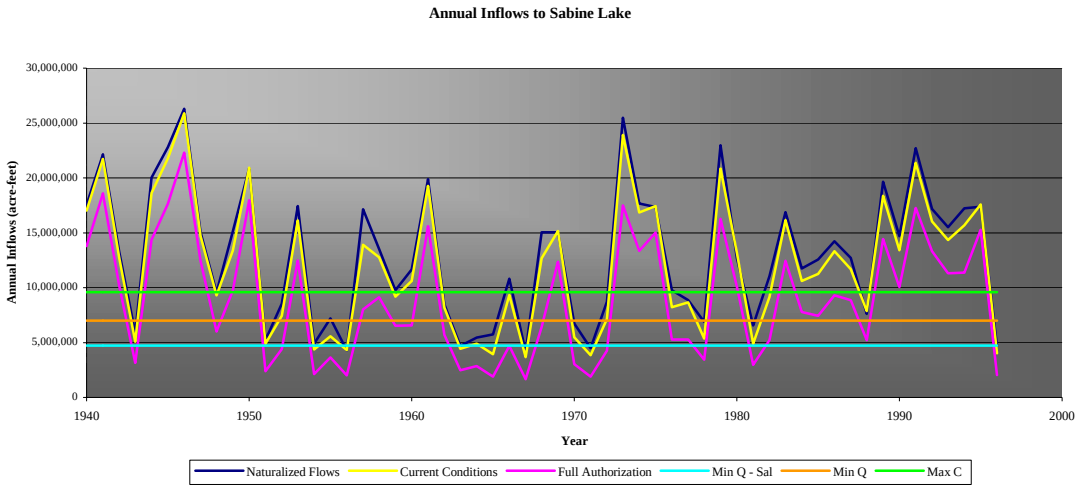
Issues and Considerations

As a result of Senate Bill 1, interbasin transfer water would have water rights junior to other water rights in the basin of origin. Although of concern, this issue may be less relevant in the case of a transfer from the Sabine River below the Toledo Bend Reservoir since the SRA is the only entity owning significant water rights in that segment of the river. This transfer, due to its magnitude, will be perceived as a sensitive management strategy requiring reconciliation of water valuation and other political issues. Valuation issues include the affect of periodic or prolonged low lake levels on property values and recreational revenues in Sabine and Shelby Counties.

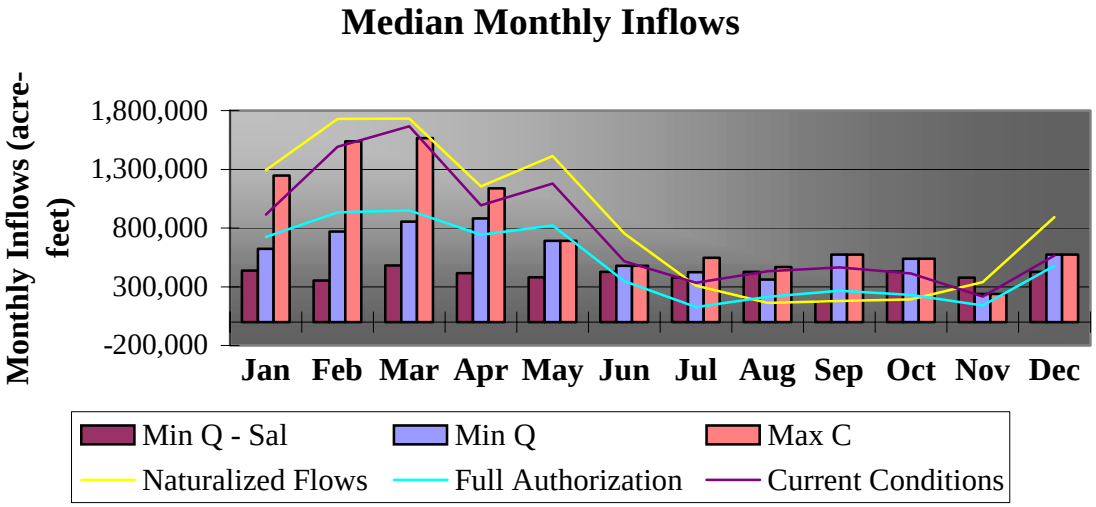
Discussions with representatives of the Region I Planning Group regarding the potential use of East Texas water within Region H occurred in February 2005. The discussions included the coordination of appropriate supply volumes potentially available for transfer to Region H after in-basin needs were fulfilled and in consideration of potential transfers of water to other planning regions including Region C. Further coordination between the Region H and Region I planning groups will be required as this strategy is more fully developed over time. Issues such as environmental impacts and basin of origin compensation will need to be addressed cooperatively by both planning groups to better enable this strategy to be implemented.

The State of Louisiana and local Sabine Lake water interests have historically voiced concern about a large-scale water transfer of the type outlined within this management strategy. This strategy will therefore require further environmental study before the ecological effects can be fully determined. Concerns may also arise regarding the introduction of Sabine and Neches River water into the Trinity basin and Trinity River water from Lake Livingston to the San Jacinto River basin.

The graph below illustrates the annual inflows to Sabine Lake from the Sabine and Neches Basins. The graph also compares inflows values from TCEQ WAM runs 3, 8, and naturalized conditions to target inflows developed by the TWDB and TWPD. The target inflows are Min Qsal, MinQ, and Max C. Min Qsal represents the minimum freshwater inflows to maintain an allowable salinity. MinQ represent the minimum freshwater inflows estimated to maintain a healthy fishery environment. MaxC represents the freshwater inflows at which the estuary production would be maximized.



Median monthly inflow quantities from the Sabine and Neches Rivers developed using naturalized, TCEQ WAM Run 3 and 8 are compared to Sabine Lake inflow targets in the graph below.



Currently, there is approximately 1,500,000 acre-feet per year of water permitted in Toledo Bend Reservoir in the Sabine River basin and approximately 820,000 acre-feet per year of water permitted in Sam Rayburn / Steinhagen Reservoir in the Neches River basin. Based on information in the 2001 Region I Water Plan, it is assumed that of the 820,000 acre-feet of water rights only 210,000 acre-feet per year is available for transfer into Region H. The 820,000 acre-feet per year represents the LNVA permitted supply and does not represent the maximum amount of firm water in Rayburn / Steinhagen Reservoir. Therefore, it was assumed that the remaining amount of supply from the Neches river basin would be comprised of new water rights permits and existing run-of-river water rights. Sabine River Authority of Texas holds approximately 750,000 of water in Toledo Bend Reservoir. Therefore, it was assumed that the full-authorization

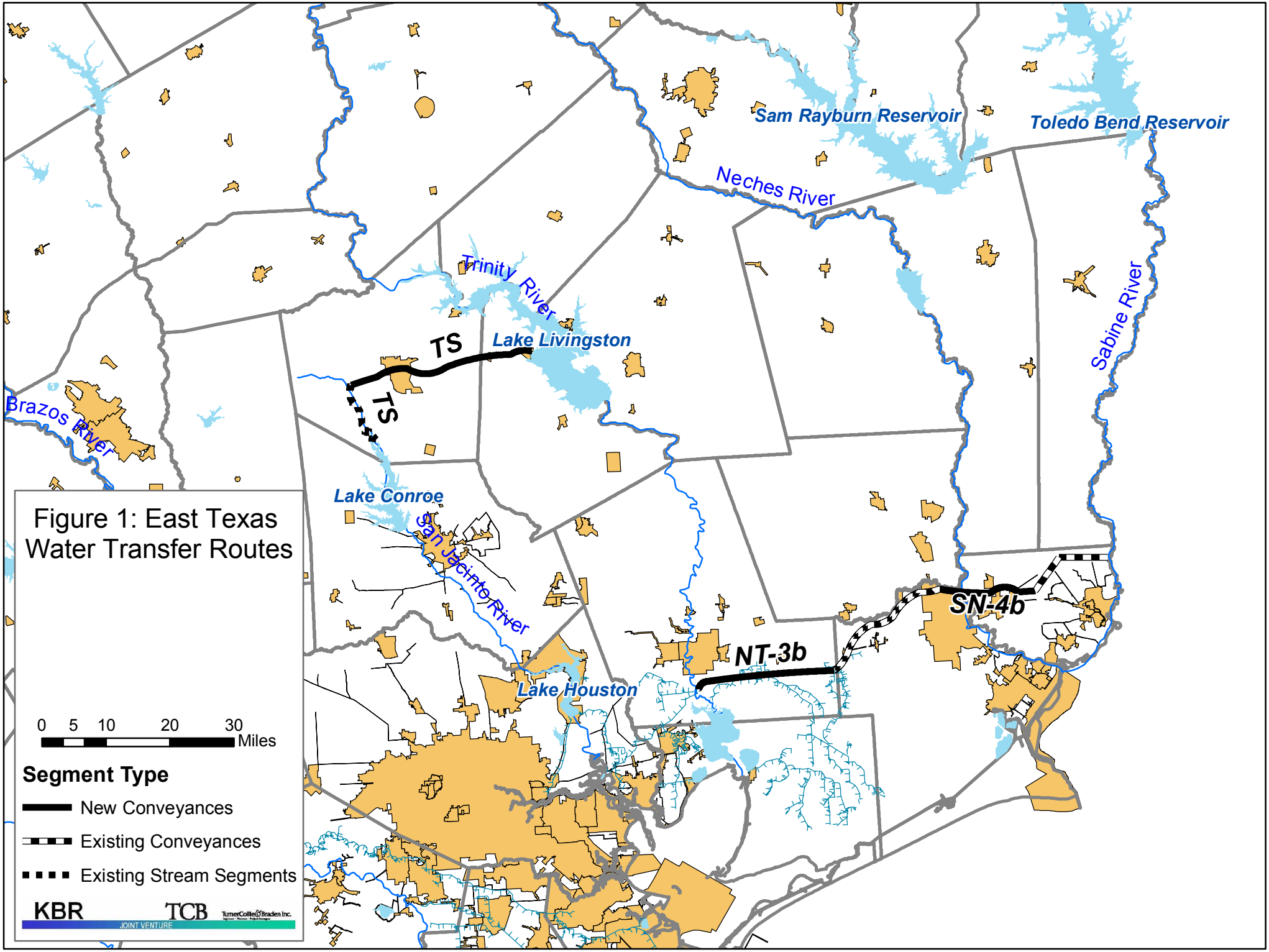
model (TCEQ WAM Run 3 model) would reflect the transfer of this water out of the river basins because the models do not include return flows. It is assumed that SRA-LA will participate in the transfer of water from Toledo Bend Reservoir. For reference purposes, the percent compliance of the Current Conditions and Naturalized Sabine Lake Inflows are compared in the table below to the Full-Authorization model with respect to estimated monthly inflow targets.

	Percent Compliance of Monthly Inflow Targets		
	Max C	**Min Qsal**	**Min Q**
Naturalized	48	66	56
TCEQ WAM Run 8 - Current Conditions	44	66	54
TCEQ WAM Run 3 - Full Authorization	29	52	38

Information was obtained from WAM Modeling conducted by Turner Collie & Braden Inc., dated 6-23-03.

When reviewing the naturalized flow conditions, the estimated bay and estuary inflow targets are met approximately 48, 66, and 56 percent of the time for Max C, Min Qsal, and Min Q, respectively. The percent inflow target compliance decreases when current water uses and return flows are added into the WAM and further decrease when currently permitted water is completely utilized and no return flows are incorporated into the WAM model. The Sabine Lake Bay and Estuary inflow targets, used to compare the various conditions discussed above, are estimated and not formally adopted by the State as targets. If instream flow requirements are required in the permit amendment process to change water use types and allow interbasin transfers, the amount of this water available for interbasin transfer could decrease. This decrease could potentially make this strategy less desirable due to financial and institutional constraints.

Other Environmental concerns related to construction within the upper West Fork of the San Jacinto River channel may also be an issue. Rectification of some segment of the river may be required. Increased use of stored water from Lake Livingston may result in periodic or prolonged low lake levels, which may adversely impact property values and recreational revenues in Walker, Trinity, San Jacinto and Polk Counties.


Sam Rayburn Reservoir
Toledo Bend Reservoir
Neches River
Trinity River
Sabine River
TS
Lake Livingston
TS
Brazos River
Lake Conroe
San Jacinto River
SN-4b
NT-3b
Lake Houston
Figure 1: East Texas Water Transfer Routes
0 5 10 20 30
Miles
Segment Type
New Conveyances
Existing Conveyances
Existing Stream Segments
KBR
TCB
JOINT VENTURE

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

NECHES RIVER TO TRINITY RIVER (NT-3b) CANAL TRANSFER

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$ 54,960,770	$ 54,960,770
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 19,236,270	$ 19,236,270
3	LAND & EASEMENTS	643	AC	$ 22,000	$ 14,137,200
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 16,625,968	$ 16,625,968
5	INTEREST DURING CONSTRUCTION	1	LS	$ 6,310,277	$ 6,310,277
	PROJECT COST				**$ 111,270,485**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**
1	DEBT SERVICE				$ 7,620,111	$ 7,620,111	$ 7,620,111
2	OPERATION & MAINTENANCE (O&M)				$ 739,373	$ 739,373	$ 739,373
3	PUMPING ENERGY COSTS				$ 1,024,923	$ 1,024,923	$ 1,024,923
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ -**	**$ -**	**$ -**	**$ 9,384,407**	**$ 9,384,407**	**$ 9,384,407**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 12,651,000	$ 12,651,000
2a	PIPELINES	1	LS	$ -	$ -
2b	PIPELINE CROSSINGS	1	LS	$ -	$ -
3	WATER TREATMENT PLANTS	1	LS	$ -	$ -
4	WATER STORAGE TANKS	1	LS	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	1	LS	$ -	$ -
6	WELL FIELDS	1	LS	$ -	$ -
7	DAMS & RESERVOIRS	1	LS	$ -	$ -
8	RELOCATIONS	1	LS	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	1	LS	$ -	$ -
10	STILLING BASINS	1	LS	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ -	$ -
12	OTHER ITEMS - CANAL EXPANSION	1	LS	$ 14,707,478	$ 14,707,478
13	OTHER ITEMS - NEW CANAL	1	LS	$ 27,602,292	$ 27,602,292
	PROJECT COST				**$ 54,960,770**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

NECHES RIVER TO TRINITY RIVER (NT-3b) CANAL TRANSFER

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 12,651,000	$ 316,275
2a	PIPELINES	0.010	%	$ -	$ -
2b	PIPELINE CROSSINGS	0.010	%	$ -	$ -
3	WATER TREATMENT PLANTS (see page before previous)	1	LS	$ -	$ -
4	WATER STORAGE TANKS	0.010	%	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0.010	%	$ -	$ -
6	WELL FIELDS	0.010	%	$ -	$ -
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS (see previous page)	1	LS	$ -	$ -
12	OTHER ITEMS - CANAL EXPANSION	0.010	%	$ 14,707,478	$ 147,075
13	OTHER ITEMS - NEW CANAL	0.010	%	$ 27,602,292	$ 276,023
	ANNUAL OPERATION & MAINTENANCE COST				**$ 739,373**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,000,000 * ln (Horsepower+148.5) - 20,000,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	New Lift Station, 596 MGD, 25' TDH	2615	HP	$ 12,651,000	$ 12,651,000
	PUMP STATIONS TOTAL COST				**$ 12,651,000**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
25	596	2615

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

NECHES RIVER TO TRINITY RIVER (NT-3b) CANAL TRANSFER

MISCELLANEOUS OTHER - CANAL EXPANSION
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 2002)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MISCELLANEOUS OTHER COST SUMMARY					
1	Compacted Fill	1,387,680	CY	$ 4.50	$ 6,244,560
2	Borrow Material	1,387,680	CY	$ 4.50	$ 6,244,560
3	Clearing	63	AC	$ 4,615	$ 289,453
4	Grubbing	63	AC	$ 4,615	$ 289,453
5	Grassing	63	AC	$ 4,615	$ 289,453
6	Check Structures	5	EA	$ 270,000	$ 1,350,000
	MISCELLANEOUS OTHER TOTAL COST				**$ 14,707,478**

MISCELLANEOUS OTHER - NEW CANAL
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 2002)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MISCELLANEOUS OTHER COST SUMMARY					
1	Excavation	2,116,800	CY	$ 2.50	$ 5,292,000
2	Compacted Fill	2,144,800	CY	$ 4.50	$ 9,651,600
3	Borrow Material	346,080	CY	$ 4.50	$ 1,557,360
4	Clearing	542	AC	$ 4,615	$ 2,501,699
5	Grubbing	232	AC	$ 4,615	$ 1,069,942
6	Grassing	363	AC	$ 4,615	$ 1,674,691
7	Check Structures	3	EA	$ 270,000	$ 810,000
8	Discharge Structures	1	EA	$ 433,000	$ 433,000
9	Fencing	21	MI	$ 134,000	$ 2,814,000
10	Access Road	21	MI	$ 65,000	$ 1,365,000
11	O&M Facilities	1	EA	$ 433,000	$ 433,000
	MISCELLANEOUS OTHER TOTAL COST				**$ 27,602,292**

PERMITTING, MITIGATION, & ENVIRONMENTAL STUDIES
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 1999)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PERMITTING & ENVIRONMENTAL STUDIES COST SUMMARY					
1	404 Permit	1	LS	$ 270,000	$ 270,000
2	404 Environmental Assessment	1	LS	$ 541,000	$ 541,000
3	Wetlands Mitigation	319	AC	$ 22,000	$ 7,022,400
4	Existing Canal Expansion Conflicts (Mitigation)	16	LS	$ 133,718	$ 2,096,698
5	New Canal Construction Conflicts (Mitigation)	39	EA	$ 170,813	$ 6,695,870

PERMITTING & ENVIRONMENTAL STUDIES TOTAL COST	$	16,625,968

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	New Lift Station Pumping Energy Costs	2615	HP	$ 1,024,923	$ 1,024,923
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				$ 1,024,923

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

SABINE RIVER TO NECHES RIVER (SN-4b) CANAL TRANSFER

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$141,354,550	$ 141,354,550
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 39,765,151	$ 39,765,151
3	LAND & EASEMENTS	523	AC	$ 22,000	$ 11,506,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 18,011,507	$ 18,011,507
5	INTEREST DURING CONSTRUCTION	1	LS	$ 16,229,510	$ 16,229,510
	PROJECT COST				**$ 226,866,717**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**
1	DEBT SERVICE				$ 15,292,261	$ 15,292,261	$ 15,292,261
2	OPERATION & MAINTENANCE (O&M)				$ 1,768,815	$ 1,768,815	$ 1,768,815
3	PUMPING ENERGY COSTS				$ 1,305,160	$ 1,305,160	$ 1,305,160
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ -**	**$ -**	**$ -**	**$ 18,366,236**	**$ 18,366,236**	**$ 18,366,236**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 23,684,600	$ 23,684,600
2a	PIPELINES	1	LS	$ -	$ -
2b	PIPELINE CROSSINGS (SIPHONS)	1	LS	$ 80,539,120	$ 80,539,120
3	WATER TREATMENT PLANTS	1	LS	$ -	$ -
4	WATER STORAGE TANKS	1	LS	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	1	LS	$ -	$ -
6	WELL FIELDS	1	LS	$ -	$ -
7	DAMS & RESERVOIRS	1	LS	$ -	$ -
8	RELOCATIONS	1	LS	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	1	LS	$ -	$ -
10	STILLING BASINS	1	LS	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS	1	LS	$ -	$ -
12	OTHER ITEMS - CANAL EXPANSION	1	LS	$ 20,896,585	$ 20,896,585
13	OTHER ITEMS - NEW CANAL	1	LS	$ 16,234,245	$ 16,234,245
	PROJECT COST				**$ 141,354,550**

REGION H
POTENTIALLY FEASIBLE WATER MANAGEMENT STRATEGY COST ESTIMATE

SABINE RIVER TO NECHES RIVER (SN-4b) CANAL TRANSFER

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 23,684,600	$ 592,115
2a	PIPELINES	0.010	%	$ -	$ -
2b	PIPELINE CROSSINGS (SIPHONS)	0.010	%	$ 80,539,120	$ 805,391
3	WATER TREATMENT PLANTS (see page before previous)	1	LS	$ -	$ -
4	WATER STORAGE TANKS	0.010	%	$ -	$ -
5	OFF-CHANNEL RESERVOIRS	0.010	%	$ -	$ -
6	WELL FIELDS	0.010	%	$ -	$ -
7	DAMS & RESERVOIRS	0.015	%	$ -	$ -
8	RELOCATIONS	0.010	%	$ -	$ -
9	WATER DISTRIBUTION SYSTEM IMPROVEMENTS	0.010	%	$ -	$ -
10	STILLING BASINS	0.010	%	$ -	$ -
11	WASTEWATER RECLAMATION PLANTS (see previous page)	1	LS	$ -	$ -
12	OTHER ITEMS - CANAL EXPANSION	0.010	%	$ 20,896,585	$ 208,966
13	OTHER ITEMS - NEW CANAL	0.010	%	$ 16,234,245	$ 162,342
	ANNUAL OPERATION & MAINTENANCE COST				**$ 1,768,815**

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,000,000 * ln (Horsepower+148.5) - 20,000,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	SRA canal pump station expansion, 241 mgd, 35' TDH	1480	HP	$ 10,363,000	$ 10,363,000
2	SRA canal pump station expansion added Intake Structure	1	LS	$ 2,072,600	$ 2,072,600
3	New canal lift station, 527 mgd, 20' TDH	1850	HP	$ 11,249,000	$ 11,249,000
	PUMP STATIONS TOTAL COST				**$ 23,684,600**

Expansion: 360.6 mgd -> 566.2 mgd

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
20	527	1850

SABINE RIVER TO NECHES RIVER (SN-4b) CANAL TRANSFER

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

Formula Basis for Estimating (not used)
Cost per LF = -0.0031*(Pipe Diameter in Inches)^3 + 0.392*(Pipe Diameter in Inches)^2 + 4.6215*(Pipe Diameter in Inches) - 524.17

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Highway 62 crossing siphon (2-120" siphons)	20	500	LF	$ 790	$ 395,000
2	Coles Creek crossing siphon (2-120" siphons)	20	500	LF	$ 790	$ 395,000
3	Neches River crossing siphon (2-120" siphons)	120	33792	LF	$ 2,360	$ 79,749,120
	PIPELINE CROSSINGS TOTAL COST					**$ 80,539,120**

MISCELLANEOUS OTHER - CANAL EXPANSION
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 2002)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MISCELLANEOUS OTHER COST SUMMARY					
1	Excavation	974,000	CY	$ 2.50	$ 2,435,000
2	Compacted Fill	2,142,000	CY	$ 4.50	$ 9,639,000
3	Borrow Material	1,314,000	CY	$ 4.50	$ 5,913,000
4	Clearing	135	AC	$ 4,615	$ 623,025
5	Grubbing	95	AC	$ 4,615	$ 438,425
6	Grassing	249	AC	$ 4,615	$ 1,149,135
7	Check Structures	3	EA	$ 233,000	$ 699,000
	MISCELLANEOUS OTHER TOTAL COST				**$ 20,896,585**

MISCELLANEOUS OTHER - NEW CANAL
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 2002)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MISCELLANEOUS OTHER COST SUMMARY					
1	Excavation	988,000	CY	$ 2.50	$ 2,470,000
2	Compacted Fill	1,024,000	CY	$ 4.50	$ 4,608,000
3	Borrow Material	184,000	CY	$ 4.50	$ 828,000
4	Clearing	388	AC	$ 4,615	$ 1,790,620
5	Grubbing	324	AC	$ 4,615	$ 1,495,260
6	Grassing	251	AC	$ 4,615	$ 1,158,365
7	Check Structures	2	EA	$ 233,000	$ 466,000
8	Fencing	15	MI	$ 134,000	$ 2,010,000
9	Access Road	15	MI	$ 65,000	$ 975,000
10	O&M Facilities	1	EA	$ 433,000	$ 433,000
	MISCELLANEOUS OTHER TOTAL COST				**$ 16,234,245**

PERMITTING, MITIGATION, & ENVIRONMENTAL STUDIES
CONSTRUCTION COSTS

Trans-Texas Water Program Estimate Basis (adjusted to Second Quarter 2002)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PERMITTING & ENVIRONMENTAL STUDIES COST SUMMARY					
1	404 Permit	1	LS	$ 270,000	$ 270,000
2	404 Environmental Assessment	1	LS	$ 541,000	$ 541,000
3	Wetlands Mitigation	425	AC	$ 22,000	$ 9,350,000
4	Existing Canal Expansion Conflicts (Mitigation)	14	LS	$ 133,718	$ 1,872,052
5	New Canal Construction Conflicts (Mitigation)	35	EA	$ 170,813	$ 5,978,455
	PERMITTING & ENVIRONMENTAL STUDIES TOTAL COST				**$ 18,011,507**

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	SRA canal pump station expansion Pumping Energy Costs	1480	HP	$ 580,071	$ 580,071
2	New canal lift station Pumping Energy Costs	1850	HP	$ 725,089	$ 725,089
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 1,305,160**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: TRA to SJRA Contract Via Lake Houston
DATE: JANUARY 14, 2005

SUMMARY

STRATEGY DESCRIPTION: Transfer 53,000 acre-feet per year of SJRA-owned supplies in the Trinity River and 59,000 acre-feet per year of TRA supply in Lake Livingston to Montgomery County, via Lake Houston, to meet projected shortages after in-basin supplies are fully utilized.

SUPPLY QUANTITY: 59,000 acre-feet per year (new TRA contract)

SUPPLY SOURCE: Lake Livingston (existing)

STARTING DECADE: 2050

TOTAL STRATEGY COST: $0 (Luce Bayou transfer analyzed separately)

UNIT WATER COST: TRA and COH contract sales cost TBD
$30 per acre-foot (Luce Bayou conveyance rate)

Water Management Strategy Analysis Description

Introduction

Montgomery County demands will exceed available groundwater and current surface water contracts beginning in year 2010. These water shortages are projected to grow from 6,800 acre-feet per year in 2010 to 150,600 acre-feet per year in 2060 (see Table 1). Currently, the San Jacinto River Authority (SJRA) is the only Wholesale Water Provider for the majority of the county. Under this strategy, in-county and in-basin supplies are fully utilized, and the remaining shortage is met through the purchase and transfer of Trinity River Authority (TRA) supply in Lake Livingston by the SJRA. The strategy requires the combined use of supplies owned by the SJRA, the City of Houston (COH) and the TRA.

Analysis

This strategy consists of first using unallocated COH supplies in Lake Conroe to meet Montgomery County needs. This may be accomplished through a water sales contract, either through SJRA as a wholesale water provider, or directly to a WUG such as Conroe, should it elect to construct an independent water treatment plant. This portion of the strategy carries

no major infrastructure cost, because the supplies are located at the point of use. Treatment and transmission facilities costs would be reflected at the WUG level.

The second phase of this strategy requires the full utilization of SJRA supplies within the San Jacinto Basin. As shown in Table 2, these supplies are available for diversion at Lake Houston. To provide treated water to the southern and eastern portions of Montgomery County, a treated water facility will need to be constructed, either in the vicinity of the existing SJRA pump station, or on the northeast bank of the lake near Luce Bayou. The latter location is preferable due to the possibility of transferring the remaining supply via the Luce Bayou Transfer.

The third phase of this strategy requires the transfer of SJRA supplies in the Trinity Basin to Lake Houston for use in Montgomery County. As seen in Table 2, this provides almost 53,000 acre-feet per year, and meets the projected demands through the 2040 decade. One of the SJRA water rights (08-4279) is not yet permitted for use in the San Jacinto Basin. In light of that fact, the yield of that right was reduced by 5% in this analysis. The most likely conveyance for this would be the Luce Bayou Transfer. Although another, independent conveyance might be constructed, Luce Bayou offers distinct advantages. First, it is already permitted as an inter-basin transfer route. Second, the City of Houston has a defined need to transfer a portion of their supplies to Lake Houston, offering an economy of scale. Finally, likely alternate routes pass through the Sam Houston National Forest, which increases the risk of adverse environmental impacts due to construction and maintenance activities.

Finally, to meet the shortages projected for the 2050 and 2060 decades, additional supplies must be obtained. The TRA is projected to have surplus supply remaining in Lake Livingston after other strategies are applied. This strategy proposes the SJRA entering into a contract for 59,000 acre-feet per year to meet the remaining Montgomery County demands, and conveying that supply via the Luce Bayou transfer as well.

Water User Group Application

The water conveyed into the San Jacinto River basin through this strategy would meet all projected shortages in Montgomery County throughout the planning period. Water available in Lake Conroe will be used to serve the northern portion of the county. Water made available at Lake Houston will serve the southern and eastern portions of the county. New treatment and transmission facilities will be required at each reservoir. These costs will be reflected in the WUG infrastructure cost estimates.

Environmental Impact

Additional transfer of Trinity River water supplies into the San Jacinto River basin will decrease freshwater inflows into the upper Trinity Bay estuary. Riverine flows should remain unchanged between Lake Livingston and the Coastal Water Authority diversion point. Downstream of the CWA diversion point, instream flows will decrease by approximately 1.7% (based upon both diversions totaling 155 cfs, compared to a 20-year average flow of 9100 cfs). This reduction potentially affects White-faced Ibis, Wood Stork

and Alligator Snapping Turtle habitats. Increased use of stored water from Lake Livingston may result in more frequent level fluctuations and prolonged low lake levels, which may adversely impact wetland areas along the lake perimeter. These fluctuations may also adversely affect property values and recreational revenues in Walker, Trinity, San Jacinto and Polk Counties.

The blending of Trinity and San Jacinto river supplies in Lake Houston will affect the water quality, and could potentially introduce invasive species to Lake Houston.

Return flows from this supply (typically 60% of the total diverted) will return to Galveston Bay via the San Jacinto River and Houston Ship Channel, affecting the spatial distribution of freshwater inflows to the bay. If the transfer were to occur instantly at its full amount, the impact on estuary species might be severe, particularly to oyster beds located in Trinity Bay. However, the full transition of this supply from the Trinity Basin to the San Jacinto basin is projected to occur gradually over a 40-year period, allowing sufficient time for species to migrate within the 20-mile width of Galveston Bay. Additionally, the size of the target diversion (155 cfs) is well within the current range of variation in annual flows (standard deviation over the last 20-years is just over 4100 cfs).

The Dallas-Fort Worth Metroplex is also projected to grow throughout the planning period. Wastewater return flows from that area flow into the Upper Trinity River. The Region C Water Plan recommends wastewater reuse as a management strategy for the upper basin, but it is anticipated that the upper basin will continue to provide flows to the Trinity, which will further off-set the impacts of this strategy.

Issues and Considerations

Although the supply infrastructure (Lake Livingston) is in place, the conveyance required for this transfer is not. The Luce Bayou transfer or a similar inter-basin pipeline must be constructed to move this supply into the San Jacinto Basin. See the Luce Bayou Transfer technical memorandum for a discussion of those costs and impacts.

Table1: Projected Water Shortages for Montgomery County

WUG	2010	2020	2030	2040	2050	2060
CONROE	-1,565	-4,022	-6,528	-9,461	-13,427	-18,201
CONSUMERS WATER INC	-35	-90	-148	-212	-305	-416
COUNTY-OTHER	-3,242	-9,834	-18,594	-29,625	-46,222	-66,583
CRYSTAL SPRNGS WATER COMPANY	-95	-259	-453	-690	-1,032	-1,445
CUT AND SHOOT	-1	-1	-2	-2	-3	-3
EAST PLANTATION UD	-73	-202	-356	-543	-810	-1,131
H M W SUD	-272	-692	-1,113	-1,588	-2,239	-3,007
HOUSTON	0	0	0	0	0	0
IRRIGATION	431	431	431	431	431	431
LIVESTOCK	0	0	0	0	0	0
MAGNOLIA	-2	-2	-2	-2	-3	-4
MANUFACTURING	-343	-884	-1,291	-1,672	-2,056	-2,442
MINING	-80	-193	-261	-315	-368	-413
MONTGOMERY COUNTY MUD #18	-282	-862	-1,698	-2,775	-4,322	-6,221
MONTGOMERY COUNTY MUD #19	-77	-172	-221	-257	-292	-320
MONTGOMERY COUNTY MUD #8	-155	-411	-698	-1,035	-1,512	-2,083
MONTGOMERY COUNTY MUD #9	-143	-401	-720	-1,112	-1,668	-2,342
MONTGOMERY COUNTY UD #2	-89	-197	-254	-294	-334	-365
MONTGOMERY COUNTY UD #3	-79	-189	-274	-362	-475	-607
MONTGOMERY COUNTY UD #4	-155	-346	-447	-517	-587	-642
MONTGOMERY COUNTY WCID #1	-81	-194	-283	-375	-494	-632
NEW CANEY MUD	-229	-607	-1,047	-1,549	-2,283	-3,166
OAK RIDGE NORTH	-114	-284	-444	-619	-854	-1,133
PANORAMA VILLAGE	-129	-327	-522	-669	-755	-827
PATTON VILLAGE	-1	-1	-1	-1	-1	-1
POINT AQUARIUS MUD	-112	-331	-630	-1,004	-1,545	-2,205
PORTER WSC	-309	-798	-1,313	-1,917	-2,155	-2,357
RAYFORD ROAD MUD	-350	-788	-1,019	-1,194	-1,355	-1,482
RIVER PLANTATION MUD	-139	-310	-398	-461	-521	-569
ROMAN FOREST	-1	-1	-2	-2	-2	-3
SHENANDOAH	-86	-192	-249	-288	-324	-355
SOUTHERN MONTGOMERY COUNTY MUD	-298	-815	-1,049	-1,222	-1,386	-1,517
SOUTHWEST UTILITIES	-40	-104	-171	-247	-353	-482
SPLENDORA	-1	-1	-2	-2	-3	-4
SPRING CREEK UD	-85	-225	-388	-586	-869	-1,210
STANLEY LAKE MUD	-114	-330	-428	-498	-565	-618
STEAM ELECTRIC POWER	4,151	1,761	57	-1,815	-4,140	-6,885
THE WOODLANDS	-2,459	-10,081	-14,022	-16,360	-18,464	-20,204
WILLIS	-95	-246	-403	-594	-853	-1,171
WOODBRANCH	-1	-1	-1	-1	-1	-1
TOTAL SHORTAGE*	-6,750	-32,201	-54,944	-79,435	-112,147	-150,616

*Shortages based on sustainable groundwater yield and current surface water contracts.
Figures do not reflect potential demand reductions through conservation.

Table 2: Surface Supply sources for Montgomery County

TOTAL SHORTAGE (from Table 1)	-6,750	-32,201	-54,944	-79,435	-112,147	-150,616
Available Supply in Montgomery County*						
Gulf Coast Aquifer	0	0	0	0	0	0
Lake Conroe - SJRA	8,035	7,661	7,287	6,913	6,539	6,165
Lake Conroe - COH	49,442	4,203	2,223	1,452	726	0
Livestock Local Supply	0	0	0	0	0	0
TOTAL SUPPLY	57,477	11,864	9,510	8,365	7,265	6,165
* Values reflect supply after meeting current contracts. Lake Conroe yield declines due to sedimentation estimates.						
REMAINING SHORTAGE	**50,727**	**-20,337**	**-45,434**	**-71,070**	**-104,882**	**-144,451**
SJRA Supply at Lake Houston						
Water Right 10-4964 (after current contracts)	20,572	20,572	20,572	20,572	20,572	20,572
Water Right 10-5809 (Reuse)	14,944	14,944	14,944	14,944	14,944	14,944
SUB-TOTAL	35,516	35,516	35,516	35,516	35,516	35,516
REMAINING SHORTAGE after Lake Houston Supply	86,243	15,179	**-9,918**	**-35,554**	**-69,366**	**-108,935**
Trinity Water Supply Available for SJRA via Luce Bayou Transfer						
Trinity Water Right 08-5271B	24,326	24,326	24,326	24,326	24,326	24,326
Trinity Water Right 08-4279A (value reflects 5% conveyance loss)	28,500	28,500	28,500	28,500	28,500	28,500
SUB-TOTAL	52,826	52,826	52,826	52,826	52,826	52,826
REMAINING SHORTAGE after Trinity Supply	139,069	68,005	42,908	17,272	**-16,540**	**-56,109**
Potential TRA Contract Size (5% overage for losses)					18,000	59,000

TABLE 2
COST ESTIMATE

TRANSFER FROM LAKE LIVINGSTON TO LAKE CONROE

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PROJECT COST SUMMARY					
1	CONSTRUCTION (CAPITAL) COST	1	LS	$156,421,600	$ 156,421,600
2	ENGINEERING, FINANCIAL & LEGAL SERVICES, AND CONTINGENCIES	1	LS	$ 48,305,760	$ 48,305,760
3	LAND & EASEMENTS	232	AC	$ 22,000	$ 5,104,000
4	ENVIRONMENTAL - STUDIES & MITIGATION	1	LS	$ 2,500,000	$ 2,500,000
5	INTEREST DURING CONSTRUCTION	1	LS	$ 17,959,421	$ 17,959,421
	PROJECT COST				**$ 230,290,781**

ITEM	DESCRIPTION	ANNUAL TOTAL					
ANNUAL COST SUMMARY		**2000**	**2010**	**2020**	**2030**	**2040**	**2050**
1	DEBT SERVICE			$ 15,415,257	$ 15,415,257	$ 15,415,257	$ 15,415,257
2	OPERATION & MAINTENANCE (O&M)			$ 1,978,000	$ 1,978,000	$ 1,978,000	$ 1,978,000
3	PUMPING ENERGY COSTS			$ 11,758,196	$ 11,758,196	$ 11,758,196	$ 11,758,196
4	PURCHASE OF WATER						
	TOTAL ANNUAL COST	**$ -**	**$ -**	**$ 29,151,453**	**$ 29,151,453**	**$ 29,151,453**	**$ 29,151,453**

ALL FACILITIES
CONSTRUCTION COSTS

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CONSTRUCTION COST SUMMARY					
1	PUMP STATIONS	1	LS	$ 27,585,600	$ 27,585,600
2a	PIPELINES	1	LS	$128,436,000	$ 128,436,000
2b	PIPELINE CROSSINGS	1	LS	$ 400,000	$ 400,000
12	OTHER ITEMS	1	LS		$ -
	PROJECT COST				**$ 156,421,600**

ALL FACILITIES
OPERATIONS & MAINTENANCE (O&M) COSTS

Formula Basis for Estimating
Pipelines, Distribution Facilities, Tanks, & Wells O&M Cost = 0.010 * (Total Construction Cost)
Dams & Reservoirs O&M Cost = 0.015 * (Total Construction Cost)
Intake Structures & Pump Stations O&M Cost = 0.025 * (Total Construction Cost)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
OPERATION & MAINTENANCE (O&M) COST SUMMARY					
1	PUMP STATIONS	0.025	%	$ 27,585,600	$ 689,640
2a	PIPELINES	0.010	%	$128,436,000	$ 1,284,360
2b	PIPELINE CROSSINGS	0.010	%	$ 400,000	$ 4,000
12	OTHER ITEMS	0.010	%	$ -	$ -
	ANNUAL OPERATION & MAINTENANCE COST				**$ 1,978,000**

TABLE 2
COST ESTIMATE

TRANSFER FROM LAKE LIVINGSTON TO LAKE CONROE

PUMP STATIONS
CONSTRUCTION COSTS

Formula Basis for Estimating (same formula as Table uses)
Cost = 4,000,000 * ln (Horsepower+148.5) - 20,000,000

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION COST SUMMARY					
1	Pump Station #1	30000	HP	$ 22,988,000	$ 22,988,000
2	Pump Station #1 added Intake Structure	1	LS	$ 4,597,600	$ 4,597,600
3	Pump Station #1 added Standby Power	0	LS	$ 8,045,800	$ -
	PUMP STATIONS TOTAL COST				**$ 27,585,600**

Horsepower calculator		
TDH (ft)	Capacity (MGD)	Horsepower (HP)
1102	155	29980

PIPELINES
CONSTRUCTION COSTS

Table Basis for Estimating

Formula Basis for Estimating (not used)
Rural Cost per LF = 2.6606 * (Pipe Diameter in Inches)$^{1.2129}$
Urban Cost per LF= 4.4167 * (Pipe Diameter in Inches)$^{1.2132}$

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE COST SUMMARY						
1	Urban Pipeline	96	26400	LF	$ 1,215	$ 32,076,000
2	Rural Pipeline	96	132000	LF	$ 730	$ 96,360,000
	PIPELINES TOTAL COST					**$ 128,436,000**

PIPELINE CROSSINGS
CONSTRUCTION COSTS

Table Basis for Estimating

Formula Basis for Estimating (not used)
Cost per LF = -0.0031*(Pipe Diameter in Inches)^3 + 0.392*(Pipe Diameter in Inches)^2 + 4.6215*(Pipe Diameter in Inches) - 524.17

ITEM	DESCRIPTION	DIAMETER	QUANTITY	UNIT	UNIT PRICE	TOTAL
		(IN)	(LF)			
PIPELINE CROSSING COST SUMMARY						
1	Pipeline Crossing	96	200	LF	$ 2,000	$ 400,000
	PIPELINE CROSSINGS TOTAL COST					**$ 400,000**

TABLE 2
COST ESTIMATE

TRANSFER FROM LAKE LIVINGSTON TO LAKE CONROE

PUMP STATIONS
PUMPING ENERGY COSTS

Formula Basis for Estimating
Cost = $0.06 * 0.7456999 kW/HP * 24 hrs/day * 365 days/yr * (Pump Station Horsepower)

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
PUMP STATION ANNUAL PUMPING ENERGY COST SUMMARY					
1	Pump Station #1 Pumping Energy Costs	30000	HP	$ 11,758,196	$ 11,758,196
	PUMP STATION ANNUAL PUMPING ENERGY TOTAL COST				**$ 11,758,196**

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Allens Creek Reservoir
DATE: February 3, 2005

SUMMARY

STRATEGY DESCRIPTION**:** Construction of an off-channel reservoir in Austin County, to hold peak flows diverted from the Brazos River. Run-of-river diversions to the reservoir are indexed to in-stream flow levels. Water would be available to meet demands in Austin, Brazoria, Fort Bend, Galveston, Harris and Waller Counties.

SUPPLY QUANTITY: 99,650 acre-feet per year

SUPPLY SOURCE: Brazos River

TOTAL STRATEGY COST: $170,040,000

UNIT WATER COST: $131 per acre-foot

Water Management Strategy Analysis Description

Introduction

The Allens Creek Reservoir site is located on Allens Creek, a tributary to the Brazos River in Austin County, 1 mile north of the City of Wallis (see Figure 1). The site was originally permitted by Houston Lighting and Power as a cooling water reservoir for a proposed nuclear power plant. The site was later jointly purchased by the Brazos River Authority and the City of Houston. A water right permit has been issued for this project to the Texas Water Development Board, Brazos River Authority (BRA) and the City of Houston for use of 99,650 acre-feet per year for municipal, industrial and irrigation purposes. The water is permitted for inter-basin transfer to the San Jacinto and San Jacinto-Brazos basins. 70% of the permit (69,750 acre-feet per year) is owned by the City of Houston, and 30% of the permit (29,900 acre-feet per year) is owned by the BRA. The maximum dam height is 53-feet, and the conservation storage is approximately 145,500 acre-feet at an elevation of 121.0 feet msl.

Analysis

This project is configured as a scalping reservoir that would divert peak (storm water) flows from the Brazos River and impound these flows into the reservoir to create storage yield. The permit conditions are based upon the consensus criteria for environmental flow needs. Specifically when monthly flows in the Brazos River before this diversion are above the

naturalized median flow, diversions shall not cause the flow to fall below that naturalized median flow. When monthly flows in the Brazos River before this diversion are below median but above the above the naturalized 25th percentile flow, diversions shall not cause the flow to fall below that naturalized 25th percentile flow. When monthly flows in the Brazos River before this diversion are less than the naturalized 25th percentile flow, diversions shall not cause the flow to fall below 734 cfs. Additionally, the permit requires the following instantaneous flow rates to be met immediately downstream of the diversion point before diversions may be made.

Table 1: Required Minimum Downstream Flow Rates (cfs)

JAN	FEB	MAR	APR	MAY	JUN
795	795	812	882	882	1017
JUL	AUG	SEP	OCT	NOV	DEC
1017	1017	882	812	812	795

The Brazos River Authority has applied to the TCEQ for a Systems Operations Permit, which would increase the yield of their reservoir system. In the BRA model, when Allens Creek Reservoir is added, the BRA can realize an additional 10,000 acre-feet per year of system yield (in addition to the original 99,650 acre-feet per year yield).

The cost data used in this plan was obtained from the permitting studies for Allens Creek Reservoir, adjusted to 2nd Quarter 2002 prices.

Water User Group Application

The water from the Allens Creek Reservoir may be used to serve municipal, industrial and irrigation customers in Austin, Brazoria, Fort Bend, Galveston, Harris and Waller Counties. The projected municipal shortages in Fort Bend and Waller Counties, coupled with the projected manufacturing shortages in Brazoria County, would fully consume the reservoir yield. The water may be diverted directly from the reservoir. Delivery to downstream customers using the bed and banks of the Brazos River would require a subsequent permit.

Environmental Impact

Approximately 7,000 acres of land will be inundated, and the overall site will impact approximately 1,700 acres of cropland, 2,000 acres of bottomland forest, 100 acres of bluff forest, 3,900 acres of grass. The most significant wetland area on the site is Alligator Hole, which contains approximately 600 acres of the largest remaining tract of bottomland forest.[1] The dam face has been configured to minimize wetlands associated impacts, and specifically excludes Alligator Hole from the project area.

A Wildlife Habitat Appraisal was performed for the Texas Parks and Wildlife Department. No threatened or endangered species have been found on the site. The quality of the habitat

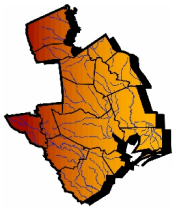
[1] Wildlife Habitat Appraisal for The Proposed Allens Creek Reservoir Site.; University of Houston Clear Lake 1995 for Texas Parks and Wildlife Department (TPWD), Resource Protection Division.

at the reservoir site is mostly degraded by extensive agriculture usage. Environmental impacts were rated as moderate to small.

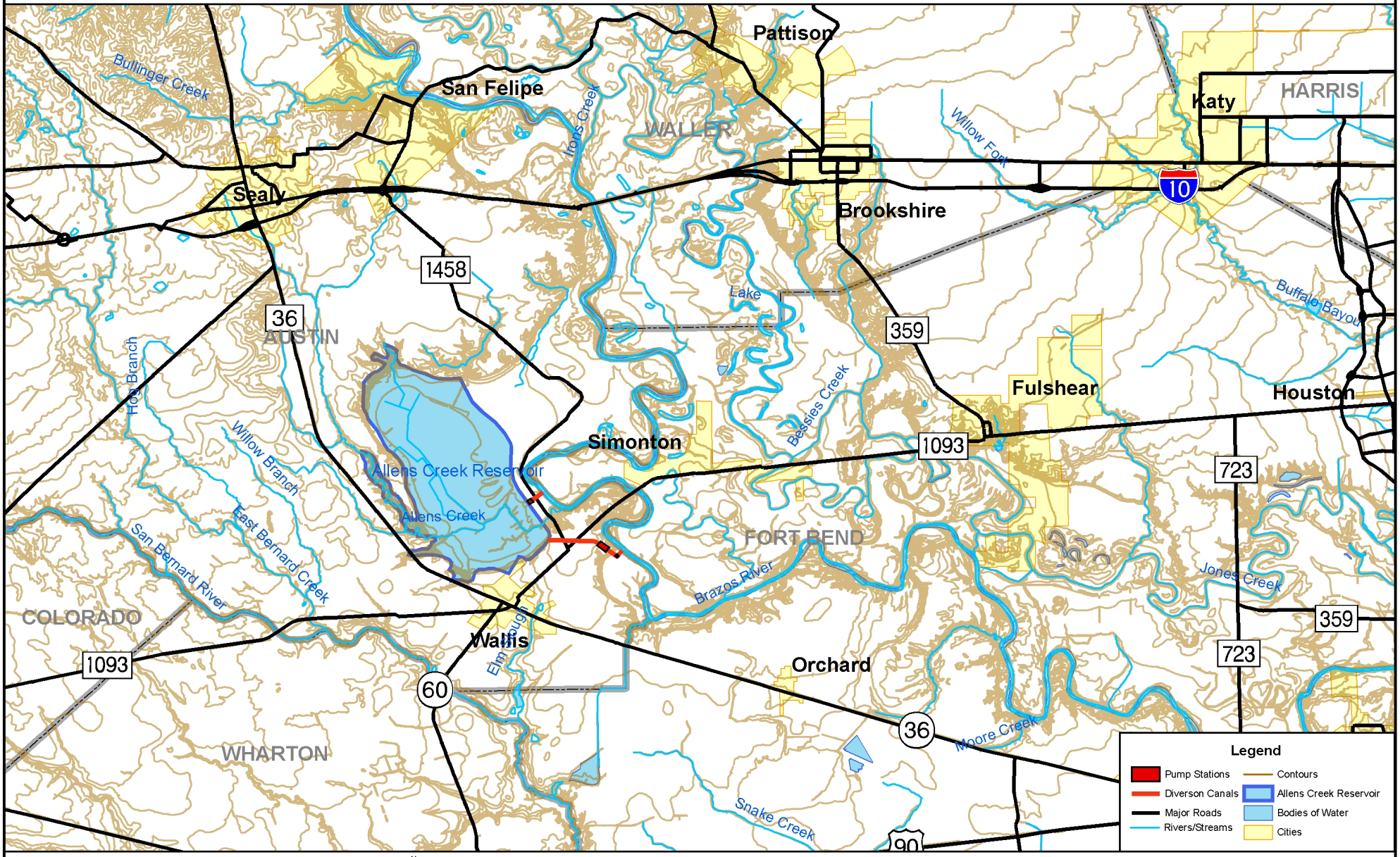
Issues and Considerations

This location has been designated as a unique reservoir site by the Texas Legislature. The project sponsors have obtained a water right permit.

There are two designated diversion points on for the Allens Creek Reservoir. The nearer, upstream point is located on an oxbow of the Brazos River, which is at risk of becoming isolated from the main stem of the river at some point in the future. The lower diversion point is farther away, requiring approximately one mile of intake canal between the pump station and the reservoir. The canal will require a two road crossings (inverted siphons).



Region H
Water Planning Group
Allens Creek Reservoir



Source: TWDB, TCEQ

Kellogg Brown & Root, Inc. | Turner Collie & Braden Inc.

JOINT VENTURE

N W E S

0 6 Miles

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: Little River Off-Channel Reservoir
DATE: December 21, 2005

SUMMARY

STRATEGY DESCRIPTION: An off-channel reservoir in Milam County.

SUPPLY QUANTITY: 32,110 ac-ft per year

SUPPLY SOURCE: Little River, Brazos Basin.

TOTAL STRATEGY COST: $96,512,000

UNIT WATER COST: $250 per acre-foot

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

INTRODUCTION

The Little River Off-Channel Reservoir was studied by the Brazos G Water Planning Group, but not recommended as a water management strategy in the 2001 Brazos G Regional Water Plan. It is an off-channel reservoir located in Milam County near the City of Cameron. The 2001 Brazos G Water Planning Group analysis of this water management strategy is attached (by permission), and was used in the Region H strategy selection process. The current Brazos G analysis is available in the 2006 Brazos G Regional Water Plan, Section 4B.13.5. The yield and cost data in the summary above is provided by the Brazos G Water Planning Group based on updated analysis and modeling. The reservoir yield above reflects inclusion of this project in the BRA System Operations.

WATER USER GROUP APPLICATION

This strategy would provide supply to WUGs in the Lower Brazos River Basin, and the adjoining Coastal Basins.

4B.13.5 Little River Off-Channel Reservoir

4B.13.5.1 Description of Option

The Little River Off-Channel Reservoir is a proposed new reservoir on Beaver Creek, a tributary to the Little River. The reservoir site is located in Milam County, east of the City of Cameron, as shown in Figure 4B.13.5-1. The project would impound water from the Beaver Creek watershed as well as divert water from the Little River during periods of flow in excess of downstream needs. The dam would be an earthfill embankment that would extend approximately 1-mile across the Beaver Creek valley and provide a conservation storage capacity of 155,812 acft at an elevation 400 ft-msl; the reservoir would inundate 4,343 surface acres.

4B.13.5.2 Available Yield

Water potentially available for impoundment in the proposed Little River Off-Channel Reservoir was estimated using the Brazos G WAM. The model utilized a January 1940 through December 1997 hydrologic period of record. Estimates of water availability were derived subject to general assumptions for application of hydrologic models as adopted by the Brazos G Regional Water Planning Group and summarized previously. The model computed the streamflow available for diversion from the Little River into the Little River Off-Channel Reservoir without causing increased shortages to downstream rights. Firm yield was computed subject to the reservoir and Little River diversion having to pass inflows to meet Consensus Criteria for Environmental Flow Needs instream flow requirements (Appendix H).

Various maximum diversion capacities associated with potential pipeline sizes (64-inch, 72-inch, 90-inch, 108-inch, and 120-inch diameter pipelines) were considered. Figure 4B.13.5-2 illustrates the Little River Off-Channel Reservoir yield for each of the pipeline diameters considered. The greatest incremental benefit in yield occurs with the 90-inch and 108-inch pipeline sizes.

The calculated firm yield of the Little River Off-Channel Reservoir is 32,110 acft/yr. The yield is constrained by the capacity of a 108-inch diameter pipeline. The available firm yield is significant since there is a substantial watershed for the Little River (7,500 square miles) that is uncontrolled. The streamflow statistics used to determine the Consensus Criteria pass-through requirements for the off-channel reservoir and the Little River diversion are shown in Tables 4B.13.5-1 and 4B.13.5-2.

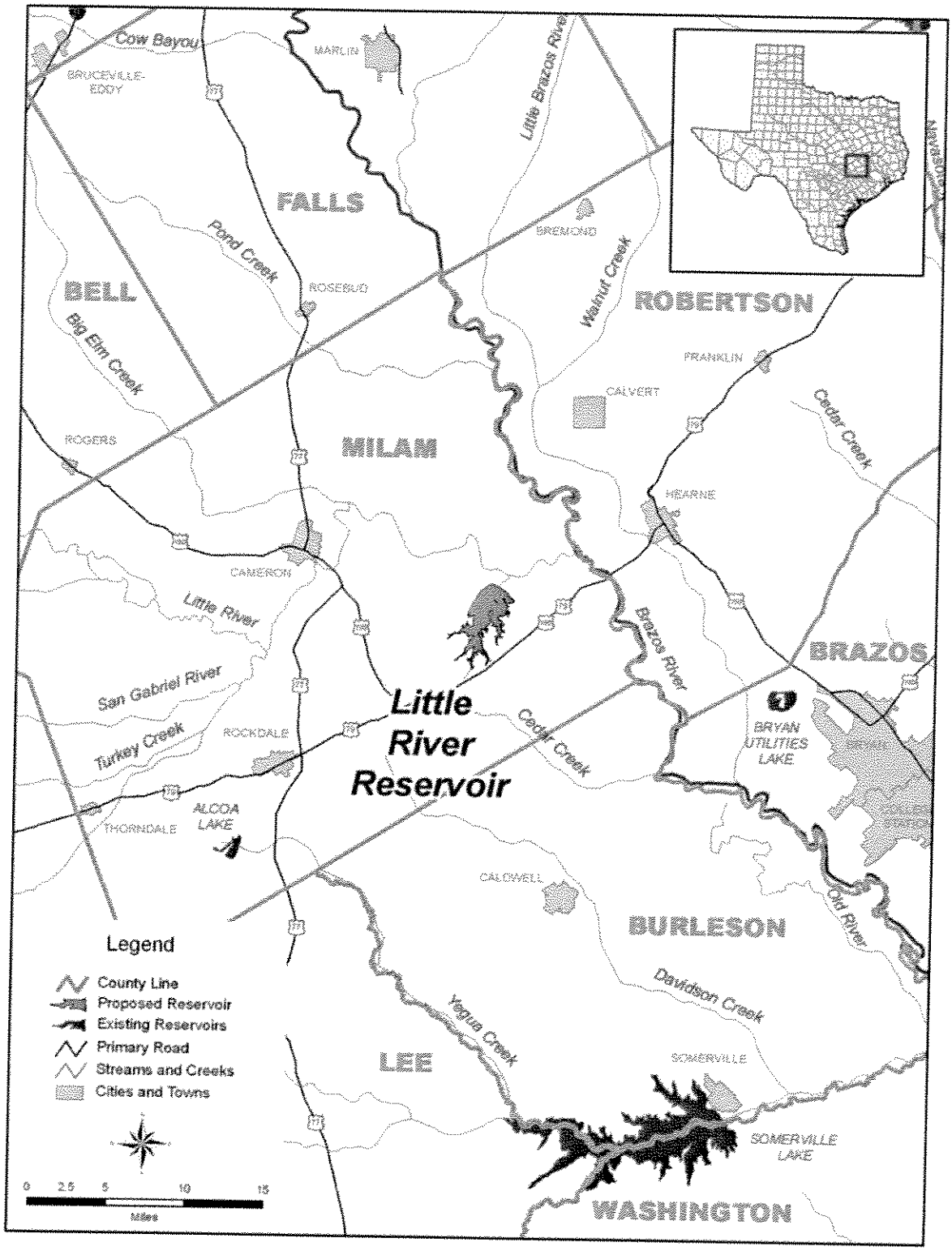


Figure 4B.13.5-1. Little River Off-Channel Reservoir

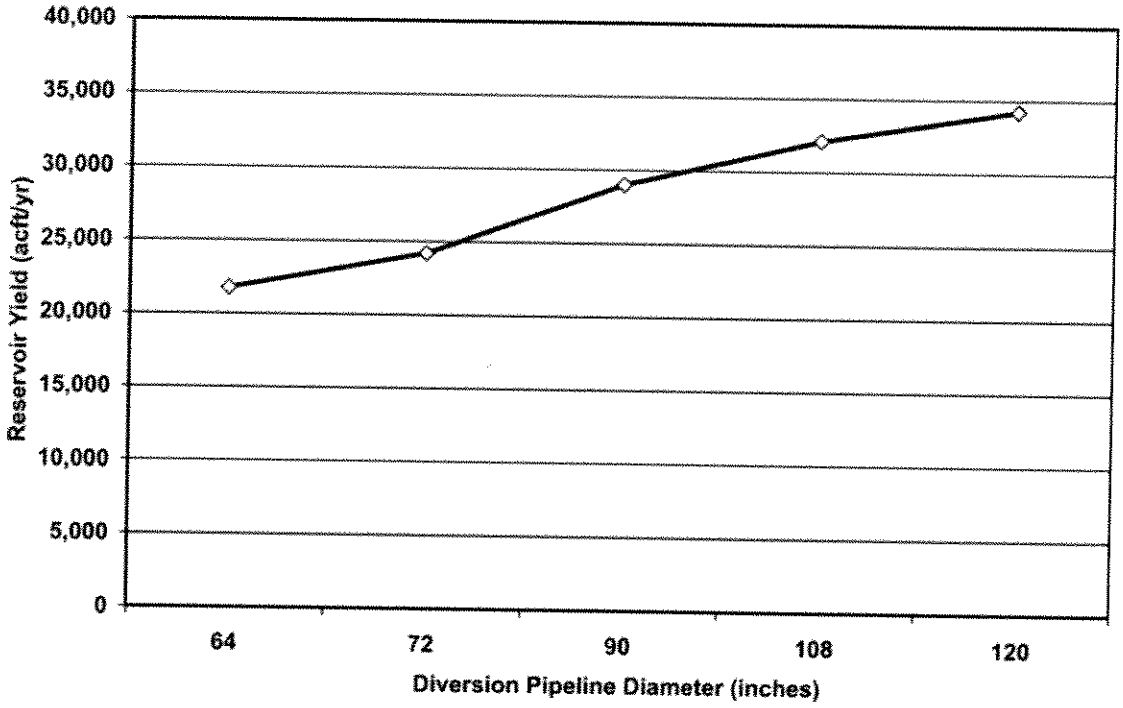


Figure 4B.13.5-2. Water Available from Little River Diversion into the Little River Off-Channel Reservoir

Table 4B.13.5-1.
Daily Natural Streamflow Statistics
for the Little River Off-Channel Reservoir

Month	*Median Flows – Zone 1 Pass-Through Requirements (cfs)*	*25th Percentile Flows – Zone 2 Pass-Through Requirements (cfs)*
January	2.7	0.6
February	2.8	1.0
March	3.0	0.9
April	2.4	0.4
May	4.5	1.2
June	3.1	0.5
July	1.7	0.3
August	1.1	0.3
September	0.8	0.1
October	0.7	0.0
November	1.5	0.6
December	2.2	0.7
Zone 3 (7Q2) Pass-Through Requirement (cfs):		0.0

Table 4B.13.5-2.
Daily Natural Streamflow Statistics
for the Little River Diversion

Month	Median Flows – Zone 1 Pass-Through Requirements (cfs)	25th Percentile Flows – Zone 2 Pass-Through Requirements (cfs)
January	466.9	190.9
February	787.9	257.1
March	761.7	269.5
April	925.0	263.2
May	1547.1	514.2
June	1022.5	317.8
July	441.0	154.5
August	244.0	92.2
September	250.9	66.9
October	268.8	76.5
November	405.3	142.5
December	494.1	165.3
Zone 3 (7Q2) Pass-Through Requirement (cfs):		54.6

Figure 4B.13.5-3 illustrates the simulated Little River Off-Channel Reservoir storage contents for the 1940 to 1997 historical period, subject to the firm yield of 32,110 acft/yr and based on delivery of Little River diversions via a 108-inch pipeline. Simulated reservoir contents remain above the Zone 2 trigger level (80 percent capacity) 82 percent of the time and above the Zone 3 trigger level (50 percent capacity) 96 percent of the time.

Figure 4B.13.5-4 illustrates the changes in streamflows at the reservoir location and the Little River caused by the project. There are significant changes in streamflow at the reservoir location due to the project; however, there are minimal changes in Little River streamflow due to the project. The largest decline in monthly median streamflow on the Little River (91 cfs) occurs in October. Figure 4B.13.5-4 also illustrates the streamflow frequency characteristics at the reservoir location and the Little River with the project in place. There is little difference in streamflow on the Little River with the project because the Little River diversion would be required to pass substantial inflows in order to satisfy senior water rights and/or environmental flow requirements.

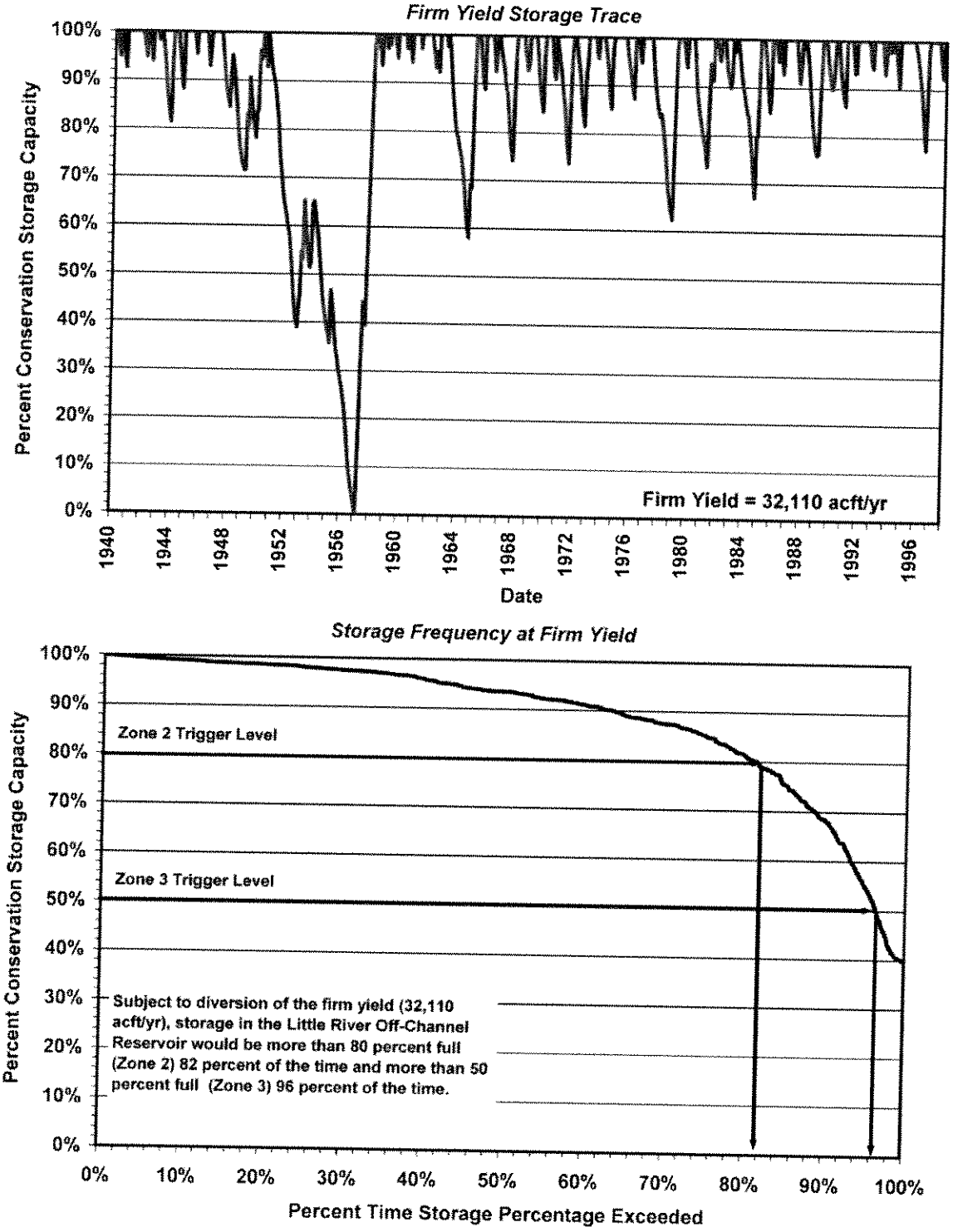


Figure 4B.13.5-3. Little River Off-Channel Reservoir Storage Considerations

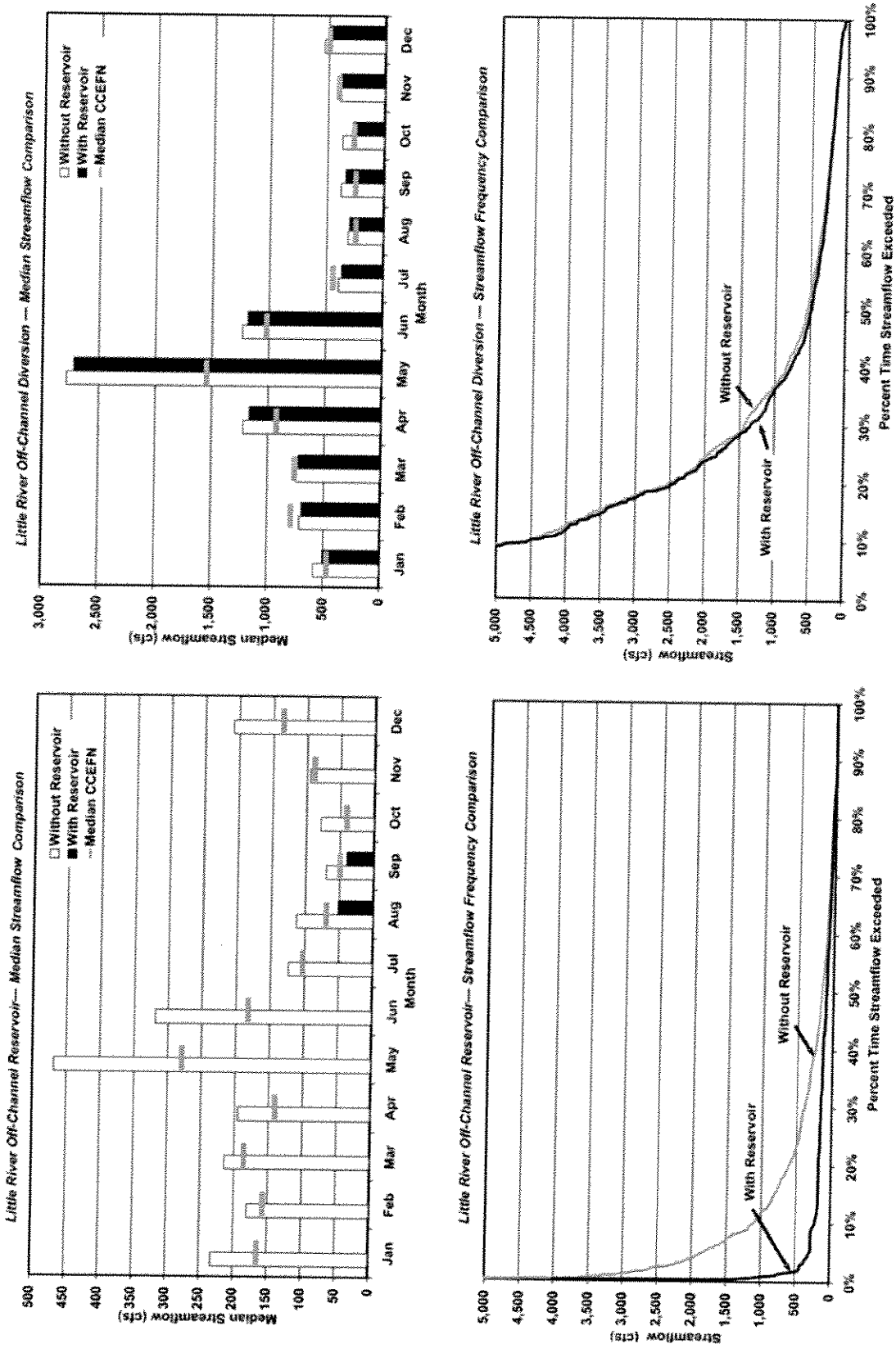


Figure 4B.13.5-4. Little River Diversion and Reservoir Streamflow Comparison

4B.13.5.3 Environmental Issues

4B.13.5.3.1 Existing Environment

The Little River Off-Channel Reservoir site in Milam County is within the Post Oak Savannah Ecological Region.[32] This region is characterized as a narrow, highly irregular oak belt that consists of intermingled forest, woodland, and savannah. It is located between the Pine-Hardwood Forest to the east, Blackland Prairies to the west, and the Coastal Prairie and South Texas Brushlands to the south. The original physiognomy of the region was medium to tall broad-leaved deciduous and some needle-leaved evergreen trees. In the northern and eastern areas, the trees are interspersed with open areas of grasses and forbs, but in the southern and western areas, trees are clumped or in solid stands. The shallow, nearly impervious clay pan of the Post Oak Savannah region causes the soil to be arid.[33] The climate is characterized as subtropical humid, with warm summers. Average annual precipitation ranges between 36 and 40 inches.[34] The Carrizo-Wilcox Aquifer is the only major aquifer underlying the project area.[35] The Queen City and Brazos River Alluvium minor aquifers are to the south and east of the project area, respectively.

The physiography of the region includes ceramic clay and lignite/coal, recharge sands, expansive clay mud, and flood-prone areas. The topography is flat to rolling with local escarpments, with local shallow depressions in flood-prone areas along waterways.[36] The predominant soil types in the project area are primarily sandy loams and loamy sands, with a small amount of silty clay.[37]

[32] Gould, F.W., G.O. Hoffman, and C.A. Rechenthin, Vegetational Areas of Texas, Texas A&M University, Texas Agriculture Experiment Station Leaflet No. 492, 1960.
[33] Telfair, R.C., "Texas Wildlife Resources and Land Uses," University of Texas Press, Austin, Texas, 1999.
[34] Larkin, T.J., and G.W. Bomar, "Climatic Atlas of Texas," Texas Department of Water Resources, Austin, Texas, 1983.
[35] Texas Water Development Board (TWDB), Major and Minor Aquifers of Texas; Maps online at http://www.twdb.state.tx.us/mapping/index.asp, 2004.
[36] Kier, R.S., L.E. Garner, and L.F. Brown, Jr., "Land Resources of Texas." Bureau of Economic Geology, University of Texas, Austin, Texas, 1977.
[37] Soil Conservation Service (NRCS), *Soil Survey for Milam County, Texas*, Soil Conservation Service, United States Department of Agriculture, 1979.

Three major vegetation types occur within the general vicinity of the proposed project: Post Oak Woods/Forest, Post Oak Woods, Forest, and Grassland Mosaic, and crops.[38] Variations of these primary types occur involving changes in the composition of woody and herbaceous species and physiognomy according to localized conditions and specific range sites. Post Oak Woods/Forest and the Post Oak Woods, Forest, and Grassland Mosaic could include the following commonly associated plants: blackjack oak (*Quercus marilandica*), eastern redcedar (*Juniperus virginiana*), mesquite (*Prosopis glandulosa*), black hickory (*Carya texana*), live oak (*Q. virginiana*), sandjack oak (*Q. incana*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis* spp.), yaupon (*Ilex vomitoria*), poison oak (*Toxicodendron pubescens*), American beautyberry (*Callicarpa americana*), hawthorn (*Crataegus* spp.), supplejack (*Berchemia scandens*), trumpet creeper (*Campsis radicans*), dewberry (*Rubus* spp.), coralberry (*Symphoricarpos orbiculatus*), little bluestem (*Schizachyrium scoparium* var. *scoparium*), silver bluestem (*Bothriochloa saccharoides*), sand lovegrass (*Eragrostis trichodes*), beaked panicum (*Panicum anceps*), three-awn (*Aristida* spp.), spranglegrass (*Chasmanthium sessiliflorum*), and tickclover (*Desmodium* spp.). Crops include cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals and may also include grassland associated with crop rotations and hay production.

4B.13.5.3.2 Potential Impacts

4B.13.5.3.2.1 Aquatic Environments including Bays & Estuaries

The potential impacts of this project were evaluated in two locations, at the proposed reservoir site and in the Little River where water will be pumped and diverted to the project site. The potential impacts of this project are very different in the two locations. In the diversion site on the Little River, very little impact is predicted in terms of a reduction in flow variability or quantity of median monthly flows. But in the proposed project site, there would be dramatic reductions in both flow variability and the quantity of median monthly flows. The difference in variability of monthly flow conditions at the proposed project site would be a factor of approximately 7.5 (measured by comparing sample variances of all monthly flows from 1940-1997 and predicted flows over that same time period with the project in place; sample variance without project =43.25 x 10^4; sample variance with project =5.54 x 10^4). The difference in

[38] McMahan, C.A., R.F. Frye, and K.L. Brown, "The Vegetation Types of Texas," Texas Parks and Wildlife Department, Wildlife Division, Austin, Texas, 1984.

variability of monthly flow values in the Little River diversion site would be negligible (sample variance without project =2.95 x 10^{10}; sample variance with project =2.93 x 10^{10}). Variability in flow is important to the instream biological community as well as riparian species and a reduction could influence the timing and success of reproduction as well as modify the current composition of species by favoring some and reducing suitability for others.

The reduction in the median monthly flow at the reservoir site would range from 0.5 cfs (43 percent) in September to 7.6 cfs (100 percent) in May, as shown in Table 4B.13.5-3. Median monthly flow would be reduced to zero (100 percent reduction) during 10 months of the year at the proposed reservoir site. At the diversion site, reductions in median monthly flow would range from 5.5 cfs (1 percent) in November to 89.7 cfs (24 percent) in October, as shown in Table 4B.13.5-4. Reductions would be 10 percent or less during 10 months of the year. This project would have minimal effects on the frequency of low-flow conditions at the proposed reservoir site. Without the project, 85 percent exceedance value of monthly flows would be 0.33 cfs; with the project in place, this value would be 0.19 cfs. At the diversion site, the 85 percent exceedance values would be 185 cfs without and 177 cfs with the project in place. Because of the number of months with zero flow values, this project is anticipated to have substantial impacts on the instream biological community at the proposed reservoir site; however, there would be minimal impacts in the Little River diversion site.

Although there would be biological impacts in the immediate vicinity of the project site and downstream, it is not likely that this project, alone, would have a substantial influence on total discharge in the Brazos River, in which case there would be minimal influence on freshwater inflows to the Brazos River estuary. However, the cumulative impact of multiple projects may reduce freshwater inflows into the estuary. As a new reservoir without a current operating permit, the Little River Off-Channel Reservoir would likely be required to meet environmental flow requirements determined by site-specific studies.

4B.13.5.3.2.2 Threatened & Endangered Species

A total of 23 species could potentially occur within the vicinity of the site that are state- or federally-listed as threatened or endangered, candidates for listing, or exhibit sufficient rarity to be listed as a species of concern. This group includes 1 amphibian, 3 reptiles, 10 birds, 2 mammals, 5 fish species and 2 plant species (Table 4B.13.5-5). One amphibian, four bird

Table 4B.13.5-3.
Median Monthly Streamflow: Little River Off-Channel Reservoir

Month	Without Project (cfs)	With Project (cfs)	Difference (cfs)	Percent Reduction
January	3.8	0.0	3.8	100%
February	3.3	0.0	3.3	100%
March	3.5	0.0	3.5	100%
April	3.3	0.0	3.3	100%
May	7.6	0.0	7.6	100%
June	5.4	0.0	5.4	100%
July	2.1	0.0	2.1	100%
August	1.8	0.8	1.0	54%
September	1.2	0.7	0.5	43%
October	1.3	0.0	1.3	100%
November	1.6	0.0	1.6	100%
December	3.4	0.0	3.4	100%

Table 4B.13.5-4.
Median Monthly Streamflow: Little River Diversion Site

Month	Without Project (cfs)	With Project (cfs)	Difference (cfs)	Percent Reduction
January	585.6	506.1	79.5	14%
February	713.0	695.5	17.6	2%
March	742.9	728.1	14.7	2%
April	1,219.5	1,165.9	53.6	4%
May	2,785.8	2,721.5	64.3	2%
June	1,231.9	1,185.9	46.0	4%
July	391.3	366.2	25.1	6%
August	313.0	298.7	14.3	5%
September	379.2	339.8	39.5	10%
October	369.0	279.3	89.7	24%
November	393.2	387.7	5.5	1%
December	537.5	494.1	43.4	8%

Table 4B.13.5-5.
Potentially Occurring Species that are Rare or Federal- and State-Listed at the Little River Off-Channel Reservoir Site, Milam County

Scientific Name	*Common Name*	*Federal/State Status*	*Potential Occurrence*
Amphibians			
Bufo houstonensis	Houston Toad	LE/E	X
Birds			
Falco peregrinus anatum	American Peregrine Falcon	DL/E	Migrant
Falco peregrinus tundrius	Arctic Peregrine Falcon	DL/T	Migrant
Haliaeetus leucocephalus	Bald Eagle	LT-PDL/T	Resident
Ammodramus henslowii	Henslow's Sparrow	SOC	Migrant
Sterna antillarum athalassos	Interior Least Tern	LE/E	Migrant*
Charadrius montanus	Mountain Plover	SOC	Migrant*
Charadrius melodus	Piping plover	LT w/CH	Migrant
Grus americana	Whooping Crane	LE/E	Migrant
Mycteria americana	Wood Stork	SOC/T	Migrant
Buteo albonotatus	Zone-tailed Hawk	SOC/T	Migrant*
Fishes			
Anguilla rostrata	American Eel	SOC	X
Cycleptus elongatus	Blue Sucker	SOC/T	X
Micropterus treculi	Guadalupe Bass	SOC	X
Notropis buccula	Smalleye Shiner	C/SOC	X
Notropis oxyrhynchus	Sharpnose Shiner	C/SOC	X
Mammals			
Myotis velifer	Cave Myotis Bat	SOC	X
Spilogale putorius interrupta	Plains Spotted Skunk	SOC	X
Canis rufus	Red Wolf	LE/E	Extirpated
Reptiles			
Thamnophis sirtalis annectens	Texas Garter Snake	SOC	X
Phrynosoma cornutum	Texas Horned Lizard	SOC/T	X
Crotalus horridus	Timber/ Canebrake Rattlesnake	SOC/T	X
Plants			
Spiranthes parksii	Navasota ladies'-tresses	LE/ E	X
Polygonella parksii	Parks' jointweed	SOC	X

X = Occurs in county; * Nesting migrant; may nest in the county.

Federal Status: LE-Listed Endangered; LT-Listed Threatened; w/CH-with critical habitat in the state of Texas; PE-Proposed to Be Listed Endangered; PT-Proposed to Be Listed Threatened; PDL-Proposed to Be De-listed (Note: Listing status retained while proposed); E/SA T/SA-Listed Endangered on Basis of Similarity of Appearance, Listed Threatened on Basis of Similarity of Appearance; DL-De-listed Endangered/Threatened; C-Candidate (USFWS has substantial information on biological vulnerability and threats to support proposing to list as endangered or threatened. Data are being gathered on habitat needs and/or critical habitat designations); SOC-Species of Concern (some information exists showing evidence of vulnerability, but is not listed).

State Status: E-Listed as Endangered by the State of Texas; T-Listed as Threatened by the State of Texas; SOC-Species of Concern (some information exists showing evidence of vulnerability, but is not listed).

Sources: TPWD, Annotated County List of Rare Species for Milam County (25 September 2004); TPWD, Texas Conservation and Biological Data System (TCBDS), 2004

species, and one plant species federally-listed as threatened or endangered could occur in the project area. These include the Houston toad (*Bufo houstonensis),* bald eagle (*Haliaeetus leucocephalus*), interior least tern (*Sterna antillarum athalassos*), piping plover (*Charadrius melodus*), and whooping crane (*Grus americana*), and Navasota ladies'-tresses (*Spiranthes parksii*). The bald eagle, interior least tern, piping plover, and whooping crane are all seasonal migrants that could pass through the project area but would not likely be directly affected by the proposed reservoir. The Navasota Ladies'-tresses occurs on upland margins of intermittent, minor tributaries in association with post oak, blackjack oak, and yaupon.

A search of the Texas Wildlife Diversity Database[39] revealed two documented occurrences of Navasota ladies'-tresses within the vicinity of the proposed Little River Off-Channel Reservoir (as noted on representative 7.5-minute quadrangle map(s) that include the project site). These data arenot a representative inventory of rare resources or sensitive sites. Although based on the best information available to TPWD, these data do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features in the project area. On-site evaluations will be required by qualified biologists to confirm the occurrence of sensitive species or habitats.

4B.13.5.3.2.3 Wildlife Habitat

Approximately 4,343 acres are estimated to be inundated by the reservoir. Projected wildlife habitat that will be impacted includes approximately 2,215 acres of Mixed Grassland, 1,839 acres of Post Oak Woods, and 289 acres of Mixed Riparian Woods/Forest.

A number of vertebrate species could occur within the Little River Off-Channel Reservoir site as indicated by county occurrence records.[40] These include four species of salamanders and newts, 16 species of frogs and toads, nine species of turtles, the American alligator, 10 species of lizards and skinks, and 21 species of snakes. Additionally, 54 species of mammals could occur within the site or surrounding region[41] in addition to an undetermined number of bird species. A variety of fish species would be expected to inhabit streams and ponds within the site, but with distributions and population densities limited by the types and quality of habitats available.

[39] Texas Parks and Wildlife Department (TPWD), Texas Wildlife Diversity Database, 2004.
[40] Texas A&M University (TAMU), "County Records for Amphibians and Reptiles," Texas Cooperative Wildlife Collection, 1998.
[41] Davis, W.B., and D.J. Schmidly, "The Mammals of Texas – Online Edition," Texas Tech University,

4B.13.5.3.2.4 Cultural Resources

A search of the Texas Archeological Sites Atlas database indicates that 31 archeological sites have been documented within the general vicinity of the proposed reservoir. Nineteen of these sites were recorded by private individuals or by university research programs for academic purposes. All of these sites lie outside the currently proposed reservoir location. These sites represent a variety of historic and prehistoric site types. Prior to reservoir inundation, the project must be coordinated with the Texas Historical Commission and a cultural resources survey must be conducted to determine if any cultural resources are present within the conservation pool. Any cultural resources identified during survey will need to be assessed for eligibility for inclusion in the National Register of Historic Places (NRHP) or as State Archeological Landmarks (SAL). Cultural resources that occur on public lands or within the Area of Potential Effect of publicly funded or permitted projects are governed by the Texas Antiquities Code (Title 9, Chapter 191, Texas Natural Resource Code of 1977), the National Historic Preservation Act (PL96-515), and the Archeological and Historic Preservation Act (PL93-291).

4B.13.5.3.2.5 Threats to Natural Resources

Threats to natural resources were identified in Section 1.7.3.2 and include lower stream flows, declining water quality, and reduced inflows to reservoirs. This project would likely have increased adverse effects on stream flow below the reservoir site, but the reservoir would trap sediment and/or dilute pollutants, providing some positive benefits to water quality downstream. These benefits could be offset by declines in dissolved oxygen through decreased flows and higher temperatures immediately downstream of the reservoir during summer periods. The project is expected to have negligible impacts to the stream flow and water quality in the Little River and Brazos River.

4B.13.5.4 Engineering and Costing

A cost estimate for the proposed Little River Off-Channel Reservoir was made utilizing available mapping and information. The total project is estimated to cost $96.5 million for construction of the dam, reservoir, river intake and pump station, and raw water pipeline from the Little River to the reservoir site. The annual project costs are estimated to be $8 million; this includes annual debt service, operation and maintenance, and pumping energy costs. A summary of the project costs is presented in Table 4B.13.5-6. The cost for the estimated firm yield of

32,110 acft/yr translates to an annual unit cost for raw water of $0.77 per 1,000 gallons, or $250/acft.

The total project cost reported in the 2001 Water Plan was $78 million; the current plan costs are estimated to be $96 million. In addition to inflation, some of the cost differences are due to increased land costs and different methodology used to calculate Environmental & Archaeology Studies and Mitigation.

The annual cost of water has increased from $128/acft ($0.39 per 1,000 gallons) in the 2001 Plan to $250/acft ($0.77 per 1,000 gallons) in the current plan. The increase in annual cost is due largely to the decrease in projected project yield; project yield was 47,000 acft/yr in the 2001 plan and is currently 32,110 acft/yr in the 2006 plan.

4B.13.5.5 Implementation Issues

This water supply option has been compared to the plan development criteria, as shown in Table 4B.13.5-6, and the option meets each criterion.

This Implementation of the Little River Off-Channel Reservoir will require permits from various state and federal agencies, land acquisition, and design and construction of the facilities. A summary of the implementation steps for the project is presented below.

Potential Regulatory Requirements:

- Texas Commission on Environmental Quality Water Right and Storage permits;
- U.S. Army Corps of Engineers Permits will be required for discharges of dredge or fill into wetlands and waters of the U.S. for dam construction, and other activities (Section 404 of the Clean Water Act);
- Texas Commission on Environmental Quality administered Texas Pollutant Discharge Elimination System Storm Water Pollution Prevention Plan;
- General Land Office Easement if State-owned land or water is involved; and,
- Texas Parks and Wildlife Department Sand, Shell, Gravel and Marl permit if state-owned streambed is involved.

State and Federal Permits may require the following studies and plans:

- Environmental impact or assessment studies;
- Wildlife habitat mitigation plan that may require acquisition and management of additional land;
- Flow releases downstream to maintain aquatic ecosystems;
- Assessment of impacts on Federal- and State-listed endangered and threatened species; and,

Table 4B.13.5-6.
Cost Estimate Summary for
Little River Off-Channel Reservoir
(Second Quarter 2002 Prices)

Item	*Estimated Costs for Facilities*
Capital Costs	
Dam and Reservoir (Conservation Pool: 155,812 acft, 4,343 acres, 400 ft-msl)	$27,396,000
Intake and Pump Station (205.5 MGD)	16,231,000
Transmission Pipeline (108-in dia., 1 mile)	2,504,000
Relocations & Other	107,000
Total Capital Cost	**$46,238,000**
Engineering, Legal Costs and Contingencies	$16,058,000
Environmental & Archaeology Studies and Mitigation	11,429,000
Land Acquisition and Surveying (4,348 acres)	11,662,000
Interest During Construction (4 years)	11,125,000
Total Project Cost	**$96,512,000**
Annual Costs	
Debt Service (6 percent for 30 years)	$1,954,000
Reservoir Debt Service (6 percent for 40 years)	4,627,000
Operation and Maintenance	
Intake, Pipeline, Pump Station	431,000
Dam and Reservoir	411,000
Pumping Energy Costs (10,087,646 kWh @ 0.06 $/kWh)	605,000
Total Annual Cost	**$8,028,000**
Available Project Yield (acft/yr)	**32,110**
Annual Cost of Water ($ per acft)	**$250**
Annual Cost of Water ($ per 1,000 gallons)	**$0.77**

Table 4B.13.5-6.
Comparison of Little River Off-Channel Reservoir Option to Plan Development Criteria

Impact Category	Comment(s)
A. Water Supply	
1. Quantity	1. Sufficient to meet some needs
2. Reliability	2. High reliability
3. Cost	3. Reasonable
B. Environmental factors	
1. Environmental Water Needs	1. Low impact
2. Habitat	2. Low to moderate impact
3. Cultural Resources	3. Low to moderate impact
4. Bays and Estuaries	4. Low impact
5. Threatened and Endangered Species	5. Low impact
6. Wetlands	6. Low impact
C. Impact on Other State Water Resources	• No apparent negative impacts on state water resources; no effect on navigation
D. Threats to Agriculture and Natural Resources	• Low to none
E. Equitable Comparison of Strategies Deemed Feasible	• Option is considered to meet municipal and industrial shortages
F. Requirements for Interbasin Transfers	• Not applicable
G. Third Party Social and Economic Impacts from Voluntary Redistribution	• None

- Cultural resources studies to determine resources impacts and appropriate mitigation plan that may include cultural resource recovery and cataloging; requires coordination with the Texas Historical Commission.

Land Acquisition Issues:

- Land acquired for reservoir and/or mitigation plans could include market transactions and/or eminent domain;
- Additional acquisition of rights-of-way and/or easements may be required; and,
- Possible relocations or removal of residences, utilities, roads, or other structures.

4B.13.6 Lake Palo Pinto Off-Channel Reservoir

4B.13.6.1 Description of Option

In 1986 a volumetric survey was performed by HDR Engineering, Inc. to determine the capacity of Lake Palo Pinto. The survey indicated the capacity of the lake to be 27,650 acft or about 16,450 acft less than the authorized capacity of 44,100 acft.

In order to help restore the capacity of Lake Palo Pinto and increase its yield, an off-channel reservoir site was investigated.[42] The proposed off-channel reservoir is located approximately 1.6 miles north of Lake Palo Pinto at Wilson Hollow, as shown in Figures 4B.13.6-1 and 4B.13.6-2. The proposed dam would be an earthfill embankment that would extend approximately 1,550 feet and provide a conservation storage capacity of 10,000 acft at an elevation 1,088 ft-msl; the reservoir would inundate 182 surface acres. It is possible to upsize or downsize the storage capacity at this site depending on the anticipated municipal growth requirements of the Palo Pinto County Municipal Water District No. 1 (District) and the future needs of the Brazos Electric Power Cooperative (BEPC).

The proposed off-channel reservoir would be filled by natural drainage and by pumping water from Lake Palo Pinto when it is spilling or nearly full. As shown in Figure 4B.13.6-2, water would be pumped 1.9 miles via a 36-inch pipeline to the off-channel reservoir from Lake Palo Pinto at a new 27 MGD intake site located at the northeast corner of the lake. When the level of Lake Palo Pinto is lowered due to drought conditions, water would be released by gravity from the off-channel reservoir to Lake Palo Pinto to increase its supply capability. When both the off-channel reservoir and Lake Palo Pinto are at their conservation elevations, 1,088 ft-msl and 867 ft-msl respectively, the combined storage capacity in 2060 would be approximately 31,426 acft. This is less than the District's authorized storage capacity of Lake Palo Pinto of 44,100 acft.

[42] HDR Engineering, Inc. "Reconnaissance Report for Off-Channel Reservoir Project for Palo Pinto County Municipal Water District No. 1", April 2005.

REGION H WATER MANAGEMENT STRATEGY ANALYSIS TECHNICAL MEMORANDUM

STRATEGY TITLE: WASTEWATER RECLAMATION FOR MUNICIPAL IRRIGATION[1]

Date: August 31, 2005

SUMMARY:

Strategy Description: The use of reclaimed wastewater for municipal irrigation of green spaces and golf courses.

Supply Quantity: Brazoria County – 399 ac-ft/yr in 2060
Fort Bend County – 8,249 ac-ft/yr in 2060
Harris County – 7,127 ac-ft/yr in 2060
Montgomery County – 12,066 ac-ft/yr in 2060

Supply Source: Wastewater Treatment Plant Discharges

Total Strategy Cost: Based on relative location of reuse water source and need

Unit Water Cost: $431 per ac-ft, based on previous studies

WATER MANAGEMENT STRATEGY ANALYSIS DESCRIPTION

Introduction

This strategy consists of using reclaimed wastewater to supplement existing and future water supplies that currently serve nonpotable municipal demands within Region H. Wastewater reuse for municipal irrigation of golf courses and maintenance of green spaces in new and some existing communities is a potentially feasible water management strategy. Some existing communities can potentially retrofit existing irrigation systems to use reclaimed wastewater. With growth expected to nearly double in the Houston metropolitan area over the next 50 years, it can be expected that new master-planned communities will be developed in many areas within Brazoria, Fort Bend, Harris, and Montgomery Counties, and this growth would also provide possible candidates for using reclaimed wastewater.

Previous Reuse Studies

Feasibility studies have been previously conducted to analyze the potential for meeting nonpotable water demands with reclaimed wastewater for a number of communities within Region H. The majority of these studies focused on individual master-planned communities

[1] This memorandum was prepared using information in the report titled *Wastewater Reclamation for Municipal Irrigation*, prepared by TCB for TWDB.

(MPCs) or on multiple communities and wastewater treatment plants (WWTPs) organized within a regional authority, including:

- Cinco Ranch
- Cinco Ranch Southwest
- Copperfield
- Fairfield Village

These studies examined a number of potential uses for wastewater and determined that the most feasible uses for reclaimed water were for:

- Golf course irrigation
- Green space irrigation, including parks and esplanades
- Maintaining water levels in amenity ponds

The overall cost for these projects was approximately $431 per acre-foot. However, costs varied depending upon whether the proposed system was included in a newly constructed development or retrofitted into an existing community, the proximity of wastewater demands to WWTPs, and the volume of water delivered.

Wastewater Reuse Demand Analysis

The potential demands for wastewater reuse and wastewater supplies in Brazoria, Fort Bend, Harris, and Montgomery Counties were examined in detail for this study, and the methodology is suitable for projecting potential wastewater reuse for the entire region. Population growth in future MPCs was identified as the most likely candidate for using this strategy. Future MPCs are assumed to represent a portion of the growth within County-Other water user groups (WUGs) in the region. Additionally, in Harris County growth in the NHCRWA WUG was also considered to have the potential for using this strategy. Therefore, NHCRWA's proposed population growth was added to County-Other for Harris County for purposes of analysis of this strategy.

Data from the Fort Bend Economic Development Council was used to determine that 25 percent of the recent county population growth has occurred in MPCs within Fort Bend County. Because Fort Bend County leads the state in the number of MPCs, it was assumed that this percentage would be representative of the growing trend toward master-planned development within Region H. This percentage was then applied to the total population growth in County-Other WUGs within the growing suburban areas of Region H to determine the population that would be expected to occur in MPCs. Accordingly, this population growth is also assumed to have a similar amount of green spaces, golf courses, and amenity lakes associated with its growth.

The number of golf courses predicted for future development within Region H was determined using data from a variety of sources. A list of courses and the number of golf holes at each location were obtained from the Houston Golf Association and compared to existing population to obtain the current ratio of golf "holes" to population. This current

ratio was then used to project the future anticipated golf course development in the four counties under evaluation. Water demands for these existing golf courses were estimated from well pumpage records and permitted withdrawals from wells in Fort Bend and Montgomery Counties that were known to be associated with golf courses. These demands, on a per-hole basis, were applied to the predicted new golf holes to find the potential golf course water demands through 2060.

The acreage of green space areas projected to accompany future development was estimated from GIS data for Cinco Ranch and Greatwood MPCs in Fort Bend County. The area of irrigated esplanades and parks was compared to the total population of each development at ultimate development to find the average per capita acreage of green space for the two communities. This per capita rate was applied to the percentage of County-Other growth expected within MPCs to determine the projected green space acreage for each county through 2060.

Irrigation demands for the expected green space acreage were determined from evapotranspiration and precipitation data obtained from TWDB using a method adapted from Richard Duble of Texas Cooperative Extension. This methodology yielded the ideal average annual application rate for turfgrass irrigation and was used with the projected acreage found above to determine the projected irrigation water demands for green spaces throughout the planning period.

Water demands from amenity lakes associated with population growth in MPCs were estimated from well data information from Fort Bend Subsidence District. Wells that were associated with amenity lakes and were located within named WUGs were identified. The population associated with these WUGs, as reported by TWDB, was compared to the annual pumpage for the wells to determine a per capita amenity lake demand. This per capita demand was then applied to the portion of population growth within County-Other that was expected to occur within MPCs.

The projected wastewater demands for each county are shown below in *Table 1*.

Table 1
Projected Potential Demands for Reclaimed Wastewater

County	Potential Reuse Application	Wastewater Reuse Demands (ac-ft/yr)					
		2010	2020	2030	2040	2050	2060
Brazoria	Golf Courses	0	22	72	117	166	216
	Green Spaces	0	9	28	46	66	86
	Amenity Lakes	0	10	32	53	74	97
	Total	**0**	**41**	**132**	**216**	**306**	**399**
Fort Bend	Golf Courses	329	1,044	2,006	2,998	4,452	5,911
	Green Spaces	61	194	372	556	826	1,096
	Amenity Lakes	69	219	421	630	935	1,242
	Total	**459**	**1,457**	**2,800**	**4,184**	**6,213**	**8,249**
Harris[1]	Golf Courses	534	1,033	1,562	2,244	2,934	3,617
	Green Spaces	243	470	711	1,021	1,335	1,646
	Amenity Lakes	275	533	805	1,157	1,512	1,864
	Total	**1,052**	**2,036**	**3,077**	**4,421**	**5,781**	**7,127**
Montgomery	Golf Courses	1,077	1,868	3,543	5,498	8,223	11,387
	Green Spaces	176	305	577	896	1,340	1,856
	Amenity Lakes	153	265	502	779	1,164	1,613
	Total	**1,405**	**2,437**	**4,622**	**7,172**	**10,727**	**14,856**
Total Potential Reuse Demands		**2,917**	**5,972**	**10,631**	**15,994**	**23,027**	**30,631**

[1] Includes demands for the NHCRWA WUG.

Wastewater Reuse Supply Analysis

The amount of wastewater that could potentially be reclaimed for nonpotable uses is subject to both the potential demands for and the supply of treated wastewater. It is important to determine the minimum average flow available since WWTPs typically experience their lowest discharge flows during the summer when irrigation demands are at their highest. The Greatwood community was used as a model for determining the average minimum per capita flow for WWTPs in low-flow conditions. Daily discharge reports from the summer of 2004 were used to generate a report of 5 weeks in this period with no rainfall. The 7-day flow for each of these weeks was averaged to determine the minimum amount of wastewater that could be provided at any time with minimal need for storage. The estimated number of wastewater connections during this time was used to find the per capita low-flow wastewater discharge, assuming a population of 3.2 persons per connection.

Based on the above methodology, the projected availability of reclaimed wastewater throughout the planning period within each county is shown in *Table 2*.

Table 2
Projected Potential Supplies for Reclaimed Wastewater

County	Wastewater Reuse Supply (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
Brazoria	0	75	241	394	556	726
Fort Bend	517	1,641	3,154	4,713	6,998	9,292
Harris[1]	2,060	3,986	6,024	8,654	11,316	13,950
Montgomery	1,141	1,980	3,754	5,825	8,713	12,066
Total Potential Reuse Supplies	**3,718**	**7,682**	**13,172**	**19,586**	**27,583**	**36,033**

[1] Includes supplies for the NHCRWA WUG.

Costs of Implementing a Reuse Strategy

The previous studies examined above were used to determine a unit cost of water for municipal wastewater reuse. These costs varied considerably depending on the following:

- Layout of the community
- New or existing construction
- Amount of water delivered

The average cost of supplying treated wastewater under these proposed scenarios was approximately $431 per acre-foot. This cost was applied to the lesser of the demand or supply determined for each county to produce the costs shown in *Table 3*.

Table 3
Potential Wastewater Reuse and Associated Costs

County	Potential Demand Reduction from Reuse (ac-ft/yr) / Implementation Cost ($1,000s)					
	2010	2020	2030	2040	2050	2060
Brazoria	0	41	132	216	306	399
	$0	$18	$57	$93	$132	$172
Fort Bend	459	1,457	2,800	4,184	6,213	8,249
	$198	$627	$1,206	$1,802	$2,675	$3,552
Harris[1]	1,052	2,036	3,077	4,421	5,781	7,127
	$453	$877	$1,325	$1,904	$2,489	$3,069
Montgomery	1,141	1,980	3,754	5,825	8,713	12,066
	$491	$852	$1,616	$2,508	$3,752	$5,196
Total	**2,653**	**5,514**	**9,763**	**14,647**	**21,012**	**27,841**
	$1,142	**$2,374**	**$4,204**	**$6,307**	**$9,048**	**$11,988**

[1] Includes demand reductions and costs for the NHCRWA WUG.

Considerations for Wastewater Treatment Standards and Proper Handling of Wastewater

The Texas Commission on Environmental Quality (TCEQ) classifies wastewater reclaimed for irrigation in two categories: Type I effluent with higher quality standards and Type II effluent that has slightly lower treatment standards. Type II effluent can generally be used in areas with controlled access and minimal potential for human contact. In areas such as parks and esplanades with pedestrian access, reclaimed wastewater must meet higher Type I standards in order to be used for irrigation purposes. The standards for Type I effluent are based on a 30-day average and have the following limits:

- BOD5 or CBOD5 not to exceed 5 mg/l
- Turbidity no greater than 3 NTU
- Average fecal coliform not to exceed 20 CFU/100 ml with a peak no greater than 75 CFU/100 ml

Typical WWTPs in these areas where MPCs are being developed are permitted to 10/15/ 3 mg/l (CBOD, TSS, N-NH_3) standards. This level of treatment is sufficient for Type II effluent applications, but additional filtration is necessary to improve the effluent quality to Type I standards. The capital cost for this improvement to Type I standards is approximately $1,500,000 for a plant with an average daily flow of 1 mgd.

Likely Communities to Benefit from a Reuse Program

This strategy is focused on the application of reclaimed wastewater for irrigation in municipal settings. In particular, these strategies are recommended for MPCs, especially those that are to be developed in the future. These communities provide a centralized population and wastewater source and a number of water-consumptive amenities such as lakes, golf courses, and green spaces within a close proximity.

New developments may also benefit from reduced costs for implementing a reuse system, since they can be planned using this strategy during the design phase. Major water demands such as for golf courses can be initially located near WWTPs to limit the expense associated with transporting water to the demand. Construction of the effluent distribution system early in the development will also reduce costs associated with laying pipelines around existing utilities and in landscaped areas.

Many of the MPCs that would be the best candidates for wastewater reuse in the Region H area are located within subsidence districts. By implementing a reuse strategy early, before subsidence regulations go into effect, communities can sometimes apply for groundwater credits that will promote better use of the limited groundwater that is available.

Other Potential Wastewater Reuse Options

Other potential participants in a reuse program were examined for this study. Agricultural irrigation for rice represents a sizable potential demand for reclaimed wastewater. The

application rate for rice is much higher than for municipal irrigation, and rice farms represent prime users of large volumes of water. Unfortunately, much of the agricultural land where municipal wastewater could most easily be used is now being developed or, in the near future, will be developed into residential communities. Therefore, these agricultural needs do not require a long-term strategy. Other irrigated agricultural operations such as commercial nurseries or turf farms represent potential demand centers that are likely to be in operation for a longer period of time. However, the locations of these operations and their availability as a point of demand are highly variable and therefore, they have not been included in this strategy at this time. Also, the total demand for this source is expected to be relatively small compared to municipal irrigation demand.

Another area of potential demand for reclaimed wastewater is for industrial cooling and process water, particularly in Harris County, but also in all the heavily urbanized areas of Region H. One major strategy for reclaimed wastewater is already included in this plan for the Houston Ship Channel industries. Other smaller opportunities for this application may be present in scattered areas throughout Harris, Galveston, and Brazoria Counties, but these are difficult to quantify and are not included at this time.

ISSUES AND CONSIDERATIONS

Environmental impacts, impacts to other water rights, and other issues or concerns would be addressed during the permitting process for this strategy. However, it should be expected that as reuse increases, instream flows potentially could decrease due to the reduction or elimination of wastewater return flows. However, not all water users will reuse their wastewater, and the increased use of water due to overall growth will most likely offset the impact of reuse as a municipal irrigation water supply strategy. Therefore, the overall reduction in instream flows is not expected to be significant.

Appendix 4C

Cost Estimating Procedure

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Appendix 4C

Cost Estimating Procedure

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COST ESTIMATING PROCEDURES
TWDB REGION H

The cost estimates of this study are expressed as one of three main categories that were dictated by TWDB guidelines: capital costs, other project costs, and annual project costs. Capital costs consist of all material, labor, and equipment expenses that are expended in the construction activities of a project. Other project costs include expenses that are not directly associated with the construction activities, such as engineering, land and easement acquisition, environmental studies, mitigation, and construction interest. Annual project costs consist of all costs that are incurred by the project upon implementation, either in repayment of borrowed funds or operating and maintaining the facility. Table 1 illustrates the primary components of the preliminary cost estimate. Cost estimating methods for the technical evaluation of alternatives considered for use in Texas TWDB Region H are explained in the following sections.

TABLE 1 MAJOR ESTIMATING CATEGORIES

PROJECT COSTS

CAPITAL COSTS	OTHER PROJECT COSTS
1. Pump Stations	**1. Engineering, Financial & Legal Services, and Contingencies**
2. Pipelines	- Includes Design, Bidding & Construction Phase Services, Geotechnical, and Surveying
3. Water Treatment Plants	
4. Water Storage Tanks	
- Ground Level	
- Elevated	
5. Off-Channel Reservoirs	**2. Land and Easements**
6. Well Fields	- Land Purchases
- Injection	- Temporary Easements
- Recovery	- Permanent Easements
- ASR Wells	- Includes Legal Services, Sales Commisions, & Surveying
7. Dams & Reservoirs	**3. Environmental - Studies and Mitigation**
8. Relocations	- Environmental & Archaeology Studies
9. Water Distribution System Improvements	- Permitting
	- Mitigation
10. Other Items	**4. Interest During Construction**

ANNUAL COSTS
1. Debt Service
2. Operation & Maintenance (O&M)
3. Pumping Energy Costs
4. Purchase of Water (if applicable)

1 CAPITAL COSTS

Capital costs, generally known as construction costs, have been compiled from a variety of reliable sources and analyzed for trends that can be used for estimating purposes. Once a trend has been identified, a set of representative values is entered into a cost table, from which the user can easily and efficiently locate a cost estimate. Each cost table is explained in the detail in the following sections. All data was adjusted to the Second Quarter of 2002 by using the Engineering News Record's Construction Cost Index (ENR CCI) ratio. The ENR CCI value for the Second Quarter of 2002 is 6508, determined by averaging the index values of April, May, and June of 2002 (6480, 6512, and 6532, respectively). For example, to update a representative cost from January of 1997 (ENR CCI value 5765), the cost from January of 1997 would be multiplied by the ratio of 6508 over 5765. The ENR CCI values are based on representative (steel, cement, and lumber) material and labor construction costs, averaged across 20 cities. The index measures the amount of money it would cost to purchase a theoretical quantity of services and goods in one year, as opposed to another. Monthly index values are reported from 1977 to the present and annual average values are reported back to 1908.

1.1 Pump Stations

The cost of a pump station depends upon a wide variety of conditions, including pump discharge, pumping head, pump type, site conditions, desired usage, and structural design. In constructing a preliminary estimate of the cost of a pump station, the intent is not to determine the pump type or details of the station structural design, but rather to estimate the cost of a general station capable of pumping the desired discharge at the necessary head conditions. Regional pump station project cost estimates and construction records were used to adjust published EPA historical pump station cost data. By using a comprehensive and reliable source of pump station cost data, recognizing the trend, and then adjusting that trend to similar projects in the region, a representative set of values for this region was determined. The cost table for this section, shown in Table 2, displays the costs for pump stations at a variety of horsepower requirements, based on peak discharge and design head. Higher horsepower requirements may require multiple pump stations.

Pump stations are generally classified as transmission or intake type structures, depending on the source of the water coming into the station. Intake stations normally pump water from a raw water source, such as a river or reservoir, and therefore require an intake structure to insure that proper flow conditions into the station are permitted. Transmission stations normally act as boosters in a plant or pipeline and do not require intake structures since the inlet pipe flow conditions are fairly constant. The total cost for the intake of a pump station has been estimated as an additional 20 percent of the pump station construction cost. While 10 percent is structural additions, the other 10 percent is trash rack screens and miscellaneous rack cleaning equipment.

TABLE 2 PUMP STATION COSTS

Pump Station Horsepower (HP)	Pump Station Construction Cost ($)
0	0
700	6,710,000
1000	8,253,000
2000	11,251,000
3000	13,005,000
4000	14,250,000
5000	15,215,000
6000	16,003,000
7000	16,670,000
8000	17,248,000
9000	17,757,000
10000	18,213,000
12000	19,002,000
15000	19,967,000
20000	21,211,000

[1] Values as of Second Quarter 2002.
[2] Add 20 percent for pumps stations with intake structures.
[3] Add 35 percent for pumps stations with standby power.

All electrical costs, with the exception of standby power, are included in the base pump station construction cost. Standby power, normally either a diesel generator or a dual power feed, is necessary to insure that the pump station can remain operational in the event of a power failure. Standby power is an optional feature which has been estimated as an additional 35 percent of the base pump station construction cost.

The costs of pump stations located in water treatment plants are accounted for in the water treatment plant cost table.

1.2 Pipelines

Pipeline capital costs are dependent upon a variety of factors, including pipe material used, trenching slopes and depths, fill material quality, frequency of valves/fittings, number of obstruction crossings, necessity of pavement removal and replacement, utility interference, traffic control, geologic conditions, and degree of urbanization. Due to the lack of significant quantities of rock in the primarily sandy clay soil of the region, only one soil type was analyzed. Table 3 shows the unit costs for pipe diameters from 12-inches to 144-inches, based on level of urban development.

TABLE 3 PIPELINE UNIT COSTS

Pipe Diameter (inches)	Rural Construction ($ / LF)	Urban Construction ($ / LF)
6	50	90
8	55	95
10	60	100
12	60	100
14	70	120
16	85	140
18	95	160
20	110	180
24	135	225
27	155	260
30	180	300
33	200	330
36	220	370
42	265	435
48	310	515
54	360	600
60	410	685
64	445	740
66	465	770
72	525	870
78	565	945
84	620	1,030
90	672	1,120
96	730	1,215
102	785	1,305
108	840	1,400
114	900	1,495
120	955	1,595
144	1,195	1,990

[1] Values as of Second Quarter 2002.

The unit costs are based on open cut construction methods, with the exception of special crossings. Special crossings at railroads, streets, and rivers will likely be accomplished by horizontal boring, also known as pipe jacking. Horizontal boring costs are shown in Table 4.

TABLE 4 PIPELINE CROSSING UNIT COSTS

Pipe Diameter (inches)	Total Cost ($ / inch dia. / LF)
6	610
8	625
10	660
12	650
16	735
18	805
20	790
24	915
30	1,015
36	1,130
42	1,270
48	1,400
54	1,545
60	1,695
66	1,785
72	1,870
78	1,945
84	2,000
90	2,080
96	2,140
102	2,195
108	2,245
114	2,290
[1] Values as of Second Quarter 2002.	
[2] Costs based on Horizontal Boring (Jacking).	

1.3 Water Treatment Plants

Water treatment plant capital costs are shown in Table 5 for three alternative treatment methods. One process is used almost exclusively on groundwater sources. The other two processes use filtration, mostly for surface water sources, and the quality of the source water normally dictates which one is used.

Groundwater is commonly treated by chlorination only, because the process is relatively inexpensive compared to filtration and the treatment equipment is small enough that each groundwater well can normally have its own. The most common of the surface water

treatment methods is conventional filtration treatment. When influent suspended solids concentrations are sufficiently low that they are completely removed by filtration and result in a reasonable backwash cycle on the filtration units, direct filtration can be used. The direct filtration plant is essentially the same as the conventional filtration plant, except the sedimentation process is deleted. Wastewater effluent is sometimes reclaimed for aquifer injection or non-potable use, but this process is discussed later in Section 1.11.

TABLE 5 WATER TREATMENT PLANT COSTS

Plant Capacity (MGD)	Groundwater Chlorination Plant Cost ($)	Direct Filtration Plant Cost ($)	Conventional Filtration Plant Cost ($)
1	403,000	2,884,000	3,742,000
10	2,349,000	17,445,000	21,805,000
50	7,570,000	56,235,000	70,293,000
75	11,355,000	84,351,000	105,439,000
100	15,140,000	112,468,000	140,585,000
150	22,710,000	168,702,000	210,878,000
200	30,280,000	224,936,000	281,170,000

[1] Values as of Second Quarter 2002.

As can be seen in Table 6, the choice of treatment methods is dictated by both the quality of the influent water source and the intended destination of the treated water. Surface waters treated by direct filtration and wastewater reclamation are not intended for conveyance to a public water distribution system. The reason for this is that surface water and wastewater effluent normally has a high suspended solids content and the treatment processes cannot remove enough of the suspended solids to produce a water quality necessary for public water supplies.

TABLE 6 WATER TREATMENT METHOD DESCRIPTIONS

Water Treatment Method	Source			Destination	
	Groundwater	Surface Water	Wastewater	Aquifer or Non-Potable Use	Public Water System Distribution
Groundwater Chlorination	●			●	●
Direct Filtration	●			●	●
Direct Filtration		●		●	
Conventional (Filtration)		●		●	●
Wastewater Reclamation			●	●	

1.4 Storage Tanks

Storage tanks are used in a variety of different water supply systems, including pump stations, distribution systems, and pipelines. Several factors influence the cost of storage tanks, including frequency of use, capacity, type of construction materials, location,

architectural treatment, and corrosion resistance. Steel tanks are normally constructed in elevated or ground-level locations, while prestressed concrete tanks are normally constructed at or below grade. Concrete does not require cathodic protection or any type of protective exterior coating. Below grade tanks require no architectural treatment, but have higher excavation and backfill costs. The costs of storage tanks that are shown in Table 7 are based on ground-level prestressed concrete construction for a range of capacities. The costs of elevated storage tanks that are shown in Table 8 are based on elevated steel construction for a range of capacities.

Table 7 GROUND LEVEL WATER STORAGE TANK COSTS

Storage Capacity (MG)	Cost ($)
0.01	170,658
0.05	202,587
0.10	264,721
0.5	523,584
1.0	780,653
2.0	1,164,891
4.0	1,752,753
6.0	2,344,076
7.5	2,832,719
9.0	3,224,950
10.0	3,477,237
15.0	4,957,402
[1] Values as of Second Quarter 2002.	
[2] Costs based on ground level prestressed concrete construction.	

Table 8 ELEVATED WATER STORAGE TANK COSTS

Storage Capacity (MG)	Cost ($)
0.01	273,817
0.10	308,963
0.25	439,706
0.5	712,495
0.8	978,255
1.0	1,252,828
[1] Values as of Second Quarter 2002.	
[2] Costs based on elevated steel construction.	

1.5 Off-Channel Reservoirs

An off-channel reservoir is a reservoir that receives minimal or no natural inflow. Two methods are normally employed in the construction of off-channel reservoirs. A dam can be constructed along a minor tributary or a ring dike can be constructed. Since little or no natural inflow reaches the reservoir, water is normally supplied by pumping from a nearby river or other location. The cost of the off-channel reservoir is highly dependent on the height of the levees that are constructed and the area of land that is available for use. Land costs will be considerably higher for a shorter ring dike with a much larger circumference that can still hold the same capacity as a taller ring dike with a smaller circumference. Table 9 shows the cost of off-channel reservoirs for a range of capacities.

TABLE 9 OFF-CHANNEL RESERVOIR COSTS

Storage Volume (ac-ft)	Ring Dike Cost ($)
500	1,044,000
1,000	1,507,000
2,500	2,502,000
5,000	4,964,000
7,500	6,200,000
10,000	7,282,000
12,500	8,265,000
15,000	11,667,000
17,500	12,688,000
20,000	17,009,000
22,500	17,889,000
25,000	19,147,000

[1] Values as of Second Quarter 2002.
[2] Values are based on ring dike construction.
[3] Values also used for cost of dams on minor tributaries.

1.6 Well Fields

The costs for public water supply wells are shown in Table 9, as estimated by LBG-Guyton Associates, Inc. The costs include well completion, pumps, and all other necessary facilities. Irrigation wells costs are assumed to amount to 55 percent of public water supply well costs for wells of equivalent depth and capacity.

TABLE 10 PUBLIC SUPPLY WELL COSTS

Well Depth	Well Capacity (gpm)				
(feet)	200	400	700	1,000	1,500
Static Water Level Less Than 200 Feet Below Land Surface					
300	$165,000	$250,000	$275,000	-	-
500	$195,000	$285,000	$310,000	$440,000	-
700	$255,000	$305,000	$335,000	$470,000	$500,000
1,000	$295,000	$360,000	$385,000	$510,000	$540,000
1,500	$340,000	$370,000	$440,000	$565,000	$610,000
Static Water Levels Between 200 and 300 Feet Below Land Surface					
500	$175,000	$240,000	-	-	-
700	$210,000	$245,000	$345,000	$480,000	$510,000
1,000	$260,000	$365,000	$400,000	$530,000	$575,000
1,500	$350,000	$380,000	$450,000	$575,000	$650,000
Static Water Levels Between 300 and 400 Feet Below Land Surface					
500	$185,000	-	-	-	-
700	$230,000	$260,000	$380,000	$510,000	$545,000
1,000	$285,000	$450,000	$400,000	$555,000	$595,000
1,500	$360,000	$450,000	$610,000	$750,000	$815,000
Static Water Levels Between 400 and 500 Feet Below Land Surface					
1,000	$305,000	$435,000	$530,000	$645,000	-
1,500	$370,000	$470,000	$625,000	$780,000	-

[1] Values adjusted to Second Quarter 2002.
[2] Costs based on underreamed, gravel-packed wells, with steel casing and stainless steel screens.
[3] Costs as estimated by LBG-Guyton Associates.
[4] Irrigation well costs assumed to be 55% of above public water supply well cost values.

1.7 Dams and Reservoirs

Dam and reservoir construction costs were estimated on an individual case basis due to the unique nature of each project. Most dams and reservoirs that are currently under consideration have been studied in detail in the past and the previous cost estimates normally include both construction cost and other project costs. In most cases, the cost estimates from these previous studies were used, after adjusting the costs with the ENR CCI to the Second Quarter of 2002.

1.8 Relocations

In some cases, projects required the use of lands that contain existing facilities or improvements. While relocation of existing utilities, roads, homes, businesses, and other

facilities is oftentimes an option, outright purchase cost of the land must be allowed for in cases where it is not deemed acceptable to relocate. Relocation cost estimates are addressed on an individual project basis due to the variation in the cost of the land and facilities which require relocation.

1.9 Water Distribution System Improvements

A water distribution system is used to distribute water throughout the service area by means of pump stations, piping, valves, storage tanks, and a variety of other equipment and facilities. When a city or entity requires additional water, improvements to the water distribution system are normally necessary. The cost of the water distribution system improvements varies considerably, based on the extent of the existing and proposed facilities and the wide variety of facilities that make up a water distribution system. Costs are estimated on an individual basis using previous proposed water distribution facility studies and cost estimates.

1.10 Stilling Basins

Stilling basins are normally used in water distribution systems to decrease the water flow velocity and allow sediment to settle out prior to discharging into a canal, reservoir, or other body of water. Stilling basin costs are estimated based on a target detention time of two hours and includes all excavation and hauling costs necessary to construct the basin. Optional mechanical sedimentation basin dredging equipment is not included. Stilling basin construction costs, when applicable, are estimated as $2,800 per cfs of discharge.

1.11 Wastewater Reclamation Plants

Wastewater effluent can be treated by a variety of methods for aquifer or other non-potable uses. The reverse osmosis membrane treatment method, including denitrification, was used to estimate the wastewater reclamation plant costs that are shown in Table 11. Reclaimed wastewater should not be sent directly to a public water distribution system.

TABLE 11 WASTEWATER RECLAMATION PLANT COSTS

Plant Capacity (MGD)	Wastewater Reclamation Plant Cost ($)
1	5,460,000
10	27,362,000
50	55,694,000
75	83,540,000
100	111,400,000
150	168,000,000
200	223,000,000

[1] Values as of Second Quarter 2002.

[2] Wastewater reclamation plant is based on nitrification method, from Draft Technical Memorandum, Task 7 - Cost Estimates, Houston Ship Channel Wastewater Reclamation and Reuse Feasibility Study, October 2004.

OTHER PROJECT COSTS

1.12 Engineering, Financial and Legal Services, and Contingencies

Engineering, financial and legal services, and contingencies are estimated as a lump sum, according to TWDB guidelines, as 30 percent of the total construction cost for pipelines and 35 percent of the total construction cost for all other types of projects.

1.13 Land and Easements

Land related costs for a project are typically one of two types: land permanently purchased for construction of a facility, or easement costs. The amount and cost of land purchased for various types of projects is considered on an individual project basis, taking into consideration similar project experience. Easement costs, on the other hand, can vary considerably in a single project, based on the variety of site conditions that a pipeline may encounter along its path. Easements are generally acquired for pipeline projects and can normally be classified as temporary or permanent. Permanent easements are purchased for the land that the pipeline will remain in once it is completed, including a wide enough buffer zone to allow maintenance access and protect the pipeline from other parallel utilities. Temporary easements are "rented" to allow extra room for material and equipment staging, as well as other construction related activities.

Land related costs include legal services, sales commissions, and surveying. Ten percent of the total land and easement costs is added to account for all legal services, sales commissions, and surveying associated with the land related purchases. Land costs can vary considerably throughout the region, based on degree of urbanization and other economic factors. County appraisal district records, previous project estimates, and other land value sources are used to estimate the land related costs.

1.14 Environmental and Archaeology Studies, Permitting, and Mitigation

Costs for environmental studies, archaeological studies, permitting, and mitigation are estimated on an individual project basis, taking into consideration previous project estimates, the judgement of qualified professionals, and any other available information. In the case of reservoir projects, mitigation costs were generally equal to the land value of the acreage that would be inundated.

1.15 Interest During Construction

Interest during construction is calculated as the cost of the interest on the borrowed funds, less the return on the unspent portion of the borrowed funds that are invested during construction. Interest during construction is calculated, according to TWDB guidelines, as the total interest accrued by a 6 percent annual interest rate on the total borrowed funds at the end of the construction phase, less a 4 percent annual rate of return on investment of unspent funds. A standard construction period of 2 years is used to calculate interest.

2 ANNUAL COSTS

Annual costs are expenses which the owner of the project can expect once the project is completed. Each of these costs is described in detail in the following subsections.

2.1 Debt Service

Debt service is the total annual payment that is required to repay borrowed funds. Debt service was calculated according to TWDB Section 4.2.9 of Exhibit B, assuming an annual interest rate of 6 percent and a repayment period of 40 years for reservoir projects and 30 years for all other projects.

2.2 Operation and Maintenance

Operation and maintenance (O&M) costs include all labor and materials required to run the facility and and keep it operational, including periodic repair and/or replacement of facility equipment. In accordance with TWDB guidelines, O&M costs are calculated as 1 percent of the total estimated construction costs for pipelines, distribution facilities, tanks, and wells, 1.5 percent of the total estimated construction costs for dams and reservoirs, and 2.5 percent of the total estimated construction costs for intake structures and pump stations. Water treatment plant cost estimates are shown in Table 12 below.

TABLE 12 OPERATION AND MAINTENANCE COSTS FOR WATER TREATMENT PLANTS

Plant Capacity (MGD)	Groundwater Chlorination Plant Cost ($)	Direct Filtration Plant Cost ($)	Conventional (Filtration) Plant Cost ($)	Wastewater Reclamation Plant Cost ($)
1	158,000	169,000	211,000	229,000
10	1,580,000	1,690,000	2,110,000	2,290,000
50	7,895,000	8,440,000	10,550,000	11,450,000
75	11,850,000	12,660,000	15,820,000	17,170,000
100	15,790,000	16,870,000	21,908,000	22,900,000
150	23,690,000	25,310,000	31,640,000	34,340,000
200	31,580,000	33,740,000	42,180,000	45,790,000

[1] Values as of Second Quarter 2002.

2.3 Pumping Energy Costs

Power costs are calculated on an annual basis, using calculated horsepower input and a power purchase cost of $0.06 per kWh, per TWDB guidelines.

2.4 Purchase of Water

The purchase of water, if applicable to the management strategy being considered, is dependent on the source and type (raw or treated) of water being purchased. The cost is

addressed on an individual project basis due to the wide variety of water types and sources.

3 PRESENTATION OF COST ESTIMATES

Each water management strategy is provided with a cost estimate that shows total construction costs, total project costs (the sum of construction costs and other project costs), and total annual project costs. The unit cost of each alternative per unit of water delivered (total project cost per acre-foot of water delivered) is also presented for further comparison. Each site specific alternative provides as much detail in the estimate as is necessary to accurately estimate the management strategy that is being considered. Detailed cost estimates are completed for each shortage and are in Appendix 4D.

Appendix 4D

Impacts on Galveston Bay Inflows

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Appendix 4D

Impacts on Galveston Bay Inflows

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REGION C Management Strategies-Imports:

1. NTMWD Additional Lake Texoma

This strategy involves the import of an additional 9,900 ac-ft/yr water for the North Texas Municipal Water District (NTMWD) from Lake Texoma (Red River Basin). CI cards were modified to include return flows associated with the 9,900 ac-ft to be used in the Trinity Basin by NTMWD. Additional return flow associated with this import total 5,463 ac-ft/year.

The WWTP's where additional return flows are discharged include: NTMWD Wylie, NTMWD Rowlett, NTMWD Wilson, NTMWD Mesquite, NTMWD Floyd, Garland-Rowlett, Garland-Duck Creek, NTMWD Buffalo, and NTMWD Squabble.

2. Oklahoma Water

This strategy involves import of 49,254 ac-ft/yr for NTMWD from Lake Hugo in Oklahoma to the Trinity Basin through Lake Cooper to Lake Lavon. CI cards were modified to include the additional return flows totaling 27,251 ac-ft/yr associated with use of this water for NTMWD.

The WWTP's where additional return flows are discharged include: NTMWD Wylie, NTMWD Rowlett, NTMWD Wilson, NTMWD Mesquite, NTMWD Floyd, Garland-Rowlett, Garland-Duck Creek, NTMWD Buffalo, and NTMWD Squabble.

3. Oklahoma Water

This strategy involves import of 11,960 ac-ft/yr for TRWD from Lake Hugo in Oklahoma to the Trinity Basin through Lake Cooper to Lake Lavon. CI cards were modified to include the additional return flows totaling 6,566 ac-ft/yr associated with use of this water by TRWD and its customers.

The WWTP's where additional return flows are discharged include: TRA Central, TRA Denton, and Fort Worth.

4. Lower Bois d'Arc Creek Lake

An additional 96,537 ac-ft/yr of water will be imported from lower Bois d'Arc Creek Lake in the Red River Basin for NTMWD. CI cards were modified to include the additional return flows totaling 60,449 ac-ft/yr associated with use of this water for NTMWD.

The WWTP's where additional return flows are discharged include: NTMWD Wylie, NTMWD Rowlett, NTMWD Wilson, NTMWD Mesquite, NTMWD Floyd, Garland-Rowlett, Garland-Duck Creek, NTMWD Buffalo, NTMWD Squabble.

5. Marvin Nichols 1 Lake

This strategy involves import of 80,475 ac-ft/yr of water for NTMWD from Marvin Nichols Lake in the Sulphur Basin to Lake Lavon. CI cards were modified to include the additional return flows totaling 47,488 ac-ft/yr associated with use of this water for NTMWD.

The WWTP's where additional return flows are discharged include: NTMWD Wylie, NTMWD Rowlett, NTMWD Wilson, NTMWD Mesquite, NTMWD Floyd, Garland-Rowlett, Garland-Duck Creek, NTMWD Buffalo, NTMWD Squabble.

6. Marvin Nichols 1 Lake

This strategy involves import of 80,388 ac-ft/yr of water for NTMWD from Marvin Nichols Lake (Phase 2) to Lake Lavon. CI cards were modified to include the additional return flows totaling 47,436 ac-ft/yr associated with use of this water for NTMWD.

The WWTP's where additional return flows are discharged include: NTMWD Wylie, NTMWD Rowlett, NTMWD Wilson, NTMWD Mesquite, NTMWD Floyd, Garland-Rowlett, Garland-Duck Creek, NTMWD Buffalo, NTMWD Squabble.

7. Marvin Nichols 1 Lake

This strategy involves import of 56,000 ac-ft/r of water for Dallas from Marvin Nichols Lake to Lake Lewisville. CI cards were modified to include the additional return flows totaling 33,619 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: DWU Central, DWU Southside, TRA Central, TRA 10 mile, The Colony, Flower Mound, Denton-Pecan, and TRA Red Oak.

8. Marvin Nichols 1 Lake

This strategy involves import of 56,000 ac-ft/yr of water for Dallas from Marvin Nichols Lake (Phase 2) to Lake Lewisville. CI cards were modified to include the additional return flows totaling 33,619 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: DWU Central, DWU Southside, TRA Central, TRA 10 mile, The Colony, Flower Mound, Denton-Pecan, and TRA Red Oak.

9. Marvin Nichols 1 Lake

This strategy involves import of 77,562 ac-ft/yr of water for TRWD from Marvin Nichols Lake to Eagle Mountain. CI cards were modified to include the additional return flows totaling 48,864 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: TRA Central, TRA Denton, and Fort Worth.

10. Marvin Nichols I Lake

This strategy involves import of 77,998 ac-ft/yr of water for TRWD from Marvin Nichols Lake (Phase 2) to Eagle Mountain. CI cards were modified to include the additional return flows totaling 49,139 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: TRA Central, TRA Denton, and Fort Worth.

11. Lake Fork Connection

This strategy involves import of 120,000 ac-ft/yr of water for Dallas from Lake Fork in the Sabine Basin, to Eastside Wastewater Treatment Plant. CI cards were modified to include the additional return flows totaling 68,990 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: DWU Central, DWU Southside, Seogoville, TRA Central, TRA 10 mile, TRA Red Oak (minute amount from Red Oak)

12. Lake Palestine Connection

This strategy involves import of 109,600 ac-ft/yr of water for Dallas from Lake Palestine in the Neches Basin to the Southeast Water Treatment Plant. CI cards were modified to include the additional return flows totaling 63,011 ac-ft/yr associated with use of this water for Dallas.

The WWTP's where additional return flows are discharged include: DWU Central, DWU Southside, Seogoville, TRA Central, TRA 10 mile, TRA Red Oak (minute amount from Red Oak)

Region C In-Basin Strategies:

1. Elm Fork Permit

Although Table 13 states "Extend Elm Fork Permit" of 10,000 ac-ft to be used in Dallas, the new permanent water right is for 40,000 ac-ft. The new permit was granted on May 17, 2002 while filed on April 2, 1992 (priority) for municipal purposes by the City of Dallas.

This water right of 40,000 ac-ft had already been reflected in the water right deck by TCEQ.

2. Cedar Creek/Richland Chambers Pipeline Expansion

This strategy is for the use of 110,000 ac-ft/yr by TRWD as a result of the CC/RC pipeline expansion. The TCEQ Water Availability model already reflected the ability to convey all

water under certificates 08-4976 and 08-5035 since the source reservoirs and return flow locations are both in the Trinity River Basin. Thus no modifications were necessary.

REGION C Reuse Strategies:

1. Lake Texoma NTMWD Indirect Reuse to Lake Lavon

According to Region C strategies, 35,288 ac-ft/yr of return flows associated with NTMWD will be reused indirectly. Portions of the reuse flow will be consumed, resulting in a reduction in net return flows. Using the return flow factors developed for NTMWD (0.55), the net total return flows associated with NTMWD Texoma water were calculated as 32,522 ac-ft/yr, as opposed to 48,122 ac-ft/yr without reuse. The adjusted return flow (a reduction of 15,600 ac-ft/yr) is reflected in the CI cards associated with NTMWD return flows.

2. Dallas Phase 2 - Southside WWTP Indirect Reuse

Region C strategies include 68,300 ac-ft/yr of the WWTP effluent to be reused by Dallas in the Trinity Basin. Assuming a return flow factor of 0.63 results in a net reduction in return flows of 25,271 ac-ft/yr at the DWU Southside WWTP. This net return flow reduction was reflected in CI cards, resulting in a CI card totaling 43,029 ac-ft/yr.

3. Reuse from Trinity River (TRWD)

This strategy is for the reuse of WWTP discharges in the Trinity River Basin of 62,744 ac-ft/yr via Richland-Chambers Reservoir and 52,432 ac-ft/yr via Cedar Creek Reservoir. A small amount of reuse for the Brazos Basin is not reflected in this model.

An instream flow requirement of 100,000 ac-ft was modeled at control point B4986A on the Trinity River near the Richland-Chambers Creek and Cedar Creek. To simulate reuse through the reservoirs, at B4986A, two diversions were simulated with a priority date of December 31, 2002: 105,020 ac-ft/yr returning 100% to Richland-Chambers Reservoir, and 90,800 ac-ft/yr returning 100% to Cedar Creek Reservoir.

A water right card was added to divert 63,000 ac-ft/yr from Richland-Chambers Reservoir, with a return flow factor of 0.63 to B66 (simplified to return all to the TRA Central WWTP) at the December 31, 2002 priority date. Similarly, an additional water right card for 52,500 ac-ft/yr from Cedar Creek Reservoir was modeled, returning 0.63 to B66.

4. Las Colinas Reuse

This strategy is for reuse of effluent by TRA in the amount of 7,000 ac-ft/yr. The purpose of reuse is irrigation and to maintain the lake levels at Las Colinas Country Club. The strategy is assumed to come from flows at TRA Central and TRA 10-mile in the amount of 3,500 ac-ft/yr each. This consumptive reuse represents a reduction of return flow and is subtracted from the CI card.

5. Joe Pool Reuse

This strategy is for reuse by TRA of 14,000 ac-ft/yr in Phase 1, and another 14,000 ac-ft/yr for Phase 2 (indirect use of effluent). The WWTPs associated with diversions from Joe Pool Reservoir include TRA Central, TRA 10 mile, and TRA Red Oak with return control points 66, 135, 262, respectively. However, in the modeling reuse, return flows are assumed to be associated with TRA Central (B66) and TRA 10 mile (B135) only because of abundant flows available at the two locations. The consumptive portion of the reuse was estimated as 12,464 ac-ft and which are subtracted from CI cards at the two WWTPs.

6. Mountain Creek Reuse

This strategy is for 3,000 ac-ft to be reused indirectly by TRA for industrial purposes. Assuming all reuse comes from TRA Central WWTP and a return flow factor of 0.63, the additional consumption is 1,110 ac-ft/yr, which is subtracted from the CI card at TRA Central.

7. Ellis County Reuse

This strategy is 20,000 ac-ft of effluent to be used by TRA for steam power. Steam power use is all consumptive use and therefore, there is no return flows associated with the reuse. The effluent available for reuse in Ellis County comes from the following sources:

Water Right No.	Water Source	RF Control Point	Diversion (ac-ft/yr)	RF Amount* (ac-ft/yr)
WR 5021	Bardwell	B81	3696	2328
WR 5021	Bardwell	B262	1584	998
WR 5021	Bardwell	B74	4320	2722
WR 3404	Joe Pool	B262	6463	4072
WR 5018	Waxahachie	B74	3570	2249

* Assume a return flow factor of 0.63.

Additionally, there are return flows totaling 830 ac-ft/yr associated with control point B262 in CI card that can be reused. The total reuse simulated thus totals 13,200 ac-ft/yr, 6,800 ac-ft less than the management strategy stated amount.

In modeling this reuse strategy in Ellis County, the return flow factors associated with the above water rights were set to zero to reflect the 100% reuse strategy. Another 830 ac-ft were subtracted from CI card at B262 (TRA-Red Oak WWTP) in the model.

8. Denton County Reuse

Table 13 for this strategy is 5,000 ac-ft to be reused directly by TRA (indirect use of effluent) at Denton Creek WWTP. Assuming consumptive reuse is 37 percent (return flow factor 0.63), the amount to be consumed is 1,850 ac-ft/yr. Also assuming the reused effluent is

associated with water right 2335 (195,422 ac-ft diversion from Robert), the return flow factor for this water right is reduced from 0.63 to 0.62 to account for the effluent consumed during reuse.

9. Tarrant County Reuse

Table 13 for this strategy is 2,500 ac-ft of effluent to be used indirectly by TRA. Assume the reused effluent will be returned to Grapevine WWTP with a return flow factor of 0.63. Consequently, 925 ac-ft of effluent will be consumed, resulting in a reduction of net return flow.

The return flow factor associated with the water right WR2362 (1,250 ac-ft diversion from Grapevine) is changed from 0.63 to 0.26 to account for the consumptive use of 925 ac-ft of effluent.

10. Grapevine Lake Reuse

Table 13 for this strategy is 8,000 ac-ft of effluent to be used indirectly by TRA from Phase 1 and 8,000 ac-ft for Phase 2. Assume a return flow factor of 0.63 for the reused effluent resulting in a consumptive use of effluent of 5,920 ac-ft which needs to be subtracted from CI card.

The WWTP's that the flows are to be returned are TRA-Central and TRA-10 mile. The consumed portion of the effluent were subtracted from the CI card at control points B66 (5,387 ac-ft) and B135 (533 ac-ft).

Region H Management Strategies

1. . Municipal and Irrigation Conservation

Municipal and irrigation conservation are strategies which reduce the demand growth. Without these strategies, the total demand would be greater, and other strategies would be necessary. When adding management strategies to the models, there is no modification necessary for conservation.

2. Houston-TRA Contract

This strategy is associated with water right 08-4248. The strategy makes 200,000 ac-ft/yr of TRA water from Lake Livingston available to the City of Houston. Purchased water will be conveyed by the COH into San Jacinto River Basin via the CWA Canal and/or Luce Bayou.

The new return flows will be reflected in the San Jacinto WAM through municipal and industrial return flow points served by the City of Houston. These return flows were not assumed in the TCEQ WAM model. The return flows are added using CI cards totaling 140,000 ac-ft/yr (200,000 afy * 0.7) at control points COHMUN and COHIND which

represent the City of Houston Municipal and Industrial wastewater flows. From these points, the return flow is distributed to individual WWTPs based on historical percentages. Although the TCEQ San Jacinto WAM did not include these return flows, the TCEQ Trinity WAM already assumed the return flows for this water right are out of basin, so no changes were necessary to the Trinity WAM.

3. Luce Bayou

This strategy is associated with water rights 08-4261 and 10-4964. The strategy conveys up to 302,500 ac-ft/yr of water from the City of Houston's Lake Livingston allocation via Luce Bayou into Lake Houston. The total diversions from the Trinity WAM do no change, nor do the return flows in the TCEQ San Jacinto WAM, because that model assumed full utilization of the COH Livingston supply, with returns throughout the COH WWTPs.

4. WW Reclamation

This strategy entails municipal wastewater reclamation for manufacturing use in the Houston Ship Channel (HSC) area. Return flows into the HSC from 69th St., Sims Bayou and GCWDA are reduced by 90,700 ac-ft/yr. Coastal Water Authority sales to industry are reduced by 90,700, freeing up that water for other demands such as the City of Houston municipal system. CRWR 177 and 186 are used for Sims Bayou and 69th St., SR_GB) and CRWR 137 are used for GCWDA (Gulf Coast Waste Disposal Authority, located south of the EWPP, discharges to Ship Channel)

A water right for 90,700 with a return flow factor of 0.6 is created to distribute the return flow from the use of this reclaimed water. Although some return flows from this strategy may got to the San Jacinto-Brazos basin, all the return flows are modeled in the San Jacinto Basin.

5. Bedias Reservoir

This is a new reservoir (Bedias) in Madison County in the Trinity River Basin. Water from this reservoir is moved by the SJRA to Lake Conroe in San Jacinto Basin. SJRA will use this water in Conroe, Oak Ridge North, Panorama Village, Shenandoah, and the Woodlands, and the southern basin towns of Barrett and Crosby and the SJRA manufacturing and irrigation WUG's.

The return flows of SJRA will be between Lake Conroe and Lake Houston. Note: (Crosby and Barrett were considered County-Other, and The Woodlands was a CDP)

CP	Entity	CRWR	Amount of Supply in 2050:
WSCN	WSCN- City of Conroe	147	14,398
SPSP	SJRA- Woodlands	221	40,750
SPSP	SJRA- Woodlands	265	2,216
CYWE	Manufacturing	208	17,609

The CRWR 208 point was chosen for manufacturing because this CRWR was a return point for some industries for the original WAM, which made it a likely candidate. The respective monthly return flow factors used for these CRWR points for the original WAM are used in this analysis.

Strategies impacting the other basins are listed below:

Name	MWP	Source Basin	Use Basin	Supply 2050, ac-ft/yr
SJRA/CLCND Contract	SJRA	8	9	30,000
Voluntary Redistribution	BRA	12	11	75,000
Create New Contract-BRA	GCWA	12	11	35,000
Allens Creek Reservoir	COH	12	11	69,750
Little River Reservoir	GCWA	12	11	28,000
Allens Creek Reservoir	**BRA**	**12**	**12**	29,900
Contractual Transfers	COH and SJRA			67,029
Little River Reservoir	**BRA**	**12**	**12**	71,000

9= Trinity-San Jacinto, 11=San Jacinto-Brazos Coastal Basin, 12= Brazos Basin

Allen's Creek reservoir has been modeled such that the use basin is San Jacinto Basin, instead of San Jacinto-Brazos basin to simplify the modeling.

Appendix 4E

Socioeconomic Impacts of Unmet Water Needs in the Region H Water Planning Area

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Appendix 4E

Socioeconomic Impacts of Unmet Water Needs in the Region H Water Planning Area

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Socioeconomic Impacts of Unmet Water Needs in the Region H Water Planning Area

Prepared by:

Stuart Norvell and Kevin Kluge of The Texas Water Development Board's Office of Water Resources Planning

Prepared in support of the:

Region H Water Planning Group and the 2006 Texas State Water Plan

May 2005

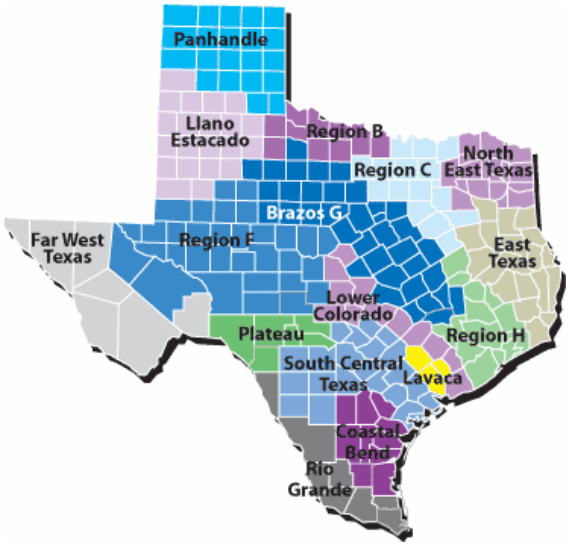

Table of Contents

Executive Summary

Background

Water shortages due to severe drought combined with infrastructure limitations would likely curtail or eliminate economic activity in business and industries heavily 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 business and industry, but they might also bias corporate decision makers against plant expansion or plant location in Texas. From a societal 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.

Section 357.7(4) of the rules for implementing Texas Senate Bill 1 requires regional water planning groups to evaluate the social and economic impacts of projected water shortages (i.e., "unmet water needs") as part of the planning process. The rules contain provisions that direct the Texas Water Development Board (TWDB) to provide technical assistance to complete socioeconomic impact assessments. In response to requests from regional planning groups, staff of the TWDB's Office of Water Resources Planning designed and conducted analyses to evaluate socioeconomic impacts of unmet water needs.

Overview of Methodology

Two components make up the overall approach to this study: 1) an economic impact module and 2) a social impact module. Economic analysis addresses potential impacts of unmet water needs including effects on residential water consumers and losses to regional economies stemming from reductions in economic output for agricultural, industrial and commercial water uses. Impacts to agriculture, industry and commercial enterprises were estimated using regional "input-output" models commonly used by researchers to estimate how reductions in business activity might affect a given economy. Estimated impacts are *independent* and distinct "what if" scenarios for a given point in time (i.e., 2010, 2020, 2030, 2040, 2050 and 2060). Reported figures are scenarios that illustrate what could happen in a given year if: 1) water supply infrastructure and/or water management strategies do not change through time, 2) the drought of record recurs. Details regarding the methodology and assumptions for individual water use categories (i.e., municipal consumers including residential and commercial water users, manufacturing, steam-electric, mining, and agriculture) are in the main body of the report.

The social component focuses on demographic effects including changes in population and school enrollment. Methods are based on population projection models developed by the TWDB for regional and state water planning. With the assistance of the Texas State Data Center, TWDB staff modified these models and applied them for use here. Basically, the social impact module incorporates results from the economic impact module and assesses how changes in a region's economy due to water shortages could affect patterns of migration in a region.

Summary of Results

Table E-1 and Figure E-1 summarize estimated economic impacts. Variables shown include:[1]

- **sales** - economic output measured by sales revenue;
- **jobs -** number of full and part-time jobs 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 for the region; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include any type of income tax).

If drought of record conditions return and water supplies are not developed, study results indicate that the Region H Water Planning Area would suffer significant losses. If such conditions occurred 2010 lost income to residents in the region could total $2,450 million with associated job losses as high 27,965. State and local governments could lose $133 million in tax receipts. If such conditions occurred in 2060, income losses could run $15,393 million, and job losses could be as high 187,670. Nearly $1,179 million worth of state and local taxes would be lost. Reported figures are probably conservative because they are based on estimated costs for a single year; but in much of Texas, the drought of record lasted several years. For example, in 2030 models indicate that shortages would cost residents and businesses in the region $9,904 million in lost income. Thus, if shortages lasted for three years total losses related to unmet needs could easily approach $30,000 million.

Table E-1: Annual Economic Impacts of Unmet Water Needs
(years, 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

Year	Sales ($millions)	Income ($millions)	Jobs	State and Local Taxes ($millions)
2010	$5,529.34	$2,449.88	27,965	$132.85
2020	$8,846.38	$4,465.83	54,665	$264.03
2030	$14,087.02	$7,597.24	97,295	$458.72
2040	$18,447.19	$9,903.96	124,720	$613.07
2050	$21,370.60	$11,811.82	149,835	$742.65
2060	$26,094.01	$15,393.84	187,670	$1,179.36

Source: Texas Water Development Board, Office of Water Resources Planning

[1] Total sales are not a good measure of economic prosperity because they include sales to other industries for further processing. For example, a farmer sells rice to a rice mill, which the rice mill processes and sells it to another consumer. Both transactions are counted in an input-output model. Thus, total sales "double count." Regional income plus business taxes are more suitable because they are a better measure of net economic returns.

Figure E-1: Distribution of Lost Income by Water Use Category
(years, 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

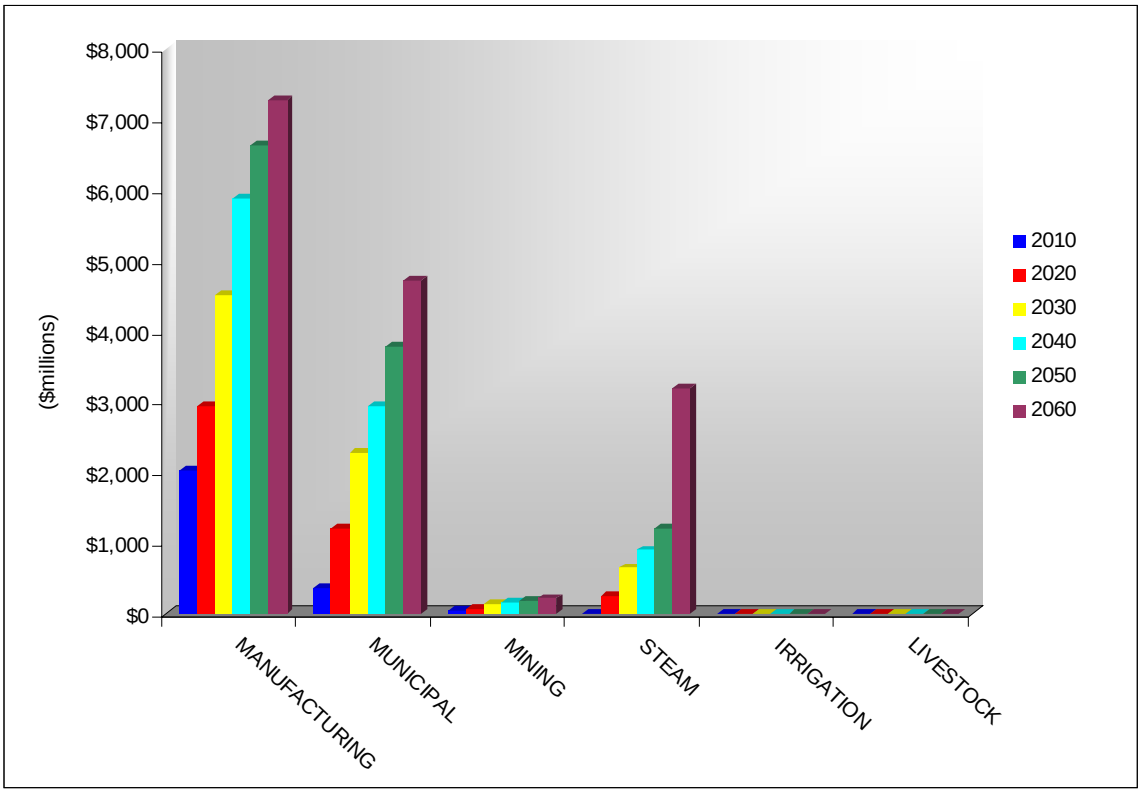

Table E-2 shows potential losses in population and school enrollment. Changes in population stem directly from the number of lost jobs estimated as part of the economic impact module. In other words, many – but not all - people would likely relocate due to a job loss and some have families with school age children. Section 1.3 in the main body of the report discusses methodology in detail.

Table E-2: Estimated Regional Social Impacts of Unmet Water Needs
(years, 2010, 2020, 2030, 2040, 2050 and 2060)

Year	Population Losses	Declines in School Enrollment
2010	42,750	10,500
2020	82,070	20,160
2030	144,925	35,600
2040	185,365	45,535
2050	221,955	54,520
2060	269,610	66,230

Source: Based on models developed by the Texas Water Development Board, Office of Water Resources Planning and the Texas State Data Center.

Introduction

Texas is one the nation's fastest growing states. From 1950 to 2000, population in the state grew from about 8 million to nearly 21 million. By the year 2050, the total number of people living in Texas is expected to reach 40 million. Rapid growth combined with Texas' susceptibility to severe drought makes water supply a crucial issue. If water infrastructure and water management strategies are not improved, Texas could face serious social, economic and environmental consequences - not only in our large metropolitan cities, but also on our farms and rural areas.

Water shortages due to severe drought combined with infrastructure limitations would likely curtail or eliminate economic activity in business and industries heavily 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 business and industry, but they might also bias corporate decision makers against plant expansion or plant location in Texas. From a societal 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.

Section 357.7(4) of the rules for implementing Texas Senate Bill 1 requires regional water planning groups to evaluate the social and economic impacts of unmet water needs as part of the planning process. The rules contain provisions that direct the Texas Water Development Board (TWDB) to provide technical assistance to complete socioeconomic impact analyses. In response to requests from regional planning groups, TWDB staff designed and conducted required studies. The following document prepared by the TWDB's Office of Water Resources Planning summarizes analysis and results for the Region H Water Planning Area. Section 1 provides an overview of concepts and methodologies used in the study. Sections 2 and 3 provide detailed information and analyses for each water use category employed in the planning process (i.e., irrigation, livestock, municipal, manufacturing, mining and steam-electric).

1. Overview of Terms and 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 Measuring Economic Impacts

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 and benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. Specifically, it addresses the potential economic impacts of unmet water needs including: 1) losses to regional economies stemming from reductions in economic output, and 2) costs to residential water consumers associated with implementing emergency water procurement and conservation programs.

1.1.1 Impacts to Agriculture, Business and Industry

As mentioned earlier, severe water shortages would likely affect the ability of business and industry to operate resulting in lost output, which would adversely affect the regional economy. A variety tools are available to estimate such 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).

Basically, an IO/SAM model is an accounting framework that traces spending and consumption between different economic sectors including businesses, households, government and "foreign" economies in the form of exports and imports. As an example, Table 1 shows a highly aggregated segment of an IO/SAM model that focuses on key agricultural sectors in a local economy. The table contains transactions data for three agricultural sectors (cattle ranchers, dairies and alfalfa farms). Rows in Table 1 reflect sales from each sector to other local industries and institutions including households, government and consumers outside of the region in the form of exports. Columns in the table show purchases by each sector in the same fashion. For instance, the dairy industry buys $11.62 million worth of goods and services needed to produce milk. Local alfalfa farmers provide $2.11 million worth of hay and local households provide about $1.03 million worth of labor. Dairies import $4.17 million worth of inputs and pay $2.61 million in taxes and profits. Total economic activity in the region amounts to about $807.45 million. The entire table is like an accounting balance sheet where total sales equal total purchases.

Table 1: Example of a County-level Transaction and Social Accounting Matrix for Agricultural Sectors ($millions)

Sectors	Cattle	Dairy	Alfalfa	All other Industries	Taxes, govt. & profits	Households	Exports	Total
Cattle	$3.10	$0.01	$0.00	$0.03	$0.02	$0.06	$10.76	$13.98
Dairy	$0.07	$0.13	$0.00	$0.25	$0.01	$0.00	$11.14	$11.60
Alfalfa	$0.00	$2.11	$0.00	$0.01	$0.02	$0.01	$10.38	$12.53
Other industries	$2.20	$1.56	$2.90	$50.02	$70.64	$66.03	$48.48	$241.83
Taxes, govt. & profits	$2.37	$2.61	$5.10	$77.42	$0.23	$49.43	$83.29	$220.45
Households	$0.82	$1.03	$1.38	$50.94	$45.36	$7.13	$14.64	$121.30
Imports	$5.41	$4.17	$3.16	$63.32	$104.17	$5.53	$0.00	$185.76
Total	$13.97	$11.62	$12.54	$241.99	$220.45	$128.19	$178.69	$807.45

* Columns contain purchases and rows represent sales. Source: Adapted from Harris, T.R., Narayanan, R., Englin, J.E., MacDiarmid, T.R., Stoddard, S.W. and Reid, M.E. "*Economic Linkages of Churchill County.*" University of Nevada Reno. May 1993.

To understand how an IO/SAM model works, first visualize that $1 of additional sales of milk is injected into the dairy industry in Table 1. For every $1 the dairies receive in revenue, they spend 18 cents on alfalfa to feed their cows; nine cents is paid to households who provide farm labor, and another 13 cents goes to the category "other industries" to buy items such as machinery, fuel, transportation, accounting services etc. Nearly 22 cents is paid out in the form of profits (i.e., returns to dairy owners) and taxes/fees to local, state and federal government. The value of the initial $1 of revenue in the dairy sector is referred to as a first-round or **direct effect.**

As the name implies, first-round or direct effects are only part of the story. In the example above, alfalfa farmers must make 18 cents worth of hay to supply the increased demand for their product. To do so, they purchase their own inputs, and thus, they spend part of the original 18 cents that they received from the dairies on firms that support their own operations. For example, 12 cents is spent on fertilizers and other chemicals needed to grow alfalfa. The fertilizer industry in turn would take these 12 cents and spend them on inputs in its production process and so on. The sum of all re-spending is referred to as the **indirect effect** of an initial increase in output in the dairy sector.

While direct and indirect impacts capture how industries respond to a change, **induced impacts** measure the behavior of the labor force. As demand for production increases, employees in base industries and supporting industries will have to work more; or alternatively, businesses will have to hire more people. As employment increases, household spending rises. Thus, seemingly unrelated businesses such as video stores, supermarkets and car dealers also feel the effects of an initial change.

Collectively, indirect and induced effects are referred to as **secondary impacts**. In their entirety, all of the above changes (direct and secondary) are referred to as **total economic impacts**. By nature, total impacts are greater than initial changes because of secondary effects. The magnitude of the increase is what is popularly termed a multiplier effect. Input-output models generate numerical multipliers that estimate indirect and induced effects.

In an IO/SAM model impacts stem from changes in output measured by sales revenue that in turn come from changes in consumer demand. In the case of water shortages, one is not assuming a change in demand, but rather a supply shock – in this case severe drought. Demand for a product such as corn has not necessarily changed during a drought. However, farmers in question lack a crucial input (i.e., irrigation water) for which there is no *short-term* substitute. Without irrigation, she cannot grow irrigated crops. As a result, her cash flows decline or cease all together depending upon the severity of the situation. As cash flows dwindle, the farmer's income falls, and she has to reduce expenditures on farm inputs such as labor. Lower revenues not only affect her operation and her employees directly, but they also indirectly affect businesses who sell her inputs such as fuel, chemicals, seeds, consultant services, fertilizer etc.

The methodology used to estimate regional economic impacts consists of three steps: 1) develop IO/SAM models for each county in the region and for the region as whole, 2) estimate direct impacts to economic sectors resulting from water shortages, and 3) calculate total economic impacts (i.e., direct plus secondary effects).

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.[2] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously (see Table 1 on page 9) were estimated for

[2]The basic IMPLAN database consists of national level technology matrices based on the Benchmark Input-Output Accounts generated the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN's 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 the national totals using a matrix ratio allocation system and county data are balanced to state totals. In other words, much of the data in IMPLAN is based on a national average for all industries.

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 industry 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 year 2000 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 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. All sectors in the IMPLAN database were assigned to a specific water use category (see Attachment A of this report).

Step 2: *Estimate Direct Economic Impacts of Water Shortages*

As mentioned above, direct impacts accrue to immediate businesses and industries that rely on water. Without water industrial processes could suffer. However, output responses would likely vary depending upon the severity of a shortage. A small shortage relative to total water use may have a nominal effect, but as shortages became more critical, effects on productive capacity would increase.

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. 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]

Note that 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.

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]

- if unmet water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;
- if water shortages are 5 to 30 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 0.25 percent reduction in output;
- if water shortages are 30 to 50 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 0.50 percent reduction in output; and
- if water shortages are greater than 50 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 1.0 percent (i.e., a proportional reduction).

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. When calculating direct effects for the municipal, steam electric, manufacturing and livestock water use categories, sales to final demand were applied to avoid double counting impacts. 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:

[3] See, Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[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 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*." Prepared by Spectrum Economics, Inc. November, 1991.

$D_{i,t}$ = 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*.

Direct impacts to irrigation and mining are based upon the same formula; however, total sales as opposed to final sales were used. To avoid double counting, secondary impacts in sectors other than irrigation and mining (e.g., manufacturing) were reduced by an amount equal to or less than direct losses to irrigation and mining. In addition, in some instances closely linked sectors were moved from one water use category to another. For example, although meat packers and rice mills are technically manufacturers, in some regions they were reclassified as either livestock or irrigation. All direct effects were estimated at the county level and then summed to arrive at a regional figure. See Section 2 of this report for additional discussion regarding methodology and caveats used when estimating direct impacts for each water use category.

Step 3: *Estimate Secondary and Total Economic Impacts of Water Shortages*

As noted earlier, the effects of reduced output would extend well beyond sectors directly affected. Secondary impacts were derived using the same formula used to estimate direct impacts; however, regional level *indirect* and *induced* multiplier coefficients were applied and only final sales were multiplied.

1.1.2 Impacts Associated with Domestic Water Uses

IO/SAM models are not well suited for measuring impacts of shortages for domestic uses, which make up the majority of the municipal category.[5] To estimate impacts associated with domestic uses, municipal water demand and thus needs were subdivided into two categories – residential and commercial. Residential water is considered "domestic" and includes water that people use in their homes for things such as cooking, bathing, drinking and removing household waste and for outdoor purposes including lawn watering, car-washing and swimming pools. Shortages to residential uses were valued using a tiered approach. In other words, the more severe the 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 costs would be much higher in this case because people could probably not live with such a reduction, and would be forced to find emergency alternatives. The alternative assumed in this study is a very uneconomical and worst-case scenario (i.e., hauling water in from other communities by truck or rail). Section 2.3.3 of this report discusses methodology for municipal uses in greater detail.

[5] A notable exception is the potential impacts to the nursery and landscaping industry that could arise due to reductions in outdoor residential uses and impacts to "water intensive" commercial businesses (see Section 2.3.3).

1.2 Measuring Social Impacts

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 much harder to measure in quantitative terms. Nevertheless, social effects associated with drought and water shortages usually have close ties 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.[6]

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on models used by the TWDB for state water planning and by the U.S. Census Bureau for national level population projections. With the assistance of the Texas State Data Center (TSDC), TWDB staff modified population projection models used for state water planning and applied them here. Basically, the social impact model incorporates results from the economic component of the study and assesses how changes in labor demand due to unmet water needs could affect migration patterns in a region. Before discussing particulars of the approach model, some background information regarding population projection models is useful in understanding the overall approach.

1.2.1 Overview of Demographic Projection Models

More often than not, population projections are reported as a single number that represents the size of an overall population. While useful in many cases, a single number says nothing about the composition of projected populations, which is critical to public officials who must make decisions regarding future spending on public services. For example, will a population in the future have more elderly people relative to today, or will it have more children? More children might mean that more schools are needed. Conversely, a population with a greater percentage of elderly people may need additional healthcare facilities. When projecting future populations, cohort-survival models break down a population into groups (i.e., cohorts) based on factors such as age, sex and race. Once a population is separated into cohorts, one can estimate the magnitude and composition of future population changes.

Changes in a population's size and makeup in survival cohort models are driven by three factors:

[6] 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.

1. *Births:* Obviously, more babies mean more people. However, only certain groups in a population are physically capable of bearing children– typically women between the ages of 13 and 49. The U.S. Census Bureau and the TSDC continually updates fertility rates for different cohorts. For each race/ethnicity category, birth rates decline and then stabilize in the future.

2. *Deaths:* When people die, populations shrink. Unlike giving birth, however, everyone is capable of dying and mortality rates are applied to all cohorts in a given population. Hence their name, cohort-survival models use survival rates as opposed to mortality rates. A survival rate is simply the probability that a given person with certain attributes (i.e., race, age and sex) will survive over a given period of time.

3. *Migration*: Migration is the movement of people in or out of a region. Migration rates used to project future changes in a region are usually based on historic population data. When analyzing historic data, losses or increases that are not attributed to births or deaths are assumed to be the result of migration. Migration can be further broken down into changes resulting from economic and non-economic factors. Economic migrants include workers and their families that relocate because of job losses (or gains), while non-economic migrants move due to lifestyles choices (e.g., retirees fleeing winter cold in the nation's heartland and moving to Texas).

In summary, knowledge of a population's composition in terms of age, sex and race combined with information regarding birth and survival rates, and migratory patterns, allows a great deal of flexibility and realism when estimating future populations. For example, an analyst can isolate population changes due to deaths and births from changes due to people moving in and out of a region. Or perhaps, one could analyze how potential changes in medical technology would affect population by reducing death rates among certain cohorts. Lastly, one could assess how changes in *economic conditions* might affect a regional population

1.2.2 Methodology for Social Impacts

Two components make up the model. The first component projects populations for a given year based on the following six steps:

1) *Separate "special" populations from the "general" population of a region:* The general population of a region includes the portion subject to rates of survival, fertility, economic migration and non-economic migration. In other words, they live, die, have children and can move in and out of a region freely. "Special populations," on the other hand, include college students, prisoners and military personnel. Special populations are treated differently than the general population. For example, fertility rates are not applied to prisoners because in general inmates at correctional facilities do not have children, and they are incapable of freely migrating or out of a region. Projections for special populations were compiled by the TSDC using data from the Higher Education Coordinating Board, the Texas Department of Criminal Justice and the U.S. Department of Defense. Starting from the 2000 Census, general and special populations were broken down into the following cohorts:

- age cohorts ranging from age zero to 75 and older,
- race/ethnicity cohorts, including Anglo, Black, Hispanic and "other," and
- gender cohorts (male and female).

2) *Apply survival and fertility rates to the general population* : Survival and fertility rates were compiled by the TSDC with data from the Texas Department of Health (TDH). Natural decreases (i.e., deaths) are estimated by applying survival rates to each cohort and then subtracting estimated deaths from the total population. Birth rates were then applied to females in each age

and race cohort in general and special populations (college and military only) to arrive at a total figure for new births.

3) *Estimate economic migration based on labor supply and demand*: TSDC year 2000 labor supply estimates include all non-disabled and non-incarcerated civilians between the ages of 16 and 65. Thus, prisoners are not included. Labor supply for years beyond 2001 was calculated by converting year 2000 data to rates according to cohort and applying these rates to future years. Projected labor demand was estimated based on historical employment rates. Differences between total labor supply and labor demand determines the amount of in or out migration in a region. If supply is greater than demand, there is an out-migration of labor. Conversely, if demand is greater than supply, there is an in-migration of labor. The number of migrants does not necessarily reflect total population changes because some migrants have families. To estimate how many people might accompany workers, a migrant worker profile was developed based on the U.S. Census Bureau's Public Use Microdata Samples (PUMs) data. Migrant profiles estimate the number of additional family members, by age and gender that accompany migrating workers. Together, workers and their families constitute economic migration for a given year.

4) *Estimate non-economic migration*: As noted previously, migration patterns of individuals age 65 and older are generally independent of economic conditions. Retirees usually do not work, and when they relocate, it is primarily because of lifestyle preferences. Migratory patterns for people age 65 or older are based on historical PUMs data from the U.S. Census.

5) *Calculate ending population for a given year*: The total year-ending population is estimated by adding together: 1) surviving population from the previous year, 2) new births, 3) net economic migration, 4) net non-economic migration and 5) special populations. This figure serves as the baseline population for the next year and the process repeats itself.

The second component of the social impact model is identical to the first and includes the five steps listed above for each year where water shortages are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060). The only difference is that labor demand changes in years with shortages. Shifts in labor demand stem from employment impacts estimated as part of the economic analysis component of this study with some slight modifications. IMPLAN employment data is based on the number of full and part-time jobs as opposed to the number of people working. To remedy discrepancies, employment impacts from IMPLAN were adjusted to reflect the number of people employed by using simple ratios (i.e., labor supply divided by number of jobs) at the county level. 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.

1.3 Clarifications, Assumptions and Limitations of Analysis

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) While useful for planning purposes, this study is not a benefit-cost analysis (BCA). BCA 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 BCA if done so properly.

2) Since this is not a BCA, future impacts are not weighted differently. In other words, estimates are not "discounted." If used as a measure of benefits in a BCA, one must consider the uncertainty of estimated monetary impacts.

3) All monetary figures are reported in constant year 2000 dollars.

4) Shortages reported by regional planning groups are the starting point for socioeconomic analyses. No adjustments or assumptions regarding the magnitude or distributions of unmet needs among different water use categories are incorporated in the analysis.

5) 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. *It is critical to stress that this is a modeling assumption necessary to maintain consistency with planning criteria, which states that water availability be evaluated assuming drought of record conditions. Analysis in this report does not predict that the drought of record will recur, nor does it predict or imply that growth will or should occur as projected.*

6) 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 on water use category to another.

7) 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 population projections are based on reduced employment in the region, they should be considered an upper bound as well.

8) IO models are static in nature. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in the year 2000. In contrast, unmet water needs are projected to occur well into the future (i.e., 2010 through 2060). Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon.

9) With respect to municipal needs, an important assumption is that people would eliminate all outdoor water use before indoor water uses were affected, and people would implement emergency indoor water conservation measures before commercial businesses had to curtail operations, and households had to seek alternative sources of water. Section 2.3.3 discusses this in greater detail.

10) 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 Texas for many communities lasted several years.

2. Regional Economic Impacts

Part 2 of this report summarizes analysis for individual water use categories. Section 2.1 presents the economic baseline containing year 2000 economic data. Section 2.2 summarizes results for agricultural water uses include livestock and irrigated crop production, while Section 2.3 summarizes impacts to municipal and industrial water uses including manufacturing, mining, steam-electric and municipal demands.

2.1 Economic Baseline

Table 2 summarizes baseline economic variables for Region H. In year 2000, the region generated nearly $407.8 billion in sales that generated income for Region H residents valued at slightly more $199.7 billion. Businesses and industry also contributed $19.6 billion to state and local tax coffers. Sections 2.2.and 2.3 discuss contributions of individual water use categories in greater detail.

Table 2: Year 2000 Economic Baseline for Region H (monetary impacts reported in $millions)

	Sales Activity			Jobs	Regional Income	Business Taxes
	Total	Intermediate	Final			
Irrigation	$36.00	$25.40	$10.70	1,740	$25.40	$2.20
% of Total Activity for Region H	<1%	<1%	<1%	<1%	<1%	<1%
Livestock	$165.30	$61.90	$103.40	7,190	$101.00	$5.70
% of Total Activity for Region H	<1%	<1%	<1%	<1%	<1%	<1%
Manufacturing	$93,689.68	$18,026.22	$75,663.46	252,035	$26,002.89	$1,204.38
% of Total Activity for Region H	23%	13%	28%	8%	13%	6%
Mining	$51,869.57	$25,756.44	$26,113.13	78,630	$24,056.71	$2,861.04
% of Total Activity for Region H	13%	19%	10%	3%	12%	15%
Municipal	$257,226.29	$92,189.75	$165,036.54	2,628,030	$145,993.82	$14,986.72
% of Total Activity for Region H	63%	67%	61%	88%	73%	76%
Steam Electric	$4,866.25	$1,660.72	$3,205.53	8,090	$3,480.17	$623.12
% of Total Activity for Region H	1%	1%	1%	0%	2%	3%
Total	$407,853.08	$137,720.37	$270,132.71	2,975,715	$199,660	$19,683.18
% of Total Activity for Region H	100%	100%	100%	100%	100%	100%

* Does not include dry-land agriculture. Mining includes offshore oil and gas production. Municipal includes" all non-industrial commercial enterprises and institutional water uses such as the military, schools and other government organizations.
Source: Based input-output models generated using IMPLAN Pro software from MIG Inc.

2.2 Agriculture

In 2000, farmers using irrigation in Region H produced about $36 million dollars worth of crops (primarily rice) that generated approximately $25 million in regional income – less than one percent of all income in the region. Livestock production generated $165 million in sales and $101 in regional income. Collectively, irrigated farming and the livestock industry accounted for less than two percent of economic activity in the region.

2.2.1 Irrigation

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 Natural Resources Conservation Service (NRCS) 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 3 shows the TWDB crops included in corresponding IMPLAN sectors. Table 4 summarizes acreage and estimated annual water use for each crop classification (year 2000). Table 5 shows year 2000 economic data for irrigated crop production in the region. By far, rice production is the largest activity generating nearly $29.4 million in sales and providing jobs for 1,620 people. Since it makes up the majority of irrigated crop production in the region, measured impacts focused on rice production only.

Table 3: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors Applied in Socioeconomic Impact Analysis

IMPLAN Sector	TWDB Sector
Cotton	Cotton
Feed Grains	Corn, sorghum and “forage crops”
Food Grains	Rice, wheat and "other grains"
Fruits	Citrus
Hay and Pasture	Alfalfa and “other hay and pasture”
Oil Crops	Peanuts, soybeans and “other oil crops”
Sugar Crops	Sugarbeets and sugarcane
Tree Nuts	Pecans
Vegetables *	Deep-rooted vegetables, shallow-rooted vegetables and potatoes
Other Crops	"All other crops" "other orchards" and vineyards

* includes melons.

Table 4. Summary of Irrigated Crop Acreage and Water Demand for Region H (Year 2000)

Sector	Acres (1000s)	Distribution of Acres	Water Use (1000s of AF)	Distribution of Water Use
Food Grains (Rice)	77	85%	438	94%
Other	14	15%	26	6%
Total	91	100%	464	100%

Source: Water demand figures are taken from the Texas Water Development Board 2006 Water Plan Projections data for year 2000. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the National Resources Conservation Service (USDA).

Table 5: Year 2000 Baseline for Irrigated Crop Production
(monetary impacts reported in $millions)

	Sales Activity			Jobs	Regional Income Total	Business Taxes Intermediate
	Total	Intermediate	Final			
Rice	$29.40	$24.70	$4.70	1,620	$20.50	$2.00
% of Total Irrigation	81.7%	97.2%	43.9%	92.6%	80.7%	90.9%
Other Crops	$6.60	$0.70	$6.00	130	$4.90	$0.20
% of Total Irrigation	18.3%	2.8%	56.1%	7.4%	19.3%	9.1%
Total Irrigation	$36.00	$25.40	$10.70	1,740	$25.40	$2.20
% of Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Based on input-output models generated using IMPLAN Pro software from MIG Inc, and data from the Texas Agricultural Statistics Service. Figures are rounded. The ratio of intermediate sales to final demand for rice was adjusted to reflect secondary data regarding rice distribution and shipments in Texas. See: See Fuller, S. and Tun-Hsiang Yu, "*Production, Consumption and Flow Patterns of Texas Grain*." Presented at TRB 26 the Annual Summer Ports, Waterways, Freight & International Trade Conference, Galveston, Texas. Sponsored by the Transportation Research Center and Texas A&M University Department of Agricultural Economics, June 2001. University of Texas.

Most sales from the rice sector are intermediate meaning that they are sold to other businesses in the region for processing, and as discussed in introductory sections of this report, economic multipliers generated using input-output models do not capture impacts to forward processors.[7] Thus, multipliers would underestimate the true impacts of reduced rice output on regional businesses, and therefore forward processors were included in the analysis. Table 6 summarizes IMPLAN data for the rice milling sector by regional planning area and county. With around 90 percent of output and jobs, Brazoria and Harris counties in Region H are the centers of rice milling in Texas. Impacts to rice mills were measured by reducing their output in proportion to

[7] The allocation of sales activity for the rice sector is based upon secondary data sources and are not figures reported in IMPLAN databases. IMPLAN data at the county level for agricultural sectors are based on national averages, and if more localized data are available and time permits, it is sometimes better to use them instead of packaged IMPLAN figures. Figures in Table 5 are based on data reported in: Fuller, S. and Tun-Hsiang Yu, "*Production, Consumption and Flow Patterns of Texas Grain*." Presented at TRB 26 the Annual Summer Ports, Waterways, Freight & International Trade Conference, Galveston, Texas. Sponsored by the Transportation Research Center and Texas A&M University Department of Agricultural Economics, June 2001.

reductions in rice production. In other words, there would be less rice to mill due to shortages of irrigation water for rice farmers and sales from rice milling sector would decline.[8]

Table 6: Year 2000 Baseline for Rice Milling (monetary impacts reported in $millions)

Planning Area	County	Sales Activity			Jobs	Income	Business Taxes
		Total	Intermediate	Final			
H	Brazoria	$86.40	< $0.01	$86.40	220	$13.50	$0.80
H	Harris	$192.30	$0.10	$192.10	470	$39.00	$2.20
I	Jefferson	$28.80	< $0.01	$28.80	70	$5.00	$0.30
K	Colorado	$0.80	< $0.01	$0.80	5	$0.10	< $0.01
Total for Texas		$308.30	$0.11	$308.10	765	$57.60	$3.30

Source: Based input-output models generated using IMPLAN Pro software from MIG Inc, and data from the Texas Agricultural Statistics Service.

The Region H 2006 Water Plan indicates that under drought of record conditions, shortages to irrigation would occur primarily in Brazoria, Chambers, Galveston, Liberty, San Jacinto and Waller counties. Tables 7 and 8 summarize estimated impacts to growers and *regional* rice millers. Attachment B of this report shows impacts by county, while Attachment C shows impacts by major river basin.

Table 7: Annual Economic Impacts of Unmet Water Needs for Rice Milling in Region H (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$18.14	$6.79	46	$0.39
2020	$17.21	$6.46	46	$0.38
2030	$17.26	$6.47	47	$0.38
2040	$17.26	$6.47	47	$0.38
2050	$17.26	$6.47	47	$0.38
2060	$17.26	$6.47	47	$0.38

* Estimates are based on *projected* economic activity in the region. Source: Based on economic impact models developed by the Texas Water Development Board, Office of Water Resources Planning.

[8] Impacts with multipliers generated for the rice milling sector were reduced or "moved" to growers. Impacts to growers were not double counted via indirect multipliers for rice milling.

Table 8: Annual Economic Impacts of Unmet Water Needs for Rice Growers in Region H (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)				
Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$2.01	$0.80	41	$0.09
2020	$1.88	$0.73	38	$0.08
2030	$1.86	$0.73	37	$0.08
2040	$1.86	$0.73	37	$0.08
2050	$1.86	$0.73	37	$0.08
2060	$1.86	$0.73	37	$0.08
* Estimates are based on *projected* economic activity in the region. Source: Based on economic impact models developed by the Texas Water Development Board, Office of Water Resources Planning.				

2.2.2 Livestock

No shortages associated with livestock sector were reported in Region H.

2.3 Municipal and Industrial Uses

Municipal and industrial (M&I) water uses make up the overwhelming majority (99 percent) of economic activity in Region H. In 2000, M&I water users generated $407.9 billion in sales and $199 billion worth of income for Region H residents. M&I added nearly $19.8 billion in state and local taxes and provided over 2,966,000 jobs in the region.

2.3.1 Manufacturing

Table 9 summarizes baseline economic data for manufacturing sectors in Region H. Petroleum refining and industrial chemicals are by far the leaders with total sales of $52.8 billion. In 2000, these sectors supported an estimated 40,385 jobs that provided Region H residents incomes worth slightly more than $9.9 billion. These manufacturing sectors are heavily reliant on the availability of water.

Table 9: Year 2000 Baseline for Manufacturing (monetary impacts reported in $millions)

Sector	Sales Activity			Jobs	Regional Income	Business Taxes
	Total	Intermediate	Final			
Petroleum Refining	$29,546.98	$4,432.49	$25,114.48	10,705	$3,692.57	$257.78
Industrial Organic Chemicals	$18,875.10	$4,844.12	$14,030.98	23,570	$5,098.99	$367.99
Plastics Materials and Resins	$4,307.04	$596.78	$3,710.27	6,110	$1,135.29	$43.43
Electronic Computers	$2,916.09	$789.10	$2,126.99	10,290	$1,057.01	$21.80
Oil Field Machinery	$2,642.23	$498.05	$2,144.17	18,080	$1,375.98	$28.66
All Other Manufacturing Sectors	$35,402.25	$6,865.68	$28,536.57	183,270	$13,643.05	$484.71
Total	$93,689.68	$18,026.22	$75,663.46	252,035	$26,002.89	$1,204.38

Source: Generated using IMPLAN models and data from MIG, Inc.

Direct impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. Care was taken to include only sectors recorded in the TWDB Water Uses 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 uses. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes in TWDB databases were matched to IMPLAN sector codes for each affected county. Non-matches were excluded when calculating direct impacts.

The distribution of water shortages among TWDB manufacturing sectors is weighted according to year 2000 water use. Accordingly, industries with the greatest use are affected the most. As a general observation, these sectors include petroleum and chemical refineries, plastic producers, paper mills, food processors and cement manufacturers. Other manufacturing sectors use considerably less water for productive processes and are less likely to suffer substantial negative effects due to water shortages. In other words, they would likely be able to haul in enough water by truck to keep their operations running.

The Region H 2006 Water Plan indicates that under drought of record conditions, shortages to manufacturing could occur in Brazoria, Harris, Chambers, Fort Bend and Montgomery counties. Table 10 summarizes estimated impacts while Attachment B of this report shows impacts by county, and Attachment C shows impacts by major river basin.

Table 10: Annual Economic Impacts of Unmet Water Needs for Manufacturing in Region H (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)				
Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$5,126.11	$2,037.94	23,065	$115.65
2020	$7,285.90	$2,930.79	32,990	$160.09
2030	$10,881.53	$4,517.25	51,845	$222.65
2040	$14,389.25	$5,884.24	66,400	$305.12
2050	$16,293.22	$6,642.49	74,910	$347.79
2060	$17,992.96	$7,279.23	81,645	$391.55
* Estimates are based on *projected* economic activity in the region. Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.				

2.3.2 Mining

Table 11 summarizes sales, employment and regional income for the mining industry in Region H. In 2000, mining sectors generated about $51.9 billion worth of output and $24.1billion worth of income and provided jobs for 78,630 workers. Natural gas and petroleum extraction accounts for about 95 percent of all mining activity in the region. About 50 percent of output from the crude extraction sector goes directly to other regional industries in the form of intermediate sales. Obviously, most of this goes to oil refineries, which are important forward linkages for the gas and crude mining sector. Thus, reduced drilling activity resulting from water shortages might affect regional oil refineries, but these impacts were not included to avoid double counting. Impacts to refineries were incorporated when estimating impacts to manufacturing sectors (see Section 2.3.1).

Table 11: Year 2000 Baseline for Mining (monetary impacts reported in $millions)						
Sector	Sales Activity			Jobs	Regional Income	Business Taxes
	Total	Intermediate	Final			
Natural Gas & Crude Petroleum	$48,575.81	$24,201.65	$24,374.17	75,270	$23,065.53	$2,705.09
All Other Mining Sectors	$3,293.76	$1,554.80	$1,738.96	3,360	$991.18	$155.95
Total	$51,869.57	$25,756.44	$26,113.13	78,630	$24,056.71	$2,861.04
Source: Generated using data from MIG, Inc., and models developed by the TWDB using IMPLAN software.						

Another consideration is that the 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 data from the Texas Railroad Commission (TRC) showing 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.

An additional problem with standard IMPLAN data matter relates to estimates of output at the county-level. In general, IMPLAN data for mining at the county level reflect sales and employment, but not necessarily physical output. For instance, a mining company and its employees may be based in Dallas County Texas, but most of its product comes from oil well leases in West Texas. However, company sales and employment figures are reported for Dallas County. In Region H, reported sales in some counties – particularly Harris - take into account off-shore gas and oil extraction in the Gulf of Mexico. To account for potential discrepancies, analysts relied on data from the TRC to check the accuracy of output in affected counties by comparing average well-head market prices for crude and gas to TRC production statistics in each county. If there were large discrepancies, estimates that reflect physical output based on TRC data were used instead of IMPLAN data.

The Region H 2006 Water Plan indicates that under drought of record conditions, shortages to mining could occur in Brazoria, Chambers, Fort Bend, Galveston, Harris and Montgomery counties. Table 12 summarizes estimated impacts. Attachment B of this report shows impacts by county, and Attachment C shows impacts by major river basin.

Table 12: Annual Economic Impacts of Unmet Water Needs for Mining in Region H
(years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$103.01	$47.09	380	$5.38
2020	$135.31	$61.73	500	$7.08
2030	$287.30	$137.21	1,105	$15.37
2040	$334.67	$159.82	1,285	$17.91
2050	$367.75	$175.28	1,410	$19.68
2060	$461.84	$217.01	1,730	$24.96

* Estimates are based on *projected* economic activity in the region. Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.

2.3.3 Municipal

Table 13 summarizes economic activity for municipal uses. In 2000, commercial businesses and institutions produced $257.2 billion worth of output. In return, they received $145.9 billion in wages, salaries and profits. Municipal uses generate the bulk of business taxes in the region – nearly $5.2 billion (76 percent of all taxes generated in the region). Top commercial

sectors in terms of income and output include wholesale trade, real estate, communications, engineering and architectural services and banking.

Table 13: Year 2000 Baseline for Municipal Sectors (monetary impacts reported in $millions)

Sector	Sales Activity			Jobs	Regional Income	Business Taxes
	Total	Intermediate	Final			
Wholesale Trade	$21,114.52	$10,287.90	$10,826.62	151,595	11,639	$3,027.18
Real Estate	$16,199.61	$7,871.80	$8,327.81	69,337	9606.97	$1,916.31
Communications	$7,782.38	$2,688.09	$5,094.29	25,474	3990.94	$424.75
Engineering, Architectural Services	$6,897.93	$3,617.75	$3,280.18	62,684	3538.24	$52.17
Banking	$6,539.01	$2,866.84	$3,672.18	24,085	4224.55	$105.69
Eating & Drinking	$6,183.15	$455.80	$5,727.35	154,567	3022.17	$421.67
All other municipal sectors	$192,509.69	$64,401.56	$128,108.12	2,140,289	$109,971.93	$9,038.93
Total	$257,226.29	$92,189.75	$165,036.54	2,628,030	$145,994.82	$14,986.72

Source: Generated using data from MIG, Inc., and models developed by the TWDB using IMPLAN software.

Estimating direct economics impacts for the municipal category is complicated for a number of reasons. For one, municipal uses comprise a range of different consumers including commercial businesses, institutions (e.g., schools and government) and households. However, reported shortages do not specify how needs are distributed among different consumers. In other words, how much of a municipal need is commercial and how much is residential? 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 (see Attachment A). For example, if year 2000 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) and thus annual use is 6.7 acre-feet. 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." The estimated proportion of water used for commercial purposes ranges from about 5 to 35 percent of total municipal demand at the county level. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

As mentioned earlier, a key study assumption is that people would eliminate outdoor water use before indoor water consumption was affected; and they would implement *voluntary* emergency indoor water conservation measures before people had to curtail business operations or seek emergency sources of water. This is logical because most water utilities have drought contingency plans. Plans usually specify curtailment or elimination of outdoor water use during periods of drought. 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."[9] Thus, when assessing municipal needs there are several important considerations: 1) how much of a need would people reduce via eliminating outdoor uses and implementing

[9] 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.

emergency indoor conservation measures; and 2) what are the economic implications of such measures?

Determining how much water is used for outdoor purposes is key to answering these questions. The proportion used here is based on several secondary sources. The first is a major study sponsored by the 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 residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[10]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.[11] A study conducted for the California Urban Water Agencies (CUWA) calculated values ranging from 25 to 35 percent.[12] 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. With respect to emergency indoor conservation measures, this analysis assumes that citizens in affected communities would reduce needs by an additional 20 percent. Thus, 50 percent of total needs could be eliminated before households and businesses had to implement emergency water procurement activities.

Eliminating outdoor watering would have a range of economic implications. For one, such a restriction would likely have adverse impacts on the landscaping and horticultural industry. If people are unable to water their lawns, they will likely purchase less lawn and garden materials such as plants and fertilizers. On the other hand, during a bad drought people may decide to invest in drought tolerant landscaping, or they might install more efficient landscape plumbing and other water saving devices. But in general, the horticultural industry would probably suffer considerable losses if outdoor water uses were restricted or eliminated. For example, many communities in Colorado, which is in the midst of a prolonged drought, have severely restricted lawn irrigation. In response, the turf industry in Colorado has laid off at least 50 percent of its 2,000 employees.[13] To capture impacts to the horticultural industry, regional sales net of exports for the greenhouse and nursery sectors and the landscaping services sector were reduced by proportion equal to reductions in outdoor water use. Note that these losses would not necessarily appear as losses to the regional or state economies because people would likely spend the money that they would have spent on landscaping on other goods in the economy. Thus, the net effect to state or regional accounts could be neutral.

Other considerations include the "welfare" losses to consumers who had to forgo outdoor and indoor water uses to reduce needs. In other words, the water that people would have to give up has an economic value. Estimating the economic value of this forgone water for each planning area would be a very time consuming and costly task, and thus secondary sources served as a proxy. Previous research funded by the TWDB, explored consumer "willingness to pay" for avoiding restrictions on water use.[14] Surveys revealed that residential water consumers in Texas

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[10] 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).

[11] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[12] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[13] Based on assessments of the Rocky Mountain Sod Growers. See, "*Drought Drying Up Business for Landscapers*." Associated Press. September, 17 2002.

[14] See, Griffin, R.C., and Mjelde, W.M. "*Valuing and Managing Water Supply Reliability*. Final Research Report for the Texas Water Development Board: Contract no. 95-483-140." December 1997.

would be willing to pay – on average across all income levels - $36 to avoid a 30 percent reduction in water availability lasting for at least 28 days. Assuming the average person in Texas uses 140 gallons per day and the typical household in the state has 2.7 persons (based on U.S. Census data), total monthly water use is 13,205 gallons per household. Therefore, the value of restoring 30 percent of average monthly water use during shortages to residential consumers is roughly one cent per gallon or $2,930 per acre-foot. This figure serves as a proxy to measure consumer welfare losses that would result from restricted outdoor uses and emergency indoor restrictions.

The above data help address the impacts of incurring water needs that are 50 percent or less of projected use. Any amount greater than 50 percent would result in municipal water consumers having to seek alternative sources. Costs to residential and non-water intensive commercial operations (i.e., those that use water only for sanitary purposes) are based on the most likely alternative source of water in the absence of water management strategies. In this case, the most likely alternative is assumed to be "hauled-in" water from other communities at annual cost of $6,530 per acre-foot for small rural communities and approximately and $10,995 per acre-foot for metropolitan areas.[15]

This is not an unreasonable assumption. It happened during the 1950s drought and more recently in Texas and elsewhere. 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 hauled delivered to their homes by private contractors.[16] 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.[17] In Australia, four cities have run out of water as a result of drought, and residents have been trucking in water since November 2002. One town has five trucks carting about one acre-foot eight times daily from a source 20 miles away. They had to build new roads and infrastructure to accommodate the trucks. Residents are currently restricted to indoor water use only.[18]

Direct impacts to commercial sectors were estimated in a fashion similar to other business sectors. Output was reduced among "water intensive" commercial sectors according to the severity of projected shortages. Water intensive is defined as non-medical related sectors that are heavily dependent upon 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,
- hotels and lodging places, and
- eating and drinking establishments.

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[15] For rural communities, figure assumes an average truck hauling distance of 50 miles at a cost of 8.4 cents per ton-mile (an acre foot of water weighs about 1,350 tons) with no rail shipment. For communities in metropolitan areas, figure assumes a 50 mile truck haul, and a rail haul of 300 miles at a cost of 1.2 cents per ton-mile. Cents per ton-mile are based on figures in: Forkenbrock, D.J., "*Comparison of External Costs of Rail and Truck Freight Transportation*." Transportation Research. Vol. 35 (2001).

[16] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[17] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

[18] Healey, N. (2003) *Water on Wheels*, Water: Journal of the Australian Water Association, June 2003.

For non-water intensive sectors, it is assumed that businesses would haul water by truck and/or rail.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City B has an unmet need of 50 acre feet in 2020 and projected demands of 200 acre-feet. In this case, residents of City B could eliminate needs via restricting all outdoor water use. City A, on the other hand, has an unmet need of 150 acre-feet in 2020 with a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and indoor conservation measures would eliminate 50 percent of projected needs; however, 50 acre-feet would still remain. This remaining portion would result in costs to residential and commercial water users. Water intensive businesses such as car washes, restaurants, motels, race tracks would have to curtail operations (i.e., output would decline), and residents and non-water intensive businesses would have to have water hauled-in assuming it was available.

The last element of municipal water shortages considered focused on lost water utility revenues. Estimating these was straightforward. Analyst used 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, averages 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 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.

The Region H 2006 Water Plan indicates that under drought of record conditions, shortages to municipal water uses would occur in Brazoria, Chambers, Fort Bend, Galveston, Harris and Montgomery counties. Tables 14 through 17 summarize estimated impacts to domestic uses, commercial businesses (water intensive and non-water intensive), water utilities and the horticultural industry. Attachment B of this report shows impacts by county, and Attachment C shows impacts by major river basin.

Table 14: Annual Economic Impacts of Unmet Water Needs for Water Intensive Commercial Businesses (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$148.61	$85.03	3,010	$8.93
2020	$717.65	$406.64	14,360	$43.37
2030	$1,529.20	$865.36	30,570	$92.30
2040	$1,887.56	$1,069.25	37,770	$113.46
2050	$2,334.62	$1,324.54	46,800	$139.53
2060	$2,844.56	$1,616.30	57,100	$169.10

* Estimates are based on *projected* economic activity in the region. Source: Source: Texas Water Development Board, Office of Water Resources Planning.

Table 15: Annual Economic Impacts of Unmet Water Needs for the Horticultural Industry (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)				
Year	Sales ($millions)	Regional Income ($millions)	Jobs	Business Taxes ($millions)
2010	$68.20	$40.60	1,420	$1.39
2020	$193.03	$114.91	4,940	$3.93
2030	$305.22	$181.70	9,120	$6.21
2040	$388.24	$231.12	12,840	$7.91
2050	$489.99	$291.69	18,110	$9.98
2060	$605.56	$360.49	25,060	$12.33
Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.				

Table 16: Annual Costs to Residential Water Users and Non-Water Intensive Commercial Businesses (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)	
Year	$millions
2010	$231.63
2020	$689.45
2030	$1,238.66
2040	$1,649.81
2050	$2,157.29
2060	$2,743.69
Source: Generated by Texas Water Development Board, Office of Water Resources Planning.	

Table 17: Annual Losses of Water Utility Revenues and Taxes due to Unmet Water Needs (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)		
Year	Revenues ($millions)	Utility Taxes ($millions)
2010	$63.26	$1.12
2020	$199.22	$3.51
2030	$310.17	$5.47
2040	$380.53	$6.71
2050	$457.25	$8.06
2060	$545.84	$9.62
Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.		

2.3.4 Steam-Electric

The steam electric sector represents economy activity associated with retail and wholesale transactions of electricity. As shown in Table 18, in 2000 the electric services sector generated annual sales of approximately $4.9 billion that resulted in nearly $3.5 billion worth of income for residents in the region. In addition, electric utilities directly provide an estimated 8,090 full and part-time jobs.

Table 18: Year 2000 Baseline for Steam Electric (monetary figures are in $millions)

Sector	Sales Activity			Jobs	Regional Income	Business Taxes
	Total	Intermediate	Final			
Electric Services	$4,866.25	$1,660.72	$3,205.53	8,090	$3,480.17	$623.12

Source: Generated using data from MIG, Inc., and models developed by the TWDB using IMPLAN software.

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, particularly during drought when surface flows are reduced. Low water levels could affect raw water intakes and water discharge outlets (i.e., outfalls) at power facilities 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 lake or river levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[19] But the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This could 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, which implies that output (i.e., sales of electricity) would decline.

Among all water use categories, steam-electric is unique and cautions are necessary when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenue. 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 power plants in a given region. If one plant became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily water (e.g., gas powered turbines or “peaking plants”) might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[20] Thus, to presume that electricity would stop flowing may be unrealistic, but to maintain consistency, the model assumes that water shortages would result in lost sales of

[19] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

[20] 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 (e.g., transmission constraints); utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

electricity.[21] Another related consideration is that IMPLAN output data report all sales transactions for particular utility in a given county - including sales generated from stations outside a county. As a countermeasure, analysts estimated sales for affected counties using production and price data from the U.S. Energy Information Administration.

The Region H 2006 Water Plan indicates that under drought of record conditions, shortages to steam-electric water uses would occur in Harris and Montgomery counties. Table 19 summarizes estimated impacts. Attachment B of this report shows impacts by county, and Attachment C shows impacts by major river basin.

Table 19: Annual Economic Impacts of Unmet Water Needs for Steam-electric Water Uses (years 2010, 2020, 2030, 2040, 2050 and 2060, constant year 2000 dollars)

Year	Total Sales	Regional Income ($millions)	Jobs	Business Taxes
2010	$0.00	$0.00	0	$0.00
2020	$296.17	$255.10	1,790	$45.67
2030	$754.50	$649.88	4,565	$116.35
2040	$1,047.81	$902.53	6,340	$161.59
2050	$1,408.66	$1,213.34	8,520	$217.24
2060	$3,715.06	$3,199.95	22,470	$572.92

Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.

3. Results of Social Impact Analysis

As discussed previously in Section 1.2, estimated social impacts focus changes including population loss and subsequent related in school enrollment. As shown in Table 20, water shortages in 2010 could result in a population loss of 42,750 people with a corresponding reduction is school enrollment of 10,500. Models indicate that shortages in 2060 could cause population in the region to fall by 269,610 people and school enrollment by 66,230 students.

[21] Losses offset through grid purchases or from peaking plants would likely result in higher production costs, which utilities would ultimately pass on to consumers in the form of higher utility bills. Determining the impacts of higher costs is not considered in this study.

Table 20: Estimated Regional Social Impacts of Unmet Water Needs (years, 2010, 2020, 2030, 2040, 2050 and 2060)		
Year	Population Losses	Declines in School Enrollment
2010	42,750	10,500
2020	82,070	20,160
2030	144,925	35,600
2040	185,365	45,535
2050	221,955	54,520
2060	269,610	66,230
Source: Generated by the Texas Water Development Board, Office of Water Resources Planning.		

Attachment A: Baseline Regional Economic Data

Tables A-1 through A-6 contain data from several sources that form a basis of analyses in this report. Economic statistics were extracted and processed via databases purchased from MIG, Inc. using IMPLAN Pro™ software. Values for gallons per employee (i.e. GED coefficients) for the municipal water use category are based on several secondary sources.[22] County-level data sets along with multipliers are not included given their large sizes (i.e., 528 sectors per county each with 12 different multiplier coefficients). Fields in Tables A-1 through A-6 contain the following variables:

- *GED* - average gallons of water use per employee per day (municipal use only);
- *total sales* - total industry production measured in millions of dollars (equal to shipments plus net additions to inventories);
- *intermediate sales* - sales to other industries in the region measured in millions of dollars;
- *final sales* - all sales to end-users including sales to households in the region and exports out of the region;
- *jobs* - number of full and part-time jobs (annual average) required by a given industry;
- *regional income* - total payroll costs (wages and salaries plus benefits), proprietor income, corporate income, rental income and interest payments;
- *business taxes* - sales taxes, excise taxes, fees, licenses and other taxes paid during normal business operations (includes all payments to federal, state and local government except income taxes).

[22] 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 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.

Table A-1: Economic Data for Irrigated Agriculture in Region H (Year 2000)

Sector	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Cotton	$1.16	$0.03	$1.13	15	0.56	$0.05
Feed Grains	$0.06	$0.00	$0.05	2	0.04	$0.00
Food Grains (Rice)	$29.37	$24.67	$4.70	1,616	20.55	$2.00
Hay and Pasture	$0.12	$0.01	$0.11	15	0.08	$0.01
Tree Nuts	$0.16	$0.00	$0.15	4	0.08	$0.00
Vegetables	$5.16	$0.63	$4.54	89	4.11	$0.15
Total	$36.03	$25.35	$10.68	1,741	25.42	$2.22

Data do not include non-irrigated acreage.

Table A-2: Economic Data for Livestock Sectors, Region H (Year 2000)

Sector	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Cattle Feedlots	$14.85	$13.66	$1.19	100	12.35	$0.92
Dairy Farm Products	$10.24	$1.30	$8.94	154	8.22	$0.06
Hogs, Pigs and Swine	$2.30	$2.26	$0.05	78	1.03	$0.12
Miscellaneous Livestock	$23.82	$3.99	$19.84	2041	8.39	$0.23
Poultry and Eggs	$18.97	$4.36	$14.61	272	10.67	$0.19
Ranch Fed Cattle	$65.73	$24.21	$41.53	3063	40.49	$2.91
Range Fed Cattle	$29.22	$12.00	$17.22	1459	19.81	$1.28
Sheep, Lambs and Goats	$0.12	$0.11	$0.01	25	0.06	$0.00
Total	$165.26	$61.89	$103.37	7193	101.01	$5.70

Table A-3: Economic Data for Municipal Sectors, Region H (Year 2000)

Sector	GED	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Accounting, Auditing and Bookkeeping	120	$2,839.19	$2,072.08	$767.11	35883	2237.51	$25.46
Advertising	117	$403.90	$391.55	$12.35	3346	221.50	$4.00
Agricultural, Forestry, Fishery Services	na	$75.92	$3.95	$71.96	2712	45.84	$2.03
Air Transportation	171	$4,470.63	$490.76	$3,979.87	34970	2473.06	$353.68
Amusement and Recreation Services,	427	$601.78	$4.28	$597.50	22907	341.51	$33.08
Apparel & Accessory Stores	68	$1,452.01	$78.44	$1,373.57	28976	802.59	$231.68
Arrangement Of Passenger	130	$706.64	$299.74	$406.90	4731	487.96	$21.10
Automobile Parking and Car Wash	681	$398.38	$47.10	$351.28	7844	269.05	$18.43
Automobile Rental and Leasing	147	$670.43	$380.68	$289.75	5965	391.40	$52.98
Automobile Repair and Services	55	$1,697.07	$573.78	$1,123.28	18698	884.04	$80.10
Automotive Dealers & Service Stations	49	$4,228.57	$848.88	$3,379.70	47201	2521.81	$653.97
Banking	59	$6,539.01	$2,866.84	$3,672.18	24085	4224.55	$105.69
Beauty and Barber Shops	216	$598.21	$66.68	$531.54	18857	370.71	$7.28
Bowling Alleys and Pool Halls	86	$31.43	$0.08	$31.35	1393	17.06	$2.79
Building Materials & Gardening	35	$875.04	$122.17	$752.87	16310	624.34	$143.94
Business Associations	160	$313.96	$148.59	$165.37	5338	247.25	$0.22
Child Day Care Services	120	$576.20	$0.00	$576.20	12682	229.57	$6.60
Colleges, Universities, Schools	75	$1,177.13	$20.05	$1,157.08	27504	894.31	$0.00
Commercial Sports Except Racing	391	$306.46	$149.71	$156.75	2668	210.09	$17.22
Commodity Credit Corporation	na	$0.00	$0.00	$0.00	0	0.00	$0.00

Table A-3: Economic Data for Municipal Sectors, Region H (Year 2000)

Communications, Except Radio and TV	47	$7,782.38	$2,688.09	$5,094.29	25474	3990.94	$424.75
Computer and Data Processing Services	40	$5,325.92	$4,265.05	$1,060.87	47970	4309.12	$80.87
Credit Agencies	156	$3,475.35	$1,564.40	$1,910.95	75012	2000.18	$127.70
Detective and Protective Services	84	$600.84	$290.90	$309.93	19156	455.23	$8.31
Doctors and Dentists	203	$5,976.96	$0.00	$5,976.96	54231	4076.63	$78.24
Domestic Services	na	$329.72	$329.72	$0.00	27185	331.36	$0.00
Dummy	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Dummy	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Eating & Drinking	157	$6,183.15	$455.80	$5,727.35	154567	3022.17	$421.67
Electrical Repair Service	37	$380.60	$172.10	$208.50	4429	165.49	$14.27
Elementary and Secondary Schools	169	$292.23	$0.00	$292.23	10922	189.69	$0.00
Engineering, Architectural Services	87	$6,897.93	$3,617.75	$3,280.18	62684	3538.24	$52.17
Equipment Rental and Leasing	29	$1,531.92	$596.11	$935.81	10838	734.71	$51.01
Federal Government - Military	61	$548.84	$548.84	$0.00	14113	548.84	$0.00
Federal Government - Non-Military	61	$1,406.34	$1,406.34	$0.00	24228	1406.34	$0.00
Food Stores	98	$2,540.68	$101.34	$2,439.34	65726	1904.74	$405.97
Funeral Service and Crematories	111	$297.78	$0.00	$297.78	5618	197.23	$8.47
Furniture & Home Furnishings Stores	42	$945.54	$104.11	$841.43	18658	613.59	$148.31
Gas Production and Distribution	51	$20,188.32	$5,704.00	$14,484.32	12358	7280.33	$2,012.78
General Merchandise Stores	47	$1,714.99	$76.78	$1,638.21	46540	1078.47	$273.66
Greenhouse and Nursery Products	na	$210.53	$107.51	$103.02	5277	122.11	$1.70
Hospitals	76	$4,366.07	$5.78	$4,360.29	58809	2829.74	$15.88
Hotels and Lodging Places	230	$1,550.23	$743.82	$806.40	23739	867.15	$111.60
Insurance Agents and Brokers	89	$1,796.52	$666.38	$1,130.14	27149	1394.19	$19.15
Insurance Carriers	136	$3,255.11	$330.68	$2,924.43	17945	1864.70	$191.00
Inventory Valuation Adjustment	na	-$134.47	-$134.47	$0.00	0	-135.11	$0.00
Job Trainings & Related Services	141	$75.82	$16.20	$59.62	1720	43.88	$0.19
Labor and Civic Organizations	122	$482.60	$2.74	$479.85	25708	386.10	$0.07
Landscape and Horticultural Services	na	$689.60	$397.10	$292.50	19298	410.69	$17.66
Laundry, Cleaning and Shoe Repair	517	$602.05	$116.92	$485.14	23792	443.09	$15.37
Legal Services	76	$4,848.50	$1,812.08	$3,036.42	39299	3732.13	$43.46
Local Government Passenger Transit	na	$163.14	$29.57	$133.57	2055	-128.96	$0.00
Local, Interurban Passenger Transit	68	$307.31	$56.93	$250.39	6215	190.96	$6.84
Maintenance and Repair Oil and Gas	25	$2,122.69	$2,122.69	$0.00	13280	1225.04	$83.50
Maintenance and Repair Other Facilities	25	$4,996.16	$3,357.26	$1,638.90	70682	3482.70	$23.28
Maintenance and Repair, Residential	25	$3,192.48	$809.30	$2,383.18	22397	1022.22	$13.86
Management and Consulting Services	87	$4,356.29	$2,523.56	$1,832.73	41317	2528.38	$33.47
Membership Sports and Recreation	427	$296.92	$12.69	$284.23	9879	156.92	$11.10
Miscellaneous Personal Services	129	$572.00	$70.60	$501.40	7852	175.40	$13.31
Miscellaneous Repair Shops	124	$1,238.62	$447.51	$791.11	15527	620.78	$38.77
Miscellaneous Retail	132	$3,666.97	$322.27	$3,344.70	82694	2300.10	$560.17
Motion Pictures	113	$528.99	$261.99	$267.00	6608	178.07	$6.23
Motor Freight Transport and	85	$4,806.88	$3,386.95	$1,419.93	44184	2007.95	$63.09
New Government Facilities	63	$5,606.57	$0.00	$5,606.57	33710	2358.91	$37.07
New Highways and Streets	45	$1,375.54	$0.00	$1,375.54	11487	580.50	$9.50
New Industrial and Commercial	63	$5,366.41	$0.00	$5,366.41	42278	2098.87	$43.47
New Mineral Extraction Facilities	63	$4,058.52	$39.10	$4,019.42	49928	2631.75	$212.30
New Residential Structures	35	$9,804.01	$0.00	$9,804.01	60343	2152.34	$72.12
New Utility Structures	63	$2,367.20	$0.00	$2,367.20	20669	1063.42	$13.85
Noncomparable Imports	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Nursing and Protective Care	197	$568.30	$0.00	$568.30	15420	418.58	$14.18
Other Business Services	84	$3,377.69	$2,844.79	$532.90	30014	1523.26	$55.37
Other Educational Services	116	$897.61	$74.48	$823.13	15633	403.25	$30.21
Other Federal Government Enterprises	-	$15.44	$8.21	$7.24	91	5.02	$0.00
Other Medical and Health Services	168	$1,853.43	$103.23	$1,750.20	38312	982.38	$30.67
Other Nonprofit Organizations	122	$219.94	$19.16	$200.77	7272	130.59	$1.61
Other State and Local Govt Enterprises	-	$1,442.56	$448.23	$994.34	7283	523.09	$0.00
Owner-occupied Dwellings	89	$13,556.82	$0.00	$13,556.82	0	8511.14	$1,757.88
Personnel Supply Services	484	$2,342.73	$1,877.90	$464.84	83263	2256.13	$44.53
Photofinishing, Commercial	112	$542.50	$369.64	$172.86	4588	229.07	$14.11
Pipe Lines, Except Natural Gas	49	$1,146.06	$660.36	$485.70	1762	795.70	$94.04
Portrait and Photographic Studios	184	$114.35	$14.11	$100.24	2818	54.53	$2.74
Racing and Track Operation	391	$89.00	$10.15	$78.86	1853	35.01	$16.40
Radio and TV Broadcasting	64	$690.42	$619.83	$70.59	2961	345.40	$12.68
Railroads and Related Services	68	$536.57	$352.73	$183.85	3815	202.94	$10.76
Real Estate	89	$16,199.61	$7,871.80	$8,327.81	69337	9606.97	$1,916.31
Religious Organizations	328	$198.81	$0.00	$198.81	1547	29.34	$0.00
Research, Development & Testing	123	$1,322.36	$1,013.97	$308.40	18019	799.63	$14.54
Residential Care	111	$275.70	$0.00	$275.70	7227	198.12	$2.78
Rest Of The World Industry	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Sanitary Services and Steam Supply	51	$855.42	$639.79	$215.63	3727	357.57	$156.62
Scrap	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Security and Commodity Brokers	59	$2,842.26	$2,129.61	$712.64	12923	1310.09	$107.48
Services To Buildings	67	$1,118.59	$700.70	$417.89	31058	478.86	$19.00
Social Services, N.E.C.	42	$427.84	$28.09	$399.75	6530	216.47	$0.66
State & Local Government - Education	61	$6,764.86	$6,764.86	$0.00	187367	6764.86	$0.00
State & Local Government - Non-	61	$5,029.65	$5,029.65	$0.00	91071	5029.65	$0.00
State and Local Electric Utilities	-	$7.91	$2.69	$5.22	18	2.77	$0.00

Table A-3: Economic Data for Municipal Sectors, Region H (Year 2000)

Theatrical Producers, Bands Etc.	36	$340.44	$208.52	$131.92	4319	131.14	$11.58
Transportation Services	40	$1,615.26	$407.89	$1,207.37	12706	1206.31	$13.97
U.S. Postal Service	-	$1,032.74	$649.12	$383.62	12793	766.67	$0.00
Used and Secondhand Goods	na	$0.00	$0.00	$0.00	0	0.00	$0.00
Watch, Clock, Jewelry and Furniture	50	$92.46	$0.82	$91.64	1482	36.11	$4.96
Water Supply and Sewerage Systems	51	$283.47	$98.47	$185.00	1328	154.46	$19.22
Water Transportation	353	$3,360.24	$961.21	$2,399.03	14279	908.27	$80.77
Wholesale Trade	43	$21,114.52	$10,287.90	$10,826.62	151595	11,639	$3,027.18
Total	120	$2,839.19	$2,072.08	$767.11	35883	2237.51	$25.46

NEC = not elsewhere classified. “na” = not available.

Table A-4: Economic Data for Manufacturing Sectors, Region H (Year 2000)

Sector	GED	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Abrasive Products	211	$23.04	$0.85	$22.18	132	6.12	$0.23
Adhesives and Sealants	268	$127.93	$95.51	$32.42	510	42.68	$1.16
Agricultural Chemicals, N.E.C	268	$783.00	$36.69	$746.31	1606	457.47	$9.29
Aircraft	62	$275.94	$32.00	$243.94	1006	75.53	$3.00
Aircraft and Missile Engines and Parts	62	$1.10	$0.27	$0.82	6	0.30	$0.01
Aircraft and Missile Equipment,	62	$22.33	$0.41	$21.91	175	9.66	$0.19
Alkalies & Chlorine	643	$284.13	$72.92	$211.21	752	156.39	$6.31
Aluminum Foundries	179	$3.30	$0.58	$2.72	30	1.19	$0.03
Aluminum Rolling and Drawing	179	$1.52	$0.86	$0.66	5	0.38	$0.02
Ammunition, Except For Small Arms,	48	$0.17	$0.00	$0.17	5	0.14	$0.00
Analytical Instruments	41	$112.75	$9.18	$103.57	545	36.29	$1.13
Animal and Marine Fats and Oils	523	$41.25	$24.14	$17.11	137	14.84	$0.34
Apparel Made From Purchased Materials	26	$61.61	$0.65	$60.96	577	15.25	$0.25
Architectural Metal Work	95	$130.61	$6.03	$124.58	1222	74.19	$1.25
Asphalt Felts and Coatings	278	$52.35	$50.39	$1.95	132	35.13	$0.48
Automatic Merchandising Machine	43	$9.44	$1.41	$8.02	63	3.00	$0.10
Automatic Temperature Controls	41	$6.04	$5.30	$0.74	73	3.66	$0.06
Automotive and Apparel Trimmings	26	$49.14	$4.92	$44.23	339	10.34	$0.30
Bags, Paper	863	$23.93	$0.17	$23.76	142	7.15	$0.22
Bags, Plastic	863	$269.92	$1.93	$267.98	1475	70.03	$2.30
Ball and Roller Bearings	47	$13.66	$0.03	$13.63	73	6.97	$0.16
Blankbooks and Looseleaf Binder	37	$24.31	$8.21	$16.10	190	9.10	$0.31
Blast Furnaces and Steel Mills	424	$266.51	$51.81	$214.70	769	62.03	$2.94
Blended and Prepared Flour	215	$30.25	$0.36	$29.89	89	7.16	$0.38
Blinds, Shades, and Drapery Hardware	36	$148.82	$0.73	$148.09	1776	64.76	$0.96
Blowers and Fans	47	$39.40	$0.68	$38.72	374	16.23	$0.34
Boat Building and Repairing	125	$21.72	$0.52	$21.20	198	7.14	$0.15
Book Printing	37	$25.21	$4.12	$21.09	139	11.38	$0.42
Book Publishing	37	$77.51	$7.86	$69.65	290	29.46	$1.02
Bookbinding & Related	37	$27.19	$2.26	$24.93	411	13.87	$0.31
Bottled and Canned Soft Drinks & Water	575	$957.21	$5.23	$951.98	2451	282.67	$10.33
Brass, Bronze, and Copper Foundries	179	$1.35	$0.22	$1.13	42	0.76	$0.01
Bread, Cake, and Related Products	96	$273.76	$75.63	$198.13	1543	101.99	$1.73
Brick and Structural Clay Tile	202	$7.16	$0.03	$7.13	71	2.54	$0.08
Broadwoven Fabric Mills and Finishing	263	$1.45	$0.59	$0.86	14	0.32	$0.01
Brooms and Brushes	49	$4.33	$0.30	$4.03	51	1.87	$0.05
Burial Caskets and Vaults	51	$15.38	$1.01	$14.37	86	12.00	$0.15
Canned and Cured Sea Foods	469	$0.10	$0.00	$0.10	1	0.02	$0.00
Canned Fruits and Vegetables	643	$20.43	$0.24	$20.19	84	7.48	$0.17
Canned Specialties	469	$10.17	$0.09	$10.08	19	3.76	$0.09
Canvas Products	26	$20.77	$14.68	$6.08	269	10.24	$0.15
Carbon and Graphite Products	30	$0.23	$0.18	$0.05	1	0.10	$0.00
Carbon Black	268	$26.68	$8.36	$18.32	65	13.18	$0.20
Carburetors, Pistons, Rings, Valves	47	$13.85	$1.53	$12.31	119	4.20	$0.09
Cellulosic Man-made Fibers	653	$0.09	$0.01	$0.09	3	0.06	$0.00
Cement, Hydraulic	202	$117.51	$0.04	$117.47	44	77.63	$3.31
Ceramic Wall and Floor Tile	65	$63.06	$0.01	$63.05	189	46.17	$1.28
Cheese, Natural and Processed	678	$3.09	$0.62	$2.47	8	0.34	$0.02
Chemical Preparations, N.E.C	268	$1,116.25	$410.04	$706.20	2568	456.37	$13.22
Coated Fabrics, Not Rubberized	26	$16.24	$0.42	$15.82	98	3.02	$0.10
Commercial Fishing	-	$26.19	$1.93	$24.26	794	23.74	$0.84
Commercial Printing	37	$1,008.32	$543.53	$464.79	8309	378.78	$11.33
Communications Equipment N.E.C.	51	$16.01	$7.09	$8.92	98	11.05	$0.15
Complete Guided Missiles	74	$333.42	$6.22	$327.20	1632	149.00	$3.58
Computer Peripheral Equipment,	43	$32.73	$19.29	$13.43	113	7.10	$0.22
Computer Storage Devices	43	$15.76	$9.29	$6.47	37	6.38	$0.19
Concrete Block and Brick	242	$67.93	$0.71	$67.22	388	25.50	$1.14
Concrete Products, N.E.C	242	$273.35	$2.26	$271.09	2110	106.57	$3.95
Condensed and Evaporated Milk	679	$5.18	$0.87	$4.31	11	1.00	$0.03
Confectionery Products	165	$2.31	$0.13	$2.18	10	0.54	$0.01
Construction Machinery and Equipment	87	$156.69	$6.65	$150.04	597	33.43	$1.32
Converted Paper Products, N.E.C	863	$87.39	$1.12	$86.27	386	30.28	$0.96
Conveyors and Conveying Equipment	47	$32.72	$18.35	$14.37	197	11.91	$0.29

Table A-4: Economic Data for Manufacturing Sectors, Region H (Year 2000)

Cookies and Crackers	97	$53.65	$1.65	$52.00	218	28.33	$0.50
Cordage and Twine	315	$0.64	$0.02	$0.62	5	0.23	$0.01
Costume Jewelery	47	$19.17	$0.30	$18.87	196	12.59	$0.23
Cottonseed Oil Mills	520	$15.51	$4.32	$11.19	40	2.16	$0.12
Curtains and Draperies	26	$20.14	$2.16	$17.98	233	4.73	$0.11
Cut Stone and Stone Products	13	$19.28	$0.14	$19.14	251	9.90	$0.20
Cutlery	152	$6.47	$0.50	$5.97	84	5.01	$0.07
Cyclic Crudes, Interm. & Indus. Organic	309	$18,875.10	$4,844.12	$14,030.98	23567	5098.99	$367.99
Dental Equipment and Supplies	88	$5.92	$3.83	$2.08	29	1.62	$0.07
Die-cut Paper and Board	863	$3.93	$0.05	$3.88	32	1.03	$0.03
Dolls	40	$0.22	$0.01	$0.22	9	0.21	$0.00
Drugs	182	$346.71	$75.55	$271.16	1457	188.57	$3.95
Electric Housewares and Fans	52	$3.91	$0.09	$3.83	29	2.15	$0.04
Electric Lamps	51	$0.47	$0.01	$0.46	3	0.30	$0.00
Electrical Equipment, N.E.C.	104	$39.59	$5.08	$34.51	193	7.14	$0.18
Electrical Industrial Apparatus, N.E.C.	30	$74.03	$8.52	$65.51	276	12.55	$0.51
Electromedical Apparatus	88	$171.09	$24.12	$146.97	602	60.18	$2.21
Electrometallurgical Products	179	$3.33	$0.29	$3.03	17	0.56	$0.03
Electron Tubes	169	$0.10	$0.08	$0.02	1	0.03	$0.00
Electronic Components, N.E.C.	169	$416.11	$297.46	$118.65	1517	106.69	$3.77
Electronic Computers	43	$2,916.09	$789.10	$2,126.99	10287	1057.01	$21.80
Elevators and Moving Stairways	47	$13.31	$11.71	$1.60	76	4.05	$0.10
Engine Electrical Equipment	104	$46.56	$23.58	$22.97	244	19.77	$0.49
Envelopes	863	$12.48	$0.07	$12.41	82	3.61	$0.11
Explosives	268	$50.37	$16.32	$34.05	255	27.03	$0.49
Fabricated Metal Products, N.E.C.	85	$41.83	$9.23	$32.60	289	15.07	$0.36
Fabricated Plate Work (Boiler Shops)	95	$637.68	$10.14	$627.54	5633	375.22	$6.47
Fabricated Rubber Products, N.E.C.	73	$110.21	$1.16	$109.05	747	32.76	$0.75
Fabricated Structural Metal	95	$499.60	$21.28	$478.32	2747	209.96	$5.42
Fabricated Textile Products, N.E.C.	26	$24.50	$6.71	$17.79	167	7.31	$0.16
Farm Machinery and Equipment	58	$20.59	$8.99	$11.61	105	6.93	$0.18
Fasteners, Buttons, Needles, Pins	48	$4.75	$0.02	$4.74	66	4.02	$0.06
Fertilizers, Mixing Only	268	$83.13	$12.54	$70.59	254	14.51	$0.84
Flavoring Extracts and Syrups, N.E.C.	576	$1.43	$0.18	$1.25	5	0.95	$0.01
Flour and Other Grain Mill Products	215	$4.38	$0.56	$3.82	13	0.97	$0.03
Fluid Milk	681	$117.34	$5.96	$111.38	334	15.22	$0.68
Fluid Power Cylinders & Actuators	47	$95.47	$2.17	$93.31	437	31.34	$0.97
Fluid Power Pumps & Motors	47	$12.43	$0.28	$12.15	102	6.42	$0.10
Food Preparations, N.E.C	244	$211.74	$1.05	$210.69	1284	49.41	$1.06
Food Products Machinery	28	$8.53	$3.96	$4.57	69	4.70	$0.09
Forest Products	-	$15.25	$0.66	$14.59	531	10.04	$0.44
Forestry Products	-	$130.95	$0.39	$130.55	1353	99.14	$20.46
Frozen Specialties	469	$334.48	$2.92	$331.56	2003	100.74	$2.15
Furniture and Fixtures, N.E.C	36	$8.64	$4.28	$4.36	44	2.16	$0.04
Games, Toys, and Childrens Vehicles	41	$4.48	$0.03	$4.45	29	2.71	$0.06
Gaskets, Packing and Sealing Devices	119	$245.98	$2.69	$243.28	1819	100.94	$1.78
General Industrial Machinery, N.E.C	47	$89.10	$2.17	$86.93	462	27.75	$0.71
Glass and Glass Products, Exc Containers	163	$78.94	$53.23	$25.71	667	33.52	$0.84
Glass Containers	164	$6.80	$5.96	$0.84	43	2.87	$0.08
Hand and Edge Tools, N.E.C.	152	$6.59	$3.15	$3.44	48	3.92	$0.07
Hand Saws and Saw Blades	152	$8.45	$2.63	$5.82	45	3.95	$0.10
Hard Surface Floor Coverings	52	$92.13	$6.41	$85.72	523	77.13	$1.10
Hardware, N.E.C.	152	$28.37	$10.87	$17.50	169	11.81	$0.27
Hardwood Dimension and Flooring Mills	74	$3.69	$3.52	$0.17	41	1.86	$0.04
Heating Equipment, Except Electric	54	$1.50	$0.06	$1.44	8	0.78	$0.01
Hoists, Cranes, and Monorails	47	$105.97	$41.91	$64.06	422	29.00	$0.74
Housefurnishings, N.E.C	26	$17.42	$2.12	$15.30	145	4.12	$0.10
Household Cooking Equipment	52	$2.42	$0.02	$2.41	10	1.03	$0.04
Household Furniture, N.E.C	36	$0.45	$0.07	$0.38	6	0.15	$0.00
Ice Cream and Frozen Desserts	680	$40.60	$12.12	$28.48	182	10.77	$0.31
Industrial and Fluid Valves	85	$932.90	$133.68	$799.22	3566	302.16	$8.90
Industrial Furnaces and Ovens	47	$23.25	$0.62	$22.64	176	8.28	$0.18
Industrial Gases	644	$307.10	$78.81	$228.29	1914	236.62	$7.13
Industrial Machines N.E.C.	47	$703.17	$7.92	$695.25	6078	334.44	$6.58
Industrial Patterns	67	$0.79	$0.01	$0.78	13	0.41	$0.01

Table A-4: Economic Data for Manufacturing Sectors, Region H (Year 2000)

Industrial Trucks and Tractors	67	$250.25	$23.90	$226.35	1275	78.26	$2.59
Inorganic Chemicals Nec.	646	$458.52	$117.67	$340.84	1367	222.65	$14.63
Inorganic Pigments	645	$4.36	$1.12	$3.24	18	1.17	$0.07
Instruments To Measure Electricity	41	$24.39	$3.28	$21.11	129	7.68	$0.19
Internal Combustion Engines, N.E.C.	153	$282.21	$141.33	$140.87	794	54.82	$2.57
Iron and Steel Forgings	183	$247.72	$15.78	$231.95	1370	130.25	$2.56
Iron and Steel Foundries	179	$74.91	$0.54	$74.36	562	26.49	$0.72
Jewelers Materials and Lapidary Work	38	$3.75	$0.00	$3.75	25	1.68	$0.03
Jewelry, Precious Metal	36	$80.08	$0.74	$79.34	551	35.68	$0.89
Knit Outerwear Mills	731	$0.32	$0.01	$0.30	4	0.11	$0.00
Laboratory Apparatus & Furniture	41	$8.13	$0.63	$7.50	36	1.64	$0.08
Lawn and Garden Equipment	58	$0.36	$0.21	$0.16	2	0.07	$0.00
Lead Pencils and Art Goods	44	$0.14	$0.00	$0.13	2	0.09	$0.00
Leather Goods, N.E.C	156	$3.30	$0.54	$2.76	65	2.50	$0.02
Lighting Fixtures and Equipment	51	$75.87	$1.17	$74.70	446	30.03	$0.91
Logging Camps and Logging Contractors	104	$103.99	$75.68	$28.30	566	50.34	$1.44
Lubricating Oils and Greases	1045	$172.64	$49.66	$122.98	369	26.39	$1.35
Luggage	153	$0.99	$0.15	$0.84	12	0.36	$0.01
Macaroni and Spaghetti	243	$22.81	$1.08	$21.73	173	5.09	$0.10
Machine Tools, Metal Cutting Types	67	$29.43	$5.16	$24.27	298	15.51	$0.29
Machine Tools, Metal Forming Types	67	$1.29	$0.87	$0.42	13	0.45	$0.01
Magnetic & Optical Recording Media	104	$0.59	$0.45	$0.14	2	0.14	$0.01
Malt Beverages	571	$511.58	$5.49	$506.09	906	178.85	$100.55
Manifold Business Forms	37	$14.84	$7.34	$7.50	105	5.04	$0.17
Manufactured Ice	469	$7.12	$0.14	$6.99	129	4.49	$0.04
Manufacturing Industries, N.E.C.	53	$173.52	$4.61	$168.90	1356	83.90	$2.08
Marking Devices	45	$6.04	$0.50	$5.54	118	4.94	$0.05
Mattresses and Bedsprings	36	$57.48	$3.28	$54.20	493	16.55	$0.23
Measuring and Dispensing Pumps	107	$16.66	$0.94	$15.71	57	3.36	$0.17
Meat Packing Plants	638	$91.66	$15.92	$75.74	251	4.81	$0.34
Mechanical Measuring Devices	41	$639.98	$60.64	$579.34	4340	260.80	$7.23
Metal Barrels, Drums and Pails	586	$149.49	$27.96	$121.53	725	44.97	$1.36
Metal Cans	586	$262.02	$69.19	$192.83	659	56.97	$2.84
Metal Coating and Allied Services	404	$374.32	$41.04	$333.28	2188	156.20	$3.64
Metal Doors, Sash, and Trim	95	$141.34	$9.45	$131.90	1294	59.37	$1.32
Metal Heat Treating	179	$185.07	$8.98	$176.09	860	72.91	$1.95
Metal Household Furniture	36	$19.72	$1.81	$17.92	162	5.13	$0.10
Metal Office Furniture	36	$7.44	$0.24	$7.20	40	2.10	$0.05
Metal Partitions and Fixtures	36	$9.32	$6.72	$2.60	74	2.86	$0.05
Metal Sanitary Ware	152	$0.34	$0.02	$0.32	5	0.25	$0.00
Metal Stampings, N.E.C.	183	$77.20	$21.03	$56.16	472	28.50	$0.66
Metalworking Machinery, N.E.C.	67	$0.89	$0.80	$0.09	4	0.12	$0.00
Millwork	32	$182.60	$175.41	$7.20	1846	65.37	$1.61
Mineral Wool	211	$16.78	$0.20	$16.58	115	7.16	$0.19
Minerals, Ground Or Treated	211	$81.45	$0.67	$80.78	451	39.35	$1.07
Mining Machinery, Except Oil Field	87	$1.08	$0.12	$0.95	9	0.29	$0.01
Miscellaneous Fabricated Wire Products	85	$210.70	$33.73	$176.97	1839	101.16	$1.88
Miscellaneous Metal Work	95	$135.31	$5.58	$129.72	305	25.53	$1.48
Miscellaneous Plastics Products	119	$1,785.00	$25.31	$1,759.70	9689	565.26	$13.26
Miscellaneous Publishing	37	$124.24	$82.52	$41.72	791	67.55	$1.51
Mobile Homes	32	$0.39	$0.00	$0.39	4	0.11	$0.00
Motor Homes	143	$3.20	$0.00	$3.20	25	1.20	$0.01
Motor Vehicle Parts and Accessories	143	$151.06	$68.12	$82.94	694	34.45	$0.47
Motor Vehicles	143	$48.37	$0.52	$47.84	85	7.16	$0.16
Motorcycles, Bicycles, and Parts	14	$0.63	$0.02	$0.61	5	0.19	$0.00
Motors and Generators	30	$177.11	$40.24	$136.88	1042	89.59	$2.55
Musical Instruments	39	$10.19	$0.22	$9.97	78	6.35	$0.09
Narrow Fabric Mills	263	$3.12	$0.17	$2.96	47	1.49	$0.03
Newspapers	37	$437.56	$308.83	$128.73	4283	237.10	$5.47
Nitrogenous and Phosphatic Fertilizers	267	$71.11	$11.15	$59.96	176	21.87	$0.96
Nonclay Refractories	211	$5.61	$0.09	$5.52	34	2.62	$0.08
Nonferrous Castings, N.E.C.	179	$6.87	$1.20	$5.67	16	0.93	$0.05
Nonferrous Forgings	183	$18.41	$0.87	$17.54	104	5.30	$0.14
Nonferrous Rolling and Drawing, N.E.C.	179	$4.58	$0.34	$4.25	17	1.46	$0.06
Nonferrous Wire Drawing and Insulating	179	$85.62	$8.92	$76.70	297	20.51	$0.80

Table A-4: Economic Data for Manufacturing Sectors, Region H (Year 2000)

Nonmetallic Mineral Products, N.E.C.	211	$63.10	$1.19	$61.91	711	25.53	$0.62
Nonwoven Fabrics	315	$1.17	$0.03	$1.14	5	0.30	$0.01
Oil Field Machinery	47	$2,642.23	$498.05	$2,144.17	18071	1375.98	$28.66
Ophthalmic Goods	69	$10.53	$0.55	$9.98	103	3.03	$0.08
Optical Instruments & Lenses	69	$0.04	$0.00	$0.04	1	0.02	$0.00
Other Ordnance and Accessories	48	$0.69	$0.00	$0.68	2	-0.05	$0.01
Packaging Machinery	47	$23.93	$10.07	$13.85	132	8.38	$0.23
Paints and Allied Products	128	$564.65	$7.83	$556.82	1614	190.67	$5.60
Paper Coated & Laminated N.E.C.	863	$17.83	$0.90	$16.93	85	7.00	$0.17
Paper Mills, Except Building Paper	1385	$246.44	$0.75	$245.69	741	91.63	$2.70
Paperboard Containers and Boxes	134	$326.80	$297.71	$29.09	1508	85.54	$3.23
Paving Mixtures and Blocks	278	$62.39	$58.72	$3.67	191	25.46	$0.47
Pens and Mechanical Pencils	43	$0.61	$0.01	$0.60	6	0.29	$0.01
Periodicals	37	$136.71	$77.96	$58.75	807	53.25	$1.33
Personal Leather Goods	155	$0.78	$0.03	$0.75	12	0.50	$0.01
Petroleum Refining	1437	$29,546.98	$4,432.49	$25,114.48	10739	3692.57	$257.78
Phonograph Records and Tape	51	$3.22	$0.72	$2.49	55	1.49	$0.02
Photographic Equipment and Supplies	141	$74.98	$10.05	$64.94	258	17.44	$0.79
Pickles, Sauces, and Salad Dressings	643	$2.33	$0.08	$2.24	8	0.76	$0.01
Pipe, Valves, and Pipe Fittings	85	$737.85	$105.73	$632.13	5800	314.74	$6.10
Plastics Materials and Resins	653	$4,307.04	$596.78	$3,710.27	6107	1135.29	$43.43
Plate Making	37	$20.27	$4.77	$15.50	313	16.56	$0.26
Plating and Polishing	404	$84.28	$10.73	$73.56	1026	67.68	$0.82
Pleating and Stitching	26	$8.06	$0.40	$7.66	129	5.32	$0.08
Plumbing Fixture Fittings and Trim	54	$6.94	$0.29	$6.64	51	3.35	$0.07
Polishes and Sanitation Goods	451	$112.93	$11.99	$100.94	563	70.93	$1.18
Porcelain Electrical Supplies	66	$6.91	$0.26	$6.65	65	3.89	$0.07
Potato Chips & Similar Snacks	244	$105.81	$2.75	$103.06	374	30.35	$0.73
Pottery Products, N.E.C	66	$1.27	$0.01	$1.26	16	0.54	$0.02
Poultry Processing	639	$0.31	$0.04	$0.27	3	0.05	$0.00
Power Driven Hand Tools	67	$90.62	$9.81	$80.81	355	34.11	$1.09
Power Transmission Equipment	47	$35.27	$0.38	$34.88	209	13.30	$0.34
Prefabricated Metal Buildings	95	$552.76	$16.78	$535.98	3383	278.44	$5.58
Prefabricated Wood Buildings	32	$39.60	$0.31	$39.29	316	12.90	$0.37
Prepared Feeds, N.E.C	469	$33.50	$0.52	$32.98	85	4.82	$0.31
Prepared Fresh Or Frozen Fish Or Seafood	638	$63.13	$1.74	$61.39	408	10.02	$0.37
Primary Batteries, Dry and Wet	104	$1.09	$0.03	$1.06	9	0.42	$0.01
Primary Metal Products, N.E.C	179	$8.02	$1.19	$6.83	35	2.17	$0.07
Primary Nonferrous Metals, N.E.C.	179	$288.52	$5.21	$283.30	1042	132.76	$4.19
Printed Circuit Boards	169	$68.49	$48.96	$19.53	924	39.55	$0.52
Printing Ink	268	$51.93	$37.03	$14.90	231	13.69	$0.41
Printing Trades Machinery	28	$1.61	$0.94	$0.67	9	0.61	$0.01
Public Building Furniture	36	$8.05	$5.47	$2.58	45	2.07	$0.05
Pumps and Compressors	47	$449.94	$7.73	$442.22	1728	123.19	$3.95
Radio and Tv Communication Equipment	51	$60.92	$26.97	$33.95	177	18.79	$0.45
Radio and TV Receiving Sets	51	$2.25	$0.20	$2.05	17	0.42	$0.01
Railroad Equipment	61	$58.76	$1.44	$57.32	233	11.31	$0.39
Ready-mixed Concrete	242	$463.29	$4.00	$459.29	2829	174.45	$7.05
Refrigeration and Heating Equipment	107	$656.27	$381.28	$274.99	3098	173.66	$6.08
Relays & Industrial Controls	30	$36.64	$21.17	$15.47	189	14.53	$0.35
Rice Milling	215	$278.70	$0.24	$278.45	691	52.50	$2.99
Roasted Coffee	243	$611.57	$30.85	$580.73	900	165.49	$5.24
Rolling Mill Machinery	67	$5.18	$0.28	$4.91	53	2.80	$0.03
Rubber and Plastics Hose and Belting	119	$46.47	$0.22	$46.24	340	17.54	$0.34
Salted and Roasted Nuts & Seeds	243	$1.62	$0.06	$1.55	4	0.15	$0.01
Sanitary Paper Products	863	$119.76	$0.80	$118.96	236	54.11	$1.44
Sausages and Other Prepared Meats	638	$400.59	$55.52	$345.07	1845	69.01	$2.62
Sawmills and Planing Mills, General	74	$140.80	$125.91	$14.90	877	32.20	$1.22
Scales and Balances	47	$3.84	$0.95	$2.89	29	1.52	$0.02
Screw Machine Products and Bolts, Etc.	95	$178.60	$47.58	$131.01	1260	80.93	$1.73
Search & Navigation Equipment	40	$20.22	$1.85	$18.37	105	5.88	$0.18
Secondary Nonferrous Metals	179	$105.32	$1.12	$104.20	286	15.07	$1.04
Semiconductors and Related Devices	169	$953.69	$371.61	$582.07	2575	564.33	$9.34
Service Industry Machines, N.E.C.	47	$73.03	$23.35	$49.68	384	26.40	$0.73
Sheet Metal Work	95	$432.00	$15.03	$416.97	3087	183.09	$3.87

Table A-4: Economic Data for Manufacturing Sectors, Region H (Year 2000)

Ship Building and Repairing	125	$345.35	$1.44	$343.90	2924	163.61	$3.13
Shoes, Except Rubber	151	$0.79	$0.00	$0.79	11	0.34	$0.01
Shortening and Cooking Oils	524	$1.46	$0.32	$1.13	3	0.12	$0.01
Signs and Advertising Displays	50	$178.47	$72.92	$105.54	1766	86.30	$1.98
Silverware and Plated Ware	37	$1.00	$0.03	$0.97	11	0.46	$0.02
Small Arms	48	$5.70	$0.01	$5.68	41	4.12	$0.54
Small Arms Ammunition	48	$7.30	$0.03	$7.26	37	5.65	$0.69
Soap and Other Detergents	451	$14.72	$2.37	$12.35	73	8.19	$0.17
Special Dies and Tools and Accessories	67	$73.02	$46.17	$26.84	765	40.79	$0.67
Special Industry Machinery N.E.C.	28	$110.61	$51.41	$59.20	258	26.99	$0.79
Special Product Sawmills, N.E.C	74	$0.56	$0.46	$0.10	5	0.38	$0.00
Sporting and Athletic Goods, N.E.C.	42	$62.23	$0.34	$61.89	527	24.21	$2.05
Stationery Products	863	$23.89	$0.59	$23.30	93	6.88	$0.22
Steam Engines and Turbines	153	$176.62	$36.01	$140.62	592	55.20	$1.25
Steel Pipe and Tubes	179	$302.86	$57.43	$245.43	1154	90.06	$3.37
Steel Springs, Except Wire	85	$2.63	$0.32	$2.31	14	0.88	$0.02
Steel Wire and Related Products	179	$231.01	$38.18	$192.83	847	60.68	$2.70
Storage Batteries	169	$6.83	$2.22	$4.60	38	2.23	$0.06
Structural Wood Members, N.E.C	32	$105.70	$99.33	$6.37	779	45.69	$1.23
Sugar	164	$364.75	$24.62	$340.13	898	59.91	$2.74
Surface Active Agents	451	$41.23	$16.84	$24.39	67	12.04	$0.36
Surgical and Medical Instrument	88	$94.28	$36.05	$58.23	488	31.81	$1.11
Surgical Appliances and Supplies	88	$166.47	$35.23	$131.23	884	41.11	$1.66
Switchgear and Switchboard Apparatus	30	$321.20	$63.31	$257.89	1624	156.18	$3.06
Synthetic Rubber	653	$498.51	$63.80	$434.71	1299	210.43	$5.72
Telephone and Telegraph Apparatus	51	$47.36	$31.97	$15.39	82	17.60	$0.40
Textile Bags	26	$3.63	$2.38	$1.25	42	1.29	$0.03
Textile Goods, N.E.C	315	$9.42	$0.11	$9.31	67	1.31	$0.08
Textile Machinery	47	$1.16	$0.52	$0.64	8	0.42	$0.01
Thread Mills	487	$0.30	$0.07	$0.23	5	0.08	$0.00
Tire Cord and Fabric	315	$0.97	$0.01	$0.95	5	0.23	$0.01
Tires and Inner Tubes	170	$0.26	$0.00	$0.26	1	0.14	$0.01
Toilet Preparations	451	$147.72	$5.40	$142.32	419	65.39	$1.38
Transformers	70	$6.68	$0.96	$5.71	50	2.93	$0.06
Transportation Equipment, N.E.C	62	$54.68	$1.24	$53.43	221	13.48	$0.45
Travel Trailers and Camper	143	$0.42	$0.00	$0.41	3	0.06	$0.00
Truck and Bus Bodies	143	$77.42	$2.96	$74.47	396	32.75	$0.33
Truck Trailers	143	$39.09	$1.04	$38.05	262	13.48	$0.19
Typesetting	37	$4.80	$2.71	$2.09	46	2.29	$0.05
Upholstered Household Furniture	36	$14.07	$0.11	$13.96	170	4.47	$0.08
Veneer and Plywood	32	$272.46	$165.41	$107.05	1956	107.83	$2.95
Vitreous China Food Utensils	66	$12.44	$0.08	$12.36	212	6.77	$0.12
Watches, Clocks, and Parts	41	$0.19	$0.01	$0.18	1	0.01	$0.00
Welding Apparatus	67	$48.52	$7.93	$40.60	188	18.59	$0.56
Wiring Devices	51	$72.18	$3.16	$69.02	532	32.74	$0.65
Wood Containers	109	$4.12	$3.71	$0.42	59	1.89	$0.03
Wood Household Furniture	36	$13.02	$0.20	$12.82	155	4.43	$0.08
Wood Kitchen Cabinets	32	$47.19	$46.49	$0.70	505	24.32	$0.49
Wood Office Furniture	36	$12.56	$1.57	$10.99	88	6.03	$0.08
Wood Pallets and Skids	82	$25.84	$24.99	$0.85	348	10.64	$0.23
Wood Partitions and Fixtures	36	$64.34	$33.54	$30.80	580	24.52	$0.38
Wood Preserving	82	$14.12	$13.63	$0.49	43	2.80	$0.14
Wood Products, N.E.C	82	$71.14	$28.03	$43.11	638	28.62	$0.75
Wood Tv and Radio Cabinets	36	$2.49	$0.09	$2.40	40	1.02	$0.03
Woodworking Machinery	28	$0.17	$0.03	$0.15	2	0.07	$0.00
X-Ray Apparatus	88	$13.14	$3.62	$9.52	49	2.98	$0.12
Yarn Mills and Finishing Of Textiles, N.E.C.	487	$0.09	$0.05	$0.05	1	0.02	$0.00
Total	-	$93,689.68	$18,026.22	$75,663.46	252034	26002.89	$1,204.38

NEC = not elsewhere classified. “na” = not available.

Table A-5: Economic Data for Mining Sectors, Region H Year 2000)

Sector	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Chemical, Fertilizer Mineral Mininig, N.E.C.	$48.78	$6.48	$42.30	297	$31.62	$2.12
Clay, Ceramic, Refractory Minerals, N.E.C.	$1.25	$0.01	$1.24	3	$0.74	$0.04
Coal Mining	$109.32	$21.45	$87.88	333	$37.29	$14.35
Dimension Stone	$1.06	$0.03	$1.03	5	$0.64	$0.03
Gold Ores	$5.48	$5.46	$0.02	20	$1.87	$0.25
Iron Ores	$0.63	$0.06	$0.58	5	< $0.00	$0.01
Metal Mining Services	$0.20	$0.20	$0.00	6	$0.03	$0.00
Misc. Nonmetallic Minerals, N.E.C.	$0.52	$0.01	$0.51	2	$0.32	$0.02
Natural Gas & Crude Petroleum	$48,575.81	$24,201.65	$24,374.17	75,269	$23,065.53	$2,705.09
Nonmetallic Minerals (Except Fuels) Service	$3,039.20	$1,514.20	$1,525.00	2,290	$866.82	$136.30
Natural Gas Liquids	$3.40	$0.06	$3.34	8	$1.90	$0.12
Potash, Soda, and Borate Minerals	$30.73	$4.08	$26.65	47	$16.80	$1.06
Sand and Gravel	$53.18	$2.77	$50.41	345	$33.14	$1.66
Total	$51,869.57	$25,756.44	$26,113.13	78,629	$24,056.71	$2,861.04

na = “not available”

Table A-6: Economic Data for the Steam Electric Sector, Region H (Year 2000)

Sector	Total Sales	Intermediate Sales	Final Sales	Jobs	Regional Income	Business Taxes
Electric Services	$4,866.25	$1,660.72	$3,205.53	8090	3480.17	$623.12

na = “not available”

Attachment B: Distribution of Economic Impacts by County and Water User Group

Tables B-1 through B-6 show economic impacts by county and water user group; however, **caution** is warranted. Figures shown for specific counties are *direct* impacts only. For the most part, figures reported in the main text for all water use categories uses include *direct and secondary* impacts. Secondary effects were estimated using regional level multipliers that treat each regional water planning area as an aggregate and autonomous economy. Multipliers do not specify where secondary impacts will occur at a sub-regional level (i.e., in which counties or cities). All economic impacts that would accrue to a region as a whole due to secondary economic effects are reported in Tables B-1 through B-6 as "secondary regional level impacts."

For example, assume that in a given county (or city) water shortages caused significant reductions in output for a manufacturing plant. Reduced output resulted in lay-offs and lost income for workers and owners of the plant. This is a *direct* impact. Direct impacts were estimated at a county level; and thus one can say with certainty that direct impacts occurred in that county. However, secondary impacts accrue to businesses and households throughout the region where the business operates, and it is impossible using input-output models to determine where these businesses are located spatially.

The same logic applies to changes in population and school enrollment. Since employment losses and subsequent out-migration from a region were estimated using *direct* and *secondary* multipliers, it is impossible to say with any degree of certainty how many people a given county would lose regardless of whether the economic impact was direct or secondary. For example, assume the manufacturing plant referred to above is in County A. If the firm eliminated 50 jobs, one could state with certainty that water shortages in County A resulted in a loss of 50 jobs in that county. However, one could not unequivocally say whether 100 percent of the population loss due to lay-offs at the manufacturing would accrue to County A because many affected workers might commute from adjacent counties. This is particularly true in large metropolitan areas that overlay one or counties. Thus, population and school enrollment impacts cannot be reported at a county level.

Manufacturing

Table B-1: Distribution of Economic Impacts by County and Water User Groups: Manufacturing						
Lost Output (Total Sales, $millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$165.86	$473.50	$683.30	$1,786.05	$2,195.48	$2,885.77
Secondary Regional Level Impacts	$173.88	$496.42	$716.37	$1,872.50	$2,301.75	$3,025.45
Chambers						
Direct	$1,096.06	$1,224.18	$1,359.73	$1,496.61	$1,623.40	$1,783.22
Secondary Regional Level Impacts	$1,091.09	$1,218.63	$1,353.57	$1,489.82	$1,616.04	$1,775.14
Fort Bend						
Direct	$91.63	$361.27	$1,156.62	$1,215.01	$1,253.76	$1,141.01
Secondary Regional Level Impacts	$60.09	$236.90	$758.43	$796.72	$822.13	$748.20
Harris						
Direct	$1,229.43	$1,594.70	$1,906.33	$2,181.77	$2,387.85	$2,284.43
Secondary Regional Level Impacts	$1,139.69	$1,478.29	$1,767.17	$2,022.50	$2,213.54	$2,117.67
Montgomery						
Direct	$45.39	$116.97	$683.31	$884.97	$1,088.22	$1,292.53
Secondary Regional Level Impacts	$32.99	$85.03	$496.71	$643.30	$791.04	$939.55
Total	$5,126.11	$7,285.90	$10,881.53	$14,389.25	$16,293.22	$17,992.96
Job Losses (numbers may not sum to figures in text due to rounding)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	189	538	777	2,031	2,496	3,281
Secondary Regional Level Impacts	1,049	2,995	4,322	11,298	13,888	18,254
Chambers						
Direct	1,967	2,197	2,440	2,686	2,914	3,200
Secondary Regional Level Impacts	7,524	8,403	9,334	10,273	11,143	12,241
Fort Bend						
Direct	300	1,185	3,793	3,984	4,111	3,741
Secondary Regional Level Impacts	544	2,146	6,871	7,218	7,448	6,778
Harris						
Direct	3,476	4,509	5,390	6,168	6,751	6,459
Secondary Regional Level Impacts	7,536	9,775	11,685	13,373	14,637	14,003
Montgomery						
Direct	203	524	3,063	3,967	4,878	5,794
Secondary Regional Level Impacts	277	714	4,172	5,404	6,645	7,892
Total	23,066	32,987	51,847	66,402	74,911	81,644
Income Losses ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$38.47	$109.83	$158.50	$414.29	$509.26	$669.37
Secondary Regional Level Impacts	$88.88	$253.73	$366.16	$957.09	$1,176.48	$1,546.39
Chambers						
Direct	$294.18	$328.57	$364.95	$401.69	$435.72	$478.61
Secondary Regional Level Impacts	$554.06	$618.82	$687.34	$756.53	$820.63	$901.42
Fort Bend						
Direct	$39.97	$157.59	$504.53	$530.00	$546.91	$497.72
Secondary Regional Level Impacts	$34.77	$137.07	$438.84	$461.00	$475.70	$432.92
Harris						

Direct	$350.00	$453.98	$542.69	$621.11	$679.77	$650.33
Secondary Regional Level Impacts	$603.14	$782.34	$935.22	$1,070.35	$1,171.45	$1,120.71
Montgomery						
Direct	$16.16	$41.64	$243.25	$315.03	$387.39	$460.12
Secondary Regional Level Impacts	$18.32	$47.21	$275.77	$357.16	$439.19	$521.64
Total	$2,037.94	$2,930.79	$4,517.25	$5,884.24	$6,642.49	$7,279.23
Business Taxes ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$2.53	$7.22	$10.42	$27.25	$33.50	$44.03
Secondary Regional Level Impacts	$6.13	$17.50	$25.26	$66.03	$81.16	$106.68
Chambers						
Direct	$18.78	$20.98	$23.30	$25.65	$27.82	$30.56
Secondary Regional Level Impacts	$36.33	$40.58	$45.07	$49.61	$53.82	$59.11
Fort Bend						
Direct	$0.88	$3.48	$11.13	$11.69	$12.06	$10.98
Secondary Regional Level Impacts	$0.94	$3.69	$11.82	$12.42	$12.82	$11.66
Harris						
Direct	$15.96	$20.70	$24.75	$28.32	$31.00	$29.66
Secondary Regional Level Impacts	$32.75	$42.49	$50.79	$58.13	$63.62	$60.86
Montgomery						
Direct	$0.57	$1.47	$8.62	$11.16	$13.72	$16.30
Secondary Regional Level Impacts	$0.76	$1.96	$11.48	$14.87	$18.28	$21.71
Total	$115.65	$160.09	$222.65	$305.12	$347.79	$391.55
Source: Texas Water Development Board, Office of Water Resources Planning						

Municipal

Impacts to the horticultural industry were estimated at the regional level only and are not included.

Table B-2: Distribution of Economic Impacts by County: Water Intensive Commercial Uses (Municipal)						
Lost Output (Total Sales, $millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Chambers						
Direct	$2.18	$2.71	$3.25	$3.78	$4.31	$4.88
Secondary Regional Level Impacts	$1.61	$2.01	$2.42	$2.80	$3.20	$3.62
Fort Bend						
Direct	$26.16	$43.05	$74.84	$99.32	$142.02	$192.27
Secondary Regional Level Impacts	$18.73	$30.82	$53.57	$71.10	$101.67	$137.64
Galveston						
Direct	$6.39	$10.89	$13.91	$14.86	$15.72	$16.41
Secondary Regional Level Impacts	$4.66	$7.94	$10.14	$10.83	$11.46	$11.95
Harris						
Direct	$51.78	$361.33	$798.73	$941.47	$1,087.64	$1,237.89
Secondary Regional Level Impacts	$37.10	$258.92	$572.35	$674.63	$779.37	$887.04
Montgomery						
Direct	$0.00	$0.00	$0.00	$39.91	$109.80	$204.83
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$28.85	$79.43	$148.02
Waller						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$148.61	$717.65	$1,529.20	$1,887.56	$2,334.62	$2,844.56
Lost Income ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Chambers						
Direct	$1.05	$1.30	$1.57	$1.82	$2.07	$2.35
Secondary Regional Level Impacts	$0.85	$1.05	$1.27	$1.47	$1.68	$1.90
Fort Bend						
Direct	$15.42	$25.38	$44.12	$58.56	$83.73	$113.35
Secondary Regional Level Impacts	$10.88	$17.91	$31.13	$41.32	$59.08	$79.98
Galveston						
Direct	$3.79	$6.45	$8.24	$8.81	$9.32	$9.72
Secondary Regional Level Impacts	$2.96	$5.04	$6.43	$6.87	$7.27	$7.59
Harris						
Direct	$28.87	$201.48	$445.38	$524.98	$606.49	$690.27
Secondary Regional Level Impacts	$21.21	$148.02	$327.21	$385.68	$445.57	$507.12
Montgomery						
Direct	$0.00	$0.00	$0.00	$23.04	$63.36	$118.33
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$16.70	$45.97	$85.69
Waller						

Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$85.03	$406.64	$865.36	$1,069.25	$1,324.54	$1,616.30
Job Losses (numbers may not sum to figures in text due to rounding)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	0	0	0	0	0	0
Secondary Regional Level Impacts	0	0	0	0	0	0
Chambers						
Direct	53	65	79	91	104	118
Secondary Regional Level Impacts	18	22	27	31	35	40
Fort Bend						
Direct	762	1,253	2,179	2,892	4,135	5,598
Secondary Regional Level Impacts	206	339	589	782	1,118	1,514
Galveston						
Direct	157	267	341	364	385	402
Secondary Regional Level Impacts	51	87	111	118	125	130
Harris						
Direct	1,365	9,527	21,061	24,825	28,679	32,641
Secondary Regional Level Impacts	401	2,799	6,187	7,292	8,424	9,588
Montgomery						
Direct	0	0	0	1,060	2,918	5,435
Secondary Regional Level Impacts	0	0	0	318	876	1,632
Waller						
Direct	0	0	0	0	0	0
Secondary Regional Level Impacts	0	0	0	0	0	0
Total	3,012	14,360	30,572	37,773	46,800	57,098
Lost Business Taxes ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Chambers						
Direct	$0.20	$0.25	$0.31	$0.35	$0.40	$0.46
Secondary Regional Level Impacts	$0.17	$0.22	$0.26	$0.30	$0.34	$0.39
Fort Bend						
Direct	$1.33	$2.20	$3.82	$5.07	$7.24	$9.81
Secondary Regional Level Impacts	$1.04	$1.70	$2.96	$3.93	$5.62	$7.61
Galveston						
Direct	$0.44	$0.75	$0.95	$1.02	$1.08	$1.13
Secondary Regional Level Impacts	$0.35	$0.60	$0.77	$0.82	$0.87	$0.91
Harris						
Direct	$3.03	$21.14	$46.72	$55.07	$63.62	$72.41
Secondary Regional Level Impacts	$2.37	$16.52	$36.51	$43.03	$49.71	$56.58
Montgomery						
Direct	$0.00	$0.00	$0.00	$2.17	$5.97	$11.13
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$1.69	$4.67	$8.68
Waller						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$8.93	$43.37	$92.30	$113.46	$139.53	$169.10
Source: Texas Water Development Board, Office of Water Resources Planning						

Table B-3: Lost Water Utility Revenues (Municipal)						
County	2010	2020	2030	2040	2050	2060
Brazoria	$1.43	$2.51	$4.40	$6.45	$9.16	$12.33
Chambers	$1.30	$1.67	$2.03	$2.34	$2.67	$3.03
Fort Bend	$17.09	$27.11	$44.37	$59.11	$76.74	$100.25
Galveston	$4.43	$5.30	$5.77	$5.86	$5.96	$6.07
Harris	$30.32	$136.10	$213.77	$254.40	$295.14	$338.94
Montgomery	$8.63	$26.42	$39.70	$52.25	$67.27	$84.07
Waller	$0.06	$0.11	$0.14	$0.14	$0.31	$1.15
Total	$63.26	$199.22	$310.17	$380.53	$457.25	$545.84
Source: Texas Water Development Board, Office of Water Resources Planning						

Table B-4: Costs to Non-Water Intensive Commercial Businesses and Households						
County	2010	2020	2030	2040	2050	2060
Brazoria	$28.19	$31.15	$41.60	$52.87	$68.13	$85.69
Chambers	$7.54	$9.21	$10.85	$12.36	$13.99	$15.78
Fort Bend	$66.20	$116.84	$226.30	$326.78	$467.42	$629.73
Galveston	$11.71	$14.38	$15.99	$16.30	$16.64	$17.05
Harris	$85.51	$419.48	$785.15	$999.85	$1,229.11	$1,484.29
Montgomery	$32.05	$97.87	$158.28	$241.16	$361.18	$507.99
Waller	$0.43	$0.51	$0.50	$0.50	$0.82	$3.17
Total	$231.63	$689.45	$1,238.66	$1,649.81	$2,157.29	$2,743.69
Source: Texas Water Development Board, Office of Water Resources Planning						

Steam Electric

Table B-5: Distribution of Economic Impacts by County and Water User Groups: (Steam Electric)						
Lost Output (Total Sales, $millions)						
County	2010	2020	2030	2040	2050	2060
Harris						
Direct	$0.00	$262.07	$667.63	$925.91	$1,240.71	$3,279.27
Secondary Regional Level Impacts	$0.00	$34.10	$86.86	$120.46	$161.42	$426.64
Liberty						
Direct	$0.00	$0.00	$0.00	$1.27	$5.78	$8.09
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.16	$0.75	$1.05
Total	$0.00	$296.17	$754.50	$1,047.81	$1,408.66	$3,715.06
Lost Income ($millions)						
County	2010	2020	2030	2040	2050	2060
Harris						
Direct	$0.00	$187.43	$477.47	$662.19	$887.32	$2,345.24
Secondary Regional Level Impacts	$0.00	$67.68	$172.41	$239.10	$320.40	$846.83
Liberty						

Direct	$0.00	$0.00	$0.00	$0.91	$4.13	$5.79
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.33	$1.49	$2.09
Total	$0	$255	$650	$903	$1,213	$3,200
Lost Jobs (numbers may not sum to figures in text due to rounding)						
	2010	2020	2030	2040	2050	2060
Harris						
Direct	0	436	1,110	1,539	2,063	5,452
Secondary Regional Level Impacts	0	1,355	3,453	4,789	6,417	16,961
Liberty						
Direct	0	0	0	2	10	13
Secondary Regional Level Impacts	0	0	0	7	30	42
Total	0	1,791	4,563	6,337	8,519	22,468
Lost Business Taxes ($millions)						
County	2010	2020	2030	2040	2050	2060
Harris						
Direct	$0.00	$33.56	$85.49	$118.56	$158.87	$419.89
Secondary Regional Level Impacts	$0.00	$12.12	$30.87	$42.81	$57.36	$151.62
Liberty						
Direct	$0.00	$0.00	$0.00	$0.16	$0.74	$1.04
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.06	$0.27	$0.37
Total	$0.00	$45.67	$116.35	$161.59	$217.24	$572.92
Source: Texas Water Development Board, Office of Water Resources Planning						

Mining

Table B-6: Distribution of Economic Impacts by County and Water User Groups: (Mining)						
Lost Output (Total Sales, $millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.53	$0.70	$0.95	$1.18	$1.43	$3.34
Secondary Regional Level Impacts	$0.04	$0.04	$0.06	$0.08	$0.10	$0.25
Chambers						
Direct	$8.85	$12.80	$15.61	$18.39	$21.17	$47.57
Secondary Regional Level Impacts	$4.80	$6.95	$8.47	$9.98	$11.49	$25.82
Fort Bend						
Direct	$0.00	$0.95	$2.78	$2.97	$3.02	$3.34
Secondary Regional Level Impacts	$0.00	$0.65	$1.90	$2.02	$2.06	$2.27
Galveston						
Direct	$9.12	$11.22	$13.03	$15.16	$17.08	$18.28
Secondary Regional Level Impacts	$0.71	$0.87	$1.02	$1.18	$1.33	$1.43
Harris						
Direct	$50.56	$64.48	$155.16	$180.73	$197.42	$228.93
Secondary Regional Level Impacts	$25.05	$31.92	$76.82	$89.48	$97.71	$113.34
Montgomery						
Direct	$1.96	$2.81	$6.85	$8.04	$8.91	$10.30

Secondary Regional Level Impacts	$1.38	$1.92	$4.66	$5.46	$6.02	$6.97
Total	$103.01	$135.31	$287.30	$334.67	$367.75	$461.84
Lost Income ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.29	$0.35	$0.50	$0.65	$0.82	$1.99
Secondary Regional Level Impacts	$0.02	$0.02	$0.03	$0.04	$0.06	$0.13
Chambers						
Direct	$2.52	$3.65	$4.45	$5.25	$6.04	$13.57
Secondary Regional Level Impacts	$2.50	$3.62	$4.42	$5.20	$5.99	$13.46
Fort Bend						
Direct	$0.00	$0.47	$1.38	$1.47	$1.50	$1.66
Secondary Regional Level Impacts	$0.00	$0.32	$0.94	$1.01	$1.02	$1.13
Galveston						
Direct	$1.46	$1.79	$2.08	$2.42	$2.73	$2.92
Secondary Regional Level Impacts	$0.36	$0.44	$0.51	$0.60	$0.67	$0.72
Harris						
Direct	$24.73	$31.53	$75.87	$88.37	$96.53	$111.95
Secondary Regional Level Impacts	$13.50	$17.20	$41.40	$48.22	$52.66	$61.08
Montgomery						
Direct	$1.19	$1.60	$3.87	$4.52	$4.97	$5.76
Secondary Regional Level Impacts	$0.51	$0.72	$1.76	$2.06	$2.28	$2.64
Total	$47.09	$61.73	$137.21	$159.82	$175.28	$217.01
Lost Jobs (numbers may not sum to figures in text due to rounding)						
	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	1	1	2	2	3	7
Secondary Regional Level Impacts	0	0	0	1	1	2
Chambers						
Direct	7	10	12	14	16	36
Secondary Regional Level Impacts	32	46	57	67	77	173
Fort Bend						
Direct	0	3	9	9	9	10
Secondary Regional Level Impacts	0	5	15	16	16	18
Galveston						
Direct	23	28	33	38	43	46
Secondary Regional Level Impacts	6	8	9	10	12	12
Harris						
Direct	100	127	306	357	390	452
Secondary Regional Level Impacts	197	251	605	704	769	892
Montgomery						
Direct	4	5	13	16	18	20
Secondary Regional Level Impacts	13	18	44	51	57	66
Total	382	503	1,104	1,285	1,409	1,733
Lost Business Taxes ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.03	$0.04	$0.06	$0.08	$0.10	$0.24
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.01	$0.01	$0.02
Chambers						
Direct	$0.40	$0.57	$0.70	$0.82	$0.95	$2.13

Secondary Regional Level Impacts	$0.39	$0.57	$0.69	$0.82	$0.94	$2.12
Fort Bend						
Direct	$0.00	$0.04	$0.13	$0.14	$0.14	$0.16
Secondary Regional Level Impacts	$0.00	$0.03	$0.10	$0.11	$0.11	$0.12
Galveston						
Direct	$0.17	$0.21	$0.25	$0.29	$0.32	$0.35
Secondary Regional Level Impacts	$0.04	$0.05	$0.06	$0.07	$0.08	$0.08
Harris						
Direct	$2.74	$3.49	$8.40	$9.78	$10.68	$12.39
Secondary Regional Level Impacts	$1.51	$1.93	$4.63	$5.40	$5.89	$6.84
Montgomery						
Direct	$0.06	$0.09	$0.22	$0.26	$0.29	$0.33
Secondary Regional Level Impacts	$0.03	$0.05	$0.12	$0.15	$0.17	$0.19
Total	$5.38	$7.08	$15.37	$17.91	$19.68	$24.96

Source: Texas Water Development Board, Office of Water Resources Planning

Irrigation

Table B-7: Distribution of Economic Impacts by County and Water User Groups: (Irrigation)

Lost Sales, $millions)

County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$4.13	$3.85	$3.86	$3.86	$3.86	$3.86
Secondary Regional Level Impacts	$5.50	$5.20	$5.22	$5.22	$5.22	$5.22
Chambers						
Direct	$0.33	$0.33	$0.33	$0.33	$0.33	$0.33
Secondary Regional Level Impacts	0.034	0.0345	0.035	0.035	0.035	0.035
Harris						
Direct	$3.63	$3.44	$3.45	$3.45	$3.45	$3.45
Secondary Regional Level Impacts	$5.44	$5.16	$5.18	$5.18	$5.18	$5.18
Galveston						
Direct	$0.77	$0.74	$0.70	$0.70	$0.70	$0.70
Secondary Regional Level Impacts	$0.10	$0.09	$0.09	$0.09	$0.09	$0.09
Liberty						
Direct	$0.16	$0.17	$0.18	$0.18	$0.18	$0.18
Secondary Regional Level Impacts	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
San Jacinto						
Direct	$0.04	$0.04	$0.04	$0.04	$0.04	$0.04
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Waller						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$20.15	$19.09	$19.12	$19.12	$19.12	$19.12

Lost Income ($millions)

County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$1.71	$1.58	$1.58	$1.58	$1.58	$1.58
Secondary Regional Level Impacts	$2.07	$1.96	$1.96	$1.96	$1.96	$1.96

Chambers						
Direct	$0.23	$0.23	$0.23	$0.23	$0.23	$0.23
Secondary Regional Level Impacts	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Harris						
Direct	$1.36	$1.29	$1.29	$1.29	$1.29	$1.29
Secondary Regional Level Impacts	$2.04	$1.94	$1.94	$1.94	$1.94	$1.94
Galveston						
Direct	$0.08	$0.08	$0.08	$0.08	$0.08	$0.08
Secondary Regional Level Impacts	$0.05	$0.05	$0.05	$0.05	$0.05	$0.05
Liberty						
Direct	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Secondary Regional Level Impacts	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
San Jacinto						
Direct	$0.004	$0.004	$0.004	$0.004	$0.004	$0.004
Secondary Regional Level Impacts	$0.002	$0.002	$0.002	$0.002	$0.002	$0.002
Waller						
Direct	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Secondary Regional Level Impacts	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$7.59	$7.19	$7.20	$7.20	$7.20	$7.20
Lost Jobs						
	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	23	21	21	21	21	21
Secondary Regional Level Impacts	14	14	15	15	15	15
Chambers						
Direct	9	9	9	9	9	9
Secondary Regional Level Impacts	0	0	0	0	0	0
Harris						
Direct	9	9	9	9	9	9
Secondary Regional Level Impacts	14	14	14	14	14	14
Galveston						
Direct	12	12	11	11	11	11
Secondary Regional Level Impacts	1	1	1	1	1	1
Liberty						
Direct	3	3	3	3	3	3
Secondary Regional Level Impacts	0	0	0	0	0	0
San Jacinto						
Direct	1	1	1	1	1	1
Secondary Regional Level Impacts	0	0	0	0	0	0
Waller						
Direct	0	0	0	0	0	0
Secondary Regional Level Impacts	0	0	0	0	0	0
Total	86	84	84	84	84	84
Lost Business Taxes ($millions)						
County	2010	2020	2030	2040	2050	2060
Brazoria						
Direct	$0.117	$0.107	$0.107	$0.107	$0.107	$0.107
Secondary Regional Level Impacts	$0.121	$0.115	$0.115	$0.115	$0.115	$0.115
Chambers						
Direct	$0.026	$0.026	$0.026	$0.026	$0.026	$0.026
Secondary Regional Level Impacts	$0.002	$0.002	$0.002	$0.002	$0.002	$0.002
Harris						
Direct	$0.078	$0.075	$0.075	$0.075	$0.075	$0.075

Secondary Regional Level Impacts	$0.117	$0.113	$0.113	$0.113	$0.113	$0.113
Galveston						
Direct	$0.008	$0.008	$0.008	$0.008	$0.008	$0.008
Secondary Regional Level Impacts	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005
Liberty						
Direct	$0.002	$0.002	$0.002	$0.002	$0.002	$0.002
Secondary Regional Level Impacts	$0.001	$0.001	$0.001	$0.001	$0.001	$0.001
San Jacinto						
Direct	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Secondary Regional Level Impacts	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Waller						
Direct	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Secondary Regional Level Impacts	$0.000	$0.000	$0.000	$0.000	$0.000	$0.000
Total	$0.478	$0.455	$0.455	$0.455	$0.455	$0.455

Source: Texas Water Development Board, Office of Water Resources Planning

Attachment C: Allocation of Economic Impacts by River Basin

Tables C-1 through C-6 distribute regional economic and social impacts by major river basin. Impacts were allocated based on distribution of water shortages among counties. For instance, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin then impacts were split equally among the two basins.

Manufacturing

Table C-1: Distribution of Impacts among Major River Basins (Manufacturing Uses)

Lost Sales ($millions)

Basin	2010	2020	2030	2040	2050	2060
Brazos	$4,162.79	$5,784.75	$8,406.69	$10,745.76	$11,511.74	$11,251.09
Brazos-Colorado	$0.03	$0.04	$0.07	$0.11	$0.16	$0.22
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$4.88	$18.60	$47.83	$87.59	$148.72	$290.08
San Jacinto-Brazos	$695.62	$1,019.89	$1,559.31	$2,050.38	$2,216.32	$2,086.25
Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity-San Jacinto	$262.79	$462.63	$867.63	$1,505.42	$2,416.27	$4,365.31
Total	$5,126.11	$7,285.90	$10,881.53	$14,389.25	$16,293.22	$17,992.96

Lost Income ($millions)

Basin	2010	2020	2030	2040	2050	2060
Brazos	$2,037.94	$2,930.79	$4,517.25	$5,884.24	$6,642.49	$7,279.23
Brazos-Colorado	$1,654.96	$2,326.94	$3,489.87	$4,394.29	$4,693.15	$4,551.74
Colorado	$0.01	$0.02	$0.03	$0.05	$0.07	$0.09
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto-Brazos	$1.94	$7.48	$19.85	$35.82	$60.63	$117.35
Trinity	$276.55	$410.26	$647.31	$838.47	$903.56	$844.01
Trinity-San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Job Losses (numbers may not sum to figures in text due to rounding)

	2010	2020	2030	2040	2050	2060
Basin						
Brazos	18,731	26,190	40,055	49,589	52,927	51,052
Brazos-Colorado	0	0	0	1	1	1
Colorado	0	0	0	0	0	0
Neches	0	0	0	0	0	0
Neches-Trinity	0	0	0	0	0	0
San Jacinto	22	84	228	404	684	1,316
San Jacinto-Brazos	3,130	4,618	7,430	9,462	10,190	9,466
Trinity	0	0	0	0	0	0
Trinity-San Jacinto	1,182	2,095	4,134	6,947	11,109	19,808
Total	23,066	32,987	51,847	66,402	74,911	81,644

Lost Business Taxes ($millions)

Basin	2010	2020	2030	2040	2050	2060

Brazos	$93.92	$127.10	$172.01	$227.86	$245.73	$244.84
Brazos-Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.11	$0.41	$0.98	$1.86	$3.17	$6.31
San Jacinto-Brazos	$15.69	$22.41	$31.90	$43.48	$47.31	$45.40
Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity-San Jacinto	$5.93	$10.16	$17.75	$31.92	$51.58	$95.00
Total	$115.65	$160.09	$222.65	$305.12	$347.79	$391.55

Source: Texas Water Development Board, Office of Water Resources Planning

Municipal

Table C-2: Distribution of Regional Impacts among Major River Basins
(Municipal Uses including Water Intensive Commercial Businesses, Domestic Uses and Horticultural Industry and Water Utilities)

Lost Sales ($millions)

Basin	2010	2020	2030	2040	2050	2060
Brazos	$60.86	$115.08	$199.46	$244.25	$299.97	$384.36
Brazos-Colorado	$7.60	$11.40	$15.10	$15.69	$16.37	$18.08
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.18	$0.25	$0.29	$0.27	$0.25	$0.25
San Jacinto	$147.81	$859.89	$1,698.80	$2,087.53	$2,488.97	$3,067.44
San Jacinto-Brazos	$57.98	$113.68	$217.22	$293.51	$383.39	$507.59
Trinity	$3.63	$6.09	$8.55	$9.26	$9.81	$10.93
Trinity-San Jacinto	$2.01	$3.52	$5.17	$5.83	$6.38	$7.31
Total	$280.07	$1,109.91	$2,144.58	$2,656.34	$3,205.14	$3,995.95

Lost Income ($millions)

Basin	2010	2020	2030	2040	2050	2060
Brazos	$77.63	$125.56	$212.58	$271.27	$353.17	$454.05
Brazos-Colorado	$9.69	$12.44	$16.09	$17.43	$19.27	$21.36
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.23	$0.27	$0.31	$0.30	$0.29	$0.29
San Jacinto	$188.55	$938.22	$1,810.59	$2,318.46	$2,930.35	$3,623.61
San Jacinto-Brazos	$73.96	$124.03	$231.52	$325.97	$451.38	$599.62
Trinity	$4.64	$6.64	$9.11	$10.28	$11.55	$12.91
Trinity-San Jacinto	$2.56	$3.84	$5.51	$6.47	$7.51	$8.64
Total	$357.26	$1,211.01	$2,285.71	$2,950.18	$3,773.52	$4,720.48

Job Losses (numbers may not sum to figures in text due to rounding)

Basin	2010	2020	2030	2040	2050	2060
Brazos	963	2,001	3,692	4,654	6,075	7,902
Brazos-Colorado	120	198	279	299	331	372
Colorado	0	0	0	0	0	0
Neches	0	0	0	0	0	0
Neches-Trinity	3	4	5	5	5	5
San Jacinto	2,339	14,953	31,444	39,774	50,406	63,066
San Jacinto-Brazos	917	1,977	4,021	5,592	7,764	10,436
Trinity	58	106	158	176	199	225
Trinity-San Jacinto	32	61	96	111	129	150
Total	4,432	19,301	39,695	50,611	64,909	82,156

Lost Business Taxes ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$2.49	$5.27	$9.67	$11.78	$14.75	$18.38
Brazos-Colorado	$0.31	$0.52	$0.73	$0.76	$0.80	$0.86
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
San Jacinto	$6.04	$39.37	$82.37	$100.65	$122.36	$146.66
San Jacinto-Brazos	$2.37	$5.20	$10.53	$14.15	$18.85	$24.27
Trinity	$0.15	$0.28	$0.41	$0.45	$0.48	$0.52
Trinity-San Jacinto	$0.08	$0.16	$0.25	$0.28	$0.31	$0.35
Total	$11.44	$50.81	$103.98	$128.07	$157.57	$191.05
Source: Texas Water Development Board, Office of Water Resources Planning						

Mining

Table C-3: Distribution of Impacts among Major River Basins (Mining Uses)						
Lost Sales ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$1.40	$1.71	$3.34	$3.80	$4.03	$4.95
Brazos-Colorado	$4.55	$5.90	$12.46	$14.96	$17.37	$23.05
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$1.89	$2.40	$4.76	$5.45	$5.92	$7.35
San Jacinto	$6.14	$9.75	$21.44	$24.57	$26.64	$32.98
San Jacinto-Brazos	$0.57	$2.66	$16.50	$19.27	$21.49	$27.43
Trinity	$68.57	$87.67	$175.46	$202.66	$220.84	$274.80
Trinity-San Jacinto	$19.89	$25.22	$53.34	$63.96	$71.46	$91.27
Total	$103.01	$135.31	$287.30	$334.67	$367.75	$461.84
Lost Income ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.64	$0.78	$1.60	$1.82	$1.92	$2.33
Brazos-Colorado	$2.08	$2.69	$5.95	$7.14	$8.28	$10.83
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.87	$1.10	$2.27	$2.60	$2.82	$3.45
San Jacinto	$2.81	$4.45	$10.24	$11.73	$12.70	$15.50
San Jacinto-Brazos	$0.26	$1.21	$7.88	$9.20	$10.24	$12.89
Trinity	$31.34	$40.00	$83.80	$96.78	$105.25	$129.13
Trinity-San Jacinto	$9.09	$11.51	$25.47	$30.54	$34.06	$42.89
Total	$47.09	$61.73	$137.21	$159.82	$175.28	$217.01
Job Losses (numbers may not sum to figures in text due to rounding)						
	2010	2020	2030	2040	2050	2060
Basin						
Brazos	5	6	13	15	15	19
Brazos-Colorado	17	22	48	57	67	87
Colorado	0	0	0	0	0	0
Neches	0	0	0	0	0	0
Neches-Trinity	7	9	18	21	23	28
San Jacinto	23	36	82	94	102	124

San Jacinto-Brazos	2	10	63	74	82	103
Trinity	254	326	674	778	846	1,031
Trinity-San Jacinto	74	94	205	246	274	343
Total	382	503	1,104	1,285	1,409	1,733
Lost Business Taxes ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.07	$0.09	$0.18	$0.20	$0.22	$0.27
Brazos-Colorado	$0.24	$0.31	$0.67	$0.80	$0.93	$1.25
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.10	$0.13	$0.25	$0.29	$0.32	$0.40
San Jacinto	$0.32	$0.51	$1.15	$1.31	$1.43	$1.78
San Jacinto-Brazos	$0.03	$0.14	$0.88	$1.03	$1.15	$1.48
Trinity	$3.58	$4.59	$9.39	$10.85	$11.82	$14.85
Trinity-San Jacinto	$1.04	$1.32	$2.85	$3.42	$3.82	$4.93
Total	$5.38	$7.08	$15.37	$17.91	$19.68	$24.96
Source: Texas Water Development Board, Office of Water Resources Planning						

Steam-Electric

Table C-4: Distribution of Impacts among Major River Basins (Steam-Electric Uses)						
Lost Sales ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Brazos-Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$296.17	$754.50	$1,047.81	$1,408.66	$3,715.06
San Jacinto-Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity-San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$0.00	$296.17	$754.50	$1,047.81	$1,408.66	$3,715.06
Lost Income ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Brazos-Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$255.10	$649.88	$902.53	$1,213.34	$3,199.95
San Jacinto-Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity-San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$0.00	$255.10	$649.88	$902.53	$1,213.34	$3,199.95
Job Losses (numbers may not sum to figures in text due to rounding)						
	2010	2020	2030	2040	2050	2060
Basin						
Brazos	0	0	0	0	0	0
Brazos-Colorado	0	0	0	0	0	0
Colorado	0	0	0	0	0	0

Neches	0	0	0	0	0	0
Neches-Trinity	0	0	0	0	0	0
San Jacinto	0	1,791	4,563	6,337	8,519	22,468
San Jacinto-Brazos	0	0	0	0	0	0
Trinity	0	0	0	0	0	0
Trinity-San Jacinto	0	0	0	0	0	0
Total	0	1,791	4,563	6,337	8,519	22,468
Lost Business Taxes ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Brazos-Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$45.67	$116.35	$161.59	$217.24	$572.92
San Jacinto-Brazos	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Trinity-San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	$0.00	$45.67	$116.35	$161.59	$217.24	$572.92
Source: Texas Water Development Board, Office of Water Resources Planning						

Irrigation

Table C-5: Distribution of Impacts among Major River Basins (Irrigation)						
Lost Sales ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.60	$0.56	$0.52	$0.48	$0.45	$0.41
Brazos-Colorado	$0.96	$0.98	$0.97	$0.94	$0.90	$0.86
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$1.16	$1.28	$1.28	$1.24	$1.15	$1.05
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.07	$0.37
San Jacinto-Brazos	$13.39	$11.69	$11.25	$10.95	$10.80	$10.46
Trinity	$0.17	$0.26	$0.75	$1.27	$1.78	$2.31
Trinity-San Jacinto	$3.87	$4.32	$4.35	$4.24	$3.96	$3.66
Total	$20.15	$19.09	$19.12	$19.12	$19.12	$19.12
Lost Income ($millions)						
Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.23	$0.21	$0.19	$0.18	$0.17	$0.16
Brazos-Colorado	$0.36	$0.37	$0.36	$0.35	$0.34	$0.32
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.44	$0.48	$0.48	$0.47	$0.43	$0.40
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.03	$0.14
San Jacinto-Brazos	$5.05	$4.41	$4.23	$4.12	$4.07	$3.94
Trinity	$0.06	$0.10	$0.28	$0.48	$0.67	$0.87
Trinity-San Jacinto	$1.46	$1.63	$1.64	$1.60	$1.49	$1.38
Total	$7.59	$7.19	$7.20	$7.20	$7.20	$7.20
Job Losses (numbers may not sum to figures in text due to rounding)						

	2010	2020	2030	2040	2050	2060
Basin						
Brazos	3	2	2	2	2	2
Brazos-Colorado	4	4	4	4	4	4
Colorado	0	0	0	0	0	0
Neches	5	6	6	5	5	5
Neches-Trinity	0	0	0	0	0	0
San Jacinto	0	0	0	0	0	2
San Jacinto-Brazos	57	51	50	48	48	46
Trinity	1	1	3	6	8	10
Trinity-San Jacinto	17	19	19	19	17	16
Total	86	84	84	84	84	84

Lost Business Taxes ($millions)

Basin	2010	2020	2030	2040	2050	2060
Brazos	$0.01	$0.01	$0.01	$0.01	$0.01	$0.01
Brazos-Colorado	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Colorado	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Neches	$0.02	$0.03	$0.03	$0.02	$0.02	$0.02
Neches-Trinity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
San Jacinto	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
San Jacinto-Brazos	$0.26	$0.23	$0.22	$0.22	$0.21	$0.21
Trinity	$0.00	$0.01	$0.01	$0.02	$0.03	$0.05
Trinity-San Jacinto	$0.08	$0.08	$0.09	$0.08	$0.08	$0.07
Total	$0.39	$0.38	$0.38	$0.38	$0.38	$0.38

Source: Texas Water Development Board, Office of Water Resources Planning

Appendix 4F

Reuse Technical Memo

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Introduction

The Region H Water Planning Group submitted a grant application in response to a request for proposals issued by the Texas Water Development Board (TWDB) on January 21, 2004. The grant application addressed changed conditions affecting the Regional Water Plan. The grant application was approved, and the existing contract between TWDB and the San Jacinto River Authority was amended to include this supplemental study, *Wastewater Reclamation for Municipal Irrigation*.

The purpose of this study is to evaluate using reclaimed wastewater to meet projected water shortages in Region H. This study investigates supplementing existing and future water supplies that currently serve municipal irrigation demands within Region H with reclaimed wastewater. The methods, costs, and benefits of using reclaimed wastewater for landscape irrigation and other non-potable uses are discussed. The use of reclaimed wastewater could also potentially supplement agricultural water supplies; however, that issue is not addressed in this study.

The areas within Region H evaluated for using reclaimed wastewater were Brazoria, Fort Bend, Harris, and Montgomery Counties—the major areas of Houston's suburban growth. Although the study focused on these four counties, the study results are applicable to all counties within Region H to some degree.

The study's scope of work consisted of the following tasks.

1. Obtain and review previous studies related to wastewater reuse performed in the region.

2. Develop a comprehensive list of golf courses within and in proximity of the service boundaries of existing water user groups (WUGs) or WUG groupings. Correlate the number of golf courses to the current WUG population. From the correlation, determine the estimated future number of golf courses and future golf course water demands within the WUGs based on the expected population growth.

3. Identify areas within the region that might benefit from a reuse program and where reuse would be most feasible and cost effective.

4. Based on existing water usage information from golf courses and master-planned communities (MPCs) in Region H, evaluate the relative water demands required to meet the irrigation needs (golf courses and common areas) of Brazoria, Fort Bend, Harris, and Montgomery Counties.

5. Evaluate the wastewater treatment plant (WWTP) permitted effluent limitations from the four-county area for suitability for reuse. Determine costs associated with upgrading WWTPs to meet the more stringent effluent criteria for reuse.

6. Develop cost estimates for implementing reuse as a strategy in the four-county area based on information developed from the previous studies.

Using reclaimed wastewater as a supplemental water supply was also considered for non-municipal irrigation such as nurseries and turf farms.

Previous Reuse Studies

Several studies involving wastewater reclamation were conducted for specific projects in the Houston metropolitan area. These studies focused on using treated WWTP effluent for various applications including irrigation. The studies, which were identified and reviewed as part of this study, are listed below.

- Fairfield Village 1990 (Turner Collie & Braden [TCB])
- Cinco Ranch 1992 (TCB)
- Cinco Ranch 2005 (TCB)
- Cinco Ranch Southwest 2004 (TCB)
- Copperfield Area (Harris County MUD 208) (TCB)

Previous reuse study findings are summarized below.

Fairfield Village

A 1990 study of the Fairfield Village MPC of nearly 2,600 acres in northwestern Harris County examined reuse for irrigation of common, commercial, and residential areas plus fire protection. This study assumed an application rate of 29.77 inches of effluent per year over irrigated spaces. This application rate was determined by an analysis of soil and climate conditions in the community, as specified by 30 Texas Administrative Code §210. The distribution system to supply this water required a capacity of nearly 5 million gallons per day (mgd).

Depending on the standard used to design the distribution network, costs of effluent ranged from $2.35 to $1.85 per 1,000 gallons. The higher price was for a system meeting Texas Department of Health (TDH), now the Texas Commission on Environmental Quality (TCEQ), standards for potable water systems. The lower cost was for a system meeting lower standards. This study was an example of the upper limit of integration for effluent reuse in municipal irrigation and would be most applicable to new developments.

Cinco Ranch

A 1992 study of the Cinco Ranch MPC in western Harris and eastern Fort Bend Counties is representative of integrating reuse into an already existing community. This study examined three options for effluent reuse in the 5,000-acre development: (1) application on the common areas along Mason Road and Westheimer Parkway, (2) the irrigation of the underdeveloped areas of Cinco Ranch Golf Club, and (3) application for rice irrigation on a farm approximately 4.2 miles from Cinco Ranch. These proposed systems had capacities of less than 1 mgd, and the cost of effluent from these alternatives was found to be $1.20, $0.57, and $0.78 per 1,000 gallons, respectively. The low cost of the golf course alternative is due to the limited distribution infrastructure required to convey effluent to a single point near the wastewater plant for application. The maximum allowable application rate for residential

areas in this study was determined to be 30.19 inches. The application rate for agricultural use was higher at 72.78 inches per year. The same application rates determined from this 2002 study were used for the Cinco Ranch Southwest MPC study in 2004, though no unit costs were determined for this development. The capital cost for the 2004 system is representative of reuse system installation in a community that is still under development rather than the retrofit of an existing MPC such as Cinco Ranch.

In 2005 another study was conducted for the Cinco Ranch MPC that examined the possibility of supplying reuse water to common areas, golf courses, and amenity lakes in the development. Two alternatives provided treated effluent directly to irrigation systems in common areas along roads as well as reservoirs where water could be pumped to sprinkler systems on an as-needed basis. The costs for effluent delivered from these systems were estimated at $0.98 and $1.39 per 1,000 gallons. The lower cost was achieved because of the connection to two golf courses. These two golf courses provided major water customers for the system with each course receiving water at a distinct take-point. Another alternative, a system that only provided water to reservoirs throughout the community, including both golf courses mentioned above, was estimated to have an even lower cost of $0.91 per 1,000 gallons of effluent. This last system, Alternative 3, would not be connected directly to irrigation systems that would require high pressure for operation and a dedicated supply of water.

Table 1 summarizes these studies. Capital costs varied considerably depending on the extent of the reuse alternative examined and the size of the MPCs served. Unit costs of delivering treated effluent water were lowest for scenarios that provided water to large customers such as golf courses or other storage reservoirs. Application rates for areas where the public would be expected to come in contact with wastewater effluent-irrigated watered grounds were approximately 30 inches per year. However, this application rate would be expected to vary somewhat throughout the region depending on climate and soil characteristics.

Table 1
Effluent Reuse Studies in the Houston Metropolitan Area

Alternative	Master-Planned Community (MPC)	Year of Study	MPC Area (ac)	Effluent Capacity (mgd)	Capital Cost (2Q2002)*	Cost/1000 gallons (2Q2002)*	Application rate (in/yr)
1	Fairfield	1990	2,595	4.9	$38,920,082	$2.35	29.77
2	Fairfield	1990	2,595	4.7	$24,266,141	$1.85	29.77
3	Cinco Ranch	1992	5,402	0.2	$674,084	$1.20	30.19
4	Cinco Ranch	1992	5,402	0.4	$625,200	$0.57	30.19
5	Cinco Ranch SW	2004	1,900	0.3	$2,110,903	N/A	30.19
6	Cinco Ranch	2005	5,402	0.6	$2,364,036	$0.98	N/A
7	Cinco Ranch	2005	5,402	0.4	$2,414,789	$1.39	N/A
8	Cinco Ranch	2005	5,402	0.7	$2,532,323	$0.91	N/A

Description of Alternatives

1 System was designed to meet TCEQ standards for potable water systems.
2 System was designed to meet standards lower than those set by the TCEQ for potable water systems.
3 Provides reuse water to common areas along Mason Road and Westheimer Parkway through direct sprinkler connections.
4 Provides reuse water to the Cinco Ranch Golf Club.
5 Supplies reuse water to irrigate common areas through direct sprinkler connections and to maintain an amenity lake.
6 Provides reuse water to two golf courses, oxbow lakes, an irrigation reservoir for common areas, and direct connections to common area irrigation systems.
7 Provides reuse water to one golf course, oxbow lakes and amenity ponds, an irrigation reservoir for common areas, and direct connections to common area irrigation systems.
8 Provides reuse water to two golf courses, oxbow lakes, and an irrigation reservoir for common areas.

* Data from second quarter 2002.

Copperfield

A 2003 study was conducted for the Copperfield subdivision to determine the availability of effluent for irrigation and the potential non-potable demands that could be met by using reclaimed wastewater. Hearthstone Country Club already received reclaimed wastewater from the Copperfield WWTP. Other municipal irrigation demands, which were currently served by potable supplies, were also considered for conversion to reclaimed WWTP effluent. This study examined the amount of the potable water irrigation demand that was used for park areas and esplanades and determined that the application rate of water for esplanades was considerably higher than that for parks. These results are shown in *Table 3*.

Table 3
Irrigation Demands and Application Rates for Copperfield Subdivision[1]

Irrigation Demand	Demand (mgd)	Application Rate (in/yr)
Hearthstone Country Club	0.3	-
Potable Irrigation[2]	4.45	-
Park Area Irrigation[3]	-	19.18
Median Area Irrigation[3]	-	110.02

[1] Data obtained from *Copperfield Area Wastewater Treatment Plant Effluent Reuse Study*.
[2] Average potable water irrigation demands for MUD 162, 163, 179, 186, and 208.
[3] Included in total potable irrigation demand.

Potential Reuse Demands

Several potential applications were examined where effluent could be used in lieu of other water supplies. Three major categories of municipal irrigation demands were identified as viable opportunities for reducing demands on conventional water supply sources. These were studied in additional detail. The municipal irrigation uses that were selected for further evaluation in this study were:

- Golf course irrigation
- Green space irrigation (esplanades, green belts, and parks)
- Water to maintain levels in amenity lakes

This report focuses on the use of treated WWTP effluent to meet non-potable municipal irrigation water demands in MPCs rather than other traditional types of communities. The structure of MPCs is beneficial to implementing such a program in the way that they tend to place important components of a reuse system together in close proximity: (1) Supplies from municipal WWTPs and (2) Numerous water-intensive amenities such as ponds, irrigated green spaces, and golf courses.

Those MPCs located in counties with subsidence districts would also benefit from the ability to apply for groundwater credits for reducing their water demands through the reclamation of wastewater. These credits could be used in the future to offset under-conversion to surface water, if directed by a groundwater regulatory plan.

Newly developed MPCs, currently defined as growth in County-Other in the Region H Water Plan, would be able to more easily benefit from reclaimed water use. This is because the community can be designed from the beginning with effluent reuse as a water supply for non-potable uses. This applies not only to the layout and design of distribution and storage systems but also to the design of WWTPs. These WWTPs can be designed within the developments to supply treated effluent at standards high enough for use in the maximum number of applications.

Percentage of Growth in MPCs

For the purpose of this study, the focus was the reduction of demands associated with growth in County-Other populations. More specifically, it was assumed that that growth in County-Other that would benefit from reuse programs would occur in MPCs, which typically have significant municipal irrigation demands. The population in County-Other within the four counties is expected to increase from almost 700,000 in 2000 to 2.5 million in 2060, including growth within the NHCRWA WUG.

The development of MPCs represents a prime opportunity for the application of effluent reuse. These developments have water consumptive amenities such as golf courses, green spaces, and lakes which are located near a population of known size and, therefore, a reliable effluent source. Many of these communities have been recently designed and built, and a potential exists to integrate wastewater reuse into new and existing development without the need for significant retrofit.

To determine the percentage of growth in MPCs, data from Fort Bend County was used to determine the percentage of county population within existing MPCs. Fort Bend County contains more MPCs than any other county in the state and is representative of the latest trends in residential development. The population of MPCs in Fort Bend County for 2004 were summed and compared to the year 2004 population for Fort Bend County. (The 2004 population of Fort Bend County was calculated by linearly interpolating from the year 2000 and 2010 county populations as projected by TWDB.) As shown in *Table 4*, this produced a percentage that could be applied to growth in County-Other to determine the expected growth in these communities.

Table 4
Fort Bend County MPC and Total Population

Year 2004 MPC Population[1]	104,804
Year 2004 Total Fort Bend County Population[2]	408,700
MPC Percentage of Total Population	**25.64%**

[1] Fort Bend Economic Development Council website, accessed August, 2005.
[2] Interpolated from year 2000 and year 2010 population as projected by TWDB.

This information developed was used to determine the percentage of County-Other growth that would have green space and amenity lake demands applied to find the total potential demands for WWTP effluent. This same percentage was also applied to find the total

amount of wastewater flows that would be produced by the portion of county populations within MPCs, which is discussed in greater detail below.

Golf Courses

A list of golf courses for Brazoria, Fort Bend, Harris, and Montgomery Counties was developed based on materials obtained from the Houston Golf Association and other sources. To develop the future expected number of golf courses in the study area, the year 2000 county populations were divided by the existing number of golf course holes. This ratio developed a population per golf hole relationship. This would then be applied to County-Other growth on a county-by-county basis to determine the number of new golf holes expected in each county. The new golf holes were then converted to equivalent 18-hole golf courses. *Tables 5* and *6* outline the ratio of persons per golf hole and estimated number of new golf courses for each county. *Exhibit 1* indicates existing golf courses located in the study area.

Table 5
County Ratio of Persons Per Golf Hole

County	Existing Golf Holes	2000 County Population	2000 Population Per Golf Hole
Brazoria	117	241,767	2,066
Fort Bend	366	354,452	968
Harris[1]	1,431	3,400,578	2,376
Montgomery	450	293,768	653
Total	2,364	4,290,565	

[1] Includes golf holes located within the service area of NHCRWA.

Table 6
Estimated Number of New Courses by County

County	County-Other Population		Total New Golf Holes		Equivalent Golf Courses		
	2000	2060	2030	2060	New 2060	Existing 2000	Total 2060
Brazoria	65,266	101,592	6	18	1	7	8
Fort Bend	38,168	503,197	163	480	27	20	47
Harris[1]	486,532	1,184,715	127	294	16	80	96
Montgomery	99,788	703,682	288	925	51	25	76
Total	689,754	2,493,186	583	1,717	95	132	227

[1] County-Other population in Harris County includes population within the NHCRWA WUG.

Typical golf course irrigation demands were determined on a per-golf-hole basis by examining existing courses in Fort Bend and Montgomery Counties and available data from Fort Bend Subsidence District (FBSD) and the Lone Star Groundwater Conservation District (LSGCD). Wells located within a 0.75-mile vicinity of golf courses, identified above, were

selected and reviewed in a geographical information system (GIS). Annual production information from wells confirmed to be associated with the listed golf courses were compiled, along with the number of holes at each course, to determine typical irrigation demand per hole for each golf course. The average demands for each course were averaged to find a total irrigation demand per hole of 12.31 acre-foot per year (ac-ft/yr). The irrigation demands for each golf course used to determine typical golf course irrigation demands are shown below in *Table 7*.

Table 7
Average Golf Course Irrigation Demands – Fort Bend and Montgomery Counties

	Golf Course	Holes	Pumpage (ac-ft)[1]					Max Pumpage	Max Pumpage Per Hole
			2004	2003	2002	2001	2000	(ac-ft)	(ac-ft)
Fort Bend County	Cinco Ranch Golf Club	18	194	242	273	241	399	399	22.19
	Club at Falcon Point	18	164	258	219	0	346	346	19.25
	Fort Bend Country Club	18	18	23	19	11	27	27	1.52
	Greatwood Golf Club	18	227	145	216	152	275	275	15.28
	Houstonian Golf Club	18	223	302	366	234	485	485	26.93
	Meadowbrook Farm Golf Club	18	124	180	177	171	231	231	12.83
	Old Orchard Golf Club	27	51	76	76	83	142	142	5.25
	Pecan Grove Country Club	27	109	160	163	163	198	198	7.35
	River Pointe Golf Course	18	105	117	92	115	77	117	6.49
	Sweetwater Country Club	36	265	246	358	168	332	358	9.95
	Willowfork Country Club	18	137	83	224	0	251	251	13.96
	Willowisp Country Club	18	90	115	85	103	169	169	9.41
								Fort Bend County Average	12.53

	Golf Course	Holes	Annual Permitted Production (ac-ft)[2]	Max Pumpage	Max Pumpage Per Hole
				(ac-ft)	(ac-ft)
Mont-gomery County	April Sound Country Club	27	279	279	10.34
	The Links at Westfork	18	247	247	13.74
	TPC at the Woodlands	18	184	184	10.23
				Montgomery County Average	11.44
			Average Maximum Dry Weather (Fort Bend and Montgomery Counties)		12.31

[1] Pumpage is based on historical well pumpage, as reported by Fort Bend Subsidence District.
[2] Pumpage is based on well production, as reported by Lone Star Groundwater Conservation District.

The irrigation demand was applied to the expected number of new golf holes for Brazoria, Fort Bend, Harris, and Montgomery Counties to find the expected future golf course irrigation demand that could potentially be met by wastewater effluent. The expected 2060 new golf course demands are shown in *Table 8*.

Table 8
Irrigation Demands Associated With New Golf Course Development

County	Total New Golf Holes		Demands Per Golf Hole (ac-ft/yr)	New Irrigation Demands (ac-ft)	
	2030	2060		2030	2060
Brazoria	6	18	12.31	72	216
Fort Bend	163	480	12.31	2,006	5,911
Harris[1]	127	294	12.31	1,562	3,617
Montgomery	288	925	12.31	3,543	11,387
Total	583	1,717		7,182	21,132

[1] Includes increased demands within the NHCRWA WUG.

Green Space

To determine the expected future green space demands associated with typical MPCs, the following methodology was used. Areas of irrigated green space within existing MPCs were related to the total, ultimate development population of these same existing communities. This acreage was examined for both medians or green belts and parks and recreational areas. Information was obtained from the land plans for the Cinco Ranch and Greatwood MPCs and was analyzed in GIS to estimate the total acreage of areas designated for the development of green belts or parks. The total population for these communities at ultimate development was determined from the expected number of single family connections, as presented in the most recent master plans for the developments, and an assumed population per household of 3.2. This total population and green space acreage was used to find the per capita area of green space for each of the two communities. The results of this analysis are shown in *Table 9*.

Table 9
Per Capita Green Space Acreage for Cinco Ranch and Greatwood MPCs

Development Name Build-Out Population	Parks	Green Belt	Total Green Space	
	Area (ac)			Notes
	Area Per 1,000 Population (ac)			
Cinco Ranch	49	265	314	1
40,320	1.205	6.576	7.781	2
Greatwood	15	114	130	3
12,915	1.196	8.858	10.055	4
Average Area Per 1,000 Persons	1.200	7.717	8.918	

1 Does not include non-irrigated area bordering Barker Reservoir.
2 Build-out population data from Greater Fort Bend Economic Development Council.
3 Acreage does not include Brazos River frontage.
4 Build-out population data from Greater Fort Bend Economic Development Council.

The amount of water applied to these green spaces was determined with the use of potential evapotranspiration (PET) between the years 1954 and 2002, and rainfall data between the years 1940 and 2002, each provided by TWDB. Climate data from quadrant number 712 was used to determine the irrigation demand for Montgomery County, while data from quadrant 812 was used to represent the remaining counties. This data is presented in *Table 10* and was analyzed using a method presented by Richard Duble of the Texas Cooperative Extension Agency in *Water Management on Turfgrasses*.

Table 10
Annual PET, Rain, and Estimated Irrigation Demands[1]

Quadrant	Avg PET[2] (in)	Avg Rain[3] (in)	Runoff[4] (in)	Water Deficit[5] (in)	Irrigation Demand[5] (in)
712 (Montgomery County)	48.97	46.64	11.66	13.99	16.13
812 (Other Counties)	46.06	46.83	11.71	10.94	12.37
Total Average	47.52	46.74	11.69	12.47	14.25

[1] Methodology adapted from Duble.
[2] Data provided by TWDB, 1954-2002.
[3] Data provided by TWDB, 1940-2002.
[4] Assumes 25% of precipitation is runoff.
[5] Assumes no allowable stress.

The application rates were used along with the per capita green space acreage and projected population growth in MPCs to determine irrigation demand. This demand would be expected to accompany new residential development. A summary of this analysis for the years 2030 and 2060 is shown in *Table 11*.

Table 11
New Green Space Irrigation Demand Associated With Residential Development

County	County-Other Population			Green Space Acreage Per Capita (ac)	MPC Development %	Green Space Irrigation Application Rate (in)	Projected New Green Space Demand (ac-ft)	
	2000	2030	2060				2030	2060
Brazoria	65,266	77,326	101,592	0.0089	25.64	12.37	28	86
Fort Bend	38,168	196,004	503,197	0.0089	25.64	12.37	372	1,096
Harris[1]	486,532	788,004	1,184,715	0.0089	25.64	12.37	711	1,646
Montgomery	99,788	287,661	703,682	0.0089	25.64	16.13	577	1,856
Total	689,754	1,348,995	2,493,186				1,689	4,684

[1] County-Other population in Harris County includes the population within the NHCRWA WUG.

Amenity Lakes

Amenity lake demands were developed based on data obtained from existing MPCs in Fort Bend County. Specifically, the typical amenity lake demands were developed based on well pumpage data obtained from the Fort Bend Subsidence District for known communities. To relate well pumpage reports with communities of known population, named WUG populations were associated with wells in GIS to find a per capita demand for amenity lakes as shown in *Table 12*. *Exhibit 2* shows locations of known amenity lakes in Fort Bend County.

Table 12
Average Amenity Lake Demands for MPCs

WUG	2004 Amenity Lake Demand (ac-ft)	Population		2000 Per Capita Demand (ac-ft)	Per Capita Demand at Build-Out [1] (ac-ft)
		2000	2060		
Fort Bend County MUD 106	30.81	2,562	3,285	0.012	0.009
Fort Bend County MUD 111	25.76	3,315	3,315	0.008	0.008
Fort Bend County MUD 67	18.65	3,306	3,306	0.006	0.006
Fort Bend County MUD 69	17.28	1,701	1,701	0.010	0.010
Grand Lakes MUD 4	71.95	1,874	18,159	0.038	0.004
Sienna Plantation MUD 2	178.96	2,763	7,000	0.065	0.026
			Average Demand	0.023	0.010

[1] Build-out population based on TWDB population projections for year 2060.

A correlation between demands and population in MPCs was developed and applied to the new growth in County-Other. The percentage of total growth in MPCs was also applied to find the total potential demand for amenity lakes in each county, as shown in *Table 13*. For the purposes of this study, amenity lake demands in Fort Bend County were assumed to be consistent with those in the other counties included in this study.

Table 13
New Amenity Lake Demand Associated With Residential Development

County	County-Other Population			Per Capita Amenity Lake Demand (ac-ft/yr)	MPC Development (%)	Projected New Amenity Lake Demand (ac-ft)	
	2000	2030	2060			2030	2060
Brazoria	65,266	77,326	101,592	0.010	25.64	32	97
Fort Bend	38,168	196,004	503,197	0.010	25.64	421	1,242
Harris[1]	486,532	788,004	1,184,715	0.010	25.64	805	1,864
Montgomery	99,788	287,661	703,682	0.010	25.64	502	1,613
Total	689,754	1,348,995	2,493,186			1,760	4,816

[1] County-Other population in Harris County includes the population within the NHCRWA WUG.

Other Demands

Other potential demands exist for the use of treated wastewater effluent in many of these developing portions of Region H. Although large agricultural operations such as rice farming represent prime users for large volumes of effluent, many of these farms are being sold and developed into new residential developments. Therefore, they do not represent long-term customers that can guarantee the use of effluent far into the future. Additionally, irrigators are not subject to groundwater pumpage restrictions set forth by groundwater districts. More compact operations, such as nurseries, will likely continue operations despite surrounding development and may represent another alternative for conversion to effluent reuse. However, the locations of these businesses are not directly related to areas with increasing residential development as are other potential customers. For instance, amenity lakes and golf courses will be built near residential areas where treated effluent is available. Therefore, effluent reuse for these applications would have to be applied in very specific circumstances and could not be used as a general strategy for the entire region. Major agricultural wells in Fort Bend County are shown in *Exhibit 3*.

There is the potential for non-municipal irrigation users to benefit from the utilization of effluent reuse from a municipal WWTP. However, as groundwater remains available and unregulated, wastewater reuse for agricultural irrigators is not feasible based on economics.

The demands developed above should be able to be applied across the region to new growth and existing communities with currently undeveloped areas within their service boundaries.

The municipal irrigation demands developed using the methodologies described above can be seen in *Table 14*.

Table 14
New Effluent Demands Associated With Residential Development

County	Potential Reuse Application	Effluent Reuse Demands (ac-ft/yr)					
		2010	2020	2030	2040	2050	2060
Brazoria	Golf Courses	0	22	72	117	166	216
	Green Spaces	0	9	28	46	66	86
	Amenity Lakes	0	10	32	53	74	97
	Total	**0**	**41**	**132**	**216**	**306**	**399**
Fort Bend	Golf Courses	329	1,044	2,006	2,998	4,452	5,911
	Green Spaces	61	194	372	556	826	1,096
	Amenity Lakes	69	219	421	630	935	1,242
	Total	**459**	**1,457**	**2,800**	**4,184**	**6,213**	**8,249**
Harris[1]	Golf Courses	534	1,033	1,562	2,244	2,934	3,617
	Green Spaces	243	470	711	1,021	1,335	1,646
	Amenity Lakes	275	533	805	1,157	1,512	1,864
	Total	**1,052**	**2,036**	**3,077**	**4,421**	**5,781**	**7,127**
Montgomery	Golf Courses	1,077	1,868	3,543	5,498	8,223	11,387
	Green Spaces	176	305	577	896	1,340	1,856
	Amenity Lakes	153	265	502	779	1,164	1,613
	Total	**1,405**	**2,437**	**4,622**	**7,172**	**10,727**	**14,856**
Total Potential Reuse Demands		**2,917**	**5,972**	**10,631**	**15,994**	**23,027**	**30,631**

[1] Includes demands for the NHCRWA WUG.

Available Supply

The actual volume of demands that can be reduced with the application of WWTP effluent reuse is the lesser of the supply and the demand for expected County-Other growth in each county. This is because it is not reasonable to plan to supply effluent that cannot be guaranteed on a regular basis, during the periods of highest demand. Additionally, some communities will only be able to use treated effluent to meet a portion of their total water demands.

The methodology used to develop the available wastewater reuse supply to meet the projected municipal irrigation demand is described below.

Demands for effluent is highest during warm, dry, summer months when evaporation is at its highest and water use for irrigation is at a maximum. Without large volumes of storage, effluent supply is generally limited to the instantaneous discharge from WWTPs at their lowest rate of flow. To determine this, WWTP discharge records for Greatwood MPC

between the months of June and September of 2004 were examined. The total flows for each week during this period were summed, along with the recorded rainfall during this time. The average daily discharge rates for the five driest weeks were then averaged to find the average dry weather per capita flow for MPC developments as shown in *Table 15*.

Table 15
Average Dry Weather WWTP Flow Analysis for Greatwood MPC[1]

Week Number	Rainfall (in)	7-Day Average Flow		
		(mgd)	(gpd/connect)	(gpd/capita)
22	4.00	1.07	259.75	81.17
23	2.90	1.02	248.21	77.56
24	4.30	1.14	277.05	86.58
25	3.80	1.21	294.59	92.06
26	0.40	1.00	241.60	75.50
27	1.20	0.97	234.71	73.35
28	*0.00*	*0.91*	*221.14*	*69.11*
29	0.30	0.89	216.29	67.59
30	0.30	0.96	232.04	72.51
31	*0.00*	*0.92*	*221.67*	*69.27*
32	0.50	0.94	227.13	70.98
33	0.60	0.96	233.03	72.82
34	2.50	1.04	250.71	78.35
35	*0.00*	*0.93*	*223.41*	*69.81*
36	0.30	0.92	221.86	69.33
37	*0.00*	*0.92*	*222.34*	*69.48*
38	*0.00*	*0.93*	*224.68*	*70.21*
		Average of 5 Driest Weeks		**69.58**

[1] The five driest weeks are indicated by shaded, italicized text.

The resulting per capita wastewater flow was then applied to a portion of the growth in County-Other WUGs in each of the four counties corresponding to the expected growth within MPCs. The resulting flow rates are shown in *Table 16*. As shown in *Table 17*, only Montgomery County is expected to have a shortage of supply, rather than demand. This is largely due to the low population associated with each golf hole in Montgomery County but is also due to the increased irrigation demands determined for green spaces within the county. The total amount of potential reuse for Brazoria, Fort Bend, Harris, and Montgomery Counties is shown in *Table 18*.

Table 16
New Effluent Supplies Associated With Residential Development

County	County-Other Population			Per Capita Wastewater Discharge (gpd)*	MPC Development (%)	Annual Wastewater Flow From New Developments (ac-ft/yr)	
	2000	2030	2060			2030	2060
Brazoria	65,266	77,326	101,592	69.58	25.64	241	726
Fort Bend	38,168	196,004	503,197	69.58	25.64	3,154	9,292
Harris[1]	486,532	788,004	1,184,715	69.58	25.64	6,024	13,950
Montgomery	99,788	287,661	703,682	69.58	25.64	3,754	12,066
Total	689,754	1,348,995	2,493,186			13,172	36,033

[1] County-Other population in Harris County includes the population within the NHCRWA WUG.
* gpd is gallons per day.

Table 17
Supply and Demand Balance for Effluent Reuse

County	Potential Reuse Application	Effluent Reuse Demands (ac-ft/yr)					
		2010	2020	2030	2040	2050	2060
Brazoria	Golf Courses	0	22	72	117	166	216
	Green Spaces	0	9	28	46	66	86
	Amenity Lakes	0	10	32	53	74	97
	Total	**0**	**41**	**132**	**216**	**306**	**399**
Fort Bend	Golf Courses	329	1,044	2,006	2,998	4,452	5,911
	Green Spaces	61	194	372	556	826	1,096
	Amenity Lakes	69	219	421	630	935	1,242
	Total	**459**	**1,457**	**2,800**	**4,184**	**6,213**	**8,249**
Harris[1]	Golf Courses	534	1,033	1,562	2,244	2,934	3,617
	Green Spaces	243	470	711	1,021	1,335	1,646
	Amenity Lakes	275	533	805	1,157	1,512	1,864
	Total	**1,052**	**2,036**	**3,077**	**4,421**	**5,781**	**7,127**
Montgomery	Golf Courses	1,077	1,868	3,543	5,498	8,223	11,387
	Green Spaces	176	305	577	896	1,340	1,856
	Amenity Lakes	153	265	502	779	1,164	1,613
	Total	**1,405**	**2,437**	**4,622**	**7,172**	**10,727**	**14,856**
Total Potential Reuse Demands		**2,917**	**5,972**	**10,631**	**15,994**	**23,027**	**30,631**

County	Effluent Reuse Supply (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
Brazoria	0	75	241	394	556	726
Fort Bend	517	1,641	3,154	4,713	6,998	9,292
Harris	2,060	3,986	6,024	8,654	11,316	13,950
Montgomery	1,141	1,980	3,754	5,825	8,713	12,066
Total Potential Reuse Supplies	**3,718**	**7,682**	**13,172**	**19,586**	**27,583**	**36,033**

County	Effluent Surplus/*(Shortage)* (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
Brazoria	0	34	108	177	250	327
Fort Bend	58	184	354	529	785	1,043
Harris	1,007	1,950	2,946	4,233	5,535	6,823
Montgomery	*(264)*	*(458)*	*(868)*	*(1,347)*	*(2,015)*	*(2,790)*
Total	**802**	**1,710**	**2,541**	**3,592**	**4,556**	**5,402**

[1] Includes demands and supplies for the NHCRWA WUG.

Table 18
Potential Reduction in Total Water Demand From Municipal Effluent Reuse

County	Potential Demand Reduction From Reuse (ac-ft/yr)					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazoria	0	41	132	216	306	399
Fort Bend	459	1,457	2,800	4,184	6,213	8,249
Harris[1]	1,052	2,036	3,077	4,421	5,781	7,127
Montgomery	1,141	1,980	3,754	5,825	8,713	12,066
Total	**2,653**	**5,514**	**9,763**	**14,647**	**21,012**	**27,841**

[1] Includes demand reductions for the NHCRWA WUG.

This total amount of potential reuse represents approximately 7 percent of the total year 2060 County-Other demands expected for these counties in the Region H Plan.

Implementation Issues

There are several issues that may impact the suitability of effluent reuse for municipal irrigation applications in certain situations. The approach presented here is intended to apply certain common characteristics of MPCs across the Region to determine the potential of using reclaimed water in typical scenarios. Actual conditions in various locations throughout Region H may make implementing a reuse strategy more difficult or may potentially allow for other alternatives for using reclaimed effluent.

As shown in *Table 1*, the cost of implementing a reuse strategy can vary considerably depending on the scale of the project and the layout of the supply and demand centers. In the future, certain considerations can be made when planning new developments to keep these costs to a minimum. Additionally, planning reuse facilities at the beginning of development can significantly reduce the costs of installing a system along with other utilities. For the purpose of this study, the average costs per 1,000 gallons shown in *Table 1* were averaged to find a representative cost for applying the levels of reuse recommended above.

The unit cost of reuse water found in this study is $431 per acre-foot. Actual costs will differ from site to site, but this cost provides a means to find an overall strategy cost for planning purposes. Typical plants in the study area are permitted to a 10/15/3 mg/l (CBOD, TSS, $N\text{-}NH_3$) standard which meets standards for Type II effluent but does not meet standards for Type I uses. Additional filtration is typically required for these plants to allow their effluent to be used in areas supporting contact recreation. Based on the study of the Fairfield MPC described above, this cost is approximately $1.5 million for filtration of a an average daily flow of approximately 1 mgd. The costs associated with effluent reuse for new developments in Brazoria, Fort Bend, Harris, and Montgomery Counties are shown in *Table 19*.

Table 19
Potential Effluent Reuse and Associated Costs

County	Potential Demand Reduction From Reuse (ac-ft/yr) / Implementation Cost ($1,000s)[1]					
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazoria	0	41	132	216	306	399
	$0	$18	$57	$93	$132	$172
Fort Bend	459	1,457	2,800	4,184	6,213	8,249
	$198	$627	$1,206	$1,802	$2,675	$3,552
Harris[2]	1,052	2,036	3,077	4,421	5,781	7,127
	$453	$877	$1,325	$1,904	$2,489	$3,069
Montgomery	1,141	1,980	3,754	5,825	8,713	12,066
	$491	$852	$1,616	$2,508	$3,752	$5,196
Total	**2,653**	**5,514**	**9,763**	**14,647**	**21,012**	**27,841**
	$1,142	**$2,374**	**$4,204**	**$6,307**	**$9,048**	**$11,988**

[1] Based on $431 per acre-foot. All values are shown in second quarter, 2002 dollars.
[2] Includes demand reductions and costs for the NHCRWA WUG.

Several guidelines specified within 30 Texas Administrative Code §210 concern the use of reclaimed wastewater for various uses. Type II effluent is of sufficient quality to be applied to limited access road rights-of-way and to be used to maintain levels in ponds that are not likely locations of direct human contact. Type I effluent, with more stringent standards, is required for contact recreation areas such as parks or golf courses. Many WWTPs are currently designed and operated at standards that do not meet the requirements for a number of potential reclaimed effluent uses. The costs presented within this report include the upgrade of standard MPC WWTPs. *Table 20* lists the water quality criteria for Type I and Type II effluent.

Table 20
Quality Standards for Using Reclaimed Water[1]

Type I Effluent	
BOD_5 or $CBOD_5$	5 mg/l
Turbidity	3 NTU
Fecal Coliform (Geometric mean)	20 CFU/100 ml
Fecal Coliform (Not to exceed)	75 CFU/100 ml
Type II Effluent (Non-Pond System)	
BOD_5 or $CBOD_5$	20 mg/l or 15 mg/l, respectively
Fecal Coliform (Geometric mean)	200 CFU/100 ml
Fecal Coliform (Not to exceed)	800 CFU/100 ml
Type II Effluent (Pond System)	
BOD_5	30 mg/l
Fecal Coliform (Geometric mean)	200 CFU/100 ml
Fecal Coliform (Not to exceed)	800 CFU/100 ml

[1] Based on a 30-day average.

Certain regulations also exist for the infrastructure involved in an effluent reuse system. Thirty Texas Administrative Code §210 dictates certain standards that should be followed to prevent cross-connection with potable water supplies and the accidental contact with treated effluent. Criteria must also be met to ensure the integrity of storage ponds that will be used for storing reclaimed water prior to distribution or irrigation. Ponds that do not currently meet these standards would require a retrofit of the liner material to prevent seepage of effluent into groundwater or be replaced with leak-proof, fabricated tanks.

Several industrial applications also exist for the use of municipal effluent. However, the effluent quality produced by wastewater treatment plants does not standards required for use in most industrial processes. For this reason, the use of reclaimed water for industrial use is generally restricted to cooling towers, such as the operations associated with power generation. These operations are not generally located near residential development, making the use of municipal effluent for these applications unlikely. For additional information concerning the use of treated effluent for industrial purposes a as a water management strategy, please refer to *Appendix 4B* of the 2006 Region H Regional Water Plan.

Turfgrass farms and plant nurseries have significant water demands that could potentially be met with reclaimed effluent. These needs could be met with Type II effluent that is readily available from typical WWTPs without the need for additional treatment. However, for these demands to be met economically, they must be located near municipal WWTPs to limit conveyance costs from the supply source. However, the areas around existing MPCs are likely to be purchased and developed into new residential developments. This makes the option of supplying effluent to agricultural areas immediately adjacent to MPCs impractical as a long-term strategy for reducing water demands. Also, subsidence districts do not

regulate the amount of groundwater these entities can pump and, therefore, these agricultural operations have little reason to seek additional water supplies to augment their groundwater wells.

Because of the factors discussed above, the potential for using municipal effluent from MPCs for meeting industrial and agricultural demands is limited. However, these alternatives may be viable options in some locations depending on site-specific conditions. These limited cases were not examined within this study, in favor of evaluating potential strategies that can be applied to growth throughout the Region.

Conclusions

The use of reclaimed wastewater as a water supply management strategy for current or future shortages in County-Other is a cost-effective strategy. The use of reclaimed water provides communities a mechanism to potentially meet groundwater reduction regulations, where applicable, or general groundwater pumpage regulations. Where expanded use of groundwater is not a viable water management strategy, reuse may aid in meeting future water supply shortages or delaying the need for major water management strategies until the population base is such that other strategies become affordable.

The typical cost associated with reclaimed wastewater as a future supply source, based on information obtained from past studies, is approximately $431 per acre-foot. These costs include pipelines and distribution infrastructure. Typical WWTPs in these developed areas are usually permitted to a 10/15/3 mg/l (CBOD, TSS, N-NH_3) standard, which is appropriate for all Type II effluent uses. Improvements to these plants are required to meet the more stringent Type I effluent standards, and this cost is approximately $1.5 million for 1 mgd of average daily effluent flow.

Based on the data obtained from previous studies and current growth trends, the areas likely to benefit from reuse systems are current and future MPC growth in rural areas or County-Other. Potential exists to use reclaimed wastewater to meet future municipal irrigation demands in urbanized areas and their expected growth. However, this study focused on rural and suburban growth.

It is recommended that during the next round of regional water planning that additional funds be granted to study in greater detail the amount of demand reduction that could occur if reuse was implemented in highly urbanized areas.

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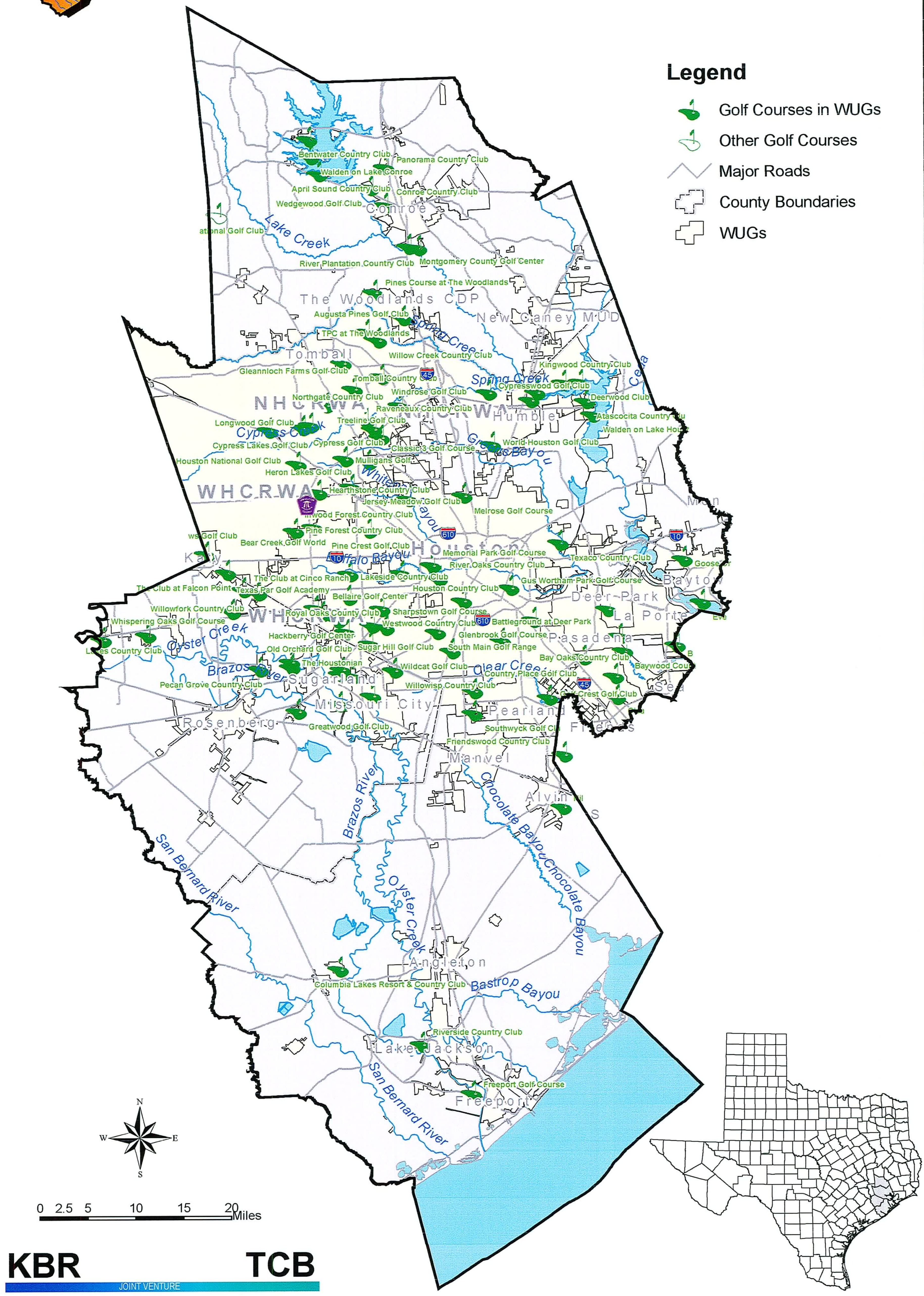
Exhibits

Region H
Water Planning Group
Exhibit 1: Golf Locations in the Study Area



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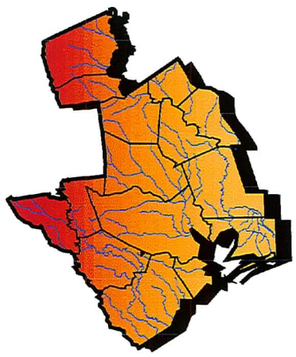


Region H Water Planning Group

Exhibit 2: Amenity Lakes in Fort Bend County

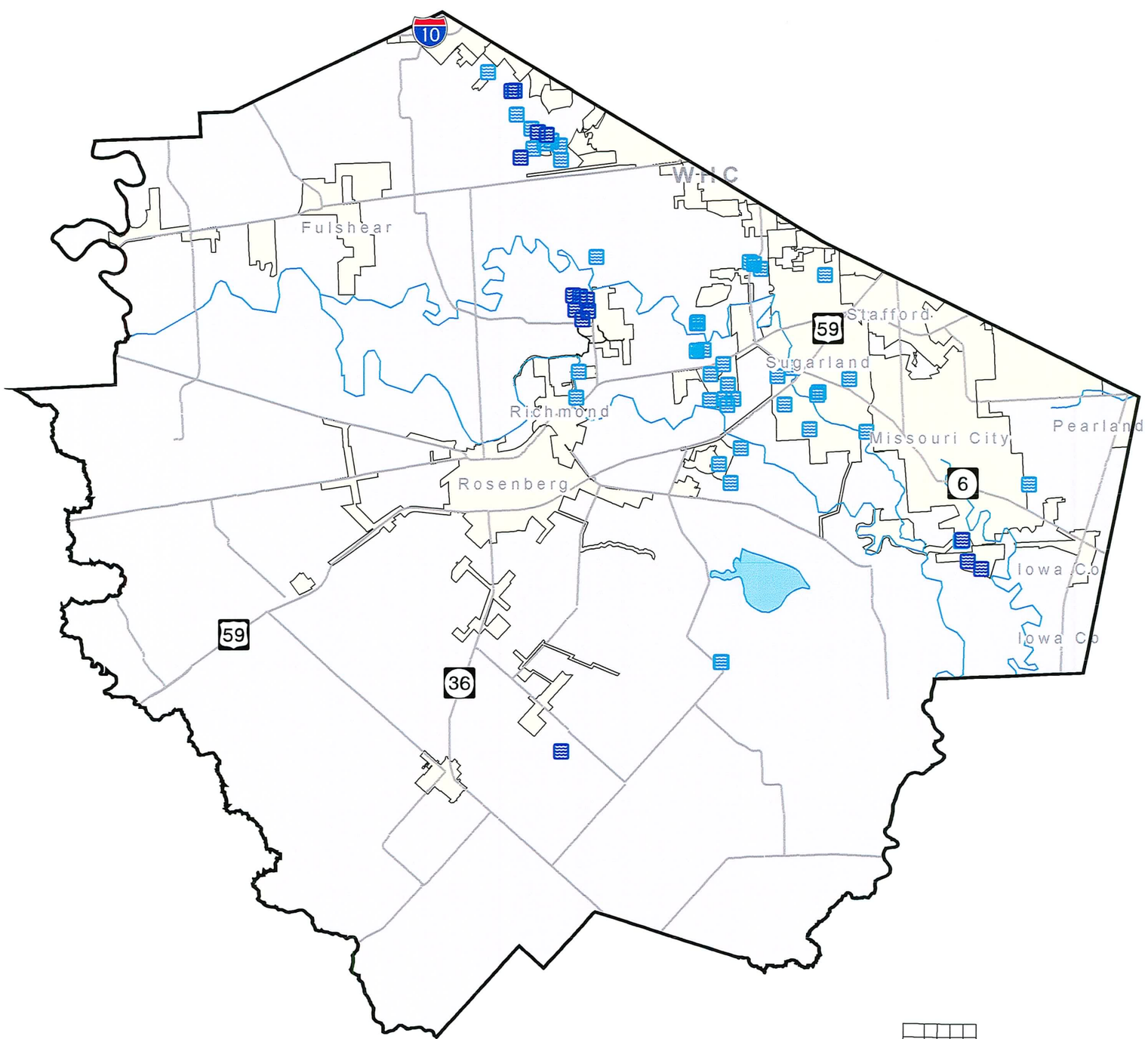
Legend

Amenity Lakes

- Aggregate Demand < 100 ac-ft/yr
- Aggregate Demand > 100 ac-ft/yr

Major Roads

WUGs



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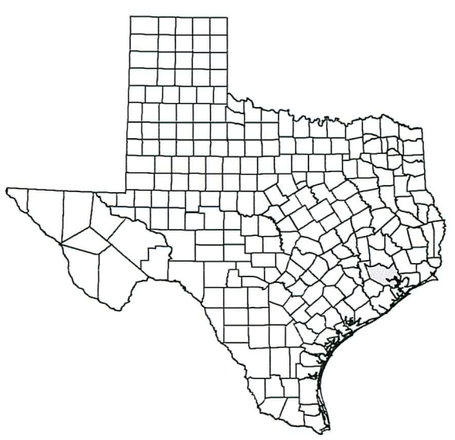

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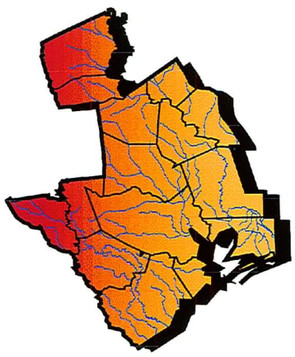
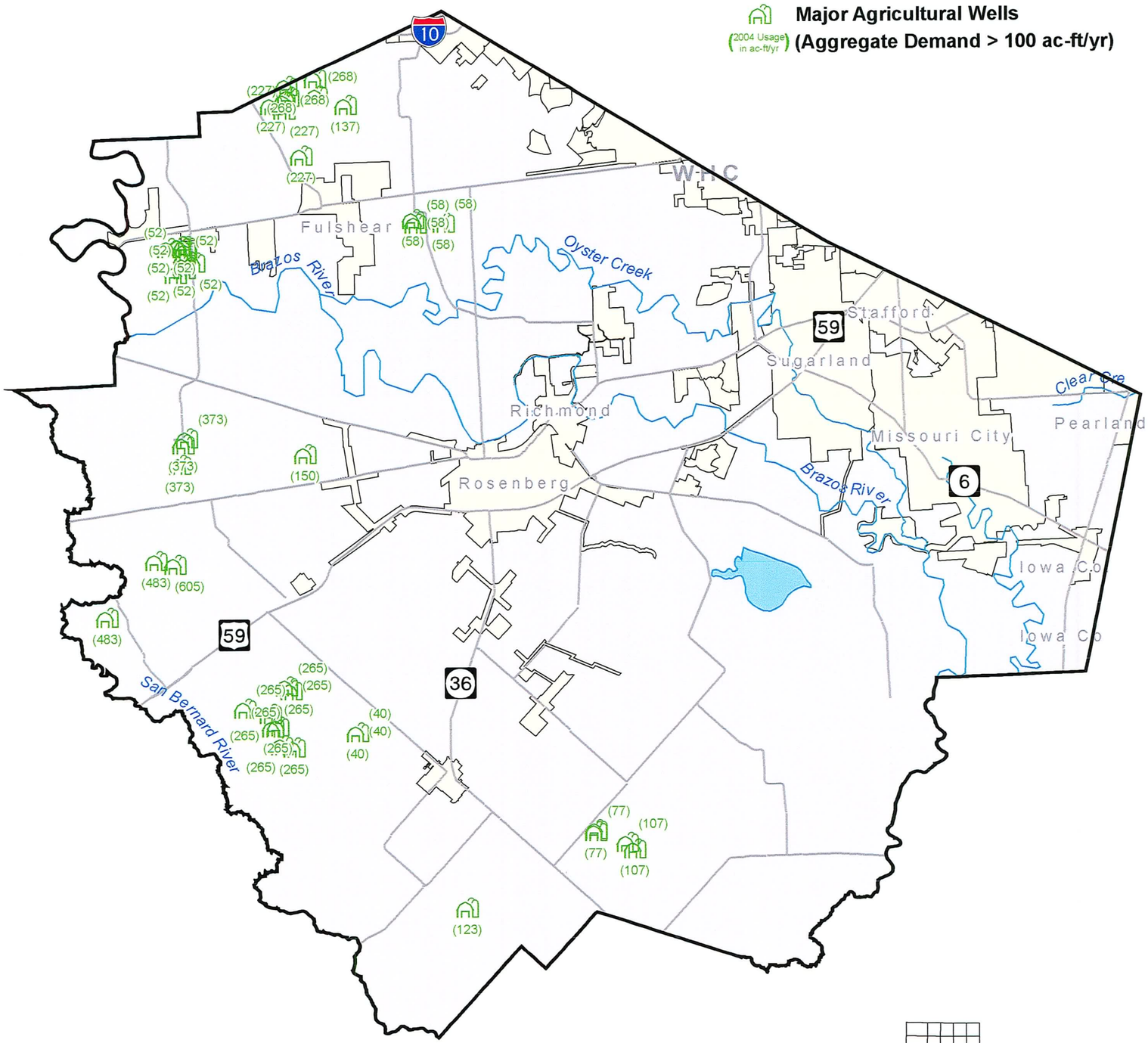


Region H Water Planning Group

Exhibit 3: Major Agricultural Wells in Fort Bend County

Legend

- Major Roads
- WUGs
- Major Agricultural Wells
- (2004 Usage in ac-ft/yr) (Aggregate Demand > 100 ac-ft/yr)



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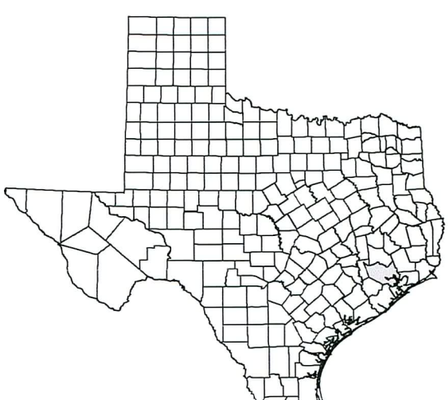

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