

Gulf Coast Water Authority Water Conservation Plan

April 18, 2024



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1.0 INTRODUCTION

1.1 GULF COAST WATER AUTHORITY

The Gulf Coast Water Authority (GCWA) is the major provider of water for Galveston County as well as a provider for Brazoria and Fort Bend Counties. GCWA was created by the Texas Legislature in 1965 to provide water supply services for municipal, domestic, manufacturing, agricultural irrigation, and other useful purposes to the inhabitants and water users of Galveston County.

The GCWA's raw water supply comes primarily from diversions from the Brazos River, with lesser amounts diverted from several named creeks and bayous. The GCWA has water rights totaling 449,432 acre-feet per year and has contracts to purchase an additional 83,142 acre-feet per year from the Brazos River Authority. The GCWA has a long history of providing vital water supplies to substantial industrial users in Galveston County. Raw water supplies from GCWA constitute the majority of water use by these facilities. With the onset of groundwater regulation because of subsidence in the Galveston County area, GCWA has become a major provider of treated surface water to numerous Galveston County customers. Further groundwater regulation and an expanding population have also led GCWA to become a major raw water provider for municipal and industrial purposes in both Fort Bend and Brazoria Counties. Finally, GCWA's canal systems were largely developed for the irrigation of rice acreage in Brazoria and Galveston Counties. GCWA continues to provide water for this purpose to numerous customers, as well as irrigation of turf grass at golf courses. An overview of the GCWA system is shown in *Exhibit 1*.

The efficient use of water is essential to meeting all of GCWA's needs now and into the future. As the development of future water supplies will come at a higher cost than existing sources of water, it is important to maximize the efficient and judicious use of water across all categories of use.

1.2 TCEQ GUIDANCE AND RULES ON WATER CONSERVATION PLANS

Recognizing the need for efficient use of existing water supplies, the Texas Commission on Environmental Quality (TCEQ) has developed guidelines and requirements governing the development of water conservation and drought contingency plans for public water suppliers. These TCEQ guidelines and requirements are included in *Appendix A*. The best management practices established by the Water Conservation Implementation Task Force, established pursuant to SB1094 by the 78th Legislature, were also considered in the development of the water conservation measures in this plan. GCWA has developed this water conservation and drought contingency plan following TCEQ guidelines and requirements. This plan replaces the Gulf Coast Water Authority's Water Conservation Plan and Drought Contingency Plan dated October 2012.

The objectives of this water conservation plan are as follows:

- To reduce water consumption from the levels that would prevail without conservation efforts,
- To reduce the loss and waste of water,
- To improve efficiency in the use of water,
- To document the level of recycling and reuse in the water supply,
- To extend the availability of firm water in a period of drought,
- To delay and decrease capital expenditures required to serve growth of GCWA's customer base, and
- To satisfy the requirements set forth by TCEQ and other agencies.

This plan includes all of the elements required by TCEQ. Some elements of this plan go beyond TCEQ requirements.

2.0 UTILITY AND SERVICE AREA DESCRIPTION

2.1 SERVICE AREA BOUNDARY

GCWA primarily functions as a water wholesaler for industrial, agricultural, and municipal water use in Brazoria, Fort Bend and Galveston Counties. GCWA serves water by open channel canals, pump stations, and pipelines. Because of this, the service area of the GCWA system is restricted within proximity to these various means of conveyance. *Exhibit 1* demonstrates the extent of the GCWA system.

2.2 CUSTOMER DATA

GCWA serves a variety of customers, including municipalities, utility districts, industrial operations, and agricultural operations. A list of GCWA customers along with their type of water use and the means of delivering the supply (conveyance system) from which they are served can be found below in *Table 2-1* through *Table 2-4*.

Table 2-1: Summary of American, Briscoe, and Galveston Canal Customers

Customer	Type of Water Use	Means of Supply
Ascend Materials	Industrial	Briscoe
Ashland	Industrial	Galveston
BTU (KV Land)	Industrial	Galveston
Underground Storage	Industrial	American
Diamond K	Agricultural (Landscape)	Briscoe
First Colony Commons	Agricultural (Landscape)	American
Fluor Daniels	Agricultural (Landscape)	American
Mag Creek Country Club	Agricultural (Landscape)	Galveston
Riverbend Country Club	Agricultural (Landscape)	American
Southwyck Country Club	Agricultural (Landscape)	Briscoe
Sugar Creek Country Club	Agricultural (Landscape)	American
Sugar Land	Agricultural (Landscape)	American
Texas City Golf Course	Agricultural (Landscape)	Galveston

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Ft. Bend WCID No. 2	Municipal (Wholesale Raw)	American
Missouri City	Municipal (Wholesale Raw)	Briscoe
Pearland	Municipal (Wholesale Raw)	American
Pecan Grove MUD	Municipal (Wholesale Raw)	American
Sugar Land	Municipal (Wholesale Raw)	American
Rice/Row Crop Farmers on American, Briscoe and Galveston Canal System	Agricultural	American, Briscoe, and Galveston

Table 2-2: Summary of Thomas Mackey Water Treatment Plant Customers

Customer	Type of Water Use	Means of Supply
Bacliff MUD	Municipal (Wholesale Treated)	TMWTP
Bayview MUD	Municipal (Wholesale Treated)	TMWTP
City of Galveston	Municipal (Wholesale Treated)	TMWTP
City of Texas City	Municipal (Wholesale Treated)	TMWTP
GC FWSD #6 (Tiki Island)	Municipal (Wholesale Treated)	TMWTP
GC WCID #1 Dickinson	Municipal (Wholesale Treated)	TMWTP
GC WCID #12 (Kemah, Clear Lake Shores)	Municipal (Wholesale Treated)	TMWTP
San Leon MUD	Municipal (Wholesale Treated)	TMWTP
City of Hitchcock	Municipal (Wholesale Treated)	TMWTP
City of La Marque	Municipal (Wholesale Treated)	TMWTP
City of League City	Municipal (Wholesale Treated)	TMWTP
GC MUD #12 (Bayou Vista)	Municipal (Wholesale Treated)	TMWTP
GC WCID #8 (Santa Fe)	Municipal (Wholesale Treated)	TMWTP

Table 2-3: Summary of Industrial Pump Station Customers

Customer	Type of Water Use	Means of Supply
Dow Union Carbide Corp.	Industrial	IPS
Valero	Industrial	IPS
Marathon Petroleum	Industrial	IPS
Eastman	Industrial	IPS

Table 2-4: Summary of Juliff/Chocolate Bayou Canal Customers

Customer	Type of Water Use	Means of Supply
INEOS	Industrial	Chocolate Bayou Canal
Rice/Row Crop Farmers on Chocolate Bayou Canal	Agricultural	Chocolate Bayou Canal
Rice/Row Crop Farmers on Juliff Canal	Agricultural	Juliff Canal

2.3 CURRENT AND PROJECTED POPULATION

The GCWA serves a variety of municipal customers through both treated water infrastructure and raw water canal conveyances. This fundamentally divides these customers into two categories. Furthermore, GCWA is responsible for serving only a portion of the service areas of some of its municipal customers, and this portion varies by customer and from year to year depending on alternative sources such as groundwater wells or water from other wholesalers.

Population data was developed from several sources. Where necessary, various sources of information were utilized including, in order of decreasing preference:

- Data from customer surveys
- 2021 Regional Water Plan for Region H

Because of the complex nature of the customers who are served only partly by supplies from GCWA, a survey of customers was conducted to determine long-term population projections as well as other pertinent information.

Representative populations served from both the treated water system and the raw water conveyances are shown in *Table 2-5* and *Table 2-6*. Wherever possible, these populations are intended to represent the portion of a customer's population served by water supplied by GCWA. The source of the data for each customer is also listed in the tables. If the customer did not provide projections through 2070, the projections for the "blank" years were calculated by using the trend in the 2021 Regional Water Plan for Region H projections applied to the latest projection year. For customers that get a significant portion of water from another supplier, the total population of their service area is shown in parentheses below the portion served by GCWA.

Table 2-5: Representative Population Projections for Treated Water Customers

Customer	Data Source	Population Projection for Year					
		2020	2030	2040	2050	2060	2070
Bacliff MUD	2021 Regional Water Plan	7,310	7,416	7,524	7,633	7,742	7,850
Bayview MUD	2021 Regional Water Plan	1,727	1,896	2,030	1,643	1,730	1,821
City of Galveston	2021 Regional Water Plan	51,260	54,643	57,846	60,955	63,941	67,085
City of Texas City	2021 Regional Water Plan	51,813	63,867	75,921	79,581	81,881	86,881
GC FWSD #6 (Tiki Island)	2021 Regional Water Plan	972	979	987	994	998	1,002
GC WCID #1 (Dickinson)	2021 Regional Water Plan	19,103	20,048	21,121	22,176	23,223	24,269
GC WCID #12 (Kemah, Clear Lake)	2021 Regional Water Plan	6,210	7,745	7,971	8,151	8,298	8,421
San Leon MUD	2021 Regional Water Plan	8,400	12,500	16,600	20,700	24,800	29,000
City of Hitchcock	2021 Regional Water Plan	8,604	10,217	11,248	12,053	12,692	13,205
City of La Marque	2021 Regional Water Plan	20,111	21,970	22,429	22,810	23,133	23,414
City of League City	2021 Regional Water Plan	10,859 (106,764)	15,171 (120,273)	18,425 (130,742)	19,234 (139,323)	19,699 (144,257)	20,018 (147,634)
GC MUD #12 (Bayou Vista)	2021 Regional Water Plan	1,538	1,541	1,544	1,546	1,548	1,549
GC WCID #8 (Santa Fe)	2021 Regional Water Plan	12,524	12,895	13,356	13,825	14,300	14,783
TOTAL		189,255	215,303	238,108	252,067	264,286	279,280

Table 2-6: Representative Population Projections for Raw Water Customers

Customer	Data Source	Population Projection for Year					
		2020	2030	2040	2050	2060	2070
City of Pearland	2021 Regional Water Plan	51,823	56,353	62,075	67,699	73,403	78,719
		(115,164)	(125,231)	(137,946)	(150,444)	(163,118)	(174,933)
City of Sugar Land	2021 Regional Water Plan	31,653	68,944	73,303	77,503	81,134	83,587
		(105,510)	(114,908)	(122,172)	(129,172)	(135,224)	(139,312)
FB WCID #2	2021 Regional Water Plan	10,656	10,944	11,307	11,710	12,162	12,669
		(17,761)	(18,241)	(18,845)	(19,518)	(20,271)	(21,115)
Pecan Grove MUD	2021 Regional Water Plan	6,906	6,921	6,948	6,972	6,991	7,009
		(11,510)	(11,535)	(11,581)	(11,620)	(11,653)	(11,683)
City of Missouri City	2021 Regional Water Plan	60,679	74,677	88,576	100,738	108,387	113,035
		(75,849)	(93,347)	(110,720)	(125,923)	(135,484)	(141,294)
TOTAL		161,717	217,839	242,209	264,622	282,077	295,019
		(325,794)	(363,262)	(401,264)	(436,677)	(465,750)	(488,337)

Table 2-7: Countywide Population Projections

Customer	Data Source	Population Projection for Year					
		2020	2030	2040	2050	2060	2070
Brazoria County	2021 Regional Water Plan	359,935	411,387	463,886	519,696	581,368	648,568
Fort Bend County	2021 Regional Water Plan	881,966	1,095,123	1,259,307	1,421,933	1,583,782	1,755,164
Galveston County	2021 Regional Water Plan	343,570	377,373	403,820	427,547	447,126	465,193
TOTAL		1,585,471	1,883,883	2,127,013	2,369,176	2,612,276	2,868,925

2.4 WATER USE DATA

Evaluation of current levels of water use is essential to identifying opportunities for implementing water conservation practices and then evaluating performance over time. Due to the diverse nature of customers supplied by GCWA, this plan examines municipal demand in terms of gallons per capita per day (GPCD) and examines industrial and agricultural water demand in terms of volume in acre-feet per year.

2.4.1. Municipal

A commonly used tool to understand municipal water demand and usage is GPCD. This metric is calculated by dividing the water used per day, including residential, commercial, and other uses, by the population of the area served. A summary of the estimated current (2018) municipal water demand (in GPCD) of GCWA customers is shown in *Table 2-8*. The current GCWA water demand for all municipal customers is approximately 120.83 GPCD. The total municipal water demand for the previous five years is shown in *Table 2-9*.

Table 2-8: Current Municipal Water Demand in GPCD

Customer	Water Demand in GPCD	Source
Bacliff MUD	74.50	Calculated from Usage
Bayview MUD	71.38	Calculated from Usage
City of Galveston	233.00	Calculated from Usage
City of Texas City	122.00	Calculated from Usage
GC FWSD #6 (Tiki Island)	211.98	Calculated from Usage
GC WCID #1 (Dickinson)	86.00	Calculated from Usage
GC WCID #12 (Kemah, Clear Lake)	109.96	Calculated from Usage
San Leon MUD	70.16	Calculated from Usage
City of Hitchcock	85.21	Calculated from Usage
City of La Marque	161.00	Calculated from Usage
City of League City	124.38	Calculated from Usage
GC MUD #12 (Bayou Vista)	120.21	Calculated from Usage

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GC WCID #8 (Santa Fe)	41.49	Calculated from Usage
City of Pearland	109.00	Calculated from Usage
City of Sugar Land	174.00	Calculated from Usage
FB WCID #2 (Stafford)	190.49	Calculated from Usage
Pecan Grove MUD	213.12	Calculated from Usage
City of Missouri City	96.93	Calculated from Usage

Table 2-9: Current Total Municipal Water Demand

	Municipal Water Demand in Acre-Feet for Year				
	2019	2020	2021	2022	2023
TOTAL	47,919	50,792	51,595	53,005	49,825

2.4.2. Industrial

GCWA supplies raw water to industry in Galveston County through a pump station and pipeline at the end of the Galveston Canal system. Industrial use in Fort Bend and Brazoria Counties is provided through canal conveyance. Industrial operations use water in such a way that GPCD is not an accurate portrayal of the water demand, so it is measured by total volume in acre-feet per year. The total volume delivered for industrial use for the past five years is shown in *Table 2-10*.

Table 2-10: Current Industrial Water Demand

Customer	Industrial Water Demand in Acre-Feet for Year				
	2019	2020	2021	2022	2023
American Canal	87	63	821	700	61
Briscoe Canal	2,262	9,305	11,048	9,569	9,138
Galveston Canal	48,137	48,123	49,268	48,327	47,676
Chocolate Bayou Canal	10,545	11,817	12,234	12,582	12,722

2.4.3. Agricultural

GCWA generally supplies raw water to agricultural customers in Brazoria, Fort Bend & Galveston Counties via canal. The agricultural customers include several rice farming operations as well as irrigation for a few golf courses. The estimated total volume delivered to rice farmers for the past five years is shown in *Table 2-11*. In 2017, GCWA began to install meters to each individual farmer whose field was >25ac. In 2018, GCWA began to bill the farmers from these meter readings instead from estimates based on certified acres. As a result, GCWA saw the lowest average acre-ft/certified acre in the past five years. Since 2021, GCWA has had a meter for every rice irrigator whose field is >25acres. GCWA also implemented a new rate incentive plan in 2019 to promote water conservation that is detailed in Appendix D.

Table 2-11: Current Agriculture Water Demand					
	2019	2020	2021	2022	2023
TOTAL (AC-FT)	33,143	62,340	29,603	49,981	37,752
TOTAL ACREAGE	14,363	17,176	16,103	15,541	13,066
AVERAGE AF/ACRE	2.38	2.31	1.51	2.80	2.37

2.5 WATER SUPPLY SYSTEM

GCWA is authorized to divert water from the Brazos River as well as Jones and Oyster Creeks in Fort Bend County and Chocolate, Halls, and Mustang Bayous in Brazoria County to meet the water needs of the customers. Diversions from Jones and Oyster Creeks are used to supply water for agricultural, municipal, and industrial uses to customers in Fort Bend and Brazoria Counties. A summary of GCWA’s Certificate of Adjudication (COA) numbers are shown below in *Table 2-12*.

Table 2-12: GCWA Water Rights Summary

COA Number	Priority Year	Description	System	Use Code	Permitted Diversion (Ac-Ft/Yr)
5168	1926	Brazos River diversion	ABG	1,2,3,13	99,932
5169	1948	Jones/Oyster Creek diversion	ABG	1,2,3,7	12,000
5171	1939	Brazos River diversion	ABG	1,2,3,4	125,000
5322	1929	Brazos River Diversion	Juliff/ Chocolate Bayou	1,2,3	155,000
5357	1937	Choc. Bayou, Mustang Bayou, Halls Bayou diversion	Juliff/ Chocolate Bayou	1,2,3,7	57,500
TOTAL					449,432

- Use Codes:
- | | | |
|------------------------|-------------------|-----------------------------|
| 1 – Municipal/Domestic | 4 – Mining | 8 – Other |
| 2 – Industrial | 5 – Hydroelectric | 9 – Recharge |
| 3 – Irrigation | 6 – Navigation | 11 – Domestic and Livestock |
| | 7 – Recreation | 13 – Storage |

The majority of agricultural irrigation use for GCWA customers is in Brazoria County, although GCWA provides some water for irrigation use in Galveston and Fort Bend Counties. GCWA maintains and operates canal systems, reservoirs, and pump stations that serve irrigation and other uses of water. The systems work collectively to serve the customers.

GCWA also purchases stored water from the Brazos River Authority (BRA). The BRA water is purchased under four separate contracts, one for 31,820 acre-feet per fiscal year, one for 9,335 acre-feet per fiscal year, one for 5,625 acre-feet per calendar year, and one 36,362 acre-feet per fiscal year. GCWA must request the release of the water from upstream reservoirs controlled by BRA. Once released, GCWA diverts the water from the Brazos River. These contracts are typically used in times of low flow in the Brazos River.

2.5.1. American Canal System

A map of the American Canal System is shown in *Exhibit 2*. The American Canal System consists of two sections, Section 1 and Section 2. Section 1 extends from the Brazos River to the Second Lift Station (Second Lift), and Section 2 extends from the Second Lift Station to the terminus near League City. Section 1 is primarily the natural streambed of Jones Creek and Oyster Creek and Section 2 is primarily earthen canal.

In whole, the American Canal System is comprised of the Shannon Plant pump station, Jones Creek and Oyster Creek, Oyster Creek Lake, and seven adjoining lakes. The system has approximately 72 miles of natural creek and man-made canals with 381 acres of lake area. The Shannon Plant includes three pumps that divert water from the Brazos River into the American Canal System. The pumps include one 41,000-GPM and two 50,000-GPM. Water pumped from the Shannon Plant is measured by a TCEQ approved open channel flow meter approximately 800 feet downstream of the diversion point. The American Canal System has a lift station further downstream in Sugar Land with two 42,000-GPM pumps and one 40,000-GPM pump. The volume of water pumped is metered at Second Lift.

Lateral 10 is shown in the comprehensive *Exhibit 1*. The Lateral 10 canal is a lateral that connects the American and Briscoe Systems and allows for the passage of flow from the former conveyance to the latter. Lateral 10 is located in Brazoria County near the City of Manvel.

2.5.2. Briscoe Canal System

A map of the Briscoe Canal System is shown in *Exhibit 3*. The Briscoe Canal System runs south of and parallel to Highway 6 from the Briscoe Pump Station (Briscoe Plant) on the Brazos River six miles west of Arcola to the Monsanto and Ranch Canals south of Alvin. Beyond the Monsanto and Ranch Canals, the Briscoe Canal System connects to the Galveston Canal System. The Briscoe Plant has three 70,000-GPM pumps that divert water from the Brazos River into the Briscoe Canal System. Water pumped from the Briscoe Plant is measured by a TCEQ approved open channel flow meter approximately 800 feet downstream of the diversion point. The Briscoe Canal System has approximately 51 miles of man-made canals.

2.5.3. Galveston Canal System

A map of the Galveston Canal System is shown in *Exhibit 4*. The approximately 17-mile-long Galveston System connects the American and Briscoe Systems. The Galveston Canal System is also used to route flow into the GCWA Reservoir and on to municipal and industrial customers in Galveston County.

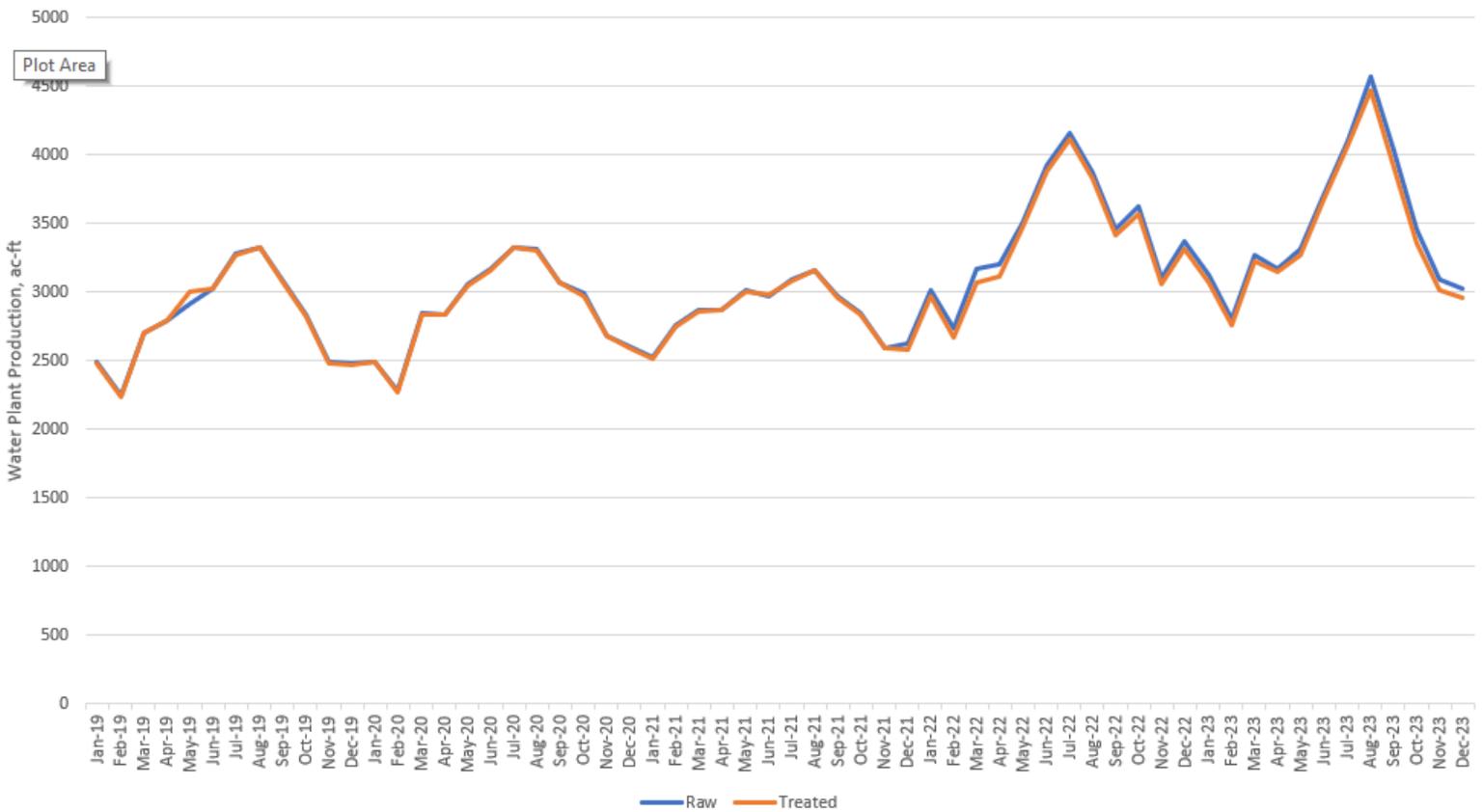
2.5.4. Industrial Canal and Industrial Pump Station

The Industrial Pump Station (IPS) pumps water from the Industrial Canal in Texas City through a 42-inch and a 36-inch pipeline to industrial customers within a 3-mile radius in Galveston County. Each of the pipelines are equipped with flow meters that record the amount of water delivered to customers. The Terminal Reservoir located at the terminus of the Industrial Canal is considered part of the Industrial System.

2.5.5. Thomas S. Mackey Water Treatment Plant

The Brazos River provides source water for the Thomas S. Mackey Water Treatment Plant (TMWTP) in Texas City. The water treatment plant is rated to 57.6 MGD, with 9 million gallons of on-site storage capacity at the treatment plant. From the plant, water is distributed through two major pipeline systems, which terminate at each customer's meter site. *Figure 2-1* shows the average water intake and output in million gallons of the TMWTP from January 2019 to December 2023. The difference in intake and output is recycled to Industrial customers.

Figure 2-1: Thomas S. Mackey Water Treatment Plant Monthly Production



2.5.6. Chocolate Bayou Canal System and Juliff Canal System

A map of the Chocolate Bayou Canal System is shown in *Exhibit 5*. The Chocolate Bayou Canal System extends approximately 2.3 miles northeast of Chocolate Bayou near Liverpool. The Chocolate Bayou Canal System delivers water to area farmers and an industrial customer.

The Chocolate Bayou Canal System also includes the Juliff Canal System. A map of the Juliff Canal System is shown in *Exhibit 6*. The Juliff Canal System has several branches and extends from the Brazos River near Juliff to approximately five miles east of Danbury. The Juliff Canal System delivers water to area farmers.

2.5.7. Reservoirs

GCWA operates and maintains several reservoirs in its system. A comprehensive list of reservoirs includes:

- A 7,308 ac-ft off-channel reservoir dedicated to industrial and municipal customers in Texas City known as the Texas City Reservoir,
- A combined 8,925.48 ac-ft reservoir of impounded runoff in joint use with The City of Sugar Land in Jones and Oyster Creeks in Fort Bend County,
- The 65 ac-ft Terminal Reservoir dedicated to industrial customers in Texas City,
- Two off-channel reservoirs in Brazoria County totaling 8,951 ac-ft of storage, and
- Two off-channel reservoirs in the Juliff and Chocolate Bayou Canal Systems in Fort Bend and Brazoria Counties totaling 864 ac-ft.

2.5.8. Delivery to Customers

All GCWA canals are earthen open channel flow conveyances. The canal system is in good condition and is maintained regularly as required for system reliability. Delivery to industrial customers in the general Texas City area is performed through a pipeline system originating at the Industrial Pump Station (IPS) except for one customer that diverts raw water directly from the canal system downstream of GCWA Reservoir. Municipal raw water customers also make diversions directly from the American and Briscoe Canal systems.

Municipal treated water customers receive water from the TMWTP through a system of pipelines. Generally, these customers are divided between service from the North Potable System and the South Potable System.

All agricultural customers have gravity flow through pipes with screw gates. Three golf course customers pump water from the American System, which is metered by flow meters in the pumping systems.

2.6 AGRICULTURAL SYSTEM INVENTORY

The GCWA serves a variety of traditional agricultural water users as well as users who irrigate golf courses and other green spaces. The majority of agricultural irrigators are located in Brazoria County and this area represents the largest demand for agricultural water served by GCWA. There is a smaller, yet still significant contingent of agricultural users in Galveston County served by the American, Briscoe, and Galveston Canal System. Landscape (typically golf course) irrigation is generally located in Fort Bend and Galveston Counties.

2.6.1. Structural Facilities

The American System, Briscoe System, Chocolate Bayou Canal System, and the Jones Creek off-channel reservoir serve GCWA agricultural customers. The canals are generally earthen channels with metal screw gate diversion points.

2.6.2. Agricultural Management Practices

In 2017, GCWA began to install meters to each individual farmer whose fields were >25ac. In 2018, GCWA began to bill the farmers from these meter readings instead from estimates based on certified acres. As a result, GCWA saw the lowest average acre-ft/certified acre in the past five years. GCWA currently has a meter for every rice irrigator whose field is >25acres. GCWA also implemented a rate incentive plan in 2019 to promote water conservation that is detailed in Appendix D.

2.6.3. User Profile

The service area of GCWA is approximately 17,000 acres in Brazoria and Galveston Counties for the purposes of irrigated agriculture.

2.7 WASTEWATER SYSTEM

GCWA does not operate a wastewater system although GCWA customers may maintain their own wastewater systems.

3.0 APPROACH TO WATER CONSERVATION

3.1 SPECIFIC CONSERVATION GOALS

As outlined in Title 30 Chapter 288, each water conservation plan must include specific, quantified conservation goals. Because GCWA serves a wide variety of customers using different delivery systems, the goals are separated into specific system-wide goals, wholesale municipal goals, wholesale industrial goals, and agricultural goals.

It is important to note that GCWA only has direct responsibility for the implementation of water conservation measures within its own system. Conservation measures implemented by the customers of GCWA and their subsequent customers are the responsibility of those individual entities. However, GCWA encourages the voluntary conservation measures by its customers listed in the sections below.

3.1.1. GCWA System

The goals for this water conservation plan for the GCWA system as a whole include the following:

- Implement and maintain a program of universal metering and meter replacement and repair, as shown in *Table 3-1* and further discussed in *Section 3.2.3*.
- Maintain the amount of water loss at Thomas S. Mackey Water Treatment Plant as shown in *Table 3-1*.
- Maintain or reduce the amount of water loss in the GCWA treated water system (from TMWTP to customer take points) as shown in *Table 3-1*.

Table 3-1: GCWA System Conservation Goals

Strategy	5-year Goal	10-year Goal
System Metering	Have the system metering along the A canal systems.	Have system metering along the B-canal and G-canal systems.
Water Loss Prevention TMWTP	Maintain water loss at 10% or less	Maintain water loss at 10% or less
Water Loss Prevention System for Treated Water System	Reduce water loss to 10% or less	Reduce water loss to 10% or less

3.1.2. Wholesale Municipal

The goals in this water conservation plan for the GCWA municipal wholesale customers include the following:

- Work with customers to reduce demands below the specified amount in gallons per capita per day listed in *Table 2-8*, toward an ultimate goal of 110 gpcd.

3.1.3. Wholesale Industrial

The goals in this water conservation plan for the GCWA industrial customers include the following:

- Work with customers to increase efficient water usage where practicable.
- Work with customers to increase the amount of water recycled in-plant where practicable.

3.1.4. Agricultural and Irrigation Use

The goals in this water conservation plan for the GCWA agricultural and irrigation customers include the following:

- Work with rice irrigators to encourage the efficiency of water use through precision leveling and other on-farm methods.
- Continue implement metering for 100% of rice irrigators (>25 certified acres) to track volume consumed rather than area irrigated.
- Monitor effectiveness of rice irrigator incentive rate detailed in Appendix D and update as necessary.
- Within 10 years, use the information gained from metering to continue to achieve finer detail in water accounting.

3.2 GCWA SYSTEM CONSERVATION PRACTICES

There are several conservation practices that may be implemented by GCWA to increase the efficiency of their water supply systems. These practices are fully within the control of GCWA and are not subject to the efforts of customer and end users.

3.2.1. Description of Practices Utilized to Measure and Account for Diversions

Conservation begins with the implementation of proper water measurement procedures within the GCWA system. Means of flow measurement varies from system to system.

In mid-2015 a Lower Brazos Water Master program was started by the TCEQ. GCWA installed an approved open channel flow meter at each of the three river plants diverting from the Brazos River. Anticipated use for the subsequent week and actual usage from the previous week is conveyed to the Water Master on a weekly basis. In addition to Brazos River diversions, measurements are made within the system for re-lifting sites as well as diversion from other permitted sources. The additional measurements are made with open channel flow meters or pipe flow (doppler) measurements. Water is metered at the outlet of the Texas City Reservoir by open channel flow meters located at the reservoir outlets. Inflow into the Thomas S. Mackey water treatment plant is metered with a full port electromagnetic flow meter.

The outflow from the Industrial Pump Station is routed through one 36-inch line and one 42-inch line. Each of these lines is equipped with a full port electromagnetic flow meter.

The method of metering agricultural customers water usage includes doppler meters installed to each field greater than 25-acres. The meters report the usage to “the cloud” where GCWA and farmers can access and monitor the usage data. Other agricultural customers have meters that are read manually monthly.

3.2.2. Monitoring and Record Management

GCWA uses a Supervisory Control and Data Acquisition (SCADA) system to acquire data and control SCADA sites. SCADA site data is collected and monitored at the water treatment plant continuously. Customer meter sites are inspected, and meter readings are recorded at a minimum of once per month.

Records are kept in accordance with TCEQ rules and regulations and the GCWA Records Management Policy. This policy adopts records control schedules that comply with records retention schedules issued by the Texas State Library and Archives Commission as provided by §203.041(a)(2), Local Government Code.

3.2.3. Metering and Leak Detection and Repair

Delivery of water to all customers, including municipal, industrial, and agricultural users should be metered in some form. Although many customers have take-or-pay contracts that do not require the exact amount of water delivered to be known, the ability to account for water delivered at each take point is essential to the purposes of water conservation.

The flow data from TMWTP is regularly monitored to identify potential losses, and physical inspection along with the potable distribution system is performed regularly to identify leaks. Ground storage tanks and clear wells are inspected annually, at a minimum. Customer meter sites are regularly checked for the evidence of leaks as well as annual meter calibration.

Canals and pipelines are continually monitored for leaks or necessary service up to the customer boundary. GCWA Canal Operators inspect fields daily for water loss.

GCWA is budgeting to perform pipeline integrity inspections on the treated effluent transmission mains each year to determine the condition of the pipelines and perform preventative maintenance to fix minor leaks before they become major problems. GCWA has also contracted with Asterra to perform regular satellite-based leak detection along the canal system and pipelines.

3.2.4. System Operations Plan

GCWA does not own or operate a series of major reservoir within a common watershed of a river basin. However, GCWA does operate a number of canal systems and pump stations that lend themselves to system operation to maximize efficient use of supply.

3.2.5. Reuse and Recycling of Wastewater

As mentioned in *Section 2.7*, GCWA does not operate a wastewater system. However, municipal and industrial customers of the system do operate wastewater facilities that may prove to be viable water supply sources. GCWA is currently exploring opportunities to take advantage of this resource in reducing the demand of fresh water within the service area and these practices will be implemented as they become economically feasible.

GCWA purchased 2 MGD of treated effluent from the City of Alvin in 2013. This water flows into the Juliff/Chocolate Bayou system and is used to meet industrial and agricultural demand.

3.2.6. Public Education

Public education is a core element of GCWA's comprehensive Communications Plan. GCWA continuously looks for opportunities to expand its public education and outreach efforts to raise awareness about water efficiency and conservation. These efforts include the following:

- Regular social media posts on the why and how of water efficiency and conservation, including how to reduce outdoor and indoor water use. In addition to original content, we share content from several sources, including the Texas Water Development Board, TCEQ's Take Care of Texas campaign, Brazos River Authority, EPA WaterSense, Water – Use it Wisely, Texas Living Waters, and the Galveston Bay Foundation.
- Quarterly meetings with public information officers representing our municipal customers to share information and raise awareness;
- Presentations to civic groups and community leaders. For example, GCWA will present annually to the Galveston County Mayors and Councilmembers Association;
- Outreach and partnerships with community groups to support and promote water conservation. These groups include the Galveston Bay Foundation, Galveston County Agriculture Extension Service and Galveston County Master Gardeners;

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- Articles on water conservation published in local media and municipal customer publications;
- And partnerships/sponsorships to support federal, state and regional programs, including EPA WaterSense, Galveston Bay Foundation's Houston Cities H2O Challenge and the Gulf Coast Water Conservation Symposium.

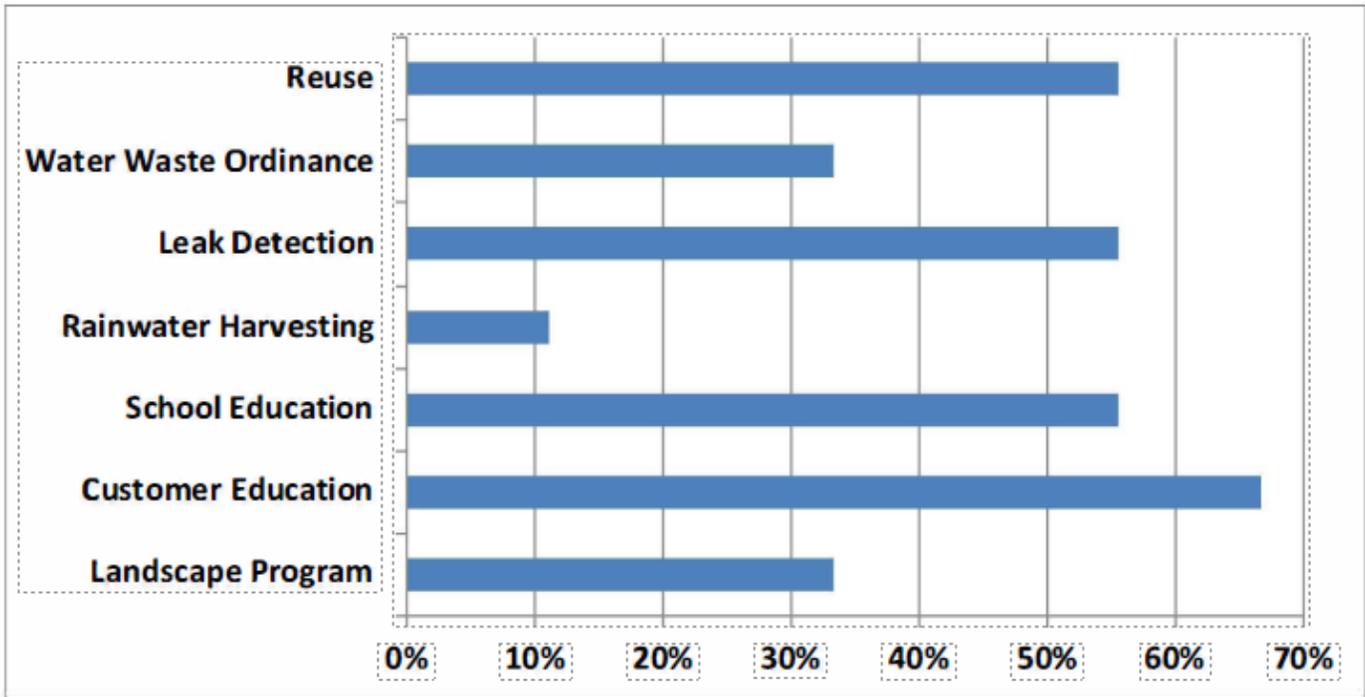
3.3 RECOMMENDED CUSTOMER CONSERVATION PRACTICES

As a wholesale water provider, GCWA has limited opportunity to implement conservation measures that affect water use after the water leaves the GCWA system. However, GCWA does encourage responsible and efficient water use by its customers and makes several recommendations for conservation practices to be used by their customers.

3.3.1. Municipal Conservation Practices

Most GCWA municipal customers are required to develop and follow their own water conservation plans that contain practices that are specific to those individual water systems. All customers were surveyed in the development of this document regarding several aspects of their water use as well as their approaches to water conservation. A summary of the responses received is shown in *Figure 3-1*. The results demonstrate that customers are already actively involved in conservation measures or planning to implement them in the near-term. Educational programs to either customers or students are very common practices. Leak detection has also been implemented on a fairly widespread basis based on the responses received. Finally, reuse projects are in place or are being implemented by numerous customers in a wide range of scales from the use of reclaimed water at wastewater facilities or widespread direct reuse for agricultural purposes.

Figure 3-1 - Summary of GCWA Municipal Customers Planning or Participating in Various Water Conservation Practices



Although GCWA is not ultimately responsible for the implementation of water conservation measures by its wholesale municipal customers, GCWA does support the implementation of various measures on a voluntary basis. Specifically, GCWA recommends the following measures for responsible and efficient use of water by wholesale municipal customers:

- Customer Education: Efforts to educate customers about issues regarding water conservation often provided through mailouts with customer billing. However, programs may also include public awareness and advertising.
- School Education: Programs that educate students about the importance of water conservation. Programs such as WaterWise, sponsored by HGSD allow retail entities a simplified approach to

applying such efforts, while programs such as TWDB's WaterIQ offer other opportunities for outreach in schools.

- **Leak Detection:** System water audits and water loss programs are effective methods of accounting for all water usage by a utility within its service area. Performing a reliable water audit is the foundation of proper water resource management and loss control in public drinking water systems.
- **Water Waste Ordinance:** Prohibition (by ordinance) of specific wasteful activities. This includes such things as: water wasted during irrigation, continuously running water from garden hoses resulting in water spilling into street, failure to fix outside faucet leaks, service line leaks (on the retail customer side of the meter), sprinkler system leaks, once-through use of water in commercial equipment, non-recirculation systems in in-bay automatic car washes, and non-recycling decorative fountains.
- **Water Rate Structures:** Water rate structures that discourage over-consumption of water. Each municipal customer of GCWA is encouraged to have a rate structure that is either flat or increasing as consumption increases. This type of structure discourages residential water use in high volumes beyond typical household use volumes.

3.3.2. Application of Equipment and Processes to Improve Industrial Water Use Efficiency

GCWA encourages the implementation of conservation measures to increase efficient water use for industrial purposes. It is recognized that these practices will be implemented in a manner specific to each industrial process as customers identify a potential net benefit of reducing water consumption. Similarly, the use of reclaimed water in industrial processes will be implemented when it becomes advantageous to the user.

3.3.3. Program for Assisting Customers in Development of On-Farm Practices

GCWA encourages the use of precision leveling and other methods of reducing on-farm water demand for rice production. Additionally, the metering program and billing incentive rate described above aims to better quantify and evaluate demands in order to aid in the efficient use of water.

4.0 IMPLEMENTATION

4.1 ADOPTION, CONTRACTUAL REQUIREMENTS, AND MEANS FOR IMPLEMENTATION AND ENFORCEMENT

As part of GCWA's water conservation plan, a requirement exists in every water supply contract entered into or renewed after official adoption of the water conservation plan, and including any contract extension, that each successive wholesale customer develop and implement a water conservation plan or water conservation measures using the applicable elements of Title 30 TAC Chapter 288. If GCWA's customer intends to resell water, then the contract between the initial supplier and customer must provide that the contract for the resale of the water must have water conservation requirements so that each successive customer in the resale of the water will be required to implement water conservation measures in accordance with the provisions of Title 30 TAC Chapter 288.

This plan was adopted by Gulf Coast Water Authority via a resolution passed by the Board of Directors on April 18, 2024. A copy of this resolution may be found in *Appendix E* of this document.

4.2 COORDINATION WITH REGIONAL WATER PLANNING GROUP

A copy of this Water Conservation Plan and GCWA's Drought Contingency Plan have been provided to the Region H Water Planning Group. A copy of the transmittal letter can be found in *Appendix F* of this document.

4.3 REVIEW AND UPDATE OF WATER CONSERVATION PLAN

As required by TCEQ rules, GCWA will review and update this plan, as appropriate based on an assessment of previous five and ten year targets and any other new or updated information. GCWA will review and update the Plan no later than May 1, 2029, and every five years after that date to satisfy TCEQ requirements. Implementation reports will also be developed annually for submittal to TCEQ regarding progress in achieving water conservation goals.