

# **Water Conservation Plan 2013**



P.O Box 940, Ingleside, Texas 78362  
361-643-6521 – [www.SanPatWater.com](http://www.SanPatWater.com)

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# **Water Conservation Plan**

## **1. Introduction**

This Water Conservation Plan (WCP) is a guidebook and reference manual for the San Patricio Municipal Water District (SPMWD), its partners and customers. This introduction chapter outlines the background of the San Patricio Municipal Water District, the purpose and reasoning of the Conservation Plan, expected results, and an overview of its geographic layout and organization.

### **1.1 Background of the San Patricio Municipal Water District**

The San Patricio Municipal Water District is a governmental agency of the State of Texas created as a conservation and reclamation district under Article 8280, Section 145 of the Constitution pursuant to Chapter 12, Acts of the Legislature of Texas, Regular Session 1951, as amended. The District has the specific authority to construct, conserve, distribute, treat and purify, store and sell both surface and underground water to persons and corporations, both public and private, as well as political subdivisions of the State and others in San Patricio, Aransas, Refugio and Nueces counties. The District is governed by eight Directors; seven are elected to four year staggered terms and represent the cities of Odem, Taft, Portland, Gregory, Ingleside, Aransas Pass and Rockport. The remaining Director is appointed by the elected Board of Directors and represents industry.

The District's mission is to provide a dependable water supply for the domestic and industrial users in San Patricio County, Aransas County and surrounding areas of such quality and quantity as to promote a high standard of life. The District's goal is to conserve, store, transport, treat, purify, distribute, sell and deliver water to customers within and outside of the District to promote health and economic development as cost effectively as possible.

The District supplies water for municipal and industrial use in a three-county service area. Major raw (untreated) water customers include two industries, Sherwin Alumina and Gregory Power Partners. Treated potable water customers include the Cities of Odem, Taft, Portland, Gregory, Ingleside, Aransas Pass, and Rockport. The District also serves treated water to Nueces County WCID No.4 (Port Aransas), Rincon Water Supply Corp. and Seaboard Water Supply Corp. and Sherwin Alumina. The District provides treated process water directly to Occidental Chemical, Ingleside Cogeneration, DuPont and Air Liquide. The District operates a water laboratory and water maintenance activity that oversees the repair and replacement of raw and treated water transmission lines. The District stays in full compliance with all state and federal requirements.

The District has a well-established conservation program. The District has a team of professionals developing and implementing outreach programs to help reduce water waste and improve efficiency. Conservation outreach includes everything from school education to providing xeriscape presentations at public events.

## **1.2 Purpose of the Plan**

The purpose of this WCP is to ensure long-term water security and efficiency for the residents and businesses served by the District. This long-term planning and management is critical so that supplies of water will always meet and exceed the demands of Coastal Bend customers. It allows water supplies to be sustainable as the region grows. Short term water security and planning during dry times is explained in a separate Drought Contingency Plan, which is included as a supporting document.

As a water supplier, the District is also required to have its Plan adhere to Title 30, of the Texas Administrative Code (TAC) Chapter 288 (30 TAC § 288). This Plan contains all of the provisions required in 30 TAC § 288, including conservation plans for municipal uses and wholesale providers, and a drought contingency plan.

By contract, the District is required to have a WCP consistent with that of Corpus Christi and to impose similar water conservation plans and strategies as those implemented by the City of Corpus Christi. Consequently, this WCP is modeled after the City of Corpus Christi Plan. General and specific goals of the Plan are explained in Chapter 4.

## **1.3 Public Involvement**

The District provided opportunity for customers to receive information about the Plan, to make comments and to provide input into the preparation of the WCP at a public meeting held on July 23, 2013. A Public Notice was published in the San Patricio County News with the date, time and location of the meeting. Notice was also posted on the District's website ([www.sanpatwater.com](http://www.sanpatwater.com)).

In addition, copies of the Water Conservation Plan draft were published on the District's website.

## **1.4 Organization of the Water Conservation Plan**

This revised WCP is organized in a way to make information easy to find and understand. Unlike previous versions, this plan is a separate document from the Drought Contingency Plan (DCP). The chapters guide the reader through the most important issues and are shown below. The end of the WCP contains appendices of other documents that are useful for the reader to understand main chapters.

- **Chapter 1:** Introduction – the basics of the District, purpose of the Plan, and organization of the Plan.
- **Chapter 2:** Supply Profile – details of the supply of the District including the water sources, transmission system, and water treatment plant.

- **Chapter 3:** Demand Profile – details of the current customer population and demand, and estimated projections of future population and demands. Demands are provided in totals and divided into sectors.
- **Chapter 4:** Goals – benefits of conservation; overall water planning and conservation goals; quantifiable five- and ten-year conservation goals and water loss goals based on per capita consumption.
- **Chapter 5:** Water Conservation Practices – efforts that encourage and/or enforce the conservation of water, or that increase the efficiency of water use.
- **Appendices:** Includes the Utility Profile, TCEQ 2001 Agreed Order Provisions, Water Rates, and Reservoir Operating Plan.

## 2. Supply Profile

This Chapter explains the three sources from which the District gets water supply to its customers in the Coastal Bend region. In addition to the supply sources, the transmission system and the water treatment plant are briefly explained.

### 2.1 Supply Sources

The District obtains its water solely from surface water sources. These surface water bodies are Lake Corpus Christi, Choke Canyon Reservoir, and Lake Texana. Details of each of these water bodies are explained below.

#### *Lake Corpus Christi*

Lake Corpus Christi is a water storage reservoir located approximately 33 miles northwest of the City. It was completed on April 26, 1958 with the dedication of the Wesley Seale Dam. When full, the lake level is 94 feet above sea level and has a capacity of 257,260 acre-feet (83.8 billion gallons). The surface area of the reservoir is 19,251 acres (30.1 mi<sup>2</sup>).

Lake Corpus Christi is part of the Nueces River Basin (or watershed). It receives inflow from the Nueces, Frio, and Atascosa Rivers. Inflow from the Frio River also goes through the Choke Canyon Reservoir. Supply in Lake Corpus Christi relies on rainfall from the whole Nueces/Frio River basin. These two watersheds covers a combined area of 16,764 square miles and reach as far north as Rocksprings in Edwards county, and west close to Eagle Pass in Maverick County.

#### *Choke Canyon Reservoir*

Choke Canyon Reservoir is located approximately 70 miles northwest of Corpus Christi. It has a capacity of 695,271 acre-feet (227 billion gallons). When it is full, the water level is 220.5 feet above sea level, and the surface area is 25,989 acres (40.6 mi<sup>2</sup>).

The United States Bureau of Reclamation financed, designed, and built the reservoir, which was dedicated on June 8, 1982. The City of Corpus Christi operates and maintains the facility.

Choke Canyon Reservoir receives inflow from the Frio River Basin. This watershed covers an area of 5,529 square miles from Three Rivers in the south to Kerr County in the north. Water from the reservoir drains into the Frio River, which drains into the Nueces River and then Lake Corpus Christi.

#### *Lake Texana*

The third surface source of water for the City is Lake Texana in Jackson County, located approximately 90 miles northeast of Corpus Christi. When full, the lake has a capacity of 161,085 acre-feet (52.5 billion gallons) and the water level is 44 feet above sea level. Its surface area when full is 9,727 acres (15.2 mi<sup>2</sup>).

Lake Texana was formed with the completion of the Palmetto Bend Dam in 1980 by the U.S. Bureau of Reclamation. It is on the Navidad River, which is part of the Lavaca River Basin and mainly flows through Lavaca and Jackson Counties. The Lake is currently owned and operated by the Lavaca-Navidad River Authority (LNRA).

The City of Corpus Christi purchased a permit to withdraw 41,840 acre-feet from the LNRA in the 1990s after a severe drought between 1993 and 1996. During that time, Nueces River Basin stream-flows were the lowest recorded, even lower than the much-remembered 1950s Drought.

To deliver that water to Corpus Christi, the City of Corpus Christi, the Nueces River Authority, the Port of Corpus Christi and the Lavaca-Navidad River Authority worked together to deliver water via a new pipeline from Lake Texana. The 101-mile-long pipeline was named for the late Mary Rhodes, mayor of Corpus Christi from 1991 to 1997, in recognition of her special contribution to the development of water resources for the residents and industries of the Coastal Bend. The pipeline came online in September 1998. It pumps water through a 64-inch pipeline from Lake Texana directly to the O.N. Stevens Water Treatment Plant in Calallen. The District tapped onto this line south of Sinton and constructed a 36" and a 42" pipeline that delivers water to the treatment facility near Ingleside. Approximately 40 to 70 percent of the water used by the District comes from Lake Texana through the Mary Rhodes Pipeline.

A map of the regional water supply system and watershed is shown on the next page in Figure 2.1.



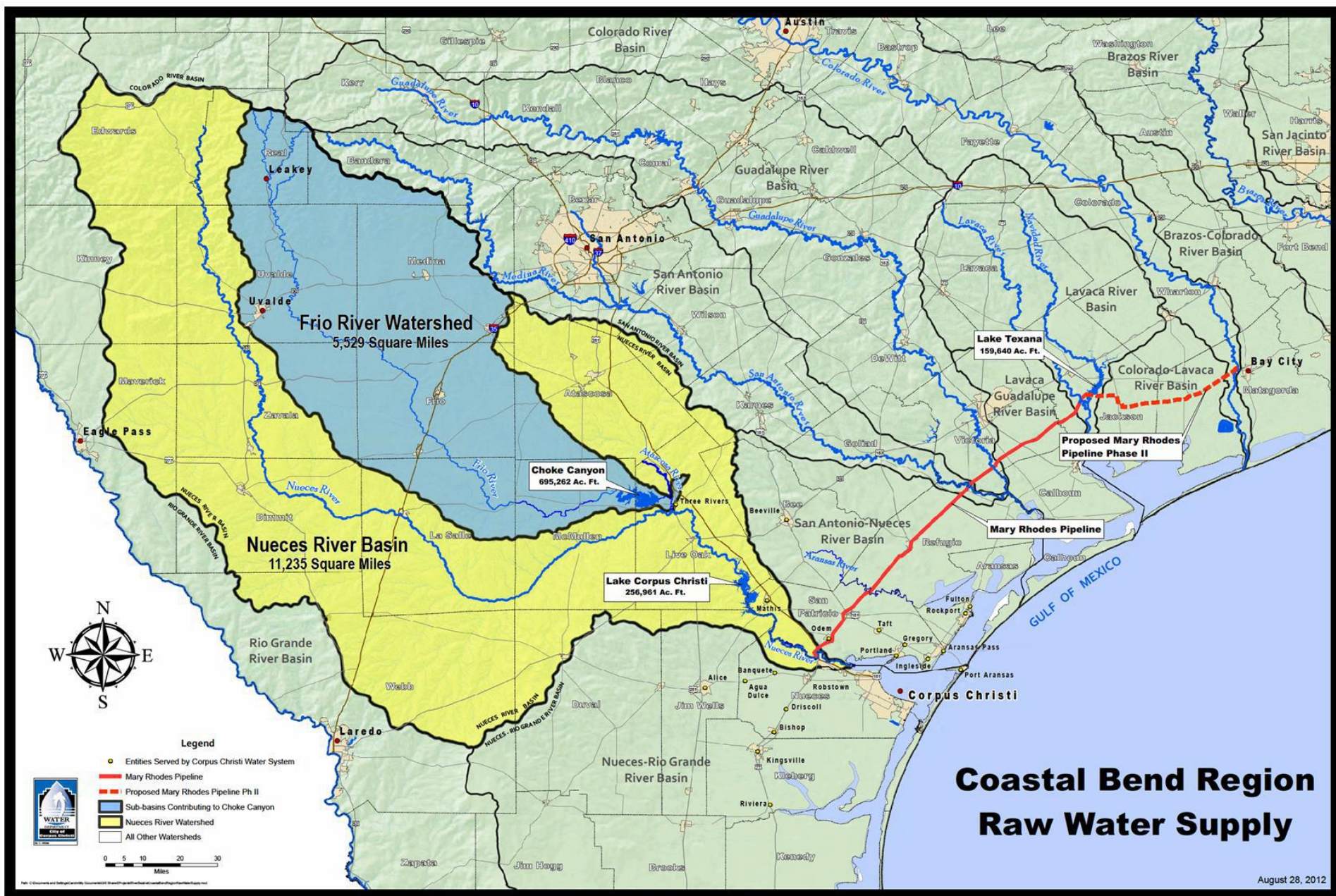


Figure 2.1. Map of the Coastal Bend Regional Water Supply, including the three surface water supply reservoirs.

## 2.2 Potential Future Sources (Undeveloped Sources)

To meet the demands of a growing community, the City of Corpus Christi has been taking steps to ensure future water supplies. In 1999, the City purchased senior water rights to 35,000 acre-feet of water per year in the Colorado River. A portion of this water will be transported to the District via a pipeline that will be constructed, in the future, from the Colorado River to the Mary Rhodes Pipeline at Lake Texana.

In addition, the City of Corpus Christi is involved with the Corpus Christi Aquifer Storage and Recovery Conservation District (CCASRCD). This groundwater conservation district was formed in 2005 by the 79<sup>th</sup> Texas Legislature and is:

*“...dedicated to protecting groundwater supplies within the District, developing and maintaining an aquifer storage and recovery program, providing the most efficient use of groundwater resources to supplement existing supplies, while controlling and preventing waste of groundwater.”*

The CCASRCD is currently exploring the possibility of using groundwater aquifers as storage for extra supply for the region. During wetter-than-normal years, the City of Corpus Christi would pump excess, partially-treated water into the aquifer storage area, which is not subject to water loss from evaporation. Water from the storage area could then be used during drought periods. A similar project by the San Antonio Water System stores over 90,000 acre-feet of water as an emergency supply.

Other potential future sources of water supply are still being researched and explored. A detailed list of water management solutions for the Coastal Bend Region can be found in the Region N 2011 Regional Water Plan, found at:

<https://www.twdb.state.tx.us/waterplanning/rwp/regions/n/>.

## 2.3 Water Customers

The District has wholesale, industrial and retail customers who purchase water from the supply system.

### *Wholesale Customers*

The wholesale customers are water utilities who purchase treated potable water in bulk, and then bill their own respective customers. The District provides treated water to wholesale customers. The following wholesale customers receive treated water: Cities of Odem, Taft, Portland, Ingleside, Aransas Pass and Rockport, Nueces County WCIDNo.4, Rincon WSC and Seaboard WSC. In addition, Sherwin Alumina and Gregory Power Partners purchase raw water, but are industrial, not wholesale customers.



### *Retail and Industrial Customers*

The remaining customers receive their water directly from the District. These retail customers are billed individually. They receive their water after it has gone through the District's treatment facility near Ingleside.

## **2.4 Water Treatment Plant**

The District operates a treatment facility near Ingleside. All raw water is pumped directly to the Plant from either the Nueces River or Lake Texana (via the Mary Rhodes Pipeline and Gene Dressen Pipeline). Nueces River water is blended with Lake Texana water at the Raw Water Blending Station near Taft and then stored at the Naismith Reservoir prior to entering the treatment facility. Water is then treated to meet drinking water standards of the Texas Commission on Environmental Quality (TCEQ). After being treated for human consumption, large pumps help to distribute water from the District to its wholesale water customers.

Approximately 10.6 billion gallons of water are treated each year. The District's Plant A is rated for 9 million gallons per day, Plant B is rated for 5.7 million gallons per day and Plant C is rated for 16 million gallons per day, which is well above the current peak summer demand of around 21.4 million gallons per day.

## **2.5 Transmission**

The District has a transmission network that transports water from the treatment facility to every customer, individual, industrial and wholesale. The District operates and maintains pumping stations and ground and elevated storage tanks, and transmission pipeline.

## **2.6 Master Meter**

In order to keep track of diverted water, the District uses a series of Master Meters from its points of diversion. The District uses two meters to track water use from the Nueces River system and the diversion point on the Mary Rhodes pipeline (Lake Texana water). There is also a meter at Corpus Christi's Cunningham plant to meter the District's take of treated water from Corpus Christi. In addition, District staff keeps monthly records through meters of ten other wholesale and industrial customers who take treated water from the District's system.

### 3. Demand Profile

This chapter explains demands placed on the water supply system of the District. Water demand is a measure of how much water is being used. Knowing current demand is critical for the District's daily operations. Projecting future demands helps District workers plan for future growth.

The region's population provides the basis of its water demands. Therefore this chapter will begin in 3.1 with an overview of current population figures of the District's customers.

The water demands in the Coastal Bend area are complex because of the various customers that the District serves. Besides the District's municipal customers, the District provides water to three large industrial customers. These people and businesses have their own unique water demands. In addition, there are other demands on the supply system, such as evaporation.

#### 3.1 Current Population

The population served by the San Patricio Municipal Water District is approximately 71,800 persons. Eight cities and two water supply corporations rely on the District for their water. The cities and their respective populations are shown in Table 3.1.

**Table 3.1 Populations (2010) of customers in the District's service area.**

<b>CUSTOMER</b>	<b>POPULATION SERVED</b>
City of Aransas Pass	9,688
City of Odem	2,701
City of Taft	3,661
City of Portland	18,786
City of Gregory	2,318
City of Ingleside/IOB	15,860
Nueces Co. #4	3300
City of Rockport/Fulton	10,672
Seaboard Water Supply	300
Rincon Water Supply	4500
<b>Total</b>	<b>71,786</b>

### 3.2 Raw Water Diversions

The raw water demand is the amount of water taken directly (diverted) out of the water supply system. It provides the most basic view of demand on the system and gives an overview of where the water is going.

After raw water has been diverted from either the Nueces River System or Lake Texana, it is pumped to the water treatment plant. The raw water customers have their own demands, based on product production (Treated water demands are explained in Section 3.4).

In 2011, the total amount of water that was diverted by the District was 21,853 acre-feet (7,120 bil gal). This included water from both the Nueces River System and Lake Texana. The District's raw water demand from the Nueces River System is shown below in Table 3.2.

**Table 3.2 Raw water demand (diversions) in 2011 from Nueces River System (acre- feet and million gallons).**

<b>Raw Water Customer</b>	<b>Diversion Amount (ac-ft)</b>	<b>Diversion Amount (MG)</b>
San Patricio MWD	11,476	3,739

The raw water demands of the San Patricio MWD from Lake Texana and Mary Rhodes Pipeline are shown below in Table 3.3.

**Table 3.3. Raw water demand (diversions) in 2011 from Lake Texas & Mary Rhodes Pipeline by SPMWD (acre-ft and million gallons).**

<b>Raw Water Customer</b>	<b>Diversion Amount (ac-ft)</b>	<b>Diversion Amount (MG)</b>
San Patricio MWD	10,377	3,381

In 2011, the District received 52% of its raw water from the Nueces River System and 48% from Lake Texana and the Mary Rhodes Pipeline.

### 3.3 Other Raw Water Demands

One uncontrolled demand of water placed on the supply system is evaporation. As mentioned in Chapter 2, the two reservoirs of the Nueces River supply system cover a large surface area of 45,240 acres when full. Because of this large area, combined with high evapotranspiration rates, water loss to evaporation is high, especially in recent hot, dry years. In 2011, the combined evaporation loss in Choke Canyon Reservoir and Lake Corpus Christi was 228,722 ac-ft (74.5 bil gal). This averages to 204 million gallons of evaporative loss per day in 2011.

Another raw water demand is environmental flow. After the impoundment of Choke Canyon Reservoir in 1982, freshwater flowing in the Nueces River Delta decreased dramatically. In order to maintain an ecosystem balance in the Delta, the City of Corpus Christi worked with TCEQ, the Nueces River Authority, and the City of Three Rivers to develop an Agreed Order in 1995. This document, revised in 2001, outlines required monthly freshwater inflows by the City of Corpus Christi into the Delta (Table 3.4). The 2001 Agreed Order is included in Appendix B.

**Table 3.4. Target Inflows to Nueces Bay from the 2001 Agreed Order (\*When lake levels are above 70%)**

Month	Target Inflows (ac-ft)	Month	Target Inflows (ac-ft)
January	2,500	July	6,500
February	2,500	August	6,500
March	3,500	September	28,500
April	3,500	October	20,000
May	25,500	November	9,000
June	25,000	December	4,500

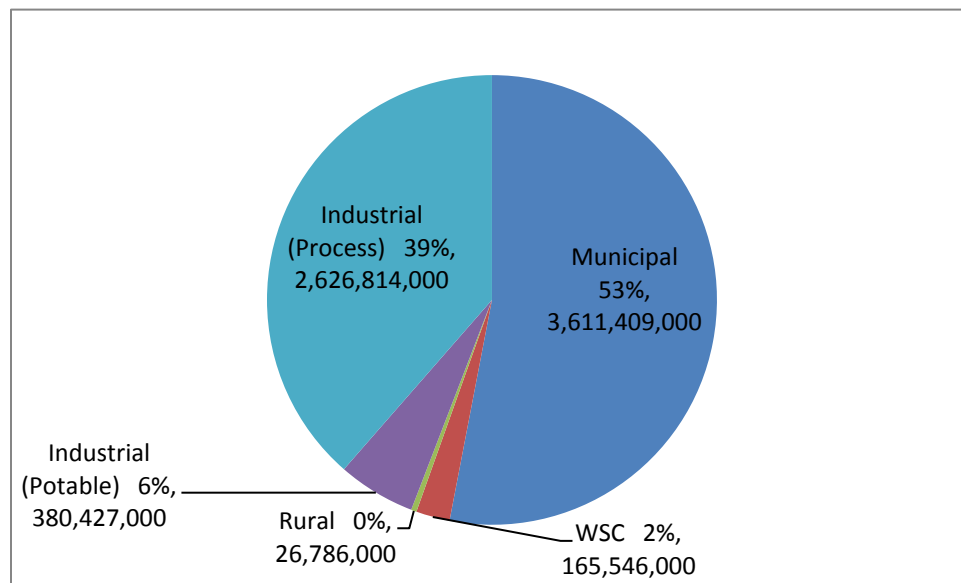
### 3.4 Treated Water Demands (Potable and Industrial)

This section focuses solely on the treated water customers of the District.

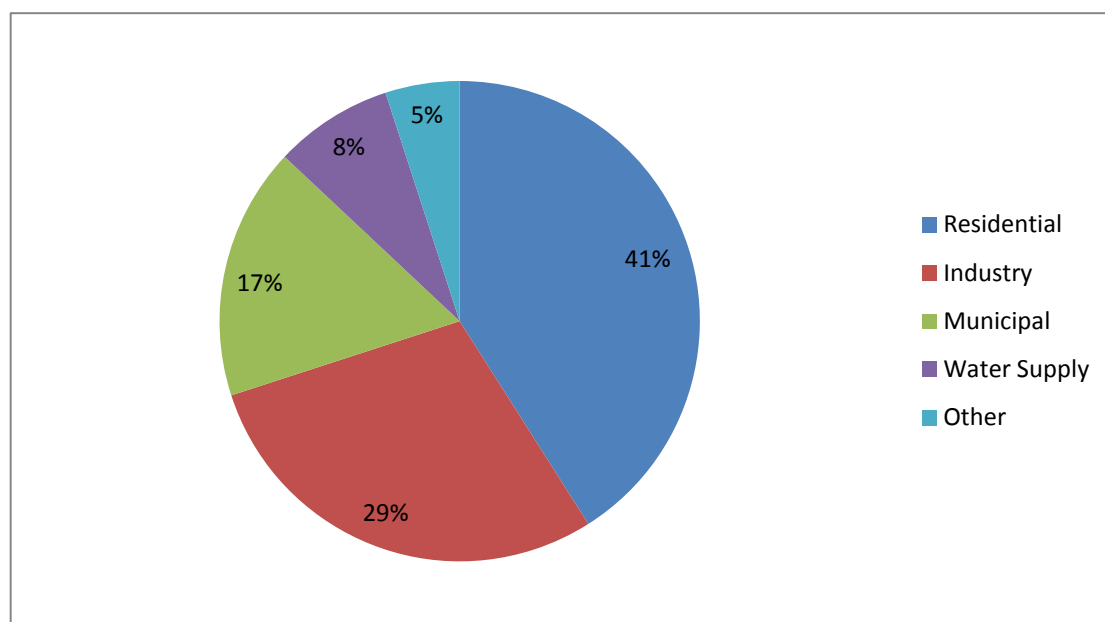
In 2011, the District billed the use of 12,841 ac-ft (4.184 bil gal) of potable water and 8,062 ac-ft (2.626 bil gal) of industrial treated water (water treated and sold directly to industry for process applications), coming from the treatment facility near Ingleside and the City of Corpus Christi O.N. Stevens Water Treatment Plant in Calallen. Of the 12,841 ac-ft of potable water, the O.N. Stevens supplied 3,269 ac-ft.

Separating treated potable demand by customer class, municipal customers represent the highest demand. Of the 12,841 ac-ft consumed in 2011, municipal customers used just over 11,592 ac-ft or 90 percent of the total. Industrial customers consumed 1,167 ac-ft (0.38 bil gal), representing 9 percent of the total. The remaining water was used by rural treated customers See Figure 3.1 below.

**Figure 3.1. Treated Water Use by Customer Class (Potable and Process)**



In 2011, there was a total of 62 treated water connections. These connections can be divided into the customer classes of residential, industrial, and wholesale. Figure 3.1.1. below shows a breakdown of connections by customer type. Residential customers make up the largest percentage of connections with forty-one percent. Following residential are industrial customers with twenty-nine percent of the connections and wholesale municipal and water supply customers with twenty-five percent of the connection.



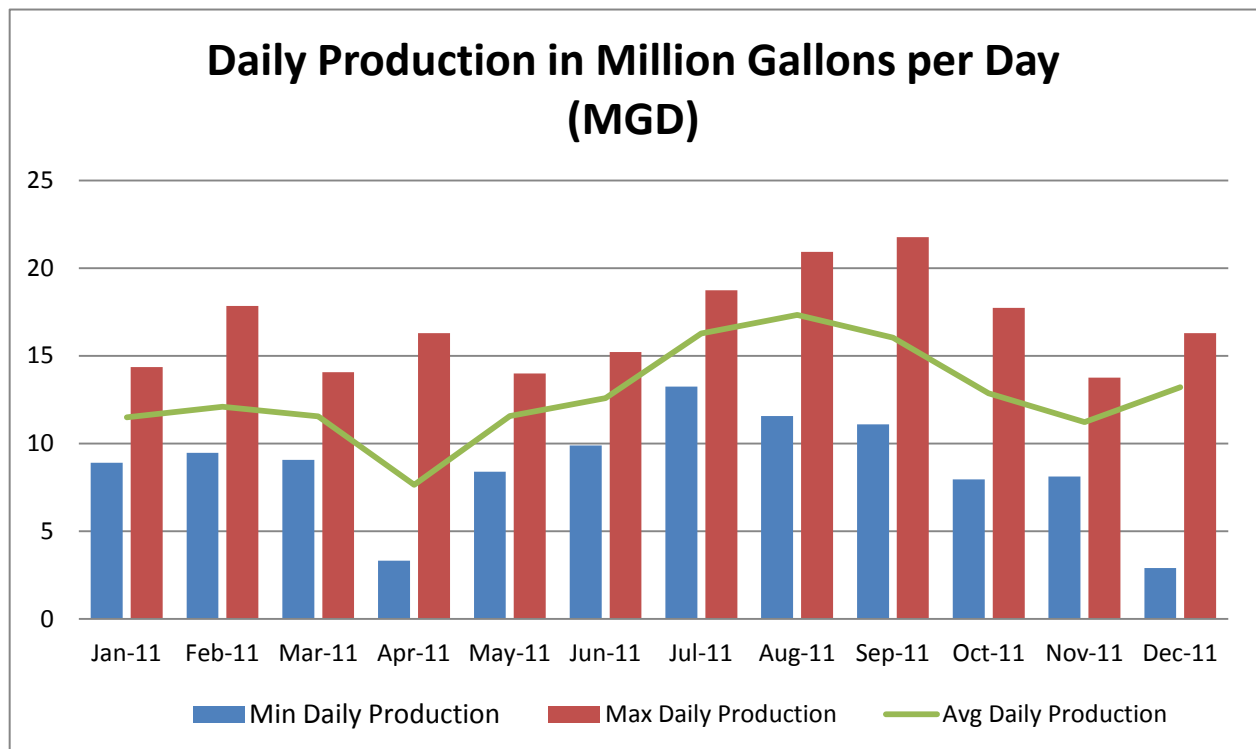
**Figure 3.1.1 2011 Connections by Customer Class (Treated Water Only)**

### 3.5 Seasonal Demands

Though the treated water demand for 2011 was 12,841 ac-ft (4.184 bil gal), the consumption was not evenly distributed throughout the year. The drought of 2011 was one of the worst in recorded history for Texas, so water demands for irrigation were high, especially during the summer months. This can be seen below in Figure 3.2, which shows seasonal demand of treated water in 2011. Customer demand on water ranged from 230 million gallons in February to 465 million gallons in August.

Seasonal demands by customers lead to “peak demands.” These peak demands put the most amount of stress on operations, including transmission and treatment. Figure 3.2 below shows daily potable treatment plant production volumes for each month of 2011 as minimums, maximums, and averages. The maximum values of each month (in red) represent the peak demand volume for that month.

**Figure 3.2. Daily production of treated potable water, showing seasonal demand as minimums, maximums, and averages for each month of 2011.**





### **3.6 Projected Populations and Demands**

The Texas Water Development Board estimates population projections for regional water planning groups. For SPMWD, they estimate that the population could reach 130,000 by the year 2060. This increase in population will result in an increase in water demand.

The TWDB estimates that municipal water demand (residential and commercial) for SPMWD will increase 40% by 2060, reaching 14,345 ac-ft per year. These projections are for SPMWD only. However, these projections only factor in a minor decrease in per capita water use from conservation measures. A more aggressive conservation program could help municipal demand level off or decrease, even with an increase in population. A goal of 1% annual reduction in municipal consumption would defer the need for additional supplies. This goal, along with others, is explained next in Chapter 4.

Projecting industrial consumption, which comprises over 50% of the District's water use, is challenging considering the large volumes that one additional customer can demand. The Region N Water Planning Group projects treated industry water demand could increase by 7,187 acre-feet by 2060.

## 4. Goals

This Chapter explains the water conservation goals of the District. These goals are what the District aims to achieve by the implementation of this Plan. Included in these goals are both qualitative goals and measureable, quantifiable goals. Before these goals are discussed, the first section (4.1) explains the benefits of conservation. This will give reason and justification for the District's conservation efforts and provide a driving factor for the goals.

### 4.1 Benefits of Conservation

There are several benefits to having a strong conservation program for San Patricio Municipal Water District. These benefits not only include maintaining the District's water supply, but also include saving the District and residents money by deferring capital expenses. Other benefits may be more difficult to quantify or may take years to materialize, but that does not lessen their importance. Each benefit of conservation listed below will help the District grow and thrive at a sustainable rate. The benefits of conservation include:

- Sustainable Water Supply – By reducing per capita water use, the District can grow without compromising supplies for future generations.
- Defers Capital Costs – Reductions in demand delay the need for new water supplies
- and thus defer the costs necessary to construct or buy new supplies. Reducing demand also delays other costs associated with new supplies such as electricity, labor, and treatment.
- Reduces Peak Demand – Peak demand puts the most stress on the District. Conservation measures would help to reduce this peak demand.
- Reduces Energy Costs – The District spends a significant portion of its electric bill on moving water through its transmission system. Conservation would reduce the amount of water pumped, thus reducing electric costs.
- More Environmental Inflows – By reducing water use, the City of Corpus Christi will have more stored water available to release into the Nueces Delta and Bay, providing needed freshwater inflows to the ecosystem.
- Less Rural Impact – By reducing water use, the City of Corpus Christi will not need to divert water from rural regions or construct a new reservoir on rural properties.

### 4.2 Water Planning/Conservation Goals and Objectives

The main, overall goal of this Plan is to *reduce total per capita consumption by one percent annually over the next decade*. This goal uses the 2011 figure of 144 gallons per capita per day (gpcd) as the benchmark for reduction. Another related goal is to reduce summertime peak demand. To achieve those goals, the District has several specific conservation objectives. Those objectives include

- Reduce water loss by one percent annually
- Educate the public on water conservation practices
- Educate the public on the District's water resources
- Convert some drought restrictions into regular conservation measures
- Adopt new water conservation regulations
- Enforce the conservation regulations
- Adopt a water-billing rate scale which encourages stronger conservation efforts
- Implement conservation measures at District-owned facilities

### 4.3 Five and Ten-Year Quantifiable Conservation Goals

As mentioned in the previous section, the goal of the Plan is to decrease total per capita water consumption by one percent each year. To track the progress of the goal, the District records the gpcd every year and sets five and ten year goals. This gpcd is measured by taking the volume of potable water produced by the Ingleside facility, excluding water sold to industrial customers, and dividing it by the permanent population and then dividing it by 365 days. There is high variability in annual consumption due to changes in weather. Residents tend to use much more water in dry years to keep landscape vegetation alive. The total gpcd, residential gpcd, and water loss are show in Tables 4.1-4.2 below. The five and ten year goals listed below in Table 4.3, and are based on a 1% annual reduction from the 2011 consumption of 144 gpcd.

**Table 4.1. Total Gallons Per Capita Per Day (gpcd) in 2011**

Total System Input in Gallons <sup>1</sup>	Permanent Population	Total gpcd <sup>2</sup>
<b>3,776,955,000</b>	<b>71,786</b>	<b>144</b>

1. Equals potable water produced – industrial consumption
2. Equals system input ÷ permanent population ÷ 365 days

**Table 4.2. Total Water Loss (Fiscal Year 2011)**

Total Water Loss in Gallons <sup>1</sup>	Permanent Population	Water Loss <sup>2</sup>	
		GPCD	Percent
<b>-134,965,000-</b>	<b>71,786</b>	<b>0</b>	<b>0</b>

1. Equals real + apparent + unidentified losses
2. Equals total water loss ÷ permanent population ÷ 365 days

**Table 4.3. Targets and Goals**

<b>Achieve Date</b>	<b>Target for Municipal GPCD</b>		<b>Target for Water Loss</b>	<b>Target for Water Loss Percentage</b>
<b>Five-Year Target Date: 2018</b>	<b>137</b>		<b>0</b>	<b>0</b>
<b>Ten-Year Target Date: 2023</b>	<b>130</b>		<b>0</b>	<b>0</b>

#### **4.4 Schedule for Implementing Plan**

In order to achieve the targets and goals of the plan, the District will use the schedule below in Table 4.4 to gradually introduce new or strengthen existing conservation measures and programs. These programs will utilize all and possibly additional measures as detailed in Chapter 5. The measures aim to reduce per capita water use through changes in habit, improvements in efficient devices, decreases in water waste, and smart planning. This schedule is not all inclusive and is a living document and is therefore subject to change.

Conservation Measure	Purpose	Target Date
School education	Educate youth about water resources and the importance of conservation	Ongoing
Public information	Educate the public about water conservation through several media outlets	Ongoing
Xeriscape education	Educate the public about Xeriscaping through the Xeriscape fliers and presentations symposium	Ongoing
Use of reclaimed water	Reduce potable demand by increasing the number of industries that are using reclaimed water for irrigation	Ongoing; private golf courses by December 1, 2013
System water audit and water loss	To identify areas of water loss to target remediation efforts	Annually
Prohibition on wasting water	Reduce consumption by prohibiting the wasting of water, regardless of drought conditions (see 5.2.1)	June 1, 2013
Irrigation Timing	To reduce evaporative loss and waste by prohibiting sprinkler irrigation between 10 am and 6 pm, regardless of drought conditions	June 1, 2013
Restaurant water saving	Reducing water waste by requiring restaurants to only serve water upon request	June 1, 2013
Irrigation consultation	Improve efficiency of irrigation system	August 1, 2013
Rainwater harvesting	Reduce potable demand by encouraging rainwater harvesting	August 1, 2013

## **5. Water Conservation Practices**

### **5.1 Introduction**

Water conservation is any practice that reduces the use of water, whether through changes in practices or improvements in the efficiencies of water devices. Reducing the use of water reduces the stress placed on water supplies and their ecosystems. It also frees up water supplies to allow for population and economic growth without having to search for “new” water. Conservation is a cost-effective and commonsense approach to ensuring a sustainable water supply for generations to come.

The District has a long-standing commitment to promoting water conservation in the community. It has adopted several practices, including public education that encourages a reduction in excessive water use. As was mentioned in Chapter 4 (Goals), the long term goal of the conservation program is to *reduce per capita water use by one percent per year over the next decade*. This Chapter highlights all of the ways that the District intends to reach that goal.

Chapter 5 includes sections (as noted) from the City of Corpus Christi WCP that may not pertain to the District, but were included for informational purposes to its wholesale customers as model programs. Chapter 5 begins with conservation measures (5.2). These are regulated best-management practices that are in effect year-round, regardless of the drought condition or the levels of the region’s reservoirs. Section 5.3 explains changes to development and building codes that could make buildings and landscapes more water efficient, while Section 5.4 explains the codes related to landscaping. Section 5.6, discusses City-Led Programs, including reclaimed water use, improvements to City-Owned properties, park water conservation, metering, system audits, and a water conservation staff. This is followed by Section 5.7, which highlights the educational efforts by the City, including both schools and public programs, and Section 5.8 on water conservation pricing. The last two parts of Section 5 explain coordination with the Region N Water Planning Group, methods to monitor the effectiveness of the various conservation practices, and means of implementation and enforcement.

### **5.2 Water Conservation Measures**

As water demands increase and water supplies become less available, it is critical that water conservation measures become regular, year-round best management practices. They are common sense approaches that reduce water waste and improve efficiency. This section lists those water conservation measures that are regulated and enforceable. They are the only measures in the WCP that are enforceable. Explanations of each of these conservation measures are shown below:

### *5.2.1 Prohibition on Wasting Water*

Under the Prohibition on Wasting Water Conservation Measure, it is unlawful to waste water. Actions leading to the wasting of water are prohibited and will be enforced. No person shall:

1. Allow water to run off property into gutters or streets.
2. Permit or maintain defective plumbing in a home, business establishment or any location where water is used on the premises. Defective plumbing includes out-of-repair water closets, underground leaks, defective or leaking faucets and taps.
3. Allow water to flow constantly through a tap, hydrant, valve, or otherwise by any use of water connected to the District water system.
4. Use any non-recycling decorative water fountain.
5. Allow irrigation heads or sprinklers to spray directly on paved surfaces such as driveways, parking lots, and sidewalks in public right-of-ways;
6. Operate an irrigation system at water pressure higher than recommended, causing heads to mist, or to operate with broken heads.

### *5.2.2 Irrigation Timing*

Landscape irrigation is most efficient during early-morning or nighttime hours, when there is less potential for evaporation from the sun. This conservation measure prohibits irrigation by spray or sprinklers between the hours of 10 am and 6 pm. It is still permissible to water by hand or by drip irrigation at any time of the day.

### *5.2.3 Restaurant Water Saving*

Under this conservation measure, commercial dining facilities must only serve water upon request. In addition, any hand-held dish-rinsing wand must have an automatic shut-off.

## **5.3 Future Updates to Codes (Included for Informational Purposes)**

Another water conservation practice that will help to conserve water in the long term is updates and improvements to codes. There are several model codes which could be updated or amended to include requirements for water conservation. A list of *potential* updates to codes is included below. The process of updating these codes is ongoing and will be included

in the WCP as an amendment when complete. *These bulleted items are proposed updates only and are listed here as a placeholder.*

- **Car Wash Water Conservation** – Many commercial car washes in the region do not recycle water in their operations. Under this proposed measure, new car washes using an automatic system would need to reuse a minimum of fifty (50) percent of water from vehicle rinses in subsequent washes. All car washes that are self-service would have to have spray wands that do not emit more than three (3) gallons of water per minute.
- **Water Saving Plumbing Fixtures** – This proposed conservation measure would require plumbing fixtures to meet or exceed the standards set by the WaterSense label of the Environmental Protection Agency (EPA). The fixtures would include gravity flush toilets, bathroom aerators, showerheads, and urinals. This measure would apply to new plumbing installations
- **Laundry Facility Conservation** – Under this proposed measure, any new installation of a coin-operated washing machine would have to meet or exceed the standards for the most current Energy Star label of the EPA and Department of Energy. This measure applies to any location that may have a coin operated facility, such as laundromats, apartment communities, or university residential buildings.
- **Cooling Tower Recycling** – This proposed conservation measure would require newly constructed cooling towers to utilize recycled water for a minimum of four (4) cycles.
- **Rainwater Harvesting** – This proposed conservation measure would require any new building construction with a minimum roof surface area of ten-thousand (10,000) square feet to install a rainwater collection system. The stored water could be used for non-potable indoor use and/or outdoor irrigation.
- **Condensate Collection** – Under this proposed measure, any new commercial building with an air conditioning system would be required to divert and collect the condensate water. This water could be used in cooling tower operation or landscape irrigation.
- **Xeriscape Landscaping** – This proposed measure would allow xeriscaping as an option for landscaping in any residential neighborhood or subdivision, regardless of deed restrictions. It also would require homebuilders and/or developers who are constructing new, single-family residential homes to offer a xeriscaping option.
- **Turfgrass Species Requirement** – This proposed conservation measure would promote the use of turfgrass appropriately suited for a particular site in order to save on irrigation water. For any new construction, the turfgrass species/variety installed on a property would have to be chosen from a list of approved species. In addition, irrigated turfgrass would not be able to exceed 50% of the landscaped area.



## **5.4 Landscaping Standard (Included for Informational Purposes)**

The City of Corpus Christi's Landscape Standard as part of its Unified Development Code (Section 7.3 of the UDC). This standard requires landscape plantings within commercial developments to enhance the beauty of the city. The ordinance assigns points to the various plant materials. To encourage the use of water-wise landscaping, drought-tolerant and low-water-use species are assigned a higher point value. To comply, a landscape design must surpass an established threshold number of points, which is achieved more easily with the water-wise and drought-tolerant plants.

## **5.5 Rebates and Incentive Programs (Included for Informational Purposes)**

This section explains the programs that the City of Corpus Christi offers to provide assistance to customers who wish to implement water conserving practices and should be considered as a model program. These programs include the current Plumbers to People program and proposed Rainwater Harvesting Rebate Programs and an Irrigation Consultation Program. Additional rebate and incentive options are being researched.

### *5.5.1 Plumbers to People*

Plumbers to People is an affordability program to provide plumbing assistance to low-income residential customers seeking to repair plumbing fixtures in their homes. The intent of the program is two-fold: (1) to eliminate the cycle of uncollected high water bills resulting from water leaks; (2) to promote water conservation.

Persons eligible for the program must contact the Utility Business Office (UBO) to identify their eligibility for the program. Eligibility is based on the individual's income limits and need for assistance.

The UBO office arranges for a contracted plumber to do repairs at the individual's home. The plumber will fix minor leaks or other issues, then send a report and invoice back to the UBO office.

### *5.5.2 Rainwater Harvesting Rebate*

The City of Corpus Christi is planning a rainwater harvesting rebate program and should be considered a model program. Under this program, customers of the Water Department will be eligible for a \$50 rebate for the purchase and installation of a rain barrel. The customer shall submit an application for the rebate and is subject to a system inspection by the Water Department. There will be specific requirements, such as a minimal size (55 gallons) and mandatory screening to prevent mosquito entry. The Water Department plans to begin the program in late 2013.

### *5.5.3 Irrigation Consultation Program*

The City of Corpus Christi is planning an Irrigation Consultation Program to reduce water waste and improve efficiency on large, existing irrigation systems and should be

considered as a model program. The service will be free to commercial sites and tells property owners how they can make meaningful changes to their irrigation system. It will begin with a consultation request from the property owner of a large irrigation system. The Water Department will coordinate a consultation with a contracted, licensed irrigator for that property. The licensed irrigator will perform a thorough inspection of the irrigation system's performance.

A report with recommendations will be provided to the property owner and the Water Department. The recommendations may include ways that the property owners can drastically reduce water consumption. The Water Department will analyze each report and may provide assistance with the recommended changes, depending on the cost and benefits. One year after the inspection, a follow-up will be performed to see if recommendations were implemented and how much water consumption was decreased.

The program will begin in late 2013 to only commercial water accounts.

## **5.6 City-Led Water Conservation Programs (Included for Informational Purposes)**

This section explains the programs that the City of Corpus Christi has initiated in order to improve its own efficiency and promote conservation to its residents. These programs are included as model programs that may be used by the customers of the San Patricio MWD. These programs include the use of reclaimed water, improvements in City-owned properties, park water conservation, accurate water metering, and a system to audit water loss. It also includes the use of a permanent, full-time water conservation staff.

### *5.6.1 Use of Reclaimed Water*

Reclaimed water by definition is, "Domestic or municipal wastewater which has been treated to a quality suitable for a beneficial use, pursuant to the provisions of this chapter and other applicable rules and permits" (30 TAC §210.3(24)). The City currently has five reclaimed water use customers and recognizes that the direct use of reclaimed water is an effective method of reducing potable water usage. Corpus Christi reclaimed water is used primarily for irrigating recreational tracts.

Historically, Corpus Christi began its reuse program in the early 1960s when it began delivering reclaimed effluent to its first customer, the Gabe Lozano Golf Course. Over the next several decades, the City acquired additional reuse customers which include other golf courses, parks, and recreational areas. Approximately 2.5 percent of the City's overall effluent flows are reused as reclaimed water.

In 2011, the City supplied 525 million gallons of reclaimed water to its irrigation customers, saving an estimated 100% of the same amount in potable water.

To facilitate expansion of its reuse program in the future, the City will identify and rank industrial, commercial, and institutional (ICI) customers according to volume of water use, and investigate the feasibility of using reclaimed water. The City will also

investigate reuse opportunities within its own accounts or with third parties outside its service area. The City owns several public areas that are candidates for reuse.

#### *5.6.1.a SPMWD Use of Reclaimed Water*

The District will continue implementation of an active water conservation education program. The District will actively pursue potentially feasible reuse or recycling options within its service area. This will specifically include reuse of municipal wastewater effluent and select industrial effluent streams.

The District will also work with existing and new water customers to prevent, where possible, contamination of wastewater streams with substances that might preclude the feasibility of reuse of the stream. Specific programs include:

1. Work with new industrial customers at the pre-design stage to assure that potential water conservation elements are included in the final plant process design, where feasible.
2. Reuse all backwash streams at the treatment plants site and maintain “zero discharge”.
3. Continued operation and maintenance of the Aransas Pass/Sherwin/Alcoa reclaimed water project.
4. Improved use of water treatment plant residual solids for land reclamation.
5. Cooperative programs with school districts addressing specific educational programs.
6. Working with public entities on xeriscape projects.
7. Working with Earth Day, Coastal Bend Bays and Estuaries Foundation, Informal Science Educators and other similar organizations.
8. Requiring new industrial customers to examine the feasibility of using reclaimed water for all or a portion of their fresh water needs.

#### *5.6.2 Improvements in City-owned Properties*

In order to be a representative of its conservation message, the City of Corpus Christi has pushed for increased xeriscape landscaping of City-owned properties. This includes water-wise landscaping at the Water Department building, and the Xeriscape Design Garden and Learning Center at the Museum and Science and History in downtown Corpus Christi (see Section 5.6.3). The Water Department will encourage the future conversion of City landscaping to more water-wise design.

Also, the City has been proactive in replacing out-dated, inefficient plumbing fixtures in its buildings. In addition, the City plans to install a rainwater harvesting system at the Water Utilities building to be used for on-site irrigation.

### *5.6.3 Identifying and Repairing Leaks*

The San Patricio Municipal Water District has a full team of employees committed to identifying and repairing leaks in water transmission throughout the City. A crew of round-the-clock responders follow the procedure below to find and fix a leak:

1. A first responder is sent to the location to identify and mark the priority of the leak. Response time is 30 minutes to an hour.
2. Crews begin to turn the needed valves to isolate the leaking line. Line locates are called in to mark all other utility lines in the area of the leak prior to repairs. Depending on the severity of the leak these locates can take up to approx. 24 hours.
3. After line locates are complete, Transmission Leak crews respond to the leak and make all needed repairs.
4. After repairs are complete, the crews back fill the area.

In addition, the District is using its SCADA system and automatic meter reading (AMR) system to identify leaks by alerting staff when there are unusual spikes in consumption.

### *5.6.4 Park Water Conservation*

The City of Corpus Christi Parks and Recreation Department manages two golf courses, two large City-wide parks, five recreation centers, four decorative fountains, eight public swimming pools, and more than 200 neighborhood parks, some with irrigated athletic fields.

Because many of the parks in the City require irrigation, it is critical that proper conservation measures are in place so the City demonstrates and promotes those measures to the public. The Water Department works with the Parks and Recreation Department to implement several water conservation practices within the park system. Some of these measures include:

1. Converting manual irrigation systems to automatic irrigation systems.
2. Including the parks properties in the water system audit.
3. Voluntarily adopting Landscape Ordinance provisions of the Corpus Christi Zoning Ordinance (explained in Section 5.2.12).
4. Replacing several spray irrigation heads with drip irrigation.

Some of the conservation measures that the City is pursuing for the future include:

1. Updating automatic irrigation systems with a “smart” Baseline Controller, which can remotely control up to 50 irrigation zones with 10 different programs. These include moisture sensors in the soil.
2. Implementing an irrigation consultation program to target specific areas where water efficiency improvements can be made.
3. Converting turfgrass species to more site-appropriate varieties to reduce water use.

To track the progress of water conservation in the parks, the Water Department will gather the following:

1. Water savings resulting from the offset of potable water use by irrigating with reclaimed waste water.
2. Water savings attributable to the repairs of leaks.
3. Changes to irrigation systems, retrofits, or upgrades; regular leak detection; maintenance policies, and estimated water savings from conservation practices.
4. Estimated water savings attributable to the changes implemented.
5. Costs of repairs, equipment upgrades, or new equipment installed.

The Water Department will evaluate data from sites before and after significant irrigation system changes or upgrades. The City maintains performance measure software to monitor the progress of leaks repaired. The Maximo software will identify individual categories to estimate the volume of water savings attributable to repairs of leaks.

#### *5.6.5 Metering All Connections*

Metering is a critical aspect in water conservation. It provides a method for customers to relate their water usage to their utility bill. For the City, meters help keep track of water use in order to target areas of inefficiency or locate areas where there may be potential leaks. New technology allows the city to track water use remotely and alert employees when there are spikes in water use among customers.

The following elements are part of the City's on-going metering program and the District will implement those items that are applicable:

1. Required metering of all connections.
2. A policy for installation of adequate, proper-sized meters as determined by a customer's current water use patterns.
3. Direct utility metering of each duplex, triplex, and four-plex unit, whether each is on its own separate lot or there are multiple buildings on a single commercial lot.
4. Metering of all utility and publicly owned facilities.
5. Use of construction meters and access keys to account for water used in new construction.
6. Implementation of the State requirements in HB 2404, passed by the 77<sup>th</sup> Legislature Regular Session and implemented through Texas Water Code 13.502, which requires all new apartments be either directly metered by the utility or submetered by the owner.
7. Annual testing and maintenance of all meters larger than two inches. Regular replacement of 5/8" and 3/4" meters after 15 years of service.
8. Replacement of meter registers or entire meter every eight years.
9. An accounting of water savings and revenue gains through the implementation of the Water Department's meter repair and replacement procedures.

Each year the Water Department estimates its annual water savings from the program. Savings can be estimated based upon a statistical sample analyzed as part of the meter repair and replacement program.

The City maintains a meter replacement policy based upon a customer's concern about the accuracy of his meter. Annual records of replaced meters are maintained through the City's Maximo software. Meter replacement takes precedence over meter repair due to the cost of repairing old meters. The City has improved efficiency and cut water loss by purging old meters and converting standard meters to automated meter reading (AMR.). The AMR program is a metering system that remotely records usage and accurately integrates that data into the billing system. Around 99 percent of the City's water meters have been installed with the AMR, benefiting the City by improving meter accuracy and reducing the cost of reading meters manually.

#### *5.6.6 Record Management*

The District has a system of record management to classify customers by sector for billing purposes and to keep track of water consumption by class. The billing system has the ability to categorize customers into sectors that can be summarized into those required by the Texas Water Development Board and the Texas Commission on Environmental Quality. These sectors include: residential (including single-family and multi-family); commercial; institutional; industrial; and wholesale .

#### *5.6.7 System Water Audit and Water Loss*

As with any infrastructure system, the District does have water loss between the treatment plant and the metering point. In order to reduce this water loss, the District performs an annual system water audit. This estimate of system water efficiency is achieved by comparing water delivered to the treatment plant, potable water produced, and water sold. The District tracks numerous leak detection and repair activities. Using this data from the audit, the City is able to focus on specific areas where improvements in efficiency can be achieved.

#### *5.6.8 Water Conservation Staff*

The District has a team of professionals who coordinate and implement water conservation programs for the District and its service area. They are critical to ensuring the success of the District's overall conservation program.

These employees are responsible for planning conservation programs; seeking and identifying new opportunities in conservation and water supply; program analysis; contributions as a member of regional workgroups; assistance with educational and promotional material; meetings with stakeholders; assistance with marketing strategies for conservation programs; assistance with annual conservation budget; preparation and submittal of annual conservation status reports of the District.

The employees are also responsible for the District's water public relations and marketing; implementing conservation programs; conservation education and marketing; coordinating with other departments and wholesale customers; coordinating programs within the District; development of marketing strategies for conservation programs; management of consultants, and contractors, when appropriate; preparation of annual conservation budget.

This conservation team takes part in several educational events and programs, which are explained in detail in section 5.7.

## 5.7 Education

One of the most effective ways to improve conservation and water-use efficiency is through education. The District is very active in educating its customers and has several programs to do so. The District has two purposes for its educational programs: to disseminate information and to change behavior. Information dissemination is education that makes the public aware of something timely, such as a current drought stage and its implications. A change in behavior occurs when education teaches the public practices that should be permanently adopted. Behavioral changes take place over a longer span of time than information dissemination, but both purposes are critical to a well-informed public. This section highlights the educational programs that the District plans, manages, and implements. These programs include school education, public information, and the water- wise landscape and conservation program.

### *5.7.1 School Education*

School education programs increase the viability of water conservation efforts, enhance the utility's public image, contribute to the attainment of Texas state education goals by students, and increase customer goodwill. The message conveyed by students to their families based upon greater knowledge of water sources and conservation can lead to behavioral changes resulting in both short- and long-term water savings.

The District and the City of Corpus Christi offer various school educational programs to all grade levels throughout the service area. These programs include:

- Major Rivers – Part of the 4th grade curriculum, the program educates students on water conservation, supply, treatment, distribution and conservation. The self-contained program offers academic and hands-on activities in math, language arts, science, and social studies, with teacher's guide geared to the interdisciplinary curriculum, as well as an introductory video and home information leaflets.
- Toby Globy Eco-Action – Introduced to school children in grades pre-kinder to second grade with classroom and special event visits by mascot Toby Globy, this locally produced bilingual program brings environmental awareness to primary grade school children in sing-along song and coloring books, a compact disc of recorded music in English and Spanish, environment-oriented classroom activities, posters, and a pictorial instruction booklet introducing solid waste and recycling, in addition to water conservation.
- Learning to be Water Wise – This program is used in 5th grade classrooms to connect science, math, language arts, and social studies with water conservation activities. Boxed kits, which include a toilet water displacement bag, toilet leak detector tablets, showerhead and faucet aerators, and instructions for repairing common toilet leaks, are given to each student.
- Workshop for Daycare Teachers – In a half-day-long workshop, pre-kinder to second grade teachers are introduced to age-appropriate water resources teaching aids,



including the educational program "Toby Globy Eco Action Team" and coloring books with a water-conservation message.

- Water Source Book – The Water Source Book, developed by the Water Environment Federation, reinforces water resource issues with hands-on classroom activities and experiments for grades 6 through 8. The classroom activities feature water, wastewater, and storm water experiments. This book is provided by the City to all local school resource libraries. Continuing education workshops introduce local classroom teachers to the Water Source Book. Teachers can utilize this teaching aid to satisfy certain TEKS objectives as established by the Texas Education Agency.
- Coastal Bend Teacher Resource Extravaganza – As a member of the Coastal Bend Informal Educators (CBIE), the City Water Department sponsors this event, which brings environmental resources to teachers throughout the Texas Education Agency Region 2 area. The City Water Department also participates in this annual event, offering valuable opportunities and resources for teachers, students and the general public.
- Museum of Science and History – The Corpus Christi Museum of Science and History houses an educational gazebo, targeted to children, featuring various showcases and an 8-foot interactive topographic map of the Nueces River Basin. The touch of a button activates lights and sound to explain the area's water resources. Displays throughout the Xeriscape Learning Center and Design Garden are used as teaching tools for children and adults.
- Other educational events – The Water Department provides age-appropriate water resources teaching materials at several public events. Materials include *Splash Activity Book*, *My Book About Water and How to Use it Wisely*, and *The Story of Drinking Water*. Spanish material is also available upon request.

The District continues to offer the programs mentioned above, being sure to stay up-to-date on any changing information related to water. They also continue to stay connected to local schools in order to identify any new potential opportunities.

To keep track of the impact of these various programs, the District records:

- The number of presentations made
- The number and type of curriculum materials developed and/or provided
- The number and percent of students reached by presentations and by curriculum
- The number of students reached outside the utility service area
- The number of in-service presentations or teacher's workshops conducted during reporting period
- The results of evaluation tools used
- Copies of program marketing and educational materials
- Annual budget for school education programs related to conservation.

Although water savings caused by school education programs are difficult to quantify, the retrofit kit included with the Learning to be Water Wise program has been shown to reduce domestic water use by 8,885 gallons per year per household.

### 5.7.2 Public Information



The District employs several types of media resources and modes of mass communication to present a compelling and consistent message about the importance of conservation and water use efficiency. The overall goal of the public information program is to raise awareness among customers of the regional water resources and the importance of conservation. The public information is also used to convey timely, urgent messages, such as those about drought or emergencies. Each year in June, the District mails a Consumer Confidence Report to every customer. This report is available online to anyone including new customers. It explains water quality and explains to customers where they can get more information on water conservation.

The City of Corpus Christi employs several methods to raise water resources awareness and to instill the importance of conservation in the community. As a partner in the Corpus Christi water system, the District benefits from the following:

- Multi-tiered media campaign – Annual television, radio, and print campaigns promoting water use efficiency. Agreements with radio and television stations provide for matching airtime for each ad purchased by the City of Corpus Christi.
- Billboard advertisement – Ads on billboards, bus benches, and other public spaces are used to promote water conservation and water quality.
- Website – The District's website includes tips on outdoor and indoor conservation, xeriscape landscaping, irrigation regulations, and educational materials for youth.
- Printed brochures – The District provides the public with printed brochures on various topics ranging from xeriscaping to indoor water conservation. They are produced by several entities, including the Water Department, the Texas Water Development Board, and Texas A&M AgriLife Extension and are available at multiple City of Corpus Christi locations and the District.
- School Education – Programs targeted to grade school children are explained in the School Education section (5.6.1).
- Xeriscape Learning Center and Design Garden – As part of the Corpus Christi Museum of Science and History, the Xeriscape Corpus Christi Steering Committee, in partnership with the City, maintains a xeriscape demonstration garden with more than 100 plant varieties. Within the garden an educational gazebo, The Water Story Exhibit, showcases an 8-foot interactive topographic map of the Nueces River Basin. A second gazebo named the Learning Center features practical landscape ideas and photographs. Educational Walk 'n' Talk Tours are held annually to enhance public education.

To track the progress and effectiveness of this educational effort, the District collects and tracks the following information:

- Number of activities, pieces of information distributed, and number of customers at an activity or program;
- Number of public school children who received instruction in water resources or water conservation;
- Number of news programs or advertisements that featured the water conservation message and how many customers had the opportunity to

- receive each message;
- Total budget by category for public information; and
- Results of annual or biannual customer survey and/or focus groups to determine the reach and impact of the program.

Water savings due to public information efforts are difficult to quantify. Water savings for other public information programs that result in specific actions by customers, such as changes in irrigation scheduling or reduction in water waste occurrences, may be quantified through surveys or analysis of water waste reporting in future years.

### *5.7.3 Water-Wise Landscape Design and Conservation Program*

The use of water for outdoor irrigation can often account for over 50% of a residential and commercial customer's consumption. The purpose of this program is to decrease both peak summertime water consumption and overall water use through the installation of water-wise landscapes at residential and commercial properties, and through improved efficiency of existing landscapes. Water-wise landscaping involves not only plant selection, but continued attention to appropriate irrigation and landscape maintenance. The program is multifaceted, implemented through a landscape standard (Section 5.4), school education (Section 5.7.1), public outreach (Section 5.7.2), and city-implemented measures (Section 5.6).

Below are some public-outreach programs explained in more detail that specialize in water-wise landscaping or emphasize the importance of using less outdoor water.

- *Xeriscape To-Go: Planning and Designing a Gardener's Dream* – This brochure, available in both print and online, was designed to educate local residents on the benefits of xeriscape landscaping. It features a list of plants suitable for the Coastal Bend and an explanation of the seven principles of xeriscaping.
- *Xeriscape: Landscape with Less Water* – A brochure detailing the seven principles of xeriscape.
- *Purple Water-Wise Plant Labels* – A brochure produced in cooperation with Xeriscape Corpus Christi, commercial nurseries, and Texas A&M AgriLife Extension to bring public awareness to lists of plants that are proven performers in the Coastal Bend since 2004. Water-wise plants are labeled with purple tags at commercial nurseries for easy identification. Purple labels are affixed to water-wise and drought-tolerant plants offered at retail nurseries.

To encourage the seven principles of xeriscape landscaping, the non-profit organization, Xeriscape Corpus Christi, was formed. The organization built and maintains a demonstration Xeriscape garden at the Museum of Science and History. The steering committee's members include the City of Corpus Christi Water Department, Storm Water Department, Park and Recreation Department, Corpus Christi Museum of Science and History, Friends of the Museum, Mayor's Water Conservation Advisory Committee, Nueces County Master Gardeners, and Texas A&M AgriLife Extension of Nueces County.

## **5.8 Water Conservation Pricing (Included for Informational Purposes)**

One of the most effective methods to influence water consumption is through changes in price structure. Water conservation pricing is a type of structure that promotes conservation by making the water rate higher as consumption increases. Another term for this type of structure is increasing block rate. The City of Corpus Christi has an increasing block rate structure for residential customers which is not “promotional.” It ensures that residents receive their most basic needed water at a reasonable price, which covers the fixed costs of the Water Department. They are billed on actual metered water use. As consumption goes into discretionary amounts, the price per gallon increases, resulting in a higher bill. A copy of the current water rate structure is attached as Appendix C.

At least annually, the Water Department staff will review consumption patterns (including seasonal use) and the income and expense levels to determine if the conservation rates are effective. They then make appropriate, regular rate structure adjustments as needed. In the past, such studies resulted in an elimination of the decreasing block rate for industrial accounts and increasing block rates for residential customers. In order to further encourage conservation, the Water Department will examine the follow potential pricing measures:

1. Seasonal rates to reduce peak demands during summer months.
2. Increasing block rates for other customer classes.
3. Restructuring of commercial rate structure to an increasing block rate.

The successful transition to a new rate structure will include public input and a process to educate the community about the new rate structure. Public involvement in the development and implementation of conservation rates helps to assure that the goals of the conservation pricing initiatives are met and accepted by local constituents. Public meetings, advisory groups, and public announcements are among ways to generate public involvement.

## **5.9 Coordination with Region N (Coastal Bend) Regional Water Planning Group**

The service area of the District is located within the Coastal Bend, designated as Region N Planning area, and the District has provided a copy of its Water Conservation and Drought Contingency Plan to the Coastal Bend Regional Water Planning Group (RWPG). The Region N Planning Group was initially appointed by the Texas Water Development Board (TWDB), under the authority of Senate Bill 1, and includes representatives from 12 interests including the public, counties, municipalities, industries, agriculture, the environment, small businesses, electric-generating utilities, port authorities, river authorities, water districts, and water utilities from across the region. This Plan is consistent with the District’s role as a leader in water supply planning in Region N, and meets the standards for water conservation planning in TAC Chapter 288.

The District has coordinated with the RWPG through the following measures:

1. The District presented the changes in the 2013 San Patricio Municipal Water District Water Conservation Plan to the Region N Water Planning Group. (Minutes from the Region N meetings can found at: <http://www.nueces-ra.org/CP/RWPG/minutes/index.php> ).
2. District staff members (in addition to RWPG representative) attend Planning Group meetings on a regular basis.
3. District staff has made formal comments (at meetings and in writing) at various times regarding issues with population and water demand projections and with selection of water management strategies.

### **5.10 Method to Monitor the Effectiveness of Conservation Measures**

The best way to monitor to the effectiveness of the conservation measures of this chapter is to track the per capita water use. As was mentioned in Chapter 4, the goal of this Plan is to reduce per capita water use (gcpd) by one percent each year over the next decade. Successful water conservation measures will result in a reduction of that per capita water use. Because water use can vary each year due to weather conditions, the District will consider rainfall amounts when analyzing water use.

### **5.11 Means of Implementation and Enforcement**

This Water Conservation Plan was approved by the SPMWD Board of Directors on August 13, 2013. The passage of this WCP provides the District the authority and guidance to implement the included conservation measures and programs.

The Board approval of the Plan provides the legal authority for the District to enforce certain conservation measures and all drought contingency measures. A copy of the meeting minutes approving the WCP and the DCP is attached as a supporting document.

### **5.12 Reservoir System Operating Plan**

Because all customers rely on the reservoir systems for their supplies, they are subject to the Reservoir Operating Plan. A copy of this is included in Appendix D.

## **6. Wholesale Customer Conservation**

### **6.1 Introduction**

The San Patricio Municipal Water District serves eight wholesale customers with treated water. As part of the 2013 Water Conservation Planning Process, the District has organized and held meetings with the wholesale customers to receive feedback on the revised Plan. Because these customers use the same source water as the District, it is important that they are kept informed and provide input into the District's decision making processes.

This chapter explains the conservation goals that the District encourages its wholesale customers to adopt. The District requires the wholesale customers to adopt conservation measures outlined in the Plan. It helps to ensure the region's water security and also ensures that customers are treated equitably. Section 6.5 explains the contractual requirements between the District and its wholesale customers.

### **6.2 Wholesale Customer Targets and Goals**

The best way to reduce water waste and increase conservation is to set targets and goals. As was mentioned in Chapter 4, the District has set a water conservation goal of one percent annual reduction in consumption. This amounts to 130 gcpd in 2023. The District, though it has no authority to require it, suggests to each its wholesale customers to also try to achieve a one percent annual reduction in consumption.

### **6.3 Metering, Monitoring, and Records Management**

The District meters all treated water delivered to its wholesale customers. By contract, these meters are calibrated on a semiannual basis, and must be accurate within 2 percent. The meters are read on a monthly basis for billing purposes.

A summary report is prepared, which aggregates all meter readings from wholesale raw water meters, wholesale treated water meters, and all retail customers, as well as the readings from the meters at the intake to the treatment facility near Ingleside

### **6.4 Leak Detection and Repair**

The treated water wholesale customers are supplied from portions of the District's transmission system. The meter location is the point of sale at which the water enters the customer's system. From there, it is the customer's responsibility to operate and maintain. The portions of the District's transmission system that serve these wholesale customers are subject to the same leak detection and repair program described Section 5.4.5, System Water Audit and Water Loss.

All treated water delivery systems from the wholesale customers to the end users are owned and operated by those customers. Therefore, they are responsible for any leak detection and repair programs as well as for unaccounted-for water. Wholesale customers are encouraged to voluntarily report their results to the District in order to promote cooperative efficiency efforts.

In addition, wholesale customers are encouraged to keep their water loss rates below ten percent.

## **6.5 Contractual Requirements**

The District has in place valid contracts with various wholesale customers including raw water contracts with municipal water suppliers: Cities of Odem, Taft Portland, Gregory, Ingleside, Aransas Pass and Rockport, along with Nueces County WCID No. 4 (Port Aransas), Rincon Water Supply corporation and Seaboard Water Supply Corporation. All of these contracts contain language related to water use restrictions in drought situations. Each contract has a section requiring the customer to accept shortages in supply, should natural or unforeseen circumstances prevent the District from delivering the water.

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

## **6.6 Reservoir System Operating Plan**

Because all of the wholesale customers rely on the reservoir systems for their supplies, they are subject to the Reservoir Operating Plan. A copy of this is included in Appendix D.

## **Appendix A**

### **Water Utility Profile**

## UTILITY PROFILE

Fill out this form as completely as possible.  
If fields do not apply to your entity, leave them blank.

### CONTACT INFORMATION

Name of Utility: San Patricio Municipal Water District

Public Water Supply Identification Number (PWS ID): 2050011

CCN Number: 10572

Water Rights ID Number: \_\_\_\_\_

Wastewater ID Number: \_\_\_\_\_

Check all that apply:



Retail Water Supplier



Wholesale Water Supplier



Wastewater Treatment Utility

Address: P O Box 940 City: Ingleside Zip Code: 78362

Email: kti@spmwd.net Telephone Number: 361-643-6521

Regional Water Planning Group: N [Map](#)

Groundwater Conservation District: San Patricio [Map](#)

Completed By: Karen Ivey Title: Assistant Secretary

Date: July 16, 2013

Check all that apply:



Received financial assistance of \$500,000 or more from TWDB



Have 3,300 or more retail connections



Have a water right with TCEQ



## Section I: Utility Data

### A. Population and Service Area Data

- Current service area size in square miles: 235  
(Attach or email a copy of the service area map.)
- Provide historical service area population for the previous five years, starting with the most current year.

Year	Historical Population Served By Retail Water Service	Historical Population Served By Wholesale Water Service	Historical Population Served By Wastewater Service
2008	100	58,500	0
2009	75	58,500	0
2010	75	58,500	0
2011	75	58,500	0
2012	75	71,786	0

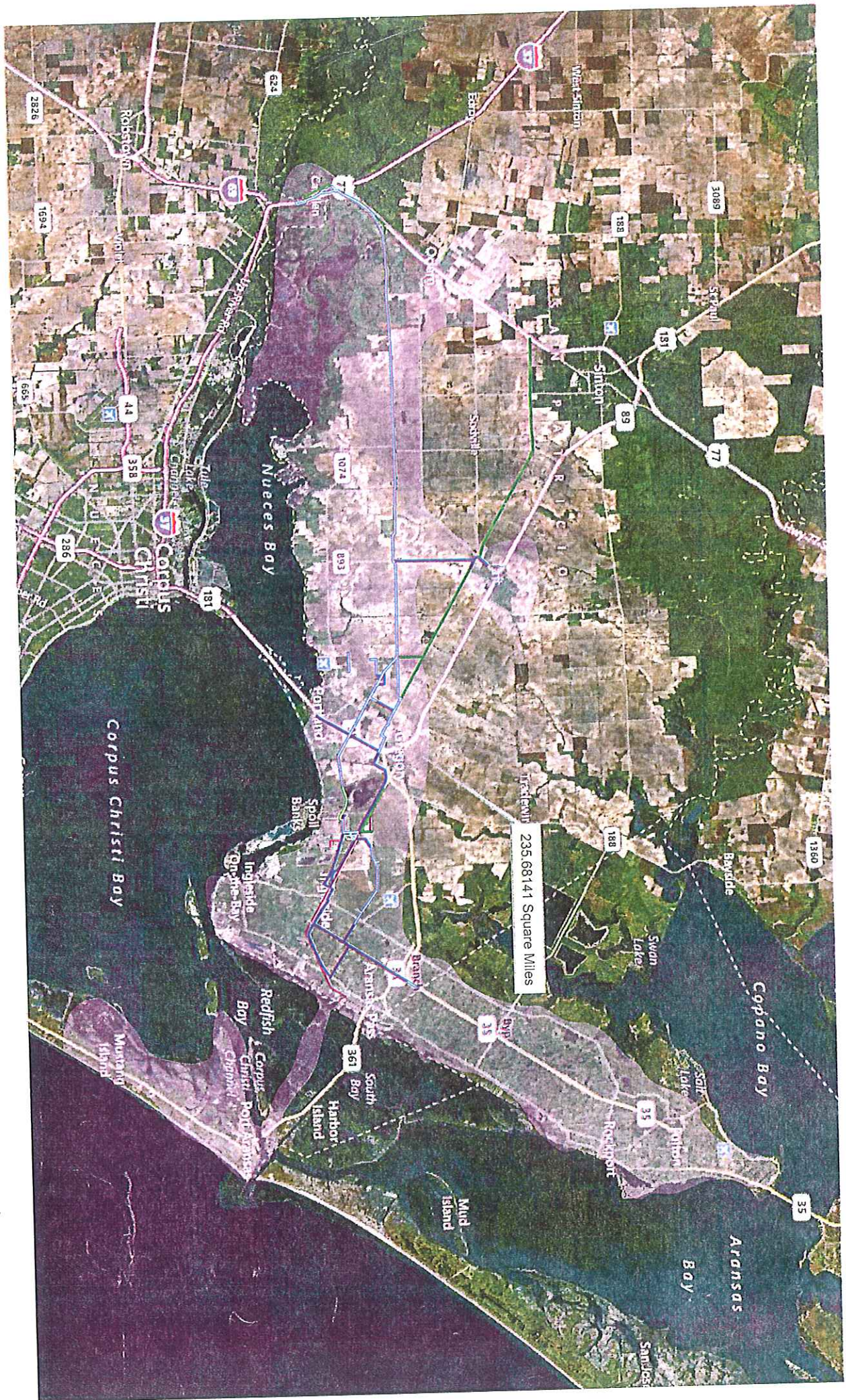
- Provide the projected service area population for the following decades.

Year	Projected Population Served By Retail Water Service	Projected Population Served By Wholesale Water Service	Projected Population Served By Wastewater Service
2020	75	96,888	0
2030	75	111,580	0
2040	75	124,177	0
2050	75	135,402	0
2060	75	145,778	0

- Describe the source(s)/method(s) for estimating current and projected populations.

Region N Plan - Coast Bend Region Population  
The District currently has 26 3/4-5/8" meters with retail use; each meter 3 household members. The District passed a resolution on September 14, 1982 that prohibited any retail service to any individual retail consumers; therefore, the projected population served by retail water service will be zero.







## B. System Input

Provide system input data for the previous five years.

Total System Input = Self-supplied + Imported – Exported

Year	Self-supplied Water in Gallons	Purchased/Imported Water in Gallons	Exported Water in Gallons	Total System Input
2008		7,680,326,000	7,752,764,000	-72,438,000
2009		7,948,612,000	7,978,866,000	-30,254,000
2010		6,941,107,000	6,957,771,000	-16,664,000
2011		8,183,316,000	8,318,281,000	-134,965,000
2012		7,955,226,000	8,161,221,000	-205,995,000

## C. Water Supply System (Attach description of water system)

- Designed daily capacity of system 31,000,000 gallons per day
- Storage Capacity:  
Elevated 250,000 gallons  
Ground 10,000,000 gallons

- List all current water supply sources in gallons:

Water Supply Source	Source Type*	Total Gallons
Nueces River	Surface water	4,289,675,000
Lake Texana	Surface water	3,322,361,000
City of Corpus Christi -	Contract	280,366,021
	Select	
	Select	
	Select	

\*Select one of the following source types: *Surface water, Groundwater, or Contract*

- If surface water is a source type, do you recycle backwash to the head of the plant?  
☐ Yes \_\_\_\_\_ estimated gallons per day  
☒ No

### **C. Water Supply System (Description)**

The San Patricio Municipal Water District is a governmental agency of the State of Texas created as a conservation and reclamation district under Article 8280, Section 145 of the Constitution pursuant to Chapter 12, Acts of the Legislature of Texas, Regular Session 1951, as amended. The District has the specific authority construct, conserve, distribute, treat, and purify, store and sell both surface and underground water to persons and corporations, both public and private, as well as political subdivisions of the State and others in San Patricio, Aransas, Refugio and Nueces counties.

The District supplies water for municipal and industrial use in a three-county service area. Major raw (untreated) water customers include three industries, Sherwin Alumina, Gregory Power Partners, and Nashtec. Treated potable water customers include the Cities of Odem, Taft, Portland, Gregory, Ingleside, Aransas Pass, and Rockport/Fulton. The District also serves treated water to Nueces County WCID #4 (Port Aransas), Rincon Water Supply Corporation, Seaboard Water Supply Corporation and Sherwin Alumina. The District provides treated process water directly to Occidental Chemical, Ingleside Cogeneration, DuPont and Air Liquide. The District operates a water laboratory and water maintenance activity that oversees the repair and replacement of raw and treated water transmission lines. The District stays in full compliance with all state and federal requirements.

4. The District does not recycle back to the head of the plant but all backwash water is sent to our industrial reservoir for industrial use. The District does not discharge any backwash water.

## D. Projected Demands

1. Estimate the water supply requirements for the next ten years using population trends, historical water use, economic growth, etc.

Year	Population	Water Demands (gallons)
2013	66,011	8,362,150,000
2014	66,399	8,792,850,000
2015	66,799	9,121,350,000
2016	67,183	11,439,100,000
2017	67,586	12,362,550,000
2018	67,998	12,592,500,000
2019	68,396	12,833,400,000
2020	68,760	13,088,900,000
2021	69,148	13,355,350,000
2022	69,528	13,610,850,000

2. Describe sources of data and how projected water demands were determined. Attach additional sheets if necessary.

The population projections are from the Texas State Data Center under the Texas Population Projections Program. The San Patricio Municipal Water District has summarized the projections of future water demands. I have used the water projections of the next ten years using this report. This report includes the industrial growth in the San Patricio county as well as the Municipal growth that is currently taking place in Portland, Gregory, Ingleside, and Aransas Pass. The combination of numerous large volume water users, population growth in the surrounding communities and support service companies, the District is projecting growth of peak water demand to be approximately 30 MGD within the following decade. Approximately 26 MGD of additional raw transmission and treatment capacity will be required by 2017. Within the decade of projections the industrial community will consume approximately 60% of the District's total water production.

## E. High Volume Customers

1. If applicable, list the annual water use for the five highest volume **RETAIL customers**. Select one of the following water use categories to describe the customer; choose Residential, Industrial, Commercial, Institutional, or Agricultural.

Retail Customer	Water Use Category*	Annual Water Use	Treated or Raw
Occidental Chemical	Industrial	1,517,209,000	Treated
Sherwin Alumina - Raw	Industrial	837,214,000	Raw
Gregory Power Partners	Industrial	615,400,000	Raw
E I Dupont	Industrial	525,456,000	Treated
Ingleside Cogeneration	Industrial	472,787,000	Treated

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

2. If applicable, list the annual water use for the five highest volume **WHOLESALE customers**. Select one of the following water use categories to describe the customer; choose Municipal, Industrial, Commercial, Institutional, or Agricultural.

Wholesale Customer	Water Use Category*	Annual Water Use	Treated or Raw
City of Rockport	Municipal	1,130,631,000	Treated
City of Portland	Municipal	770,669,000	Treated
City of Aransas Pass	Municipal	473,595,000	Treated
City of Ingleside	Municipal	409,082,000	Treated
Nueces County WCID #4	Municipal	212,383,000	Treated

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

## **Section II: Retail System Data**

If you do not provide retail water, go to Section III.

## A. Retail Connections

1. List the active retail connections by major water use category.

Water Use Category*	Active Retail Connections		
	Metered	Unmetered	Total Connections
Residential - Single Family	23		23
Residential – Multi-family (units)	0		0
Industrial	21		21
Commercial	8		8
Institutional			0
Agricultural	8		8
<b>TOTAL</b>	<b>60</b>	<b>0</b>	<b>60</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

2. List the net number of new retail connections by water use category for the previous five years.

Water Use Category*	Net Number of New Retail Connections				
	2008	2009	2010	2011	2012
Residential - Single Family	0		0	0	0
Residential – Multi-family (units)	0		0	0	0
Industrial	0		0	0	0
Commercial					
Institutional					
Agricultural					
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

## B. Retail Water Accounting Data - Water Use Categories

For the previous five years, enter the number of gallons of RETAIL water provided in each major water use category.

Water Use Category*	Total Gallons of Retail Water				
	2008	2009	2010	2011	2012
Residential - Single Family	28,496,000	42,129,000	33,271,000	25,071,000	20,723,000
Residential – Multi-family	0	0	0	0	0
Industrial	4,231,464,000	4,159,655,000	3,759,143,000	4,500,994,000	4,593,253,000
Commercial	1,041,000	25,036,000	1,278,000	12,950,000	915,000
Institutional	0	0	0	0	0
Agricultural	1,371,000	1,570,000	926,000	2,311,000	2,440,000
<b>TOTAL</b>	<b>4,262,372,000</b>	<b>4,228,390,000</b>	<b>3,794,618,000</b>	<b>4,541,326,000</b>	<b>4,617,331,000</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).



### C. Retail Water Accounting Data - Annual and Seasonal Use

For the previous five years, enter the number of gallons provided to RETAIL customers.

#### TREATED

	2008	2009	2010	2011	2012
January	265,804,000	197,868,000	213,734,000	217,854,000	274,053,000
February	221,177,000	193,246,000	188,294,000	221,055,000	211,927,000
March	233,895,000	233,890,000	238,255,000	276,730,000	203,727,000
April	245,351,000	223,533,000	215,898,000	251,988,000	209,915,000
May	234,676,000	211,945,000	195,272,000	244,415,000	290,102,000
June	259,038,000	281,006,000	263,001,000	298,620,000	281,158,000
July	293,070,000	262,916,000	253,008,000	265,997,000	309,782,000
August	252,944,000	266,461,000	279,481,000	313,117,000	301,803,000
September	289,976,000	269,616,000	251,021,000	262,005,000	268,935,000
October	231,507,000	239,826,000	149,501,000	226,565,000	272,988,000
November	156,308,000	185,487,000	238,218,000	252,058,000	237,900,000
December	215,013,000	227,484,000	224,519,000	203,623,000	300,910,000
<b>TOTAL</b>	2,898,759,000	2,793,278,000	2,710,202,000	3,034,027,000	3,163,200,000

#### RAW

	2008	2009	2010	2011	2012
January	108,002,000	93,409,000	75,373,000	74860000	120,830,000
February	91,421,000	129,036,000	72,606,000	75,676,000	97,604,000
March	61,858,000	117,611,000	72,446,000	68,940,000	96,330,000
April	119,608,000	119,244,000	75,112,000	110,599,000	131,513,000
May	88,443,000	174,902,000	98,597,000	113,821,000	111,794,000
June	189,760,000	139,404,000	137,533,000	200,577,000	115,862,000
July	133,223,000	152,929,000	86,840,000	162,401,000	89,586,000
August	89,227,000	170,977,000	89,580,000	154,830,000	209,439,000
September	116,684,000	99,561,000	106,332,000	161,940,000	133,181,000
October	97,553,000	82,363,000	87,418,000	104,990,000	89,207,000
November	149,402,000	81,289,000	112,611,000	161,686,000	129,888,000
December	118,432,000	74,387,000	70,972,000	116,979,000	128,897,000
<b>TOTAL</b>	1,363,613,000	1,435,112,000	1,085,420,000	1,507,299,000	1,454,131,000

<b>RETAIL</b>	2008	2009	2010	2011	2012	<b>Average in Gallons</b>
Summer Retail (Treated + Raw)	1,217,262,0	1,273,690	1,109,443,0	1,395,542,0	1,307,630,0	1,260,714,000 5yr Average
TOTAL Retail (Treated + Raw)	4,262,372,0	4,228,390	3,795,622,0	4,541,326,0	4,617,331,0	4,289,008,200 5yr Average

## D. Water Loss

Provide Water Loss Data for the previous five years.

Water Loss GPCD = [Total Water Loss in Gallons ÷ Permanent Population Served] ÷ 365

Water Loss Percentage = [Total Water Loss ÷ Total System Input] x 100

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2008	0	0	0%
2009	0	0	0%
2010	0	0	0%
2011	0	0	0%
2012	0	0	0%
5-year average	0	0	0%

## E. Peak Day Use

Provide the Average Daily Use and Peak Day Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Peak Factor
2008	-198,460	28,230,000	-142.25
2009	-82,888	30,890,000	-372.67
2010	-45,655	24,750,000	-542.11
2011	-369,767	30,680,000	-82.97
2012	-564,370	30,090,000	-53.32

## **Section III: Wholesale System Data**

If you do not provide wholesale water, go to Section IV.

## A. Wholesale Connections

1. List the active wholesale connections by major water use category.

Water Use Category*	Active Wholesale Connections		
	Metered	Unmetered	Total Connections
Municipal	15		15
Industrial			0
Commercial			0
Institutional			0
Agricultural			0
<b>TOTAL</b>	<b>15</b>	<b>0</b>	<b>15</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

2. List the net number of new wholesale connections by water use category for the previous five years.

Water Use Category*	Net Number of New Wholesale Connections				
	2008	2009	2010	2011	2012
Municipal	0	0	0	0	0
Industrial					
Commercial					
Institutional					
Agricultural					
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

## B. Wholesale Water Accounting Data - Water Use Categories

For the previous five years, enter the number of gallons of WHOLESale water exported (*sold or transferred*) to each major water use category.

Customer Category*	Total Gallons of Wholesale Water				
	2008	2009	2010	2011	2012
Municipal	3,490,392,000	3,750,476,000	3,163,153,000	3,776,955,000	3,544,890,000
Industrial					
Commercial					
Institutional					
Agricultural					
<b>TOTAL</b>	<b>3,490,392,000</b>	<b>3,750,476,000</b>	<b>3,163,153,000</b>	<b>3,776,955,000</b>	<b>3,544,890,000</b>

\*For definitions on recommended customer categories for classifying customer water use, refer to the [Guidance and Methodology for Reporting on Water Conservation and Water Use](#).

### C. Wholesale Water Accounting Data - Annual and Seasonal Use

For the previous five years, enter the number of gallons exported (*sold or transferred*) to WHOLESALE customers.

#### TREATED

	2008	2009	2010	2011	2012
January	282,907,000	269,795,000	219,278,000	236,200,000	270,854,000
February	221,180,000	246,570,000	213,569,000	229,658,000	214,897,000
March	260,456,000	301,480,000	250,431,000	284,013,000	268,334,000
April	298,019,000	318,559,000	251,923,000	282,949,000	255,673,000
May	280,003,000	328,078,000	268,445,000	291,203,000	315,476,000
June	373,396,000	415,071,000	354,139,000	382,905,000	340,315,000
July	334,848,000	445,372,000	252,044,000	422,596,000	346,994,000
August	290,051,000	414,573,000	325,303,000	464,928,000	403,248,000
September	317,633,000	302,848,000	258,117,000	347,385,000	319,678,000
October	286,662,000	248,585,000	258,611,000	288,490,000	307,482,000
November	234,185,000	213,062,000	266,250,000	309,877,000	241,624,000
December	311,052,000	246,483,000	245,043,000	236,751,000	260,315,000
<b>TOTAL</b>	3,490,392,000	3,750,476,000	3,163,153,000	3,776,955,000	3,544,890,000

#### RAW

	2008	2009	2010	2011	2012
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
<b>TOTAL</b>	0	0	0	0	0

WHOLESALE	2008	2009	2010	2011	2012	Average in Gallons
Summer Wholesale (Treated + Raw)	998,295,000	1,275,016	931,486,000	1,270,429,000	1,090,557,000	1,113,156,600 5yr Average
TOTAL Wholesale (Treated + Raw)	3,490,392,000	3,750,476,000	3,163,153,000	3,776,955,000	3,544,890,000	3,545,173,200 5yr Average

## D. Water Loss

Provide Water Loss Data for the previous five years.

Water Loss GPCD = [Total Water Loss in Gallons ÷ Permanent Population Served] ÷ 365

Water Loss Percentage = [Total Water Loss ÷ Total System Input] x 100

Year	Total Water Loss in Gallons	Water Loss in GPCD	Water Loss as a Percentage
2008	0	0	0%
2009	0	0	0%
2010	0	0	0%
2011	0	0	0%
2012	0	0	0%
5-year average	0	0	0%

## E. Peak Day Use

Provide the Average Daily Use and Peak Day Use for the previous five years.

Year	Average Daily Use (gal)	Peak Day Use (gal)	Peak Factor
2008	-198,460	29,006,000	-146.16
2009	-82,888	30,850,000	-372.19
2010	-45,655	26,880,000	-588.77
2011	-369,767	32,710,000	-88.46
2012	-564,370	31,330,000	-55.51

## Section IV: Wastewater System Data

If you do not provide wastewater system services then you have completed the Utility Profile. Save and Print this form to submit with your Plan. Continue with the [Water Conservation Plan Checklist](#) to complete your Water Conservation Plan.



**A. Wastewater System Data** (Attach a description of your wastewater system)

- Design capacity of wastewater treatment plant(s): \_\_\_\_\_  
**gallons per day.**
- Provide data on the types of recycling and reuse activities implemented during the current reporting period.

	<b>Total Annual Volume (in gallons)</b>
On-site irrigation	
Plant wash down	
Chlorination/de-chlorination	
Industrial	
Landscape irrigation (parks, golf courses)	
Agricultural	
Discharge to surface water	
Evaporation pond	<b>0</b>

- Could treated wastewater be substituted for potable water?  
☐ Yes      ☐ No

**B. Wastewater Data for Service Area**

- Percent of water service area served by wastewater system: \_\_\_\_\_%
- Monthly treated wastewater volume in gallons, for the previous five years.

	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

You have completed the Utility Profile. Save and Print this form to submit with your Plan.

Continue with the Water Conservation Plan Checklist to complete your Water Conservation Plan.

## **Appendix B**

### **TCEQ 2001 Agreed Order on Freshwater Inflows**

# TEXAS NATURAL RESOURCE CONSERVATION COMMISSION



## AN AGREED ORDER

Amending the operational procedures and continuing an Advisory Council pertaining to Special Condition 5.B., Certificate of Adjudication No. 21-3214; Docket No. 2001-0230-WR

On April 4, 2001, came to be considered before the Texas Natural Resource Conservation Commission ("Commission") the Motion by the City of Corpus Christi and Nueces River Authority for the adoption of an amendment to the Agreed Order issued April 28, 1995, establishing operating procedures pertaining to Special Condition 5.B., Certificate of Adjudication No. 21-3214, held by the City of Corpus Christi, the Nueces River Authority, and the City of Three Rivers" (the two cities and river authority shall be referred to herein as "Certificate Holders"). The Certificate Holders and the Executive Director of the Texas Natural Resource Conservation Commission have agreed to the provisions of this Agreed Order.

The City of Corpus Christi (managing entity) requests that Section 2 of this Agreed Order be amended to add further detail to the provisions regarding the use of water for bays and estuaries and to make changes in the required passage of inflows for the bays and estuaries automatic at 40 percent and 30 percent of total reservoir system capacity upon institution of mandatory outdoor watering restrictions. Additionally, Certificate Holders request the most recent bathymetric surveys be used for determining reservoir system storage capacity. The Certificate Holders request details be added regarding provisions for two projects to enhance/augment the amount of freshwater going into the receiving estuary and timelines for those projects.

After considering the proposals and the presentations of the parties, the Commission finds that it has authority to establish operational procedures under Special Condition 5.B. of Certificate of Adjudication No. 21-3214, and that operational procedures previously established should be amended. The Commission finds that, because of the need to continue to monitor the ecological environment and health of related living marine resources of the estuaries to assess the effectiveness of freshwater inflows provided by requirements contained in this Agreed Order relating to releases and spills from Choke Canyon Reservoir and Lake Corpus Christi (collectively referred to as the Reservoir System), as well as return flows, and to evaluate potential impacts which may occur to the reservoirs as well as to the availability of water to meet the needs of the Certificate Holders and their customers which may result from those operational procedures, the existing advisory council should be maintained to consider such additional information and related issues and to formulate recommendations for the Commission's review.

The Commission additionally finds that based on the preliminary application of the Texas Water Development Board's Mathematical Programming Optimization Model, (GRG-2), 138,000 acre-feet of fresh water is necessary to achieve maximum harvest in the Nueces Estuary; and, therefore, when water is impounded in the Lake Corpus Christi-Choke Canyon Reservoir System to the extent greater than 70 percent of the system's storage capacity, the delivery of 138,000

acre-feet of water to Nueces Bay and/or the Nueces Delta, by a combination of releases and spills, together with diversions and return flows noted below, should be accomplished; and that during periods when the reservoir system contains less than 70 percent storage capacity, reductions in releases and spills, along with diversions and return flows, are appropriate in that a satisfactory level of marine harvest will be sustained and the ecological health of the receiving estuaries will be maintained.

The Commission finds that return flows, other than to Nueces Bay and/or the Nueces Delta, that are delivered to Corpus Christi Bay and other receiving estuaries are currently in the assumed amount of 54,000 acre-feet per annum (per calendar year), and that they shall be credited at this amount until such time as it is shown that actual return flows to Corpus Christi Bay and other receiving estuaries exceed 54,000 acre-feet per annum.

The Commission finds that by contractual relationships, the City of Corpus Christi is the managing entity for operating the Reservoir System.

The Commission finds that the Motion by the City of Corpus Christi and Nueces River Authority to Amend this Agreed Order is reasonable and should be granted. Benefits of the proposed diversion project and operating changes will include increased water supply, increased reservoir storage levels, increased positive flow events for Rincon Bayou and the upper Nueces Delta, increased sources of nitrogen for the upper delta, and lower salinity levels in the upper delta.

When the Commission uses the word "release" in this Order, release means spills, inflow passage, intentional releases, and return flows; provided, however, under this Order no release from storage is required to meet conditions of this Order.

By consenting to the issuance of this Agreed Order, no party admits or denies any claim, nor waives with respect to any subsequent proceeding any interpretation or argument which may be contrary to the provisions of this Agreed Order.

**NOW, THEREFORE, BE IT ORDERED BY THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION THAT:**

1. a. The City of Corpus Christi, as operator of the Choke Canyon/Lake Corpus Christi reservoirs (the "Reservoir System"), shall provide not less than 151,000 acre-feet of water per annum (per calendar year) for the estuaries by a combination of releases and spills from the Reservoir System at Lake Corpus Christi Dam and return flows to Nueces and Corpus Christi Bays and other receiving estuaries (including such credits as may be appropriate for diversion of river flows and/or return flows to the Nueces Delta and/or Nueces Bay), as computed and to the extent provided for herein.
- b. When water impounded in the Reservoir System is greater than or equal to 70 percent of storage capacity, a target amount of 138,000 acre-feet is to be delivered to Nueces Bay and/or the Nueces Delta by a combination of releases and spills from

the Reservoir System as well as diversions and return flows. In accordance with the monthly schedule and except as provided otherwise in this Agreed Order, target inflows to Nueces Bay and/or the Nueces Delta shall be in the acre-foot amounts as follow:

January	2,500	July	6,500
February	2,500	August	6,500
March	3,500	September	28,500
April	3,500	October	20,000
May	25,500	November	9,000
June	25,500	December	4,500

It is expressly provided, however, that releases from Reservoir System storage shall not be required to satisfy the above targeted inflow amounts, as calculated in Subparagraph d.

- c. When water impounded in the Reservoir System is less than 70 percent but greater than or equal to 40 percent of storage capacity, a targeted amount of 97,000 acre-feet is to be delivered to Nueces Bay and/or the Nueces Delta by a combination of releases and spills from the Reservoir System as well as diversions and return flows. In accordance with the monthly schedule and except as provided otherwise in this Agreed Order, target inflows to Nueces Bay and/or the Nueces Delta shall be in the acre-foot amounts as follows:

January	2,500	July	4,500
February	2,500	August	5,000
March	3,500	September	11,500
April	3,500	October	9,000
May	23,500	November	4,000
June	23,000	December	4,500

It is expressly provided, however, that releases from Reservoir System storage shall not be required to satisfy the above targeted inflow amounts as calculated in Subparagraph d.

- d. The amounts of water required in subparagraphs 1.b. and 1.c. will consist of return flows, and intentional diversions, as well as spills and releases from the Reservoir System as defined in this subparagraph. For purposes of compliance with monthly targeted amounts prescribed above, the spills and releases described in this paragraph shall be measured at the U.S. Geological Survey stream monitoring station on the Nueces River at Calallen, Texas (USGS Station No. 08211500). Any inflows, including measured wastewater effluent and rainfall runoff meeting lawful discharge standards which are intentionally diverted to the upper Nueces Delta region, shall be credited toward the total inflow amount delivered to Nueces Bay and/or the Nueces

Delta. Inflow passage from the Reservoir System for the purpose of compliance with the monthly targeted amounts prescribed in subparagraphs 1.b. and 1.c. shall in no case exceed the estimated inflow to Lake Corpus Christi as if there were no impoundment of inflows at Choke Canyon Reservoir. The estimated inflow to Lake Corpus Christi as if there were no impoundment of inflows at Choke Canyon Reservoir shall be computed as the sum of the flows measured at the U.S. Geological Survey (USGS) STREAMFLOW GAGING STATIONS ON THE Nueces River near Three Rivers (USGS No. 08210000), Frio River at Tilden, Texas (USGS No. 08206600), and San Miguel Creek near Tilden, Texas (USGS No. 08206700) less computed releases and spills from Choke Canyon Reservoir.

- e. The passage of inflow necessary to meet the monthly targeted allocations may be distributed over the calendar month in a manner to be determined by the City. Relief from the above requirements shall be available under subparagraphs (1) or (2) below and Section 2.(b) and 3.(c) at the option of the City of Corpus Christi. However, passage of inflow may only be reduced under one of those subparagraphs below, for any given month.
  - (1) Inflows to Nueces Bay and/or the Nueces Delta in excess of the required monthly targeted amount may be credited for up to fifty (50) percent of the targeted requirement for the following month, based on the amount received.
  - (2) When the mean salinity in Upper Nueces Bay (Lat. 27°51'02", Long. 97°28'52") for a 10-day period, ending at any time during the calendar month for which the reduction of the passage of inflow is sought, is below the SUB\*, pass through of inflow from the reservoir system for that same calendar month may be reduced as follows:
    - (a) For any month other than May, June, September and October, if 5 parts per thousand (ppt) below the SUB for the month, a reduction of 25% of the current month's targeted Nueces Bay inflow;
    - (b) If 10 ppt below the SUB for the month, a reduction of 50 % of the current month's targeted Nueces Bay inflow except that credit under this provision is limited to 25 % during the months of May, June, September and October;

\* "SUB" means "salinity upper bounds" as set forth more specifically in Section 3.b.

- (c) If 15 ppt below the SUB for that month, a reduction of 75% of the current month's targeted Nueces Bay inflow.

- f. The City of Corpus Christi shall submit monthly reports to the Commission containing daily inflow amounts provided to the Nueces Estuary in accordance with this Agreed Order through releases, spills, return flows and other freshwater inflows.
- 2.
- a. Certificate holders are to provide in any future contracts or any amendments, modifications or changes to existing contracts the condition that all wholesale customers and any subsequent wholesale customers shall develop and have in effect a water conservation and drought management plan consistent with Commission rule. The City of Corpus Christi shall solicit from its customers and report to the Commission annually the result of conservation under the City's plan, the customers' plans, and the feasibility of implementing conservation plans and programs for all users of water from the reservoir system. This report shall be submitted with the Certificate Holder's annual water use report as provided by 31 T.A.C. §295.202.
  - b. The Certificate Holders may reduce targeted Nueces Bay inflows during times of prolonged drought in accordance with this subparagraph 2.
    - (1) When the combined storage in the Choke Canyon/Lake Corpus Christi reservoir system (Reservoir System Storage) falls below 50% of the total system storage capacity, the City of Corpus Christi shall issue public notice advising and informing the water users of the region of voluntary conservation measures that are requested immediately and required drought management measures to be taken should the Reservoir System Storage fall to under 40% and/or 30% of total system storage capacity. To the extent of its legal authority, the City of Corpus Christi shall require its wholesale customers to issue public notice advising and informing the water users of the region of voluntary conservation measures that are requested immediately and required drought management measures to be taken should the Reservoir System Storage fall to under 40% and/or 30% of total system storage capacity.
    - (2) In any month when Reservoir System Storage is less than 40%, but equal to or greater than 30% of total system storage capacity, the City of Corpus Christi shall implement time of day outdoor watering restrictions and shall reduce targeted inflows to Nueces Bay to 1,200 acre-feet per month (1,200 acre-feet per month represents the quantity of water that is the median inflow into Lake Corpus Christi during the drought of record). Time of day outdoor watering restrictions prohibit lawn watering between the hours of 10:00 o'clock a.m. and 6:00 o'clock p.m. and are subject to additional conditions as described in the City of Corpus Christi's approved "Water Conservation and Drought Contingency Plan ("Plan")." To the extent of its legal authority, the City of Corpus Christi shall require its wholesale customers to implement time of day outdoor watering restrictions similar to those of the City.

- (3) In any month when Reservoir System Storage is less than 30% of total system storage capacity, the City of Corpus Christi shall implement a lawn watering schedule in addition to time of day outdoor watering restrictions (see subparagraph 2.b.(2)) and shall suspend the passage of inflow from the Reservoir System for targeted inflows to Nueces Bay. However, return flows directed into Nueces Bay and/or the Nueces Delta shall continue. The lawn watering schedule shall allow customers to water lawns no oftener than every five days, subject to the time of day restrictions described in subparagraph 2.b.(2) and any additional conditions as described in the City's Plan.
  - (4) Certificate Holders' may implement whole or partial suspension of the passage of inflow through the reservoir as described above when the City implements, and requires its customers to implement, water conservation and drought management measures at diminished Reservoir System levels, as set forth in subparagraphs b.(2) and b.(3).
- c. For purposes of this Agreed Order, Reservoir System storage capacity shall be determined by the most recently completed bathymetric survey of each reservoir. As of 2001, completed bathymetric surveys of each reservoir reports conservation storage capacities of 695,271 acre-feet (below 220.5 feet mean sea level) for Choke Canyon Reservoir (Volumetric Survey of Choke Canyon Reservoir, TWDB September 23, 1993) and 241,241 acre-feet (below 94 feet mean sea level) for Lake Corpus Christi (Regional Water Supply Planning Study-Phase I Nueces River Basin, HDR, December, 1990).
- d. Percentage of the Reservoir System capacity shall be determined on a daily basis and shall govern, in part, the inflow to be passed through the reservoir during the remaining days of the month.
- e. Within the first ten days of each month, the City of Corpus Christi shall submit to the Commission a monthly report containing the daily capacity of the Reservoir System in percentages and mean sea levels as recorded for the previous month as well as reservoir surface areas and estimated inflows to Lake Corpus Christi assuming no impoundment of inflows at Choke Canyon Reservoir. The report shall indicate which gages or measuring devices were used to determine Reservoir System capacity and estimate inflows to Lake Corpus Christi.
- f. Concurrent with implementing subparagraphs 2.b.(1) through 2.b.(3), the City shall proceed to:
  - 1. Acquire land rights to properties necessary to re-open the Nueces River Overflow Channel and make the Nueces River Overflow Channel and Rincon Bayou Overflow Channel permanent features of the Rincon Bayou Diversion;



2. Construct and operate a conveyance facility to deliver up to 3,000 acre-feet per month of required Reservoir System "pass-throughs" directly from the Calallen Pool into the Upper Rincon Bayou by use of one or two of the five authorized points of diversion under Certificate of Adjudication No. 2464, being the existing San Patricio Municipal Water District point of diversion and/or a point on the North bank of the Calallen Pool located at Latitude 27.8823°N, Longitude 97.6254°W, also bearing S 27° 24' W, 4,739 feet from the southwest corner of the J.H.W. Ottman Survey, Abstract No. 212, San Patricio County, Texas, where the water will be pumped at the maximum rate of 45,000 gpm; and
3. Implement an on-going monitoring and assessment program designed to facilitate an "adaptive management" program for freshwater inflows into the Nueces Estuary.
4. Construction necessary to implement subparagraph 2.f.1. shall be accomplished by December 31, 2001 and work necessary to accomplish subparagraph 2.f.2. shall be accomplished by December 31, 2002.
5. In the event the City fails to timely complete the work set forth in subparagraphs 2.f.1. and 2.f.2., this amendment shall automatically terminate and the provisions of the Agreed Order of April 28, 1995 shall be reinstated and become operative despite this amendment, unless the Executive Director grants a modification after considering the recommendations of the Nueces Estuary Advisory Council.

- g. The Executive Director is delegated authority to make modifications to subparagraph 2.f., after considering the recommendations of the Nueces Estuary Advisory Council. However, changes may be made through this process only with the City's consent if the changes result in increased costs to the City.

If the Executive Director makes modifications to subparagraph 2.f. as authorized in this paragraph, any affected person may file with the chief clerk a motion for reconsideration of the Executive Director's action no later than 23 days after the date the Executive Director mails notice of the modification to the City. This motion shall be considered under the provisions of 30 Texas Administrative Code § 50.39(d) and (e).

- h. The City shall obtain all necessary permits from the Commission before beginning these projects. The deadlines set out above include time necessary to apply for, process and, if necessary, complete hearings on these permits.
3. a. The City of Corpus Christi, with the assistance and/or participation of federal, state and local entities, shall maintain a monitoring program to assess the effect of this

operating plan on Nueces Bay. The cornerstone of this program is the development of a salinity monitoring program. The program shall include at least two monitoring stations, one in upper Nueces Bay (Lat. 27°51'02", Long. 97°28'52") and one in mid Nueces Bay (Lat. 27°51'25", Long. 97°25'28") with the capability of providing continuous salinity and/or conductivity data, temperature, pH, and dissolved oxygen levels. Additional stations may be established at the recommendation of the Advisory Council (continued by paragraph 4 of this Agreed Order) to assess inflow effects throughout the estuarine system, but the City shall not be obligated to establish such additional stations except to the extent authorized by its City Council.

- b. The City of Corpus Christi or its designated representatives shall monitor salinity levels in Upper and Mid-Nueces Bay. The lower (SLB) and upper (SUB) salinity bounds (in parts per thousand-ppt) developed for application of the Texas Estuarine Mathematical Programming Model and considered appropriate for use herein, are as follows:

	SLB	SUB		SLB	SUB
January	5	30	July	2	25
February	5	30	August	2	25
March	5	30	September	5	20
April	5	30	October	5	30
May	1	20	November	5	30
June	1	20	December	5	30

- c. When the average salinity for the third week (the third week includes the seven days from the 15th through 21st) of any month is at or below the subsequent month's established SLB for upper Nueces Bay (Lat. 27°51'02", Long. 97°28'52"), no releases from the Reservoir System to satisfy targeted Nueces Bay inflow mounts shall be required for that subsequent month.
- d. All data collected as a result of the monitoring program required by paragraph 3 of this Agreed Order shall be submitted monthly to the Commission within the first ten days of the immediately following month. The Nueces Estuary Advisory Council shall study the feasibility of developing a method of granting credits for inflows which exceed the required amounts to replace the credits that are set out in subparagraph 1.e.(1) and make recommendations to the Commission for possible implementation. That method shall have as its goal the maintenance of the proper ecological environment and health of related living marine resources and the provision of maximum reasonable credits towards monthly inflow requirements.
4. a. To assist the Commission in monitoring implementation of this Order and making recommendations to the Commission relating to any changes to this Agreed Order and the establishment of future operating procedures, the Nueces Estuary Advisory

Council shall be continued. Its members shall include, but are not limited to a qualified representative chosen by each of the following entities or groups: the Executive Director of the Texas Natural Resource Conservation Commission, whose representative shall serve as chair; the Texas Water Development Board; the Texas Parks and Wildlife Department; the Texas Department of Health; the General Land Office; the holders of Certificate of Adjudication No. 21-3214 (the Cities of Corpus Christi and Three Rivers and the Nueces River Authority; the University of Texas Marine Science Institute; Texas A&M University - Corpus Christi; Save Lake Corpus Christi; Corpus Christi Chamber of Commerce; the City of Mathis; Coastal Bend Bays and Estuaries Program, Inc.; a commercial bay fishing group; a conservation group (e.g. the Sierra Club and the Coastal Bend Bays Foundation); wholesale water suppliers who are customers of the Certificate Holders (e.g., the South Texas Water Authority and the San Patricio Municipal Water District); the Port of Corpus Christi Authority; and a representative of industry. The representatives should have experience and knowledge relating to current or future water use and management or environmental and economic needs of the Coastal Bend area.

- b. No modification shall be made to this Order without the unanimous consent of the Certificate Holders, except to the extent provided by law.
- c. Matters to be studied by the Nueces Estuary Advisory Council and upon which the Executive Director shall certify recommendations to the Commission shall include, but are not limited to:
  - (1) the effectiveness of the inflow requirements contained in this Agreed Order on Nueces Estuary and any recommended changes;
  - (2) the effect of the releases from the Reservoir System upon the aquatic and wildlife habitat and other beneficial and recreational uses of Choke Canyon Reservoir and Lake Corpus Christi;
  - (3) the development and implementation of a short and long-term regional water management plan for the Coastal Bend Area;
  - (4) the salinity level to be applied in Paragraphs 1.e. and 3.c., at which targeted inflows in the subsequent month may be suspended;
  - (5) the feasibility of discharges at locations where the increased biological productivity justifies an inflow credit computed by multiplying the amount of discharge by a number greater than one; and development of a methodology for granting credits for inflows which exceed the required amount to replace the credits that are set out in subparagraph 1.e. That methodology shall have as its goal the maintenance of the proper ecological

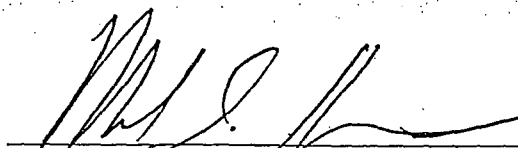
environment and health of related living marine resources and the provision of maximum reasonable credits towards monthly inflow requirements; and,

(6) any other matter pertinent to the conditions contained in this Agreed Order.

5. This Agreed Order shall remain in effect until amended or superseded by the Commission.

Issued date: APR 05 2001

TEXAS NATURAL RESOURCE  
CONSERVATION COMMISSION

  
Robert J. Huston, Chairman

## **Appendix C**

### **SPMWD Water Rates**

**SAN PATRICIO MUNICIPAL WATER DISTRICT  
2013 RATE SCHEDULE**

Adopted December 4, 2012

BE IT RESOLVED by the Board of Directors of the San Patricio Municipal Water District that all previous rate schedules, resolutions or directives be rescinded and that the following rate schedule and resolution be adopted by the District, effective on the 31st day of December, 2012. All water rates are subject to revision and to the provisions of the District's supply contract with the City of Corpus Christi.

**SCHEDULE A-POTABLE WATER**

The monthly rates for sale of Potable Water to users having Retail Water Service Agreements (other than Municipal or Contractual\*) are hereby established as follows:

<u>Min. Monthly Usage</u>	<u>Meter Size</u>	<u>Min. Monthly Charge</u>
3000	5/8" x 3/4" meters	\$ 17.05
4000	1" meters	21.10
5000	1-1/2" meters	25.20
6000	2" meters	29.30
12000	3" meters	52.20
26000	4" meters	111.80

All usage over the minimum monthly billed at \$4.40 per 1000 gallons.

\*All 6" or larger customers shall be contractual users and the rate set by the Board of Directors.

**SCHEDULE B-UNTREATED WATER**

The monthly rates for sale of Untreated Water to users having Retail Water Service Agreements (other than Contractual users\*\*) are hereby established as follows:

<u>Min. Monthly Usage</u>	<u>Meter Size</u>	<u>Min. Monthly Charge</u>
3000	5/8" x 3/4" meters	\$ 19.20
4000	1" meters	22.05
6000	1-1/2" meters	28.05
9000	2" meters	35.60
50000	3" meters	157.40
110000	4" meters	315.80
250000	10" meters	750.00

All usage over minimum monthly billed at \$2.90 per 1000 gallons.

\*\*All untreated water users in excess of 300,000 gallons per month shall be by special contract based on water cost, delivery cost, operation, overhead and maintenance costs and other necessary costs of the District.

**CONNECTION CHARGES**

A connection charge of \$25.00 is required from all new customers. A reconnect charge of \$35.00 is required to establish any service terminated for non-payment.

Two inch (2") Oil Rig connections to be billed a \$250.00 connection charge, with an additional \$500.00 refundable deposit which may be applied to the water bill at the termination of service.

All new taps will be billed at actual tapping and connection cost, cost of meter, valves, other materials and labor.

**MUNICIPAL \$2.64 per thousand**

Agenda for APPROVAL by the Board of Directors of the San Patricio Municipal Water District, the 4<sup>th</sup> day of December, 2012.

Rebecca Krumnow, Secretary/Treasurer





## **Appendix D**

### **Reservoir Operating Plan**

OPERATIONS PLAN FOR THE  
LAKE CORPUS CHRISTI-CHOKE CANYON RESERVOIR SYSTEM

The following operations plan for the Lake Corpus Christi –Choke Canyon Reservoir water system provides for the two reservoirs to be operated as a regional water supply with primary purpose to be furnishings a dependable supply to the people in the Coastal Bend area. The plan also recognizes the need for the recreational facilities for public use and the Texas Water Commission adjudicated water permit which requires a minimum flow of 151,000 acre-feet of water annually to bays and estuaries from return flows, spills, or fresh water releases from Lake Corpus Christi once Choke Canyon Reservoir fills.

The Plan consists of four phases of operation depending on the water levels in the two reservoirs.

PHASE I - This phase applies only to the initial filling period of Choke Canyon Reservoir. It is necessary that this reservoir be filled at the earliest opportunity so that all structures and mechanical equipment can be tested. Initial filling of the reservoir also triggers the requirement that minimal flows be made available for bays and estuaries.

1. During the initial period, only the releases requires required by agreement between the City of Corpus Christi and the Texas Parks and Wildlife Department, varying between 15 and 33 cubic feet per second depending on the reservoir level, will be made unless Lake Corpus Christi elevation falls below elevation 86 feet.
2. If water user demand is less than 200,000 acre-feet annually and Lake Corpus Christi is at elevation 86 feet, water will be released from Choke Canyon to maintain this elevation until Choke Canyon Reservoir falls to elevation 184 feet.
3. When Lake Corpus Christi has fallen to elevation 86 feet and Choke Canyon has fallen to elevation 184 feet, Lake Corpus Christi will be allowed to drop to elevation 76 feet, at which time water will be released from Choke Canyon to allow user's intake structures at Lake Corpus Christi to be used.
4. Should water user demand excess 200,000 acre-feet annually, the water level of Lake Corpus Christi will be allowed to drop to elevation 76 feet prior to releases from Choke Canyon Reservoir.

PHASE II - This phase applies after Choke Canyon Reservoir is filled and water user demand is less than 150,000 acre-feet annually.

1. A minimum of 2,000 acre-feet per month will be released from Choke Canyon Reservoir to meet conditions of the release agreement between City of Corpus Christi and the Texas Parks and Wildlife Department.

2. Whenever Lake Corpus Christ water surface falls to elevation 88 feet and Choke Canyon Reservoir surface elevation is above 204 feet, releases will be made from Choke Canyon Reservoir to maintain Lake Corpus Christi surface at elevation 88 feet.
3. Whenever Lake Corpus Christi water surface is at or below elevation 88 feet and Choke Canyon Reservoir surface elevation is below 204 feet, the Choke Canyon release for the current month is made equal to the Lake Corpus Christi release from the preceding month. This minimizes drawdown at Lake Corpus Christi for recreation purposes and promotes a more constant quality of water by mixing Choke Canyon Reservoir releases with Lake Corpus Christi content.

PHASE III - This phase applies after Choke Canyon Reservoir is filled and water user demand is between 150,000 and 200,000 acre-feet annually. During this period, water release plan prepared by the Bureau of Reclamation will be followed to produce a dependable yield of 252,000 acre-feet.

1. A minimum of 200,000 acre-feet per month will be releases from Choke Canyon Reservoir to meet conditions of the release agreement between the City of Corpus Christi and the Texas Parks and Wildlife Department.
2. Whenever Lake Corpus Christi water surface is at or below elevation 88 feet, and the ratio of Choke Canyon Reservoir content to Lake Corpus Christi content (both at the end of the preceding month) exceeds the corresponding ratio with 6-foot drawdown at both reservoirs, the Choke Canyon Reservoir release for the current month is made equal to the Lake Corpus Christi release during the preceding month. This equalizes drawdown at the two reservoirs for recreation purposes and promotes a more constant quality of water by mixing Choke Canyon Reservoir releases with Lake Corpus Christi content.

PHASE IV - This phase applies after Choke Canyon Reservoir is filled, water user demand exceeds 200,000 acre-feet annually, and developed long-term supply is less than 300,000 acre-feet annually.

1. A minimum of 2,000 acre-feet per month will be released from Choke Canyon Reservoir to meet conditions of the release agreement between the City of Corpus Christi and the Texas Parks and Wildlife Department.
2. In order to provide maximum dependable yield from the two reservoirs, the water level in Lake Corpus Christi will be allowed to drop top elevation 74.0 feet (Ordinance Changed #022661) before water is released from Choke Canyon Reservoir in excess of the 2,000 acre-feet per month requirement. When the elevation of Choke Canyon Reservoir drops to 155 feet, Lake Corpus Christi will be lowered to its minimum elevation.

# LAKE CORPUS CHRISTI-CHOKE CANYON RESERVOIR STATISTICAL DATA

	<u>Capacity, Acre-Feet*</u>	<u>Water Elevation When Full, Feet</u>	<u>Minimum Functional Elevation, Feet</u>
Lake Corpus Christi	272,000	94.0	76.0
Choke Canyon Reservoir	692,000	220.5	147.5

Intake Structure Elevations of Customers Withdrawing Water Directly from Lake Corpus Christi:

	<u>Elevation, Feet</u>
City of Mathis	73.0
Beeville Water Authority	74.0
Alice Water Authority	67.0
City of Corpus Christi	55.0

Annual Lake Corpus Christi Withdrawals:

<u>Fiscal Year</u>	<u>Total Withdrawn From Lake, Acre-Feet</u>
1975-76 . . . . .	86,416
1976-77 . . . . .	86,408
1977-78 . . . . .	101,596
1978-79 . . . . .	96,029
1979-80 . . . . .	106,851
1980-81 . . . . .	104,657
1981-82 . . . . .	107,002
1982-83 . . . . .	107,348
1983-84 . . . . .	119,701
1984-85 . . . . .	90,226
1985-86 . . . . .	105,469

\* 1 acre-foot = 325,850 gallons