Coastal Bend Regional Water Planning Area

2011 Regional Water Plan

Study 5
Region-Specific Water Conservation
Best Management Practices (BMPs)

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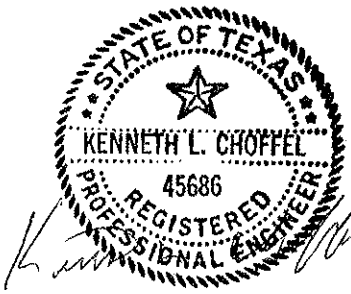
Study 5
Region Specific Water Conservation Best Management Practices (BMPs) (Final)



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BMP	Best Management Practices
CBRWPG	Coastal Bend Regional Water Planning Group
GCD	Groundwater Conservation District
gpcd	Gallons per capita per day
NCWCID #3	Nueces County Water Control and Improvement District No. 3
SPMWD	San Patricio Municipal Water District
STWA	South Texas Water Authority
TWDB	Texas Water Development Board
TCEQ	Texas Commission on Environmental Quality
UWCD	Underground Water Conservation District
WCID	Water Control and Improvement District
WSC	Water Supply Corporation

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Executive Summary

In accordance with the Texas Administrative Code guidance[1], regional water planning groups are instructed to document regional water conservation planning efforts in developing their water plans and are required to consider water conservation for each water user group with a need or projected water shortage.

The Coastal Bend Region has successfully implemented numerous voluntary municipal water conservation programs to reduce water consumption. The 2006 Coastal Bend Regional Water Plan (2006 Plan) considered water conservation for each municipal water user group with a projected shortage. Furthermore, the 2006 Plan also considered the Texas Water Development Board (TWDB) estimates of current and projected per capita water use for water user groups in the Coastal Bend Region and specifically recommended a voluntary 15 percent reduction in per capita water use for those municipal entities greater than 165 gallons per capita per day (gpcd) in 2060. Although the 2006 Plan included possible water conservation practices with estimated water savings and costs, it did not consider the effectiveness of implementing specific strategies or identifying those that have been successful in the Coastal Bend Region. Furthermore, due to the Texas Commission on Environmental Quality (TCEQ) schedule and associated timing constraints, local water conservation plans were not considered during development of the 2006 Plan.

This study included gathering information for current water conservation programs in the Coastal Bend Region, developing a list of water conservation best management practices (BMPs) to promote to regional water users, distributing a water conservation survey throughout the Coastal Bend Region requesting voluntary feedback, and evaluating survey results. The survey had a response rate of 29% (21 responses out of 72 requests) for rural and urban communities throughout the eleven-county Coastal Bend Region for a range of utility sizes from small water supply corporations to the largest wholesale water provider in the region, the City of Corpus Christi. The completed surveys included system-specific information about voluntary water conservation programs implemented by water users in the Coastal Bend Region including: the amount of reduction in water consumption, program goals, costs, currently implemented BMPs, interest in additional water conservation BMPs, and challenges in implementing future water conservation measures.

[1] Per 31 Texas Administrative Code Title 10 Chapter 357.

According to survey responses, the primary objectives of water conservation programs in the Coastal Bend Region are to reduce (1) unaccounted for water, (2) per capita consumption, and/or (3) seasonal and peak water demands. The main reasons cited for a lack of interest in adding new BMPs to existing water conservation programs are cost and a lack of staff. In the future, the Texas Legislature should continue to provide funding to the TWDB and other state agencies for water conservation initiatives, including providing technical support and assistance to water user groups regarding public information programs; adoption of conservation rates; tracking the effectiveness of implemented BMPs; leak detection, repair, and monitoring; meter testing and replacement; or other BMPs included in their water conservation programs. Additional water conservation grants or low-interest loans may also provide needed assistance for water user groups that may be interested in implementing voluntary BMPs in the future.

1.0 Introduction

Water conservation is typically a low-capital intensive alternative that water suppliers can pursue to either reduce the demand for water supply or increase the efficiency of water supplies or facilities to make water available for future use. The City of Corpus Christi (City), the largest municipal water user in the Coastal Bend Region, has demonstrated significant water savings attributable to water conservation efforts over the last decade. The City's municipal water use was 232 gpcd in 1990 and was reduced to 179 gpcd in 2000, a decrease of 53 gpcd (or 23 percent).[1] According to the Texas Water Development Board (TWDB) water use projections, the City's water use is anticipated to decline to 165 gpcd by 2060.

1.1 Background

In 2001, the 77th Texas Legislature amended the Texas Water Code to require Regional Water Planning Groups to consider water conservation and drought management measures in developing a regional water plan for each water user group with a need, or projected water shortage. The Water Conservation Implementation Task Force (Task Force), comprised of volunteers with experience and commitment to using Texas' water more efficiently, was created by the 78th Texas Legislature under Senate Bill 1094 and charged with "reviewing, evaluating, and recommending optimum levels of water use efficiency and conservation for the state". Furthermore, the Task Force prepared a guidance document[2] with support from the TWDB to assist Regional Water Planning Groups in development of the 2006 Regional Water Plans. The Task Force guidance document includes descriptions of water conservation best management practices (BMPs), procedures for implementing these strategies, estimates for water savings (where available), and cost effectiveness considerations. A BMP is defined as a useful, proven, cost-effective method of delivering a conservation measure or series of measures that is generally accepted among conservation experts.

The Coastal Bend Region used the Task Force guidance document to develop the 2006 Coastal Bend Regional Water Plan (2006 Plan), which included evaluating water savings for typical water conservation practices recognized by the water supply industry. In the 2006 Plan, the Coastal Bend Regional Water Planning Group (CBRWPG) encouraged all municipal entities

[1] TWDB Population and Municipal Water Demand Projections, 2006 Plan.
[2] TWDB and Water Conservation Implementation Task Force, "Water Conservation Best Management Practices Guide," Texas Water Development Board Report 362, November 2004.

in the region to conserve water, regardless of per capita consumption. The 2006 Plan considered current and projected per capita water use based on TWDB projections for Coastal Bend water user groups and specifically recommended a voluntary 15 percent reduction in per capita water use for those municipal entities that were projected to have per capita use greater than 165 gpcd in 2060. Specific conservation measures were not assigned for municipal entities to provide flexibility for entities to identify practical conservation strategies that fit their individual situation the best.

According to regional water planning guidelines, regional water planning groups must consider water conservation and drought contingency plans when developing a regional water plan. The Texas Commission on Environmental Quality (TCEQ) provides guidance in 30 Texas Administrative Code (TAC) Chapter 288 for water supply entities to use for developing their Water Conservation and Drought Contingency Plans, which are required to be filed with applications for entities applying for new water rights or an amendment to an existing water right. Furthermore, 30 TAC Chapter 288 requires "specific, quantified five and ten year targets for water savings to be included in all water conservation plans to be submitted to the TCEQ no later than May 1, 2005." Due to timing constraints, specific water conservation target savings for entities in the Coastal Bend Region were not included in the 2006 Plan; however, when available, this information will be considered during Phase II development of the 2011 Coastal Bend Regional Water Plan.

1.2 Need for Study

The 2006 Plan included water conservation as a water management strategy for Coastal Bend municipal entities with shortages, pursuant to regional water planning guidelines. In the 2006 Plan, eight water user groups and two county-other municipal users in the Coastal Bend Region showed projected per capita water use exceeding 165 gpcd in 2060. A voluntary 15 percent reduction in per capita water use was recommended for these entities. Water conservation for these entities was projected to begin by 2010, with projected water savings of between 1 to 5 gpcd by 2010 depending on their per capita consumption rate in Year 2000. Although possible water conservation BMPs were listed with associated estimated costs and typical water savings to satisfy plan requirements, the 2006 Plan did not consider the effectiveness of implementing such strategies or prioritizing BMPs that have been successful in the Coastal Bend Region. The Task Force guidelines include limited information on costs and

water savings achieved with municipal BMPs, since the effectiveness of many practices vary according to local conditions, costs, water system specifics, incentive programs, and/or susceptibility of water supplies to drought. Furthermore, local water conservation plans were not considered during development of the 2006 Plan.

To encourage more effective water conservation, this study was performed to identify existing water conservation programs that are currently being implemented within the Coastal Bend Region and develop a region-focused list of voluntary water conservation BMPs for the CBRWPG to promote to regional water users.

2.0 Description of Study and Project Objectives

This study included developing and distributing a water conservation survey to municipal water user groups in the Coastal Bend Region, gathering information regarding the success of their water conservation practices, and determining their level of interest in participating in voluntary water conservation BMPs identified by the CBRWPG. The survey was also intended to gather information about challenges that water user groups in the region have experienced with respect to implementing water conservation programs.

3.0 Methodology and Approach

The CBRWPG considered local water conservation resources prior to developing the survey, including: (1) a region-specific document prepared for the 2001 Plan to assist communities with water conservation in the Coastal Bend Region entitled "Strategies to Enhance Water Conservation in the Coastal Bend"[3] and (2) local water conservation plans for water user groups in the Coastal Bend Region on file with the Nueces River Authority or TCEQ. Additional water conservation guidance reports included the Task Force BMP Guide[4] and 2003 TWDB water conservation guidance report.[5] Descriptions of municipal BMPs considered by the CBRWPG are included in Attachment A.

[3] Naismith Engineering Inc, "Strategies to Enhance Water Conservation in the Coastal Bend," April 1999.
[4] TWDB and Water Conservation Implementation Task Force, "Water Conservation Best Management Practices Guide," Texas Water Development Board Report 362, November 2004.
[5] TWDB, GDS Associates, "Quantifying the Effectiveness of Various Water Conservation Techniques in Texas,"2003.

3.1 Summary of BMPs Included in Local Water Conservation Plans

A summary of BMPs obtained from local water conservation plans in the Coastal Bend Region are shown in Table 3-1. As shown in the table, numerous water conservation BMPs are being implemented on a voluntary basis in the Coastal Bend Region. In most cases, the local water conservation plans include specific benefits and goals that can be achieved by implementing BMPs.

Table 3-1.
Summary of Task Force BMPs Included in Local Water Conservation Plans

BMPs for Municipal Water Users (from Task Force BMP Guide)	*Wholesale Water Providers**				*Other Entities*	
	City of Corpus Christi	*SPMWD*	*STWA*	*NCWCID #3*	*City of Alice*	*City of Portland*
1. System Water Audit and Water Loss	✓	✓	✓	✓		✓
2. Water Conservation Pricing	✓	✓	✓		✓	✓
3. Prohibition on Wasting Water	✓				✓	
4. Showerhead, Aerator, and Toilet Flapper Retrofit						✓
5. Residential Toilet Replacement Programs						
6. Residential Clothes Washer Incentive Program						
7. School Education	✓	✓				
8. Water Survey for Single-Family and Multi-Family Customers						
9 & 10. Landscape Irrigation Conservation and Incentives and Water Wise Landscape Design and Conservation Programs	✓	✓				✓
11. Athletic Field Conservation						
12. Golf Course Conservation						
13. Metering of All New Connections and Retrofit of Existing Connections	✓			✓		✓
14. Wholesale Agency Assistance Programs		✓	✓			
15. Conservation Coordinator	✓					
16. Reuse of Reclaimed Water	✓	✓				
17. Public Information	✓	✓	✓	✓		✓
18. Rainwater Harvesting and Condensate Reuse						
19. New Construction Graywater (or Retrofit of Existing Households)						
20. Park Conservation	✓					
21. Conservation Programs for Industrial, Commercial, and Institutional Accounts						
Total Number of BMPs Being Actively Implemented*	**10**	**7**	**4**	**3**	**2**	**6**

* Note: The information in this list was obtained from water conservation plans provided by selected regional water supply entities. Accordingly, this list may not include all water conservation programs implemented by these selected water users. Additionally, there may be other municipal water suppliers within the Coastal Bend Region (such as small water utilities included under County-Other) that have water conservation plans on file with TCEQ which are not included in the list above.

The Coastal Bend Region has four wholesale water providers, and all have submitted water conservation and drought contingency plans to the Nueces River Authority and TCEQ. These include the City of Corpus Christi, San Patricio Municipal Water District (SPMWD), South Texas Water Authority (STWA), and Nueces County WCID #3. The City's water conservation plan focuses on two efficiency goals: to reduce summertime peaking and reduce per capita consumption by 1% per year.[6] The City has also worked with its wholesale customers to promote water conservation and coordinate efforts during times of water shortage such as in the mid-1990s.

The SPMWD water conservation plan includes goals of limiting water losses to no more than 3% of volume delivered and maintaining per capita water use for municipal and industrial customers at least 10% below previous five-year state averages. STWA has a water conservation goal to maintain water loss rates of less than 2% and reduce per capita consumption by 1% per year (consistent with Task Force recommendations). The Nueces County WCID # 3 is targeting a reduction in water consumption that is less than or equal to 97.5% of the state average water use and is currently implementing a water accounting recording program to reduce the volume of water losses and identify the amount of water used for irrigation.

3.2 Evaluation of Costs and Water Savings

Based on the Task Force BMP Guide[7] and 2003 TWDB water conservation guidance document,[8] costs and savings were identified for municipal BMPs and updated to second quarter 2007 dollars as shown in Table 3-2. Per capita water savings and costs for other BMPs were not readily available, and are highly variable based on local conditions and water system specifics.

3.3 Selection of Best Management Practices by the CBRWPG

On August 9, 2007, the Coastal Bend Regional Water Planning Group considered several water conservation resources including: 21 municipal BMPs identified by the Task Force BMP Guide shown in Table 3-1; local water conservation programs and plans; and estimated water savings and costs to implement BMPs, as available. Upon considering these resources, thirteen BMPs were selected by the CBRWPG as shown in Table 3-3 to promote to the Coastal Bend

[6] City of Corpus Christi, Water Conservation and Drought Contingency Plan, 2005.
[7] TWDB and Water Conservation Implementation Task Force, "Water Conservation Best Management Practices Guide," Texas Water Development Board Report 362, November 2004.
[8] TWDB, GDS Associates, "Quantifying the Effectiveness of Various Water Conservation Techniques in Texas," July 2003.

Region. These thirteen BMPs were included in a water conservation survey sent to 72 water user groups in the Coastal Bend Region

The costs were qualitatively assessed, ranging from low to high, since there is often considerable variability in costs to implement BMPs based on system size, funding mechanisms, incentive programs, and other issues.

Table 3-2.
Costs and Projected Water Savings of Possible Water Conservation Techniques (BMPs)

	Associated with Task Force BMP (#)	***Costs (per acft of water saved)***	***Typical Water Savings (gpcd)***
Indoor Conservation			
Toilet Retrofits[1]	5	$364 - $520	4.2 - 5.3
Showerhead/Aerators[1]	4	$49 - $108	2.2 - 2.8
Clothes Washer Rebate[1]	6	$651 - $994	0.7 - 5.0
Outdoor Conservation			
Landscape Irrigation Conservation & Incentives[2]	9	$450	12
Irrigation audit-high water users[1]	1	$454 - $529	0.7 - 1.0
Rainwater Harvesting[1]	18	$554- $850	0.2 - 0.6
Rain Barrels[1]	18	$1,305 - $1,413	0.4

[1]Costs and typical water savings obtained from GDS Associates, July 2003, amortized at 6% interest over life of the BMP measure and updated to second quarter 2007 US Dollars based on Consumer Price Index (CPI) for inflation.

[2]Costs obtained from Task Force guidance. Typical based on 15 percent reduction of outdoor water use and maximum based on 30 percent reduction of outdoor water use. Outdoor water use= Total water use - 72.5 gpcd (indoor).

NOTE: All costs have been updated to 2007 U.S. dollars based on Consumer Price Index (CPI) for inflation.

Table 3-3.
BMPs Selected by the CBRWPG to Include in the Water Conservation Survey and Promote to the Coastal Bend Region

Municipal Best Management Practices	*Typical Water Savings (gpcd)*	*Cost (per acre-ft of water saved)**
1. System Water Audit and Water Loss	Variable	Low to Medium Cost
-Irrigation audit for high water users	0.7 - 1.0	Medium Cost
2. Water Conservation Pricing	2% savings for each 10% price increase	Low Cost
- seasonal water use reduction	2.4	Low to Medium Cost
3. Prohibition on Wasting Water	Variable	Low Cost
4. Showerhead, Aerator, and Toilet Flapper Retrofit	9.5 (for all)	Low Cost
- showerhead/ aerators	2.2 - 2.8	Low Cost
- toilet flapper retrofit	6.7 - 7.3	Low Cost
5. Residential Toilet Replacement Program	4.2 - 5.3	Medium Cost
6. School Education	0.2	Low Cost
7. Water Survey for Single-Family and Multi-Family Customers	Variable	Low Cost
8. Landscape Irrigation Conservation and Incentives and Water-Wise Landscape Design and Conversion Programs	Variable	Medium to High Cost
9. Metering of All New Connections and Retrofit of Existing Connections	Variable	Medium to High Cost
10. Public information	3	Low Cost
11. Rainwater Harvesting and Condensate Reuse	Variable	Medium to High Cost
12. New Construction Graywater (or Retrofit of Existing Households)	Variable	Medium to High Cost
13. Conservation Programs for Ind., Commercial, and Inst. Accounts	Variable	Medium to High Cost

* Range of Costs:
Low Cost (< $300 per acft saved)
Medium Cost ($300 - $600 per acft saved)
High Cost (greater than $600 per acft saved)

4.0 Water User Group Surveys

A water conservation survey was developed by the CBRWPG and sent to 72 water user entities in the Coastal Bend Region on August 21, 2007 requesting voluntary participation and encouraging feedback regarding the success of water conservation programs currently being implemented in the region by each entity. In the survey, the CBRWPG requested input to assist with regional water planning purposes only, and emphasized that a response to the survey does not imply commitment or implementation of any water conservation practices. A copy of the water conservation survey is provided in Attachment B. The survey included a brief questionnaire, description of each of the thirteen BMPs selected by the CBRWPG to promote to the region, estimated cost and water savings, and list of references for additional water conservation resources and assistance.

5.0 Results of the Survey

Of the 72 surveys mailed to water user groups in the Coastal Bend Region, 21 responses (or 29%) were completed and received by the Nueces River Authority. A list of survey respondents is shown in Table 5-1. Survey respondents ranged from large utilities, such as the City, to ones with less than 280 acre-ft year demands, such as East Riviera Water Supply Corporation. Water user groups in nine of the eleven counties in the Coastal Bend Region provided completed surveys, whose combined water demand equals about 92% of the total municipal water demand in the Coastal Bend Region[9]. The two least populated counties in the region, McMullen and Kenedy, have smaller water user entities[10] and primarily use groundwater supplies. No responses were received for McMullen and Kenedy water user entities.

The survey responses varied and results are summarized for the following questions (1 through 10). Several Groundwater Conservation Districts (GCDs) including McMullen GCD, Live Oak Underground Water Conservation District (UWCD), and Bee County GCD responded that the survey has limited application to groundwater conservation districts. Accordingly, the survey results summarized below do not include responses from the GCDs. San Diego Municipal Utility District #1's water conservation plan is in progress, and therefore their returned survey

[9] Based on 2006 Plan municipal water demand data provided by the TWDB for Year 2000 for Coastal Bend Region water users (99,950 acft/yr). Those who responded showed municipal water demands of 91,550 acft/yr without including results from small water users included in County-Other.

[10] The TWDB does not differentiate water user groups in McMullen or Kenedy counties for regional water planning, with all population and water demand projections included in County-Other. Water user entities are grouped in "County-Other" for population less than 500 and water use less than 280 acre-ft in 2000.

did not include responses to survey questions. Copies of completed water conservation surveys and responses by individual water user groups are included in Attachment C. Discussions of the results of each survey question follows.

Table 5-1.
List of Water User Entities Whose Survey Responses were Received by the Nueces River Authority

Completed Surveys Received From:	*Entity Provides Water for the Following Counties:*
Wholesale Water Providers	
City of Corpus Christi	Nueces (indirectly: San Patricio, Aransas, and Kleberg)
SPMWD	San Patricio, Aransas, Nueces
STWA	Kleberg, Nueces
Nueces County WCID # 3	Nueces
Water Users (Cities)	
City of Beeville	Bee
City of Gregory	San Patricio
City of Odem	San Patricio
City of Rockport	Aransas
City of Sinton	San Patricio
City of Falfurrias	Brooks
Water Users (Water Supply Corporations or Utility Districts)	
Cyndie Park II WSC	Nueces
East Riviera WSC	Kleberg
Freer WCID	Duval
McCoy WSC	Live Oak
Ricardo WSC	Kleberg
River Acres WSC	Nueces
Nueces WSC	Kleberg, Nueces
San Diego Municipal Utility District #1	Duval, Jim Wells
Groundwater Conservation Districts	
McMullen GCD	McMullen
Live Oak UWCD	Live Oak
Bee GCD	Bee

(1) When was the water conservation plan initiated?

Of the survey responses, sixteen indicated a timeframe for their water conservation plan. According to the completed surveys, the City of Beeville initiated the earliest water conservation plan in the Coastal Bend Region in the 1970s. As shown in Table 5-2, most of the water conservation plans in the region (eleven out of sixteen responses) showed that their water conservation plans were initiated between 2000 and 2006. This is during the time frame when the TCEQ required water conservation plans to be developed.

Table 5-2.
Summary of Timeframe When Water Conservation Plans were Initiated (from Survey Responses)

	1970s	*1980s*	*1990s*	*2000-2006*
Wholesale Water Providers				
City of Corpus Christi		✓		
SPMWD			✓	
STWA				✓
Nueces County WCID #3			✓	
Water Users (Cities)				
City of Beeville	✓			
City of Gregory	Not Provided			
City of Odem				✓
City of Rockport			✓	
City of Sinton				✓
City of Falfurrias				✓
Water Users (Water Supply Corporations or Utility Districts)				
Cyndie Park II WSC				✓
East Riviera WSC				✓
Freer WCID				✓
McCoy WSC				✓
Ricardo WSC				✓
River Acres WSC				✓
Nueces WSC				✓
Note: The STWA adopted its first water conservation plan in 1988.				

(2) <u>What programs are currently being implemented</u>?

As shown in Table 5-3, the top three BMPs that are currently being implemented in the region based on survey responses are: public information programs; leak detection, repair, and monitoring; and meter testing and replacement.

Table 5-3.
Summary of Current BMP Programs (from Survey Responses)

	Public Information	*Leak Detection, Repair, Monitoring*	*Landscape Irrigation Conservation*	*Plumbing Retrofit*	*Meter Testing/ Repair/ Replacement*	*Other*
Wholesale Water Providers						
City of Corpus Christi	✓	✓	✓	✓	✓	
SPMWD	✓	✓	✓	✓	✓	School Education, Rainwater Harvesting, Reuse
STWA	✓	✓			✓	
Nueces County WCID #3		✓	✓		✓	
Water Users (Cities)						
City of Beeville			✓		✓	
City of Gregory	✓				✓	
City of Odem		✓			✓	
City of Rockport	✓	✓	✓		✓	
City of Sinton	✓			✓		
City of Falfurrias	✓	✓			✓	
Water Users (Water Supply Corporations or Utility Districts)						
Cyndie Park II WSC	✓	✓			✓	
East Riviera WSC		✓				
Freer WCID					✓	
McCoy WSC	✓	✓			✓	
Ricardo WSC	✓	✓			✓	
River Acres WSC	✓	✓			✓	
Nueces WSC	✓	✓			✓	
Total Number of Entities, by BMP	**12**	**13**	**5**	**3**	**15**	**1**

(3) What is the current budget for water conservation programs (as % of total water budget)?

Of the fourteen responses to this survey question, six entities reported a water conservation budget less than 1% of their total water budget. Three entities each reported water conservation budgets of 1-2% and 3-5%, respectively. Two entities (Ricardo WSC and Nueces WSC) reported water conservation budgets of 6 to 8% of the total water budget.

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

Of the sixteen responses to this survey question, nine entities (over 50%) reported a 1% to 5% annual reduction in water use attributable to their water conservation programs as shown in Table 5-4. According to responses from two wholesale water providers and two water supply corporations, it has not been possible to quantify the amount of water use reduction attributed to their respective water conservation program.

Table 5-4.
Summary of Reductions in Water Use Attributable to Water Conservation Programs (from Survey Responses)

	1-5 % Reduction Annually	*5-10 % Reduction Annually*	*No Noticeable Change*	*Unable to Determine*
Wholesale Water Providers				
City of Corpus Christi	✓			
SPMWD				✓
STWA				✓
Nueces County WCID #3	✓			
Water Users (Cities)				
City of Beeville	Not Provided			
City of Gregory		✓		
City of Odem	✓			
City of Rockport	✓			
City of Sinton			✓	
City of Falfurrias	✓			
Water Users (Water Supply Corporations or Utility Districts)				
Cyndie Park II WSC	✓			
East Riviera WSC			✓	
Freer WCID	✓			
McCoy WSC	✓			
Ricardo WSC				✓
River Acres WSC	✓			
Nueces WSC				✓
Total Number of Entities, by category	**9**	**1**	**2**	**4**

(5) What is the primary objective of your water conservation program?

The most prevalent water conservation objective from survey responses is to reduce water loss. As shown in Table 5-5, reduction in seasonal peak demands and per capita consumption is also important to the water user group respondents.

Table 5-5.
Summary of Primary Objectives of Water Conservation Programs (from Survey Responses)

	Reduce Seasonal Peak Demands	*Reduce Water Loss*	*Reduce per capita Consumption*	*Other*
Wholesale Water Providers				
City of Corpus Christi	✓	✓	✓	
SPMWD				✓ (Education)
STWA		✓		
Nueces County WCID #3			✓	
Water Users (Cities)				
City of Beeville	✓			
City of Gregory			✓	
City of Odem		✓		
City of Rockport	✓	✓	✓	
City of Sinton	✓			
City of Falfurrias		✓		
Water Users (Water Supply Corporations or Utility Districts)				
Cyndie Park II WSC	✓	✓	✓	
East Riviera WSC		✓		
Freer WCID		✓		
McCoy WSC		✓	✓	
Ricardo WSC		✓		
River Acres WSC		✓		
Nueces WSC		✓		
Total Number of Entities, by category	**5**	**12**	**6**	**1**

(6) Is your organization already implementing any of the voluntary BMPs recommended by the CBRWPG?

Of the seventeen responses to this survey question, fourteen indicated that their organization was implementing some of the voluntary BMPs recommended by the CBRWPG. Some of the reasons sited by the three respondents that do not implement BMPs promoted by the CBRWPG include: cost, lack of staff, impact to expected revenue, water supply is not susceptible to droughts, and/or small size of system.

(7 – 9) Of those currently not being implemented, is your organization interested in pursuing any of the thirteen BMPs being promoted in the region? If so, which ones? If not, please describe why?

Of the surveyed responses, five responses indicated interest in pursuing additional BMPs from the list provided by the CBRWPG. Five responses indicated possible interest (maybe) in additional BMPs, but four of these entities did not select specific BMPs of interest.

Those interested in additional BMPs (yes or maybe) identified five of the thirteen BMPs as being of particular interest as shown in Table 5-6 which included:

- Water conservation pricing (BMP #2);
- Prohibition on wasting water (BMP #3);
- School education (BMP #6);
- Landscape irrigation conservation and water wise landscaping (BMP #8); and
- Metering of all new and retrofit existing connections (BMP #9).

For the seven entities that indicated that their organization would not be interested in additional BMPs promoted by the CBRWPG, the primary reasons sited were due to cost or lack of staff as shown in Table 5-7. Other reasons for lack of interest included: impact to expected revenues, water supplies are not susceptible to droughts, existing water conservation program is effective, and/or due to size of their system.

Table 5-6.
Summary of Interest in CBRWPG Recommended BMPs for the Region
(from Survey Responses)

	For those entities that indicated interest in any of the 13 BMPs promoted by the CBRWPG (Yes or Maybe) these BMPs of interest were mentioned				
	2. Water Conservation Pricing	***3. Prohibition on Wasting Water***	***6. School Education***	***8. Landscape Irrigation Conservation and Water Wise Landscape***	***9. Metering of All New and Retrofit Existing Connections***
Wholesale Water Providers					
City of Corpus Christi				✓	
SPMWD[1]					
STWA			✓		
Nueces County WCID #3	✓		✓		✓
Water Users (Cities)					
City of Falfurrias[2]				✓	
Water Users (Water Supply Corporations or Utility Districts)					
McCoy WSC	✓	✓			
Total Number of Entities, by category	**2**	**1**	**2**	**2**	**1**

[1] No BMPs were specified by SPMWD.

[2] The City of Falfurrias is also interested in showerhead and toilet flapper retrofits and residential toilet replacement programs.

Table 5-7.
Summary of Those Not Interested in Pursuing Additional BMPs
(from Survey Responses)

	Reasons why entity is not interested in promoting BMPs selected by the CBRWPG					
	Cost	***Lack of Staff***	***Impact to Expected Revenues***	***Water Supply is not Susceptible to Droughts***	***Existing Water Conservation Program is Effective***	***Other***
Wholesale Water Providers						
City of Corpus Christi	✓	✓				
SPMWD					✓	
Water Users (Cities)						
City of Beeville	✓	✓	✓			
City of Gregory	✓	✓				
City of Odem	✓	✓	✓			
City of Rockport	✓	✓	✓		✓	
City of Sinton	✓	✓				
Water Users (Water Supply Corporations or Utility Districts)						
Cyndie Park II WSC	✓	✓		✓		
East Riviera WSC	✓	✓		✓		✓ (Small size of system)
Freer WCID			✓			
Ricardo WSC	✓	✓				
River Acres WSC					✓	
Nueces WSC	✓	✓				
Total Number of Entities, by category	**10**	**10**	**4**	**2**	**3**	**1**

(10) Would you like a follow-up phone call to discuss specific BMPs, or water conservation assistance programs?

Five respondents requested a follow-up phone call and/or additional information including: the City, SPMWD, Nueces WCID #3, City of Sinton, and City of Falfurrias. Follow-up phone calls were made on October 30, 2007 and additional information about financing programs and specific BMPs was provided upon request.

6.0 Summary and Recommendations

Many water user groups in the Coastal Bend Region have developed water conservation plans and are actively implementing voluntary BMPs as part of their current water conservation programs. The water conservation survey developed by the CBRWPG is an effective tool for collecting water conservation information for water user groups in the Coastal Bend Region, as shown by a 29% success rate (or 21 responses out of 72). Based on survey responses, most local water conservation programs have shown at least a 1-5% annual reduction in water use which exceeds the Task Force target of a "minimum annual reduction of one percent in total gpcd".[11] The results of the water conservation survey provide valuable information regarding the success of existing water conservation programs and determining interest in additional, future water conservation programs.

As water demands increase due to population growth and water supplies become more limited, water conservation can be an effective strategy to reduce water consumption and extend the project life of additional water supplies. For example according to TCEQ[12], an effective public information water conservation program can expect water savings of 3 gpcd and cost less than $300 per acre-ft of water saved. For a mid-sized utility with a water demand of 2,000 acre-ft/year (or 165 gpcd), an effective public information program could reduce estimated water demand by 40 acre-ft/year (or 2%) to 1,960 acre-ft/yr.

According to survey responses, the primary objectives of water conservation programs in the Coastal Bend Region are to reduce (1) water loss, (2) per capita consumption, and/or (3) seasonal and peak water demands. Not surprisingly, the main reasons cited for lack of interest in adding new BMPs to existing water conservation programs are cost and a lack of staff.

[11] TWDB Special Report, "Water Conservation Implementation Task Force Report to the 79th Legislature," Nov.2004.
[12] TCEQ Water Utility Profile form.

The CBRWPG encourages voluntary water conservation throughout the Coastal Bend Region. Regional water planning guidelines require each region to consider water conservation to meet projected shortages, although funding to implement such water conservation programs is limited. In the future, the Texas Legislature should continue to provide funding to the TWDB and other state agencies for water conservation initiatives, including providing technical support and assistance to water user groups regarding public information programs; adoption of conservation rates; tracking the effectiveness of implemented BMPs; leak detection, repair, and monitoring; meter testing and replacement; or other BMPs included in their water conservation programs. Based on survey results, the Texas Legislature should consider providing water conservation grants or low-interest loans to implement the following BMPs in the Coastal Bend Region:

- Water conservation pricing,
- Prohibition on wasting water,
- School education,
- Landscape irrigation conservation,
- Metering connections and retrofits,
- Plumbing retrofits and replacements, or
- Other BMPs identified by water user groups.

7.0 Texas Water Development Board Report Formalities

This report was prepared in accordance with the approved Scope of Work pursuant to TWDB Contract No. 0704830699. The preliminary draft report was posted in October 2008 on the Nueces River Authority website for Regional Water Planning Group and public comment. All draft report comments were addressed. The draft report was approved by the Coastal Bend RWPG on November 13, 2008 and submitted to the TWDB on December 23, 2008.

The TWDB did not have any comments to the draft report, as included in their March 2009 letter. The Coastal Bend RWPG approved submittal of the final report at their meeting on March 12, 2009.

Attachment A:
Descriptions of Municipal Best Management Practices Considered by the Coastal Bend Regional Water Planning Group

Summary of Municipal Best Management Practices
Source: TWDB Water Conservation Best Management Practices Guide, November 2004

1. System Water Audit and Water Loss

Description: Uses information from a water audit to revise meter testing and repair practices, detect leaks, reduce unauthorized water use, improve accounting for authorized but unbilled water and implement effective water loss strategies.
Water Savings: Variable. Potential savings should be contained in the audit report.
Cost to Implement: Initial and ongoing costs for performing and updating water audits, capital costs for leak detection equipment and billing software upgrades.

2. Water Conservation Pricing

Description: The use of water rate structures discourages inefficient use or waste of water. Conservation pricing structures include increasing unit prices with increased consumption such as inverted block rates, base rates, and excess use rates such as water budget and seasonal rates.
Water Savings: Variable. Previous studies have shown an average reduction in water use of 1 to 3 percent for every 10 percent increase in average monthly water bill.
Cost to Implement: May include costs to manage a stakeholder involvement program and consultant services, costs associated with developing and adopting ordinances, and possibly reprogramming the billing system.

3. Prohibition on Wasting Water

Description: For this BMP, the utility enacts and enforces ordinances to prohibit wasteful activities including: water waste during irrigation (such as water running along the curbs), failure to fix outside faucet leaks, service line leaks, sprinkler system leaks.
Water Savings: Variable, based on water efficiency measure implemented.
Cost to Implement: Primary costs are administrative and staff costs, and possible one time cost associated with adopting ordinances.

4. Showerhead, Aerator, and Toilet Flapper Retrofit

Description: Useful for utilities serving customers, with at least 20% of homes constructed prior to 1995 and for which there has not been an active retrofit program for efficient showerheads and faucets. This BMP involves installing low flow plumbing devices, such as: showerheads rated at 2 gallons per minute (gpm) or less; kitchen faucets of 2.2 gpm or less, bathroom faucets of 1.5 gpm or less; toilet flappers that flush at the designed volume for the toilet model (i.e. 1.6 gallons per flush).
Water Savings: Savings = Number of Devices Retrofitted x Device Savings
Showerhead and Faucet Aerators— 5.5 gallons per day (per device)
Toilet Flapper— Up to 12.8 gallons per day (per device)
Cost to Implement: Labor costs range from $10 to $30 per customer for showerhead installation and additional $5 to $20 per toilet for replacement. Showerheads purchased in bulk cost less than $2 each; aerators less than $1; flappers cost from $3 to $10. Marketing and outreach costs may range from $5 to $10 per single family customer. Administrative and overhead costs range from 10 to 20% of labor costs. Total cost per unit = total all costs divided by number of units retrofitted

5. Residential Toilet Replacement Programs

Description: This BMP involves replacing old toilets with water efficient ones. Useful for utilities, with at least 20% of homes in its service area constructed prior to 1995 and for which

there has not been an active retrofit program to replace high flush volume toilets with 1.6 gallons per flush toilets.
Water Savings: Single/Multi-Family Units—10.5 gpcd if all toilets replaced in each household
Cost to Implement: Most utilities have found success in rebates set at $70 to $100 per toilet.

6. Residential Clothes Washer Incentive Program

Description: Developed to encourage customers to purchase efficient clothes washers. Conventional top-loading clothes washers use 41 gallons per load on average while efficient clothes washers use 11 to 25 gallons per load.
Water Savings: Single/Multi-Family Units— 5 gpcd per day
Cost to Implement: Variable, based on rebates (commonly set at $50 to $100 per efficient clothes washer.) Labor costs range from $15 to $35 per clothes washer. Marketing and outreach costs range from $5 to $15 per clothes washer, with administrative costs at 10 – 20% labor costs.

7. School Education

Description: School education programs may result in both short and long-term water savings. To be effective, a school program should provide curriculum materials appropriate to grade level.
Water Savings: Variable. Harris Galveston Coastal Subsidence District found an average savings of 18% (or 1,400 gpm) in homes where student and parent installed efficient plumbing fixtures.
Cost to Implement: Variable. Most programs require utility staff oversight and outreach efforts.

8. Water Survey for Single- Family and Multi-Family Customers

Description: This BMP including conducting a survey of customers to provide information about methods to reduce indoor water use through replacement of inefficient plumbing fixtures and increasing efficiency of irrigation systems (typically for users of more than 20,000 gallons per mo).
Useful for utilities with at least 20% of homes and apartments in their service area constructed prior to 1995 and/or more than 10 % of landscapes equipped with automatic irrigation systems.
Water Savings: Showerheads/Aerators— 5.5 gpcd per device;
Irrigation Audit— 26 gpd for single family home; 15% outdoor water use for multi-family units
Cost to Implement: Cost of survey ($50 to $150 per unit), possible cost of water efficient plumbing fixtures, outreach, administration, and one-time cost purchase of leak detection equipment or meters.

9. Landscape Irrigation Conservation and Incentives

Description: This BMP provides non-residential and residential customers with customer support, education, incentives, and assistance in improving their landscape water-use efficiency. A ratio of 1.6 or greater (summer peak/ winter average use) indicates potential for substantial water savings.
Water Savings: 15% reduction in outdoor water demands (for those participating)
Cost to Implement: Costs of survey ($50 and higher, depending on size and scope), outreach, administration, and one-time cost purchase of leak detection equipment and meters.

10. Water Wise Landscape Design and Conversion Programs

Description: This BMP offers financial incentives for landscape conservation to a water wise landscape or requires by ordinance that all new landscapes incorporate water wise principles. Useful for utilities that have 20% or more residential customers with high water use landscapes (more than 20,000 gallons per month) or use more than twice as much water in the summer as in the winter.
Water Savings: Variable, based on actual metered data.
Cost to Implement: Cost of rebates to customers for conversion to water wise landscape, often ranges from $0.05 to $1.00 per square foot. Costs for staff labor, outreach, and administration.

11. Athletic Field Conservation

Description: Useful for utilities that maintain athletic fields, this BMP consists of implementing a watering regimen that uses only the amount of water necessary to maintain viability of field turf.
Water Savings: Variable, based on program implementation and reduction of water use.
Cost to Implement: Labor costs of survey range from $250 to $1000 +, marketing costs range from $5 to $15 per survey, and administrative costs range 10 to 20% of labor costs.

12. Golf Course Conservation

Description: A landscape or irrigation survey is conducted to determine water needed to efficiently irrigate the golf course. This BMP may involve installation of high efficiency irrigation system(s).
Water Savings: Expected to range from 15% to 25% reduction in water demands compared to golf courses without a Computer Controlled Irrigation System.
Cost to Implement: Variable; may include labor costs for producing a golf course conservation plan and annual review, marketing, and administrative costs.

13. Metering of All New Connections and Retrofit of Existing Connections

Description: This BMP is intended for utilities that do not have 100% metering of all customer connections. Ensures all aspects of meter installation, replacement testing, and repair are managed optimally for water use efficiency.
Water Savings: Variable. Savings can be estimated based on a statistical sample analyzed as part of the meter-testing program.
Cost to Implement: Costs include installing new meters, retrofitting older ones, meter testing, and administration. A replacement meter ranges from $50 to $1,000 + for large, compound meters.

14. Wholesale Agency Assistance Programs

Description: Under this BMP, the wholesale agency provides financial and/or technical support to wholesale purchasers to advance water conservation efforts for wholesale and retail customers. Financial support may consist of incentives as appropriate and beneficial.
Water Savings: Variable; based on equipment changes and quantified efficiency measures.
Cost to Implement: Labor costs dependent upon type of conservation BMPs.

15. Conservation Coordinator

Description: Involves designation of a Conservation Coordinator to be responsible for preparation and implementation of the utility's water conservation and drought contingency plans and preparation and submittal of annual conservation status reports to utility management.
Water Savings: Variable, based on implemented water conservation programs.
Cost to Implement: Salary and associated overhead expenses.

16. Water Reuse

Description: This BMP is appropriate for water users that have potential applications for reusing water within its system. Reuse can be direct with reclaimed water replacing potable or raw water, or indirect which involves intentional planned use of system return flows.
Water Savings: Up to 100% of total amount of water replaced by reuse.
Cost to Implement: Costs of facilities (capital), engineering, regulatory, outreach, and operations.

17. Public Information

Description: Involves educating customers about the overall picture of water resources in the community, including providing data and information on specific actions and measures the customers can take to implement community goals.
Water Savings: Variable. Savings can be quantified for information efforts that target a specific action, such as showerhead distribution, by comparing use without implementation of the BMP.
Cost to Implement: Depends on scope of the public information effort, ranges from $0.50 to $3.00 per customer per year depending on the size of the utility.

18. Rainwater Harvesting and Condensate Reuse

Description: Using this BMP, the utility provides customers with support, education, incentives, and assistance in proper installation and use of Rainwater Harvesting/ Condensate Reuse systems. Rainwater harvesting is based on ancient practices of collecting and storing rainwater close to its source, and using it for nearby needs.
Water Savings: Catchment Potential (gallons)— Area x 0.62 x 0.8 x Rainfall (in)
Storage capacity to provide for a three-month period of water demand may be desired.
Cost to Implement: Costs may include administrative program management costs and incentives to customers for implementing rainwater harvesting projects (i.e. discounts to purchase rain barrels). Staff labor cost ranges from $50 to $100 per project, in addition to outreach costs ($20-$50 per project), and administrative costs at 10-20% of labor costs.

19. New Construction Graywater

Description: This BMP involves the use of graywater (wastewater from clothes washers, showers, bathtubs, and handwashing sinks) for landscape purposes. HB2661 added a provision that allows graywater use without treatment of up to 400 gallons per day for landscape irrigation or gardening at private home.
Water Savings: Variable, depending on type and extent of installation.
Cost to Implement: Administrative costs, including review of plans and inspection of construction. Staff labor costs may range from $50 to $100 per project; marketing and outreach range from $20 to $50 per project; and administrative costs may range from 10 – 20 % of labor costs.

20. Park Conservation

Description: Under this BMP, the utility requires an irrigation system to manage each park including, development of a conservation plan and verifying metering of park facilities.
Water Savings: Variable, based on implemented water efficiency measures. Water savings can range from 15 – 25% with efficiency measures implemented as recommended by a survey.
Cost to Implement: Labor costs may range from $250 to more than $1,000 depending on the size and scope of the survey, in addition to outreach and administrative costs.

21. Conservation Programs for Industrial, Commercial, and Institutional Accounts

Description: For entities that serve industrial, commercial, and institutional customers, this BMP focuses a conservation program toward higher use customers and those sectors with highest conservation potential.
Water Savings: Variable, based on the implementation of water efficient operating procedures. Estimated up to 20% water savings.
Cost to Implement: Variable, includes labor, marketing and outreach, and administrative costs.

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Attachment B:
Water Conservation Survey
(Sent to 72 Water User Entities in the Coastal Bend Region)

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity _____
Your Name _____ Title _____
Address _____
Phone Number _____

(1) When was your current water conservation plan first initiated? Year _____ _____

(2) What water conservation program(s) are currently being implemented by your organization?

□ Public Information
□ Leak Detection, Repair, Monitoring
□ Landscape Irrigation Conservation
□ Showerhead/Aerator/Toilet Flapper Retrofit
□ Meter Testing/Repair/Replacement
□ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? _____

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

□ 1-5 % reduction annually
□ 5- 10% reduction annually
□ No noticeable change
□ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

□ Reduce seasonal peak demands
□ Reduce per capita consumption
□ Reduce unaccounted for water
□ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1?

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

□ Yes □ No □ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

□ Cost
□ Lack of staff
□ Impact to expected revenues
□ Water supply is not susceptible to droughts
□ Existing water conservation program is effective
□ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? □ Yes □ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

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Attachment 1: Summary of Best Management Practices
Source: TWDB Water Conservation Best Management Practices Guide, November 2004

1. System Water Audit and Water Loss

Description: Uses information from a water audit to revise meter testing and repair practices, detect leaks, reduce unauthorized water use, improve accounting for authorized but unbilled water.
Water Savings: Variable. Potential savings should be contained in the audit report.
Cost to Implement: Initial and ongoing costs for performing and updating water audits, capital costs for leak detection equipment and billing software upgrades.

2. Water Conservation Pricing

Description: The use of water rate structures discourages inefficient use or waste of water. Conservation pricing structures include increasing unit prices with increased consumption such as inverted block rates, base rates, and excess use rates such as water budget and seasonal rates.
Water Savings: Variable, may reduce water use 1 -3 % for every 10 % increase in water bill.
Cost to Implement: May include costs to manage a stakeholder involvement program, costs associated with developing and adopting ordinances, and possibly reprogramming the billing system.

3. Prohibition on Wasting Water

Description: For this BMP, the utility enacts ordinances to prohibit wasteful activities including: water waste during irrigation (water running along the curbs), failure to fix faucet leaks, and other system leaks.
Water Savings: Variable, based on water efficiency measure implemented.
Cost to Implement: Primary costs are administrative and staff costs, and possible one time cost associated with adopting ordinances.

4. Showerhead, Aerator, and Toilet Flapper Retrofit

Description: This BMP involves installing low flow plumbing devices, such as: showerheads rated at 2 gallons per minute (gpm) or less; kitchen faucets of 2.2 gpm or less, bathroom faucets of 1.5 gpm or less; toilet flappers that flush at the designed volume for the toilet model.
Water Savings: Savings = Number of Devices Retrofitted x Device Savings
Showerhead/Faucet Aerators— 5.5 gallons per day (per device); Toilet Flapper— Up to 12.8 gpd
Cost to Implement: Labor costs for showerhead installation and toilet replacement. May also include costs for marketing and outreach, administrative, and overhead costs.

5. Residential Toilet Replacement Programs

Description: This BMP involves replacing old toilets with water efficient 1.6 gallons per flush toilets. Useful for utilities, with at least 20% pre 1995 homes for which there has not been an active retrofit program.
Water Savings: Single/Multi-Family Units—10.5 gpcd if all toilets replaced in each household
Cost to Implement: Most utilities have found success in rebates set at $70 to $100 per toilet.

6. School Education

Description: School education programs may result in both short and long-term water savings. To be effective, a school program should provide curriculum materials appropriate to grade level.
Water Savings: Variable. Harris Galveston Coastal Subsidence District found an average savings of 18% (or 1,400 gpm) in homes where student and parent installed efficient plumbing fixtures.
Cost to Implement: Variable. Most programs require utility staff oversight and outreach efforts.

7. Water Survey for Single- Family and Multi-Family Customers

Description: This BMP including conducting a survey of customers to provide information about methods to reduce indoor water use through replacement of inefficient plumbing fixtures and increasing efficiency of irrigation systems (typically for users of more than 20,000 gallons per mo).
Water Savings: Showerheads/Aerators— 5.5 gpcd per device;
Irrigation Audit— 26 gpd for single family home; 15% outdoor water use for multi-family units
Cost to Implement: Cost of survey ($50 to $150 per unit), possible cost of water efficient plumbing fixtures, outreach, administration, and one-time cost purchase of leak detection equipment or meters.

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Attachment 1: Summary of Best Management Practices
Source: TWDB Water Conservation Best Management Practices Guide, November 2004

8. Landscape Irrigation Conservation and Incentives and Water Wise Landscape Design and Conservation Programs

Description: This BMP provides non-residential and residential customers with customer support, education, incentives, and assistance in improving their landscape water-use efficiency and water wise principles. A ratio of 1.6 or greater (summer peak/ winter average use) indicates potential for water savings, or utilities with 20% residential customers with high water use landscapes (+20,000 gallons per month).
Water Savings: Variable, up to 15% reduction in outdoor water demands (for those participating)
Cost to Implement: Costs of survey ($50 and higher, depending on size and scope), outreach, administration, and one-time cost purchase of leak detection equipment and meters.

9. Metering of All New Connections and Retrofit of Existing Connections

Description: Ensures all aspects of meter installation, replacement testing, and repair are managed optimally for water use efficiency.
Water Savings: Variable. Savings can be estimated based on a statistical sample analyzed as part of the meter-testing program.
Cost to Implement: Costs include installing new meters, retrofitting older ones, meter testing, and administration. A replacement meter ranges from $50 to $1,000 + for large, compound meters.

10. Public Information

Description: Involves educating customers about the overall picture of water resources in the community, including providing information on specific actions and measures the customers can take to implement community goals.
Water Savings: Variable. Savings can be quantified for information efforts that target a specific action, such as showerhead distribution, by comparing use without implementation of the BMP.
Cost to Implement: Depends on scope of the public information effort, ranges from $0.50 to $3.00 per customer per year depending on the size of the utility.

11. Rainwater Harvesting and Condensate Reuse

Description: Using this BMP, the utility provides customers with support, education, incentives, and assistance in proper installation and use of Rainwater Harvesting/ Condensate Reuse systems. Rainwater harvesting collects and stores rainwater close to its source, and using it for nearby needs.
Water Savings: Catchment Potential (gallons)— Area x 0.62 x 0.8 x Rainfall (in)
Storage capacity to provide for a three-month period of water demand may be desired.
Cost to Implement: Costs may include administrative program management costs and incentives to customers for implementing rainwater harvesting projects (i.e. discounts to purchase rain barrels). Also, may include staff labor costs, outreach and administrative costs at 10-20% of labor costs.

12. New Construction Graywater (or Retrofit of Existing Households)

Description: This BMP involves the use of graywater (wastewater from clothes washers, showers, bathtubs, and handwashing sinks) for landscape purposes. HB2661 added a provision that allows graywater use without treatment of up to 400 gallons per day for landscape irrigation or gardening at private home.
Water Savings: Variable, depending on type and extent of installation.
Cost to Implement: Administrative costs, including review of plans and inspection of construction. Staff labor costs may range from $50 to $100 per project; marketing and outreach range from $20 to $50 per project; and administrative costs may range from 10 – 20 % of labor costs.

13. Conservation Programs for Industrial, Commercial, and Institutional Accounts

Description: For entities that serve industrial, commercial, and institutional customers, this BMP focuses a conservation program toward higher use customers and those sectors with highest conservation potential.
Water Savings: Variable, based on the implementation of water efficient operating procedures. Estimated up to 20% water savings.
Cost to Implement: Variable, includes labor, marketing and outreach, and administrative costs.

Attachment 2- Cost and Water Savings for Selected BMPs, and Resources for Additional Water Conservation Information

Cost and Water Savings

Based on indoor/outdoor water conservation techniques presented in Texas Water Development Board Guidance documents, costs and savings for the following best management practices have been identified. Water savings and costs for other best management practices recommended by the CBRWPG that are not listed in the table are difficult to quantify, and are highly variable based on local conditions and water system specifics.

	Costs (per acft of water saved)	Typical Water Savings (gpcd)
Indoor Conservation		
Toilet Retrofits	$364 - $520	4.2 - 5.3
Showerhead/Aerators	$49 - $108	2.2 - 2.8
Clothes Washer Rebate	$651 - $994	0.7 - 5.0
Outdoor Conservation		
Landscape Irrigation Conservation & Incentives	$450	12.0
Irrigation audit-high water users	$454 - $529	0.7 - 1.0
Rainwater Harvesting	$554- $850	0.2 - 0.6
Rain Barrels	$1,305 - $1,413	0.4

Source: GDS Associates, "Quantifying Cost Effectiveness of Various Water Conservation Techniques in Texas", July 2003 (except Landscape Irrigation- Source: Task Force BMP Guide, November 2004). All costs have been updated to 2007 dollars based on Consumer Price Index (CPI) for inflation.

Water Conservation Resources

The Texas Water Development Board provides assistance to water entities interested in water conservation, including guidance for developing a water conservation plan or conducting a water audit/ water loss program, and provides leak detection equipment that can be borrowed for free (http://www.twdb.state.tx.us/assistance/conservation/Municipal/munic.asp). The following pamphlets are available for public information, which can be accessed at the web address above or ordered from the Texas Water Development Board, Stephen F. Austin Bldg, P.O. Box 13231, Austin, Texas 78711-3231:

- Being Water Smart Indoors
- Being Water- Wise Outdoors
- Top Water Smart Tips In and Around the Home
- Texas Lawn Watering Guide
- Agricultural Water Conservation Practices
- Know Your Water- Coloring Book
- Water Conservation Lesson Plans (Elementary/ Middle/ High School Curriculum)

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Attachment C:
Completed Water Conservation Surveys
Sent to the Nueces River Authority

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity City of Corpus Christi Water Department
Your Name Yolanda Marruffo Title Public Relations and Marketing Coordinator
Address P.O. Box 9277 Corpus Christi, Tx 78469-9277
Phone Number 361/826-1879 yolandam@cctexas.com

(1) When was your current water conservation plan first initiated? Year 1986

(2) What water conservation program(s) are currently being implemented by your organization?

- ☑ Public Information
- ☑ Leak Detection, Repair, Monitoring
- ☑ Landscape Irrigation Conservation
- ☑ Showerhead/Aerator/Toilet Flapper Retrofit
- ☑ Meter Testing/Repair/Replacement
- ☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? _____

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- ☑ 1-5 % reduction annually
- ☐ 5- 10% reduction annually
- ☐ No noticeable change
- ☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

- ☑ Reduce seasonal peak demands
- ☑ Reduce per capita consumption
- ☑ Reduce unaccounted for water
- ☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- ☑ Yes
- ☐ No
- ☐ Maybe

(8) If so, which ones? 8

(9) If not, please describe why (please check all that apply)?

- ☑ Cost
- ☑ Lack of staff
- ☐ Impact to expected revenues
- ☐ Water supply is not susceptible to droughts
- ☐ Existing water conservation program is effective
- ☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☑ Yes ☐ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity San Patricio Municipal Water District
Your Name Karen Ivey Title Admin Asst.
Address PO Box 940 Aransas Pass TX 78336
Phone Number (361) 777-4020

(1) When was your current water conservation plan first initiated? Year 1991

(2) What water conservation program(s) are currently being implemented by your organization?

- [x] Public Information
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [x] Leak Detection, Repair, Monitoring
- [x] Meter Testing/Repair/Replacement
- [x] Landscape Irrigation Conservation
- [x] Other (please specify): Education, Xeriscape, Rainwater harvesting, Major Rivers Kits, Outdoor Classrooms.

(3) What is your current budget for water conservation programs (as % of total water budget)? .25%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [ ] 1-5 % reduction annually
- [ ] 5- 10% reduction annually
- [ ] No noticeable change
- [x] Other (please specify): We believe education promotes water conservation and we do not try to quantify the savings per dollars spent.

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [ ] Reduce per capita consumption
- [ ] Reduce unaccounted for water
- [x] Other (please specify): Education

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [x] Yes
- [ ] No
- [ ] Maybe

(8) If so, which ones? We are always looking to expand our water conservation program but we have no ordinance authority to implement some of these BMPs to make them effective.

(9) If not, please describe why (please check all that apply)?

- [ ] Cost
- [ ] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [x] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?

- [x] Yes
- [ ] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

RECEIVED
AUG 2007
SOUTH TEXAS WATER AUTHORITY

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity South Texas Water Authority
Your Name Carola G. Serrato Title Ex. Director
Address P.O Box 1701, Kingsville, TX 78364
Phone Number 361-592-9323 x12

(1) When was your current water conservation plan first initiated? Year 2005

(2) What water conservation program(s) are currently being implemented by your organization?

- [X] Public Information
- [X] Leak Detection, Repair, Monitoring
- [ ] Landscape Irrigation Conservation
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [X] Meter Testing/Repair/Replacement
- [ ] Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 0.22% * However, purchased water from City of CC is 44% of budget excluding water & personnel - 0.86%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [ ] 1-5 % reduction annually
- [ ] 5- 10% reduction annually
- [ ] No noticeable change
- [X] Other (please specify): This does not apply to STWA, As a wholesaler to entities that supplement with surface water, calculation is not easily done- too many variables.

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [ ] Reduce per capita consumption
- [X] Reduce unaccounted for water
- [ ] Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [ ] Yes
- [ ] No
- [X] Maybe

(8) If so, which ones? School Education, Public Information

(9) If not, please describe why (please check all that apply)?

- [ ] Cost
- [ ] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [ ] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?

- [ ] Yes
- [X] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

* This does not include daily water loss calculations & reporting.

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity NUECES County Water Control & Imp. Dist. #3
Your Name PHILIP J. RICHARD Title DISTRICT MANAGER
Address PO BOX 1147 501 E MAIN ROBSTOWN, TX 78380
Phone Number 361-387-4549

(1) When was your current water conservation plan first initiated? Year 1991

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☒ Leak Detection, Repair, Monitoring
☒ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☒ Meter Testing/Repair/Replacement
☐ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? 3%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☒ 1-5 % reduction annually
☐ No noticeable change
☐ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☐ Reduce unaccounted for water
☒ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? YES

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☒ Yes ☐ No ☐ Maybe

(8) If so, which ones? #2, #6, #9

(9) If not, please describe why (please check all that apply)?

☐ Cost
☐ Lack of staff
☐ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☒ Yes ☐ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity City of Beeville
Your Name Ford Patton Title City Manager
Address 400 N. Washington Street, Beeville, TX 78102
Phone Number 361-358-4641

(1) When was your current water conservation plan first initiated? Year 1970's with Revisions since then

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☐ Leak Detection, Repair, Monitoring
☒ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☒ Meter Testing/Repair/Replacement
☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? < 1.0%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☐ 1-5 % reduction annually
☐ No noticeable change
☐ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☒ Reduce seasonal peak demands
☐ Reduce unaccounted for water
☐ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? YES

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☒ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☒ Cost
☒ Lack of staff
☒ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☒ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412 *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity City of Odem
Your Name Billie Jo Tennill Title City Secretary
Address PO Box 754 Odem, Texas 78370-0754
Phone Number 361 368 2831

(1) When was your current water conservation plan first initiated? Year 7 1984

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☒ Leak Detection, Repair, Monitoring
☐ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☒ Meter Testing/Repair/Replacement
☐ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? _____

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☒ 1-5 % reduction annually
☐ No noticeable change
☐ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☒ Reduce unaccounted for water
☐ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☐ No ☒ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☒ Cost
☒ Lack of staff
☒ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☒ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity Gregory
Your Name Norma Garcia Title City Secretary
Address P.O. Box 297 Gregory, TX 78359
Phone Number 361-643-6562

(1) When was your current water conservation plan first initiated? Year _____

(2) What water conservation program(s) are currently being implemented by your organization?

☑ Public Information
☐ Leak Detection, Repair, Monitoring
☐ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☑ Meter Testing/Repair/Replacement
☐ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? Approx 5

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☐ 1-5 % reduction annually
☐ No noticeable change
☒ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☑ Reduce unaccounted for water
☑ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1?

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☐ No ☑ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☑ Cost
☑ Lack of staff
☐ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☑ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity City of Rockport
Your Name Jean-Louie Picarazzi Title Utilities Superintendent
Address 402 E. Laurel St., Rockport, TX. 78382
Phone Number 361-790-1160

(1) When was your current water conservation plan first initiated? Year 1996

(2) What water conservation program(s) are currently being implemented by your organization?

☒ Public Information
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☒ Leak Detection, Repair, Monitoring
☒ Meter Testing/Repair/Replacement
☒ Landscape Irrigation Conservation
☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? .4 %

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☒ 1-5 % reduction annually
☐ 5- 10% reduction annually
☐ No noticeable change
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☒ Reduce seasonal peak demands
☒ Reduce per capita consumption
☒ Reduce unaccounted for water
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☒ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☒ Cost
☒ Lack of staff
☒ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☒ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☒ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity City of Sinton
Your Name Hilario Chavez III Title Director of Public Works
Address P.O. Box 1395 / 301 E. Market
Phone Number (361) 364-1964

(1) When was your current water conservation plan first initiated? Year September 2004

(2) What water conservation program(s) are currently being implemented by your organization?

- ☑ Public Information
- ☐ Leak Detection, Repair, Monitoring
- ☐ Landscape Irrigation Conservation
- ☑ Showerhead/Aerator/Toilet Flapper Retrofit
- ☑ Meter Testing/Repair/Replacement
- ☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? n/a

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- ☐ 1-5 % reduction annually
- ☑ No noticeable change
- ☐ 5- 10% reduction annually
- ☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

- ☑ Reduce seasonal peak demands
- ☐ Reduce unaccounted for water
- ☐ Reduce per capita consumption
- ☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- ☐ Yes
- ☑ No
- Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

- ☑ Cost
- ☑ Lack of staff
- ☐ Impact to expected revenues
- ☐ Water supply is not susceptible to droughts
- ☐ Existing water conservation program is effective
- ☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☑ Yes ☐ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive [illegible] Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity CITY OF FALFURRIAS UTILITY BOARD
Your Name MATIAS M. SAENZ III Title GENERAL MANAGER
Address P.O. BOX 518 FALFURRIAS, TX 78355
Phone Number (361) 325-2597

(1) When was your current water conservation plan first initiated? Year 2002

(2) What water conservation program(s) are currently being implemented by your organization?

- [X] Public Information
- [X] Leak Detection, Repair, Monitoring
- [ ] Landscape Irrigation Conservation
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [X] Meter Testing/Repair/Replacement
- [ ] Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 2 %

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [X] 1-5 % reduction annually
- [ ] No noticeable change
- [ ] 5- 10% reduction annually
- [ ] Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [X] Reduce unaccounted for water
- [ ] Reduce per capita consumption
- [ ] Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? YES

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [X] Yes
- [ ] No
- [ ] Maybe

(8) If so, which ones? #4, #5, & #8

(9) If not, please describe why (please check all that apply)? N/A

- [ ] Cost
- [ ] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [ ] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?

- [X] Yes
- [ ] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412 *Phone number 361-825-3193*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity Cynthia Park II WSC
Your Name Chauncey G. Pipp Title Manager
Address P O Box 261155, Corpus Christi, TX 78426-1155
Phone Number 361-394-9293

(1) When was your current water conservation plan first initiated? Year 2005

(2) What water conservation program(s) are currently being implemented by your organization?

- ☑ Public Information
- ☐ Showerhead/Aerator/Toilet Flapper Retrofit
- ☑ Leak Detection, Repair, Monitoring
- ☑ Meter Testing/Repair/Replacement
- ☐ Landscape Irrigation Conservation
- ☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 0.5

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- ☑ 1-5 % reduction annually
- ☐ 5- 10% reduction annually
- ☐ No noticeable change
- ☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

- ☑ Reduce seasonal peak demands
- ☑ Reduce per capita consumption
- ☑ Reduce unaccounted for water
- ☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? NO

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☑ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

- ☑ Cost
- ☑ Lack of staff
- ☐ Impact to expected revenues
- ☑ Water supply is not susceptible to droughts
- ☐ Existing water conservation program is effective
- ☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☑ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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Name of Water Entity East Riviera Water Supply Corp.
Your Name Robert Seyth Title Secretary
Address 817 Carol Lane, Riviera, TX 78379 (P.O. Box 368)
Phone Number 361-296-3684

(1) When was your current water conservation plan first initiated? Year 2005

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☒ Leak Detection, Repair, Monitoring
☐ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☐ Meter Testing/Repair/Replacement
☐ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? 0

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☐ 1-5 % reduction annually
☒ No noticeable change
☐ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☒ Reduce unaccounted for water
☐ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? NO

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☒ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☒ Cost
☒ Lack of staff
☐ Impact to expected revenues
☒ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☒ Other (please specify): Small size of system

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☒ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number* 361-825-3193.

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity FREER W.C.I.D.
Your Name VICENTE GUERRA Title GEN. MGR.
Address P.O. 329 FREER TEX. 78357
Phone Number 361-394-7336

(1) When was your current water conservation plan first initiated? Year 2000

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☐ Leak Detection, Repair, Monitoring
☐ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☑ Meter Testing/Repair/Replacement
☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 1 %

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☑ 1-5 % reduction annually
☐ No noticeable change
☐ 5- 10% reduction annually
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☑ Reduce unaccounted for water
☐ Reduce per capita consumption
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? No

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☑ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☐ Cost
☐ Lack of staff
☑ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☑ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
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This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity McCoy Water Supply Corporation
Your Name Bill LAFrance Title General Manager
Address 2125 FM 541 McCoy, Texas 78114
Phone Number 830-569-5575

(1) When was your current water conservation plan first initiated? Year 2006

(2) What water conservation program(s) are currently being implemented by your organization?

- [X] Public Information
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [X] Leak Detection, Repair, Monitoring
- [X] Meter Testing/Repair/Replacement
- [ ] Landscape Irrigation Conservation
- [ ] Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 2-3%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [X] 1-5 % reduction annually
- [ ] 5- 10% reduction annually
- [ ] No noticeable change
- [ ] Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [X] Reduce per capita consumption
- [X] Reduce unaccounted for water
- [ ] Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [ ] Yes
- [ ] No
- [ ] Maybe

(8) If so, which ones? 2, 3

(9) If not, please describe why (please check all that apply)?

- [ ] Cost
- [ ] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [ ] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?
- [ ] Yes
- [X] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

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RICARDO WATER SUPPLY CORPORATION

This survey is being conducted by the Coastal Bend Regional Water Planning Group (Planning Group) to receive feedback regarding the success of water conservation programs that are being implemented in the region. This information is being collected solely for regional water planning purposes, and your input is voluntary and *does not* imply commitment or implementation of any water conservation practices. Included with this survey is information on 13 voluntary Best Management Practices (BMPs) that the Planning Group selected (Attachment 1). Additional water conservation assistance information, including potential costs and water savings of common indoor and outdoor conservation strategies, is included as Attachment 2. Your participation in completing the survey is appreciated. **Please send your survey responses (this page only) using the pre-addressed and stamped envelope provided, by September 14, 2007.** Thank you for your time.

Name of Water Entity Ricardo Water Supply Corporation
Your Name Carola G. Serrato Title General Manager
Address P.O. Box 1572, Kingsville, TX 78364
Phone Number 361-592-3952 x13

(1) When was your current water conservation plan first initiated? Year 2005

(2) What water conservation program(s) are currently being implemented by your organization?

- [X] Public Information
- [X] Leak Detection, Repair, Monitoring
- [ ] Landscape Irrigation Conservation
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [X] Meter Testing/Repair/Replacement
- [ ] Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 6.22%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [ ] 1-5 % reduction annually
- [ ] 5- 10% reduction annually
- [ ] No noticeable change
- [X] Other (please specify): unable to determine

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [ ] Reduce per capita consumption
- [X] Reduce unaccounted for water
- [ ] Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [ ] Yes
- [ ] No
- [X] Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

- [X] Cost
- [X] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [ ] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?

- [ ] Yes
- [X] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

* This does not include

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Name of Water Entity River Acres WSC
Your Name Tara Moffitt Title Ofc. Mgr.
Address 15602 NW Blvd., Ste H
Phone Number 387-2614

(1) When was your current water conservation plan first initiated? Year 2000

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information ☐ Showerhead/Aerator/Toilet Flapper Retrofit
☐ Leak Detection, Repair, Monitoring ☒ Meter Testing/Repair/Replacement
☐ Landscape Irrigation Conservation ☐ Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 1%

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☒ 1-5 % reduction annually ☐ 5- 10% reduction annually
☐ No noticeable change ☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands ☐ Reduce per capita consumption
☒ Reduce unaccounted for water ☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? Y

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☒ No ☐ Maybe

(8) If so, which ones? 1, 3, 9, 10

(9) If not, please describe why (please check all that apply)?

☐ Cost ☐ Water supply is not susceptible to droughts
☐ Lack of staff ☒ Existing water conservation program is effective
☐ Impact to expected revenues ☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☒ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 5100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Water Conservation Survey
To Support Regional Water Planning Efforts for the Coastal Bend Region

RECEIVED
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NUECES WATER SUPPLY CORPORATION

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Name of Water Entity Nueces Water Supply Corporation
Your Name Carola G. Serrato Title General Manager
Address P.O. Box 415, Kingsville, TX 78364
Phone Number 361 592-1720 x12

(1) When was your current water conservation plan first initiated? Year 2005

(2) What water conservation program(s) are currently being implemented by your organization?

- [X] Public Information
- [X] Leak Detection, Repair, Monitoring
- [ ] Landscape Irrigation Conservation
- [ ] Showerhead/Aerator/Toilet Flapper Retrofit
- [X] Meter Testing/Repair/Replacement
- [ ] Other (please specify): _____

(3) What is your current budget for water conservation programs (as % of total water budget)? 7.53%*

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

- [ ] 1-5 % reduction annually
- [ ] 5- 10% reduction annually
- [ ] No noticeable change
- [X] Other (please specify): Unable to determine

(5) What is the primary objective of your water conservation program (please check all that apply)?

- [ ] Reduce seasonal peak demands
- [ ] Reduce per capita consumption
- [X] Reduce unaccounted for water
- [ ] Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1? yes

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

- [ ] Yes
- [ ] No
- [X] Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

- [X] Cost
- [X] Lack of staff
- [ ] Impact to expected revenues
- [ ] Water supply is not susceptible to droughts
- [ ] Existing water conservation program is effective
- [ ] Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs?
- [ ] Yes
- [X] No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193*

* This does not include monthly water loss calculations & reporting.

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Name of Water Entity San Diego Municipal Utility District #1
Your Name Vic Casas, Jr. Title General Manager
Address 200 S. Dr. E.E. Dunlap Hwy., San Diego, Texas 78384
Phone Number (361) 279-3357

(1) When was your current water conservation plan first initiated? Year Do not have one in place. We are working on one.

(2) What water conservation program(s) are currently being implemented by your organization?

☐ Public Information
☐ Leak Detection, Repair, Monitoring
☐ Landscape Irrigation Conservation
☐ Showerhead/Aerator/Toilet Flapper Retrofit
☐ Meter Testing/Repair/Replacement
☐ Other (please specify):_____

(3) What is your current budget for water conservation programs (as % of total water budget)? _____

(4) What is the percent reduction in water consumption attributed to your water conservation program, as measured by average or peak gallons per person (or connection) per day consumption?

☐ 1-5 % reduction annually
☐ 5- 10% reduction annually
☐ No noticeable change
☐ Other (please specify): _____

(5) What is the primary objective of your water conservation program (please check all that apply)?

☐ Reduce seasonal peak demands
☐ Reduce per capita consumption
☐ Reduce unaccounted for water
☐ Other (please specify): _____

(6) Is your organization already implementing any of the voluntary BMPs listed in Attachment 1?

(7) Of those not being currently implemented, is your organization interested in pursuing any of the 13 BMPs listed in Attachment 1?

☐ Yes ☐ No ☐ Maybe

(8) If so, which ones? _____

(9) If not, please describe why (please check all that apply)?

☐ Cost
☐ Lack of staff
☐ Impact to expected revenues
☐ Water supply is not susceptible to droughts
☐ Existing water conservation program is effective
☐ Other (please specify): _____

(10) Would you like a follow-up phone call to discuss specific best management practices, or water conservation assistance programs? ☐ Yes ☐ No

Thank you for your participation. Please send completed survey to Rocky Freund, Deputy Executive Director Natural Resource Center Suite 3100, Corpus Christi, Texas 78412. *Phone number: 361-825-3193.*

Rocky Freund

From: Lonnie Stewart
Sent: Saturday, August 25, 2007 9:21 AM
To: Rocky Freund
Subject: Water Conservation Survey

Rocky, After a review of the survey, I don't think it applies to GCD's. All of the districts have some form of public information dissemination, but not what was in the attachment.
If you want me to fill it out, and return. Let me know, and I will, but most of the questions do not pertain to my districts.
Lonnie

Lonnie Stewart

McMULLEN GROUNDWATER CONSERVATION DISTRICT
LIVE OAK UNDERGROUND WCD
BEE GROUNDWATER CONSERVATION DISTRICT

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