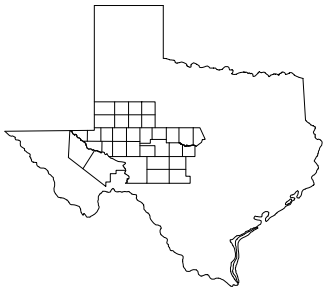
FINAL

Municipal Conservation Survey

April 2009

Prepared for

The Region F Water Planning Group



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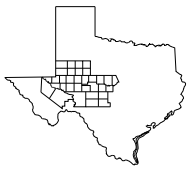

Region F
Water Planning Group

Freese and Nichols, Inc.

MUNICIPAL CONSERVATION SURVEY
April 2009

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MUNICIPAL CONSERVATION SURVEY

1 EXECUTIVE SUMMARY

Water conservation has been identified throughout the State's Regional Water Planning process as an important strategy for meeting future water needs. While important, the methods to achieve water conservation and the costs and effectiveness of conservation strategies remain uncertain. In an effort to gain more information regarding those uncertainties, Region F authorized this study to document current conservation practices used by municipalities in Region F and the costs and water savings associated with them. This study was also intended to identify municipal conservation practices that may be appropriate for Region F.

Thirteen cities were surveyed regarding their conservation efforts, and selected cities were interviewed to obtain further information on their conservation practices. The results from the surveys were compiled and analyzed along with rainfall data and Texas Water Development Board historical water use data. Costs of implementing conservation strategies were also collected and analyzed.

The results of this survey and analysis show that most cities are implementing one or more conservation strategies, but funding is key to continued and increased conservation efforts in the region. Several cities expressed interest in wastewater reuse for municipal or industrial purposes. Cities have great difficulty in tracking water savings from conservation practices. Only specific projects, such as pipe replacement programs and reuse, had quantified savings. Reuse and System Water Audit and Water Loss are two practices that show the greatest overall savings. (System Water Audit and Water Loss include repair and replacement of pipelines.)

2 INTRODUCTION

Water conservation is a vital aspect of the Regional Water Planning Process. The TWDB has ensured that conservation be included in the planning process through future reductions in per capita water use from water efficient plumbing fixture rules. Additional water conservation is to be considered as a water management strategy in the regional water planning process. In addition, Region F is located in arid West Texas and is subject to frequent droughts, and the region has limited water sources for existing entities and future growth. As such, water conservation is an important water management strategy to meet demands in the region. While it is an important strategy, the methods to achieve water conservation, the costs, and the effectiveness of conservation strategies remain uncertain. For that reason, in this third round of planning for Region F one of the special studies focused on municipal conservation. Thirteen cities were surveyed in Region F to get an overview of current conservation practices throughout the region. In addition to the surveys, four cities were contacted through teleconferences to discuss their municipal conservation programs in greater detail. The information gathered through the surveys and teleconferences will be used to update the recommended conservation strategies for Region F in the 2011 regional water plan.

2.1 Authorization and Objectives

This study was authorized by the Region F Regional Water Planning Group and is funded through a Research and Planning Grant sponsored by the Texas Water Development Board.

The objectives of this Conservation Survey are to: document current conservation practices used by municipalities and the costs and water savings associated with them; identify municipal conservation practices that may be appropriate for Region F (with an estimated range of potential water savings for each practice); and summarize this information so that it can be included in the 2011 Region F Plan.

3 METHODOLOGY

3.1 City Selection

Thirteen cities in Region F were selected to receive a survey. Cities were selected to represent a range of locations and sizes within Region F. Table 1 shows the cities selected and their population in 2006 based on data from the Texas State Data Center. These populations may differ from the service populations for water, which may include areas outside of the city limits. Figure 1 shows a map of Region F and the location of each of the cities within the region.

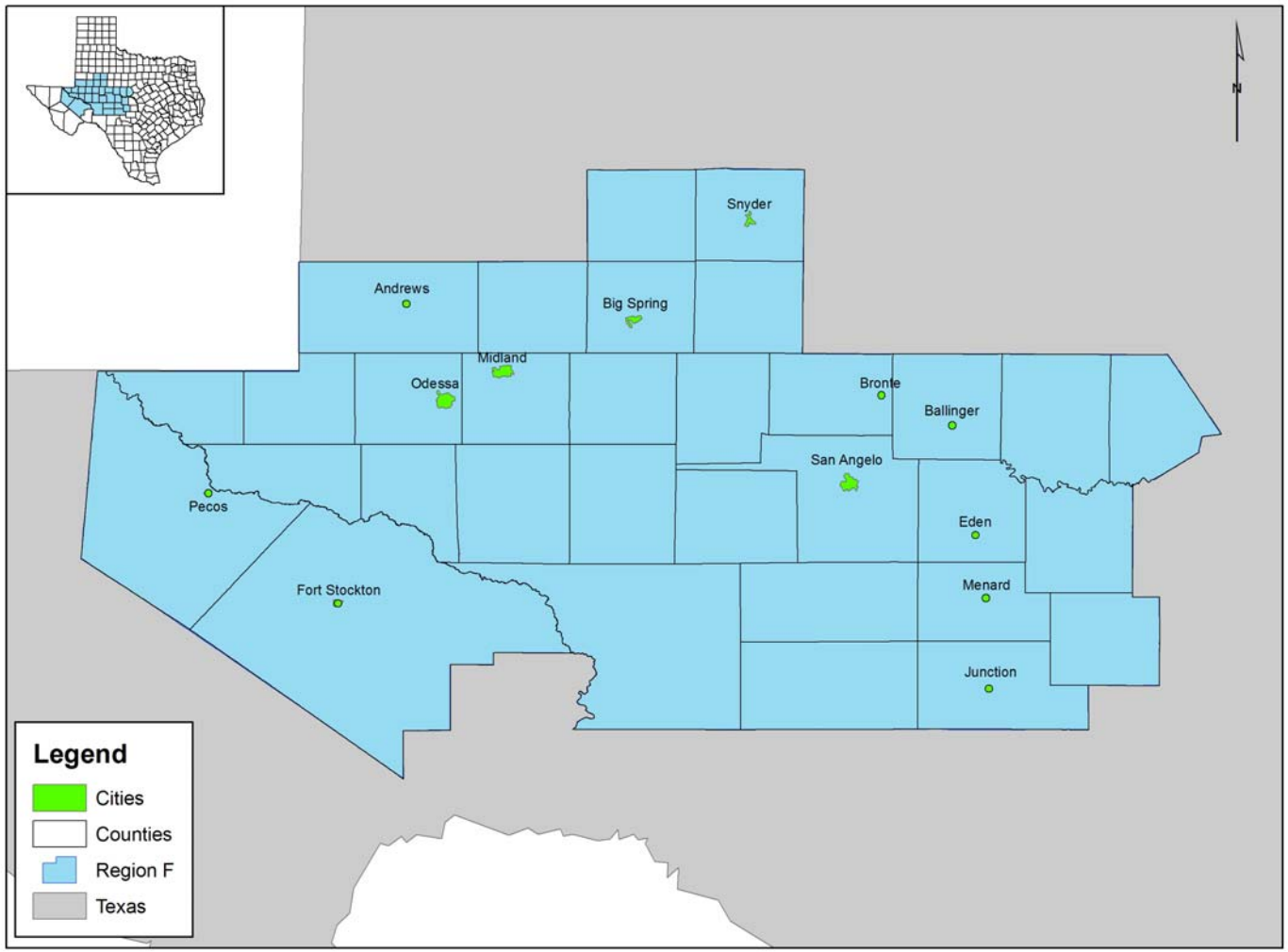
Table 1: List of Cities Surveyed in Region F and Population[1]

City	Population (2006)
Andrews	9,322
Ballinger	4,084
Big Spring	25,179
Bronte	1,129
Eden	2,451
Fort Stockton	7,422
Junction	2,659
Menard	1,611
Midland	100,193
Odessa	94,089
Pecos	8,258
San Angelo	87,212
Snyder	10,493

Populations listed are in-city population, which may differ from water service population.

[1] Texas State Data Center and Office of the State Demographer, http://txsdc.utsa.edu/tpepp/txpopest.php, accessed 6-16-08

Figure 1: Region F Surveyed Cities



3.2 Municipal Conservation Survey

A survey was created by Freese and Nichols, Inc. staff to gather data on current conservation practices used by Region F cities, water savings from the conservation practices, conservation costs and the effectiveness of these programs. Included with the survey was a two page summary of the *Water Conservation Best Management Practices Guide*[2] outlined by the Water Conservation Implementation Task Force in their 2004 Report. A copy of the survey and the best management practices are included in Appendix A. Also included in Appendix A are the surveys that were returned by the cities as part of this study. The survey asked about public education programs or school education programs offered. The cities were asked to indicate which conservation practices were used in their city from the list of best management practices. Based on their current practices, they were asked to list the most effective and least effective practices. Each city was asked to provide the budget for their conservation program and the savings estimated from these practices. Lastly, the cities were asked which practices they would like to offer in the future if the funds were available.

3.3 City Meetings

Four of the cities which returned the survey and demonstrated active conservation programs were contacted via teleconference: Menard, Midland, Odessa and San Angelo. Each of the selected cities uses three or more conservation practices. Conference calls were conducted to discuss conservation programs, their cost and their effectiveness for each city. These four cities were asked to provide an additional breakdown of the conservation budget by practice. In related questions the cities were asked to try and determine their savings from all of their water conservation activities and through individual conservation practices. During these conversations any issues or challenges to implementation including the costs and financing for water conservation activities were discussed.

[2] Water Conservation Implementation Task Force, Water Conservation Best Management Practices, Texas Water Development Board Report 362, November 2004.

3.4 Data Collection

Data was collected from select Region F cities through the previously mentioned survey. The results from the survey responses were placed in a matrix to show each practice a city uses along with the number of cities which used each practice. This information is presented in Table 2 (in Section 4 of this report).

Using the Water Conservation Implementation Task Force Best Management Practices guide, savings and costs information were compiled for each conservation practice listed in the guide. The savings and costs from the surveys were compared to the Task Force best management practices costs and savings.

Freese and Nichols, Inc. also collected historical data for water consumption for the cities surveyed. The Texas Water Development Board maintains historical data on the water consumption, population and per capita demand for cities in Texas. The historical data for the thirteen surveyed cities were collected from 1990-2005 focusing on the per capita demand, which is one method used to track the impact of water conservation. Five year moving averages were calculated for the historical data to smooth out the lines and limit the annual variability due to weather conditions. Projected future population, demand and per capita use were obtained from the *2006 Region F Water Plan*.

4 RESULTS

4.1 Survey Results

The surveys were sent by mail on February 7, 2008 to each of the thirteen cities. One month following the survey, cities which had not responded were contacted by phone so FNI could answer any questions which might hinder the return of the survey. A total of eight of the thirteen municipal conservation surveys were returned. This results in a response rate of 62%, which is a high rate of return for surveys.

Each of the surveys was entered into a database to track responses. A matrix was created to show the conservation strategies each city implemented in comparison to the Region F recommended strategies. Totals for each city were used to show how many of the strategies each individual city implemented. Totals for each strategy are also shown to indicate strategies which were used by the most cities. Table 2 shows the matrix of the returned surveys. The highlighted cells represent the strategies recommended in the *2006 Region F Water Plan*. These include water audits, school and public education and water conservation pricing. Region F also recommended accounting for water savings associated with the new Federal energy rules that recently went into effect, which results in lower water use for new clothes washers. This is a passive strategy and is not reflected in the Task Force BMPs or our conservation survey.

Each of the strategies listed in the matrix represents one of the conservation best management practices recommended by the Water Conservation Implementation Task Force. Eleven of the twenty-two practices (50%) recommended by the task force were implemented in at least one of the cities. The city of San Angelo reported using seven of the practices while Odessa reported using six practices. The most commonly implemented practices by Region F cities are school and public education programs, the metering of connections, and retrofit of existing connections. Two of the cities did not have an active conservation program.

The trends apparent from the survey results are that the recommended strategies from the *2006 Region F Water Plan* are the most frequently used. The only strategy which was mentioned by multiple cities not recommended in the Region F Plan was the metering of connections. It

also seems that the most frequently targeted water use for conservation is water used for landscape irrigation.

4.2 City Meeting Results

In addition to the surveys, four cities were contacted through teleconferences to discuss their municipal conservation programs in greater detail. A brief overview of the teleconference with each city is provided in this section.

Menard

Sharon Key and Rhome Hill with the City of Menard discussed their conservation programs during a conference call on May 15, 2008. Although Menard was the smallest city contacted during the teleconferences, they have implemented three conservation practices.

Menard does not have a line item in their budget for conservation. To help with their programs, they rely on partnerships with other agencies: Master Gardeners, the Texas Cooperative Extension Service and the Menard Underground Conservation District. One project they would like to implement is the reuse of treated wastewater for golf course irrigation. One of the greatest challenges facing Menard is the amount of funding required to offer these conservation programs with a small city budget. Menard has seen a decrease in water use, but were unable to quantify the savings from implementing individual conservation practices. The city shows pumping and water levels on their bill inserts. Whenever the well levels begin to drop they see reduced water use. Menard has started a meter replacement program to replace older meter with new meters.

The City is interested in pursuing wastewater reuse for golf course irrigation and implementing a leak detection program. The city is currently trying to secure funding for a new wastewater treatment plant, which would provide the opportunity for wastewater reuse.

Table 2: Conservation Survey Matrix

	Population less than 10,000				Population greater than 10,000				
Strategy	City of Andrews	City of Bronte	City of Eden	City of Menard	City of Midland	Big Spring	City of Odessa	San Angelo	**Totals**
System Water Audit and Water Loss *							X	X	**2**
Water Conservation Pricing*					X			X	**2**
School Education*				X		X	X	X	**4**
Public Information*					X	X	X	X	**4**
Residential Clothes Washer Incentive Program									**0**
Prohibition on Wasting Water			X			X		X	**3**
Showerhead, Aerator, and Toilet Flapper Retrofit									**0**
Residential Toilet Replacement Programs									**0**
Water Survey for Single-Family and Multi-Family Customers									**0**
Landscape Irrigation Conservation and Incentives					X				**1**
Water Wise Landscape Design and Conversion Programs				X			X		**2**
Athletic Field Conservation									**0**
Golf Course Conservation									**0**

*Highlighted text represents recommended strategies from the *2006 Region F Water Plan*

Table 2: Conservation Survey Matrix (Continued)

	Population less than 10,000				Population greater than 10,000				
Strategy	City of Andrews	City of Bronte	City of Eden	City of Menard	City of Midland	Big Spring	City of Odessa	San Angelo	**Total**
Metering of All New Connections and Retrofit of Existing Connections			X	X			X	X	**4**
Wholesale Agency Assistance Programs									**0**
Conservation Coordinator								X	**1**
Water Reuse	X		X	**	**		X	**	**3**
Rainwater Harvesting and Condensate Reuse				X					**1**
New Construction Gray water									**0**
Park Conservation									**0**
Conservation Programs for Industrial, Commercial, and Institutional Accounts									**0**
Cost-Effectiveness Analysis for Municipal Water Users									**0**
Totals	**1**	**0**	**3**	**4**	**3**	**3**	**6**	**7**	

** Cities use their wastewater effluent for non-municipal purposes (such as agricultural irrigation).

Midland

Stuart Purvis with the City of Midland discussed their conservation program during a conference call on June 3, 2008. The City of Midland is currently focusing on their largest water user, the Midland Independent School District. The city is subsidizing the cost to install sprinkler systems at the schools with centralized control for each of the systems. Projected savings from this project is 369,000 gallons per day in the summer months. Midland also wants to construct an interceptor unit which would provide Midland College with 100,000 gallons per day of reuse

water for landscape irrigation. Regulatory restrictions have held up the progress of this project. The City of Midland has historically used most of their effluent to irrigate crops on a city-owned farm or has sold the effluent to other farmers. The other conservation practices in the city have primarily targeted outdoor water use. Savings from these other practices cannot be easily quantified. The greatest challenge faced by Midland is public awareness of the importance of water conservation.

Odessa

Debbie McReynolds with the City of Odessa discussed their conservation programs during a conference call on June 2, 2008. The City of Odessa has an extensive reuse program. Most of the treated wastewater is used at a refinery for process water. Excess treated wastewater is used for commercial and residential irrigation. One homeowners association has installed a dual plumbing system to allow individual homeowners to irrigate with reuse water. The City currently has funds available for replacement and rehabilitation of aging water distribution infrastructure. As the older infrastructure is replaced, the City expects to see reduction in their water loss. The greatest challenge to conservation programs in Odessa is public awareness of the importance of water conservation.

San Angelo

Toni Fox and Will Wilde with the City of San Angelo discussed their conservation program during a conference call on May 12, 2008. The City of San Angelo uses a variety of conservation practices to achieve savings. One practice which has shown significant savings is a pipeline replacement and repair program which began in 2001[3]. This corresponds with the significant drop in the per capita demand in San Angelo shown in Figure 5. The city has historically reused their wastewater to irrigate crops on a city-owned farm or has sold the effluent to other irrigators. The City of San Angelo also employs a full time staff person to run its conservation programs. The challenges San Angelo faces are limited funding to implement additional conservation practices and support of these programs as cost saving strategies. San Angelo indicated through their survey and during the teleconference they are interested in funding a landscape irrigation

[3] For the purposes of this study, the City of San Angelo's pipeline replacement and repair program is considered to be an application of the System Water Audit and Water Loss Study best management practice.

inspection program. The goal is to hire a full time staff position to conduct the inspections and organize a landscape irrigation rebate program.

Several trends were observed from the four cities contacted through the teleconferences.

1. Partnerships with other organizations are vital to successful conservation programs. Each of the cities stated that they worked with another group (outside of city staff) especially in education programs. Two of the cities mentioned working with the Master Gardeners. Groundwater conservation districts and the Extension Service were also mentioned.
2. Reuse of treated wastewater was a strategy which every city mentioned. The cities that do not currently provide reuse water plan to do so in the future.
3. Landscape conservation programs are an important part of each city's conservation program. In most cases the cities' landscape conservation consisted of education on proper watering amounts and recommendation of landscape to be used to reduce water demand. Several of the cities constructed demonstration landscapes using city facilities or city parks.
4. Raising prices does have an impact on water demand. Two of the cities indicated that they observed decreased consumption with increased water rates or the transition from flat rates to increasing block rates.
5. School education is difficult for each city to implement. School systems have required curriculum to complete, which leaves little time to teach water conservation in the classroom.
6. Cities have a great difficulty in tracking the savings from individual conservation practices. Each city contacted through a teleconference could not quantify the savings from their conservation programs. Only specific projects had quantified savings, such as San Angelo's pipe replacement program or Midland's school district irrigation conservation project. Practices such as school or public education or water conservation pricing could not be quantified.
7. Funding for conservation program is difficult to obtain. Most of the cities do not have a dedicated staff person or dedicated funding for conservation programs.

4.3 Historical Water Use

Figures 2 through 5 show historical water use in gallons per capita per day (gpcd) obtained from the Texas Water Development Board (TWDB) for the cities contacted through conference calls. For this study, gpcd calculations were used to identify possible trends in reduced water use that may be associated with water conservation measures.

"Gallons per capita per day" (gpcd) is a measurement of water use, and the TWDB calculates gpcd as:

$$\frac{\text{(water diverted/ purchased) – (wholesale sales +industrial sales + power sales)}}{\text{Population of service area}}$$

The gpcd value provides an estimate of municipal per capita water use that includes commercial, retail, some light industrial, institutional and in some cases, municipal golf course irrigation. This definition provides a historical context for water use for a single water provider and may be a reasonable tool to assess water conservation trends. It is not a good tool for comparing water usage between providers because of the potential different percentages of non-residential water use. Since weather conditions also impact water use, the graphical comparisons on Figures 2 through 5 show historical gpcd, rainfall and timeline of when conservation measures were implemented.

As shown, water use trends varied by city, but generally there has not been sufficient time to confirm that reductions in water use are associated with implemented conservation measures. Menard and San Angelo show reducing trends over the last five years, while Odessa and Midland remain about the same. Menard, Odessa and San Angelo have five year average per capita water use typically between 150 and 200 gpcd. Midland has a somewhat higher five year average per capita water use typically between 200 and 250 gpcd, with the exception of recent drought years when use was slightly over 250 gpcd. As a point of reference, the TWDB projects the future per capita water use for Region F to be 205 gpcd in 2010 and decrease to 194 gpcd by 2060.

Figure 2: TWDB City of Menard Historical Per Capita

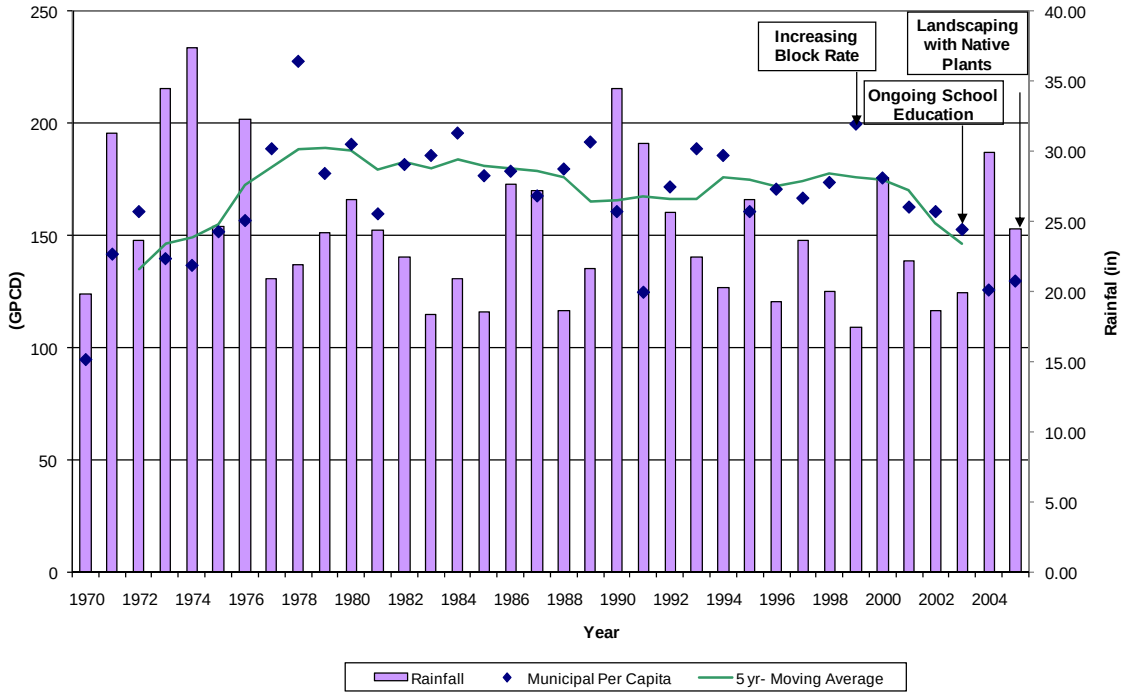


Figure 3: TWDB City of Midland Historical Per Capita

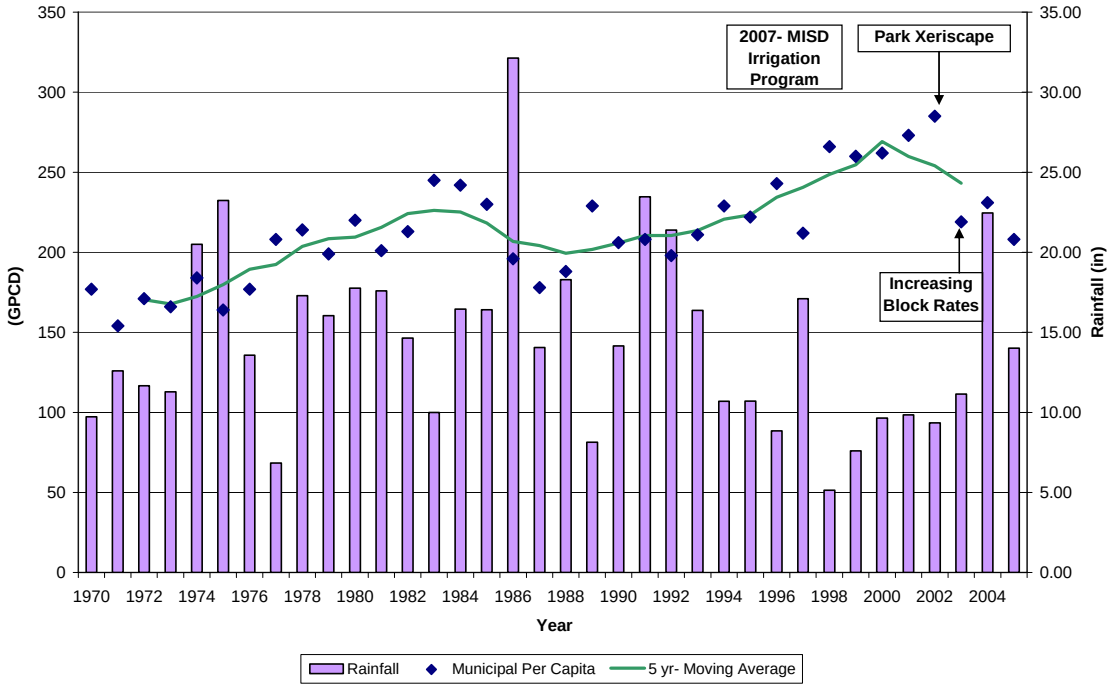


Figure 4: TWDB City of Odessa Historical Per Capita

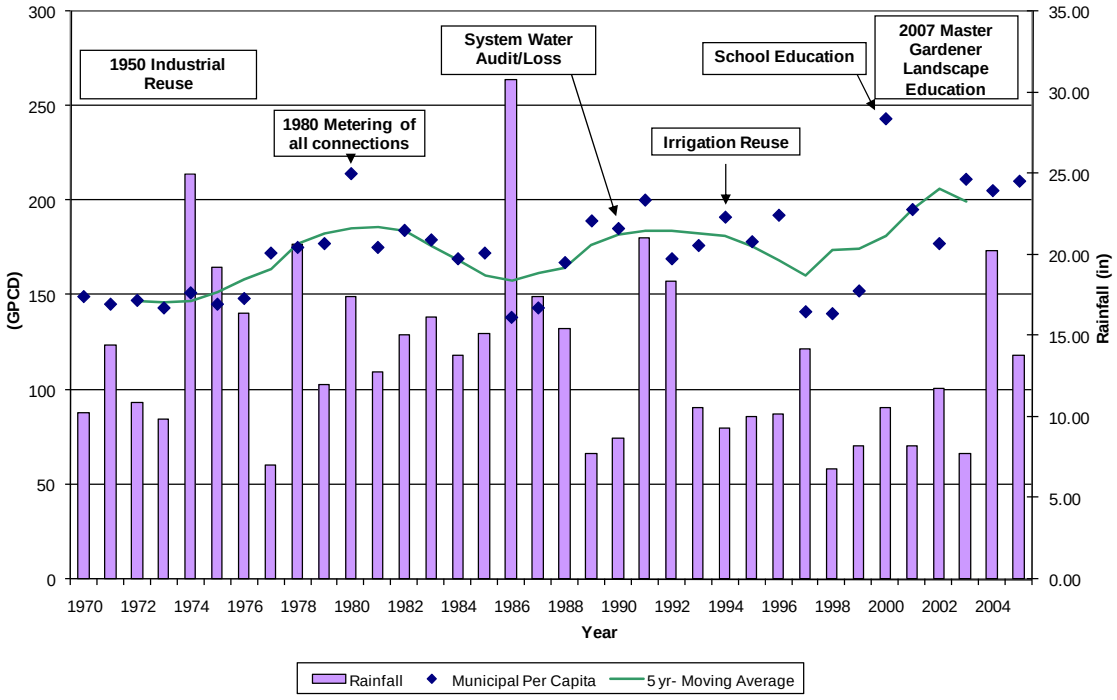
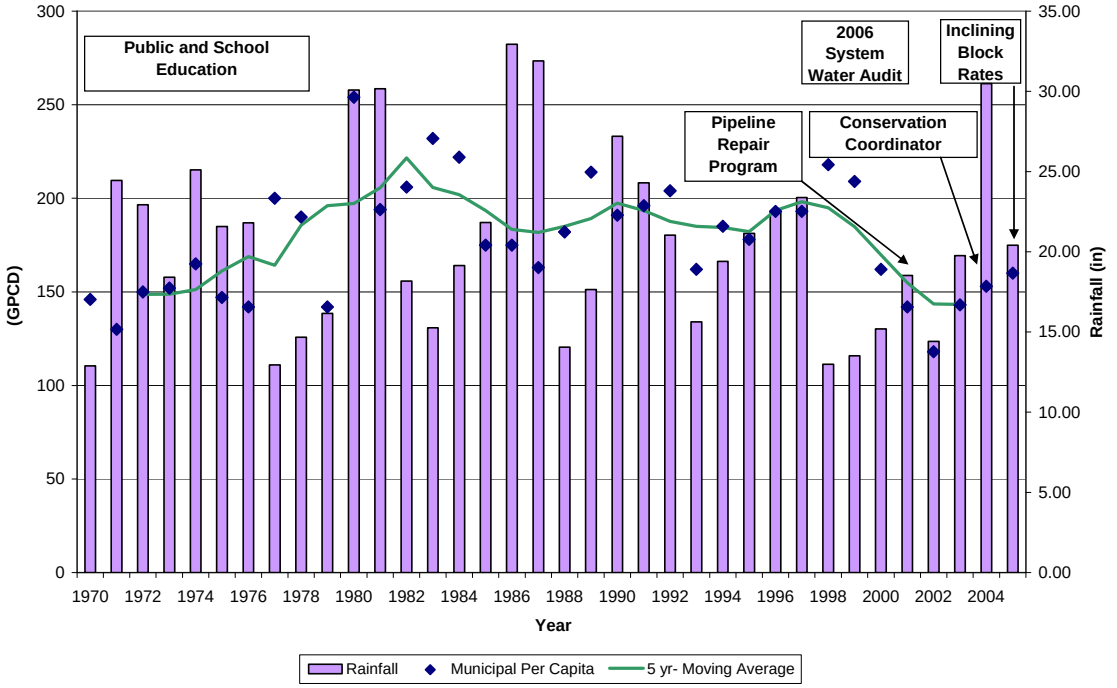


Figure 5: TWDB City of San Angelo Historical Per Capita



4.4 Recommended Region F Conservation Strategies

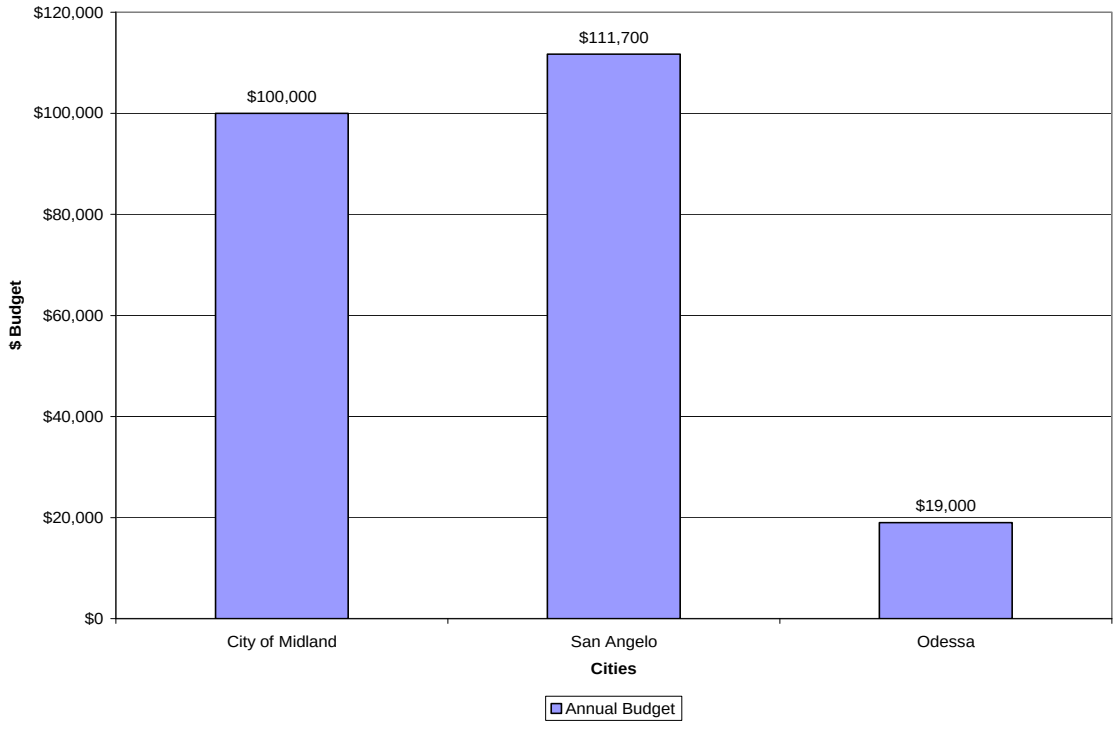
Five strategies were recommended in the *2006 Region F Water Plan* for Region F cities. The five strategies were

- System Water Audit and Water Loss Study
- Water Conservation Pricing
- Federal Residential Clothes Washer Initiative (Passive adoption)
- School Education
- Public Information.

4.4.1 Costs

Three cities, Midland, Odessa and San Angelo, provided their annual budget for conservation programs. Figure 6 shows the annual budget for the cities conservation program. The City of San Angelo has the largest budget for their water conservation program of the cities surveyed.

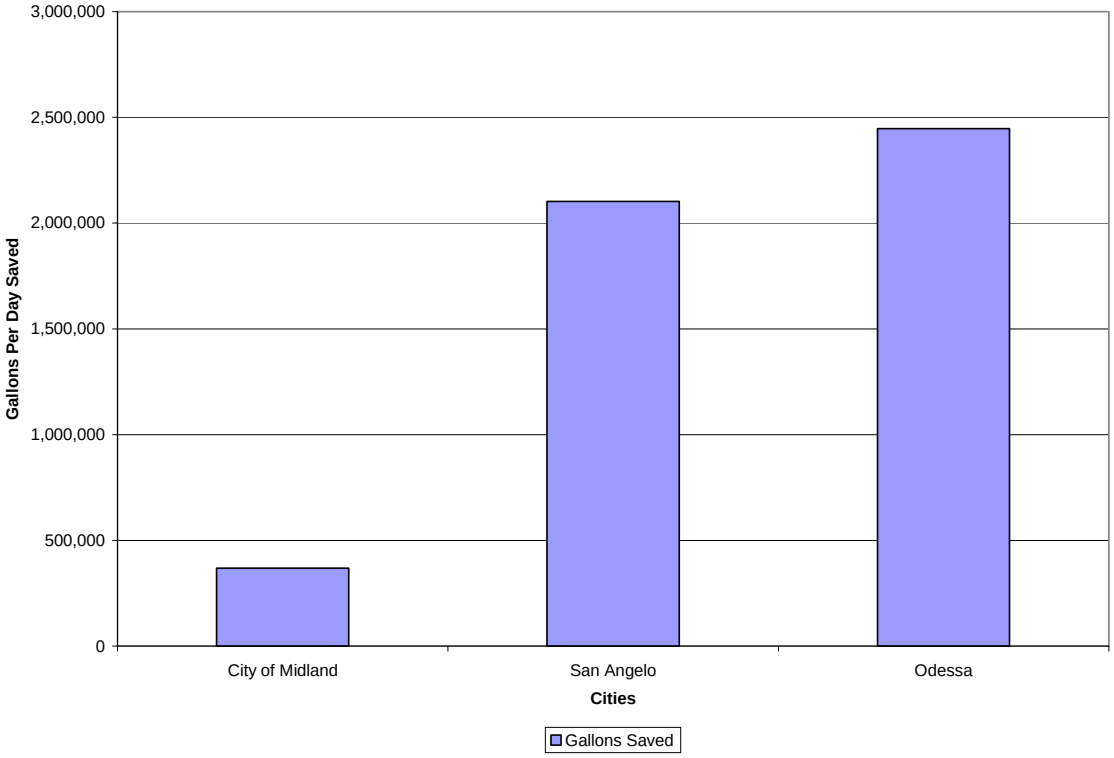
Figure 6: Cities' Annual Conservation Budget



4.4.2 Savings

The cities which responded to the survey with water savings from their conservation program are shown in Figure 7. San Angelo and Odessa both offer reuse water which accounts for a substantial amount of their savings. Midland currently has plans for a reuse project which will save 100,000 gallons per day, but that is not yet reflected in Figure 7.

Figure 7: Gallons per Day Saved through Conservation Program



4.4.3 Feasibility

Many of the strategies recommended by the Water Conservation Implementation Task Force have estimates for the impact each practice will have on the per capita water use when implemented. For several retrofit practices a standard amount of savings achieved through the practice is provided. Practices that do not have this standard savings amount include a methodology for calculating the savings achieved on an individual city basis. The list of practices for which the Task Force provided savings does not match the list of strategies implemented in Region F. Without the comparisons between these practices it is not possible to

tell if practices implemented by Region F cities are meeting or exceeding the savings or the costs developed by the Water Conservation Implementation Task Force. Figure 8 shows the savings based on data provided from the surveys.

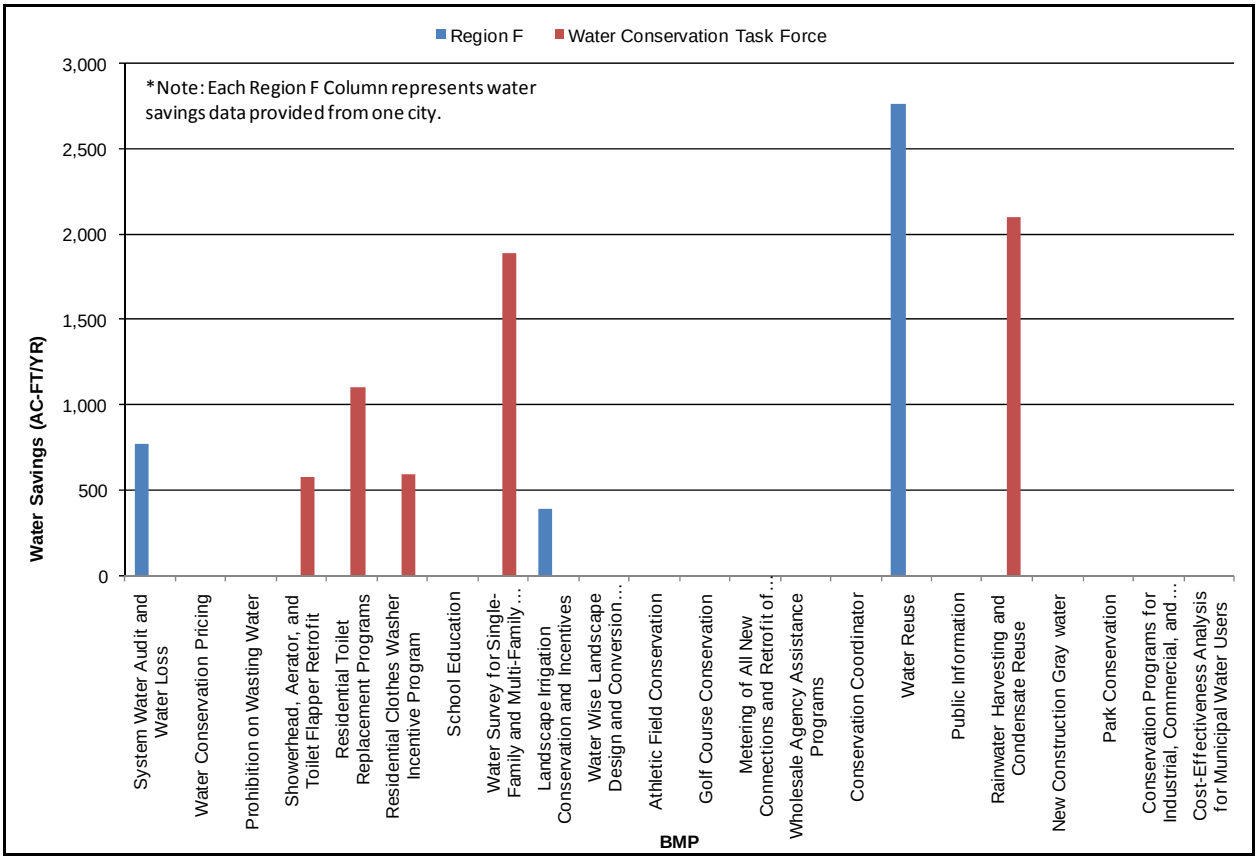
The Region F savings were calculated by taking savings from the survey or teleconference and then normalizing them for the savings expected from a city of 95,000 (the approximate population of Midland, Odessa and San Angelo). Savings from the Water Conservation Implementation Task Force were calculated by multiplying the per capita savings for the conservation practice by a population of 95,000. Direct comparison between the practices implemented by Region F and the Water Conservation Task Force are not possible because there are no water savings data on the same practice from both the Task Force and the Region F cities contacted.

Table 3: Region F Cost Per Acre Foot by Strategy

City	Strategy	Cost per Acre-Foot
Midland	Landscape Irrigation Conservation and Incentives	$241.94
San Angelo	System Water Audit and Water Loss	$47.43
Odessa	Water Reuse	**

**Note - The conservation costs provided by the City of Odessa do not include the costs for the reuse program. City of Odessa did provide the amount of water that is reused.

Figure 8: Normalized Water Savings by Practice
City with population of 95,000



*Note: 1. Water Conservation Implementation Task Force data developed from report per capita multiplied by a population of 95,000.
2. Region F Data developed from water savings provided from surveys and teleconferences, normalized to apply to a city with a population of 95,000.
3. The BMPs shown above with no conservation water savings indicate that no meaningful data was available.

5 CONCLUSIONS

- Based on the survey results, public and school education programs and universal metering of connections are the most frequent water conservation practices currently being implemented by cities in Region F.
- There is an interest in wastewater reuse in the region, especially for the larger cities.
- Several cities expressed interest in expanding their conservation programs, but are limited by funding and public support.
- Funding is needed to continue and increase the amount of municipal conservation in Region F.
- It is difficult to determine savings from individual conservation practices. None of the cities surveyed tracked water savings for individual practices with the exception of specific projects such as pipe replacement or reuse.
- Reuse and System Water Audit and Water Loss Study are the practices that show the greatest savings overall. (System Water Audit and Water Loss Study include pipeline repair and replacement.)

APPENDIX A – WATER CONSERVATION SURVEY

Survey Questionnaire:

City Name: _____

Contact Name: _____

Phone: _____ FAX: _____ Email_____

Mailing address: _____

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through Texas Water Development Board?

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

4. Do you have a leak detection program in operation?

5. What other techniques/programs have you used to save water through conservation?

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

8. What conservation practices* have you implemented provide the greatest water savings?

9. What conservation practices* have you implemented provide the least water savings?

10. What new conservation practices* would you be interested in implementing in the future?

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

DESCRIPTION OF WATER CONSERVATION PRACTICES

(From *Water Conservation Best Management Practices Guide*[1])

CITY PROGRAMS / DEPARTMENTS:

System Water Audit and Water Loss – Conducting a study of all the water usage by a utility within the service area. Identifies "unaccounted water" and locates possible reasons for the loss (accounting, unbilled water, leaks)

Water Conservation Pricing – Raising the price of water to encourage conservation. Usually accomplished through an increasing block rate structure i.e. (0-2000 gallons = $2.00 per 1,000 gallons; 2,000 – 6-000 gallons = $2.25 per 1,000 gallons, etc.).

Prohibition on Wasting Water- Passage of a city ordinance that prohibits water wastes such as water leaks, or water flowing into streets or sidewalks. Usually, includes a warning system and fines.

Water Survey for Single-Family and Multi-Family Customers – Visit the location to investigate measures to reduce consumption. Includes an indoor and outdoor survey. Indoor, look for leaks or inefficient appliances. Outdoor, look for leaks on the property, in the sprinkler system and adjusts sprinkler system for excessive use.

Metering of All New Connections and Retrofit of Existing Connections – Requires metering of all new and existing customers, and replacing meters that are old and no longer accurate.

Wholesale Agency Assistance Programs - The wholesale agency provides financial and/or technical support to wholesale purchasers to advance water conservation efforts both for the wholesale customer and its retail water customers.

Conservation Coordinator – Employment of a conservation coordinator to implement conservation programs, develop conservation programs, monitor expenses and track savings.

Water Reuse – Using treated wastewater effluent for non-potable uses (i.e. golf courses, city parks, athletic fields, industrial processes).

Rainwater Harvesting and Condensate Reuse – Education or rebate program that refunds the purchase of rainwater harvesting barrels. Incentive to install condensate collection systems, which collect cooling tower blow down, and air conditioner system condensate in a cistern to be used for irrigation.

New Construction Gray Water – Installing dual plumbing systems in homes so homeowners can use gray water on their landscape. Gray water is water from washing machines, sinks not used for hazardous materials or food preparation, and bathtubs.

Conservation Programs for Industrial, Commercial, and Institutional Accounts- Programs which offer incentives for specific activities such as: retrofits of equipment that consume less water, or conversion to reclaimed water for processes where non-potable water can be used.

LANDSCAPE:

Landscape Irrigation Conservation and Incentives – Provides education on and incentives to install irrigation systems that have greater efficiency (i.e. converting to drip instead of spray irrigation in flower beds, rain sensor installation).

Water Wise Landscape Design and Conversion Programs – Offer rebates or incentives for homeowners or businesses that will convert to low-water need landscapes.

Athletic Field/ Golf Course/ or Park Conservation – Evaluates the water need for the respective facility to maintain health for users by developing a conservation plan. Encourages managers to meet this need by adjusting watering schedules, improving efficiency or using non-potable water (water reuse).

PUBLIC INFORMATION / EDUCATION:

School Education – Any type of in-class materials, exhibits or presentations on ways to conserve water. Extensive as an entire unit provided to teachers or as simple as a presentation from conservation staff.

Public Information – Education programs targeted at the general public through media, mail outs, or public meetings.

RETROFIT / REBATE / INCENTIVES:

Showerhead, Aerator, and Toilet Flapper Retrofit – Program to distribute free showerheads, aerators or toilet flappers, or offer a rebate on their purchase.

Residential Toilet Replacement Programs – Offer rebates or free toilets for homes with existing high-flow (greater than 1.6 gallons per flush) toilets.

Residential Clothes Washer Incentive Program – Provide rebates for homeowners who replace old high-flow clothes washers with low-flow energy efficient models. Can incorporate energy utility to offer a rebate as well.

Survey Questionnaire:

City Name: CITY OF ANDREWS

Contact Name: DAVID SANDERS

Phone: 432-523-4820 FAX: 432-523-4820 Email dsanders@cityofandrews.org

Mailing address: 111 LOGSDON
ANDREWS, TX 79714

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

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1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☐ **Yes (Customers)** ☑ **No** ☐ **Don't Know**

   ☐ **Yes (Schools)** ☑ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

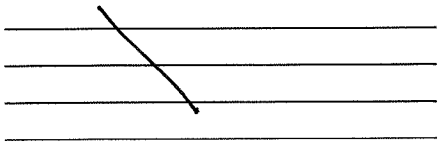
3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

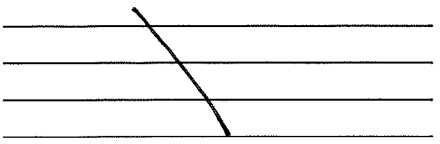
   ☑ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?





6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   — **GPD** — **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   N/A

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

N/A

9. What conservation practices* have you implemented provide the least water savings?

N/A

10. What new conservation practices* would you be interested in implementing in the future?

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

Please return completed surveys to:

Attn. Simone Kiel
Freese and Nichols, Inc.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: Big Spring

Contact Name: Todd Darden

Phone: 432-264-2501 FAX: 432-263-8310 Email

Mailing address: 310 Nolan St.
Big Spring, TX 79720

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☒ **Yes (Customers)** ☐ **No** ☐ **Don't Know** all new customers

   ☒ **Yes (Schools)** ☐ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through Texas Water Development Board?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   Parks and Rec automated Irrigation

   Prohibit Water Waste

   Landscape ordinance encouraging xeriscape

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   ____ **GPD** ____ **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   -

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

Landscaping ordinance
Public & school education

9. What conservation practices* have you implemented provide the least water savings?

10. What new conservation practices* would you be interested in implementing in the future?

Additional Education

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

No assistance needed, Additional funds would lead to more programs.

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

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Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: City of Bronte

Contact Name: Pat Martindale

Phone: 325-473-3501 FAX: 325/473-2048 Email brontetx@wcc.net

Mailing address: P.O. Box 370
Bronte, TX 76933

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☐ **Yes (Customers)** ☑ **No** ☐ **Don't Know**

   ☐ **Yes (Schools)** ☑ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through Texas Water Development Board?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☑ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   _____ _____
   _____ _____
   _____ _____
   _____ _____

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   _____ **GPD** _____ **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   $0

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

NONE

9. What conservation practices* have you implemented provide the least water savings?

NONE

10. What new conservation practices* would you be interested in implementing in the future?

NOT SURE

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

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Fort Worth, Texas 76109
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Survey Questionnaire:

City Name: Eden

Contact Name: Celina Hemmeter

Phone: 325-869-2211 FAX: 325-869-5055 Email edencity@wcc.net

Mailing address: PO Box 915
Eden TX 76837

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☐ **Yes (Customers)** ☒ **No** ☐ **Don't Know**

   ☐ **Yes (Schools)** ☒ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☐ **Yes** ☐ **No** ☒ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☐ **No** ☒ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   - Conservation hours for watering lawns in the summer months
   - metering of all new connections - check for "dead meters"

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   DNK **GPD** _____ **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   Ø

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

_____ _____

_____ _____

9. What conservation practices* have you implemented provide the least water savings?

_____ _____

_____ _____

10. What new conservation practices* would you be interested in implementing in the future?

_____ _____

_____ _____

_____ _____

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

_____

_____

_____

_____

_____

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

Please return completed surveys to:

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Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: Menard

Contact Name: Rhome Hill

Phone: 325)396-4706 FAX: 325)396-2015 Email menards4u@yahoo.com

Mailing address: P.O. Box 145

Menard, TX 76859-0145

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☐ **Yes (Customers)** ☒ **No** ☐ **Don't Know**

   ☒ **Yes (Schools)** ☐ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☒ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   Drought continues.

   School-Education.

   Landscaping with native plants.

   Higher water rates.

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   ? **GPD** ? **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   _____

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

Meter replacement.

Rain water harvest.

Irrigating wastewater effluent (Ag.)

Notices on well depth on water bills

9. What conservation practices* have you implemented provide the least water savings?

Rain water harvest

Less than 20" of rain/year

10. What new conservation practices* would you be interested in implementing in the future?

Golf course irrigated with wastewater effluent when new sewer plant is finished.

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

Leak detection.

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

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4055 International Plaza, Suite 200
Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: CITY of MIDLAND

Contact Name: STUART T. PURVIS

Phone: 432-685-7262 FAX: 432-685-5056 Email SPURVIS@MIDLANDTEXAS.GOV

Mailing address: P.O. Box 1152

MIDLAND, TX 79702

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☑ **Yes (Customers)** ☐ **No** ☐ **Don't Know**

   ☐ **Yes (Schools)** ☑ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   - SUBSIDIZE INSTALLATION OF AUTOMATED SPRINKLER SYSTEMS/WELLS FOR SCHOOL SYSTEM - LARGEST USER (MISD)
   - INCREASING BLOCK RATES
   -

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   369,000 **GPD** _____ **% total delivered**

   when MISD complete

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   MISD PROJECT - $500,000 OVER 5 YEARS

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?

MISD IRRIGATION CONVERSION

9. What conservation practices* have you implemented provide the least water savings?

- INSIDE USAGE DEVICES

10. What new conservation practices* would you be interested in implementing in the future?

- IRRIGATION SOIL MOISTURE DETECTORS, RAIN, WIND, FREEZE SENSORS

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.

NO

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

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Freese and Nichols, Inc.
4055 International Plaza, Suite 200
Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: City of Odessa

Contact Name: Debbie McReynolds

Phone: 432-335-4634 FAX: 432-335-4698 Email dmcreyno@ci.odessa.tx.us

Mailing address: P.O. Box 4398
Odessa, Tx 79760

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☑ **Yes (Customers)** ☐ **No** ☐ **Don't Know**

   ☑ **Yes (Schools)** ☐ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☑ **Yes** ☐ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☐ **Yes** ☐ **No** ☐ **Don't Know**

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☑ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   Reuse
   Water System Audit / Loss
   Metering of all connections
   Work with Master Gardners on landscaping conservation
   Bookcovers to students in ECISD

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   _____ **GPD** _____ **% total delivered**

   893,049,000 gal of reuse for 2007

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   $ 19,000

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?
   Water Reuse - voluntary

9. What conservation practices* have you implemented provide the least water savings?
   Public education - voluntary

10. What new conservation practices* would you be interested in implementing in the future?
    Golf course / Park Conservation / Athletic Field

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.
    We are implementing an infrastructure rehab program that will replace many old lines that break, may be leaking and contribute to water quality issues that necessitate uses of large volumes of water for line flushing

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Fort Worth, Texas 76109
Phone (871) 735-7446 Fax (817) 735-7401

Survey Questionnaire:

City Name: San Angelo

Contact Name: Toni Fox

Phone: 325-657-4506 FAX: 325-655-6397 Email: toni.fox@sanangelotexas.us

Mailing address: 72 W College Ave
San Angelo TX 76903

Please answer the survey questions below. Refer to the attached descriptions of the different conservation practices if you are uncertain. Please contact me with any questions you might have at the contact information provided.

---

1. Does your city provide educational materials to customers and/or schools on water conservation?

   ☒ **Yes (Customers)** ☐ **No** ☐ **Don't Know**

   ☒ **Yes (Schools)** ☐ **No** ☐ **Don't Know**

2. Have you ever participated in the Texas Water IQ program or used free conservation materials available through TWDB?

   ☒ **Yes** ☐ **No** ☐ **Don't Know**

3. Would you be interested in participating in a conservation education program such as Texas Water IQ?

   ☒ **Yes** ☐ **No** ☐ **Don't Know** ☒ depending on cost

4. Do you have a leak detection program in operation?

   ☐ **Yes** ☒ **No** ☐ **Don't Know**

5. What other techniques/programs have you used to save water through conservation?

   Pricing
   Pipe replacement
   Water main replacement
   Prohibiting waste of water

6. How much water do you estimate you save through conservation? (Please provide gallons per day (GPD) and/or percentage of total delivered)

   _____ **GPD** 15 **% total delivered**

7. Approximately, what is your annual budget for water conservation programs? If available, could you please provide a breakdown of cost per program?

   $111,700 = Salary, benefits, vehicle & vehicle maintenance, continuing education, travel, office supplies & projects.

Conservation Survey (page 2)

8. What conservation practices* have you implemented provide the greatest water savings?
   Sprinkler Checklist
   Landscape Irrigation
   Public Information

9. What conservation practices* have you implemented provide the least water savings?

10. What new conservation practices* would you be interested in implementing in the future?
    Water Wise Landsape
    Toilet Replacement
    Landscape Rebates

11. Would your city need assistance in implementing new water conservation practices? If yes, please describe the assistance needed.
    - Toilet replacement/rebate - Landscape replacement/ rebate & new landscape (xeriscape) incentive programs - grants &/or matching funds
    - Stronger state laws on irrigation, native plants use, landscape design, etc

* If appropriate, please indicate whether the conservation practice is mandatory or voluntary.

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Fort Worth, Texas 76109
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