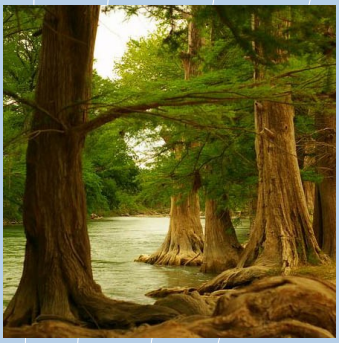
July 2010

Texas is the fastest growing state in the nation. Our water supplies are limited. So it is a shame that during the summertime, much of our most precious natural resource ends up...

Sprayed Away



Seven Ways to Reduce Texas' Outdoor Water Use

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Acknowledgements

Sprayed Away: Seven Ways to Reduce Texas' Outdoor Water Use is a joint publication of the National Wildlife Federation and the Lone Star Chapter of the Sierra Club. The document was written by Lacey McCormick and Jennifer Walker. The authors would like to thank the following people: Michelle Camp for compiling much of the information from the utility profiles, Ken Kramer and Myron Hess for their guidance and comments, and Leslie Pool for her assistance with proofreading and compilation.

This publication was produced as an activity of the Texas Living Waters Project. This project is a collaborative effort of the National Wildlife Federation, Environmental Defense Fund, and the Lone Star Chapter of the Sierra Club. The goals of the project are to:
1) ensure adequate water for people and environmental needs,
2) reduce future demand for water and foster efficient and sustainable use of current water supplies,
3) educate the public and decision makers about the impact of wasteful water use and the opportunities for water conservation, and
4) involve citizens in the decision-making process for water management.

The Texas Living Waters Project has received generous support from: Houston Endowment Inc.; The Meadows Foundation; The Brown Foundation, Inc.; The Cynthia and George Mitchell Foundation; The Coypu Foundation; James A. "Buddy" Davidson Charitable Foundation; The Reese Foundation; The Jacob and Terese Hershey Foundation; The Rachael and Ben Vaughan Foundation; The Dixon Water Foundation; The Trull Foundation, Magnolia Charitable Trust; Harris and Eliza Kempner Fund

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Introduction

One of the most critical issues facing Texas now and in the future is how we use water. The ways in which we approach water have enormous implications for our environment, our pocket books, and the quality of our lives. We can only grapple with this issue successfully if we have a clear idea of how much water we use, how we use it, and how we might become more efficient in using it. One major area of water use in Texas is outdoor landscape watering, which is especially significant in the summer.

During Texas' long, hot summers, our water use increases dramatically as residents turn on their taps to water their lawns and fill their pools. The National Wildlife Federation and the Lone Star Chapter of the Sierra Club have reviewed outdoor water use in 18 Texas cities in recent years to create a better understanding of outdoor water use in our state and to examine how we might become more efficient in that use.

In the 18 cities we looked at, monthly total water use increased by an average of 58% during the summer months of July, August, and September when compared to the winter months of December, January, and February. That equates to an additional 13.5 billion gallons of water that must be supplied, treated, and pumped each day during the summer in all of these 18 cities combined.

Water use increases by an average of 58% percent during the summer months in the 18 cities we looked at. If these cities could reduce this increase by just 25%, they could save a combined 147 million gallons every day during the summer. *Photo by Kristin Bradley.*

Much of this summer increase is not necessary, even for the purpose of maintaining landscapes. The Texas Water Development Board has estimated that half of the water we use on our landscapes is simply wasted due to overwatering or runoff.[1] It makes little sense to procure, treat, and deliver high-quality drinking water to customers across a city only to have it evaporate immediately or disappear down a storm drain once we apply it inefficiently to our outdoor landscapes.

Our analysis estimates how much water each city could save, on average, every day during the summer with just a 25% reduction in outdoor water use. This level of reduction has been proven to be realistic and achievable. In 2005, after various outdoor conservation practices had been implemented, the San Antonio Water System (SAWS) estimated that landscape watering in its service area had fallen by 30%.[2] In California, the Irvine Ranch Water District's conservation efforts resulted in a 46% reduction in landscape water use from 1992-2004 on a per acre basis.[3] Both utilities are continuing to strive for further reductions.

Conservation could enable a utility—and its customers—to save substantial amounts of money. For example, water must be treated to drinking water quality standards before it is delivered to customers around the city. Treatment plant capacity has to be sized to meet peak day water use, which is almost always driven by summer lawn watering. If conservation enabled a utility to build a 75 million gallon a day (MGD) plant instead of a 100 MGD plant the savings could be on the order of $20 million. In addition, a typical 75 MGD water treatment plant costs $2.5 million less to operate every year than a comparable 100 MGD plant.[4]

The need for water conservation increases when one looks to the future. Texas is currently the fastest growing state in the country; demographers are predicting the state's population will double by the middle of this century. Meanwhile, scientists are warning us that global warming could bring more severe and more frequent droughts. Specifically, one recent Columbia University study predicted that the weather patterns of the 1950s drought could "within the coming years to decades, become the new climatology of the American Southwest."[5]

Building new water supplies, such as new reservoirs or groundwater wells, to meet these increased demands is not the silver bullet some claim it to be. Investing ratepayer dollars in costly, controversial, and environmentally damaging supply projects just to provide water for wasteful outdoor use does not make economic sense. Furthermore, the possibilities for new supply projects are somewhat limited. For many Texas rivers, the state has already given out more water rights than there is water, particularly during dry years, and many of our groundwater sources are already being pumped faster than rainwater can replenish them. Increasing the efficiency in the way we water our landscapes is the best choice as it will save money, make better use of limited water supplies, and help protect our natural heritage.

About our analysis

The data in this report come from the utility profiles that water utilities submit to the Texas Commission on Environmental Quality and the Texas Water Development Board along with their water conservation plans. In these profiles, water utilities report the total amount of water they use on a monthly basis over a five-year period.

Our analysis compares total water use during the winter months of December, January, and February with total water use during the summer months of July, August, and

Table 1: Decreasing outdoor use could save significant amounts of water across Texas

	Percent total water use increases during summer (July-Aug-Sept) over winter (Dec-Jan-Feb)	Potential savings during July-Aug-Sept with a 25% decrease in outdoor water use, in gallons per day*
Arlington	81%	8,600,000
Austin	49%	13,900,000
Beaumont	14%	800,000
Brownsville	14%	600,000
College Station	93%	1,800,000
Corpus Christi	28%	4,400,000
Dallas	58%	22,700,000
El Paso	71%	11,800,000
Fort Worth	83%	27,600,000
Garland	78%	4,900,000
Houston	14%	17,600,000
Katy	68%	300,000
Laredo	38%	2,800,000
Lubbock	78%	4,200,000
Pflugerville	84%	500,000
Plano	103%	10,500,000
San Antonio	30%	11,000,000
Tyler	67%	2,700,000
Average:	58%	**Total:** 146,700,000

*Rounded to the nearest hundred thousand

September. The three winter months represent a baseline use level because, in most areas of Texas, there is little outdoor water use in the winter season. By contrast, the three summer months were chosen to represent the time when outdoor water use is at its peak. We came up with a seasonal average for each city based on five years of data.

To calculate the potential summer daily savings, we assumed a fairly modest 25% reduction in the summer season outdoor water use, represented by the difference between the seasonal averages. We then converted that reduction to a daily amount by dividing it by 31.

There are many factors that can affect how large a percentage increase a city sees during the summer months. Climatic factors obviously have a strong impact, with cities in wetter areas generally seeing less of an increase. Also, cities with warmer winter temperatures also may experience significant levels of outdoor use during winter months. Industrial water use is generally not strongly correlated to the seasons; a city with a large amount of industrial use may have less of a summer increase, by percentage, than an otherwise similar city with a higher percentage of commercial and residential users. Economically prosperous communities tend to use more water outdoors than less affluent areas. Seasonal fluctuations in populations can also affect summer water use. For example, college towns usually have a population outflow during the summer, while other communities see population increases in colder months from "winter Texans." Finally, cities with strong outdoor water conservation programs are likely to see smaller increases during the summer months. **For these reasons, we have focused on identifying the potential for savings rather than on ranking the cities or making comparisons across cities.**

Water use in Plano more than doubles during the summer months due to lawn watering and other outdoor uses. If the city cut this increase by just 25%, Plano could save roughly 10.5 million gallons of water a day during the summer. Improving the efficiency of outdoor water use could save Plano residents money both by reducing individual usage and by limiting new infrastructure needs for the utility. *Photo by John Ousby.*

The information from these utility profiles is similar for all cities but is not entirely uniform. This report does not make direct comparisons between cities, so these slight differences do not affect the validity of the results for each utility. Most of the utility profiles include information from the years 2004-2008, but the data from College Station, Dallas, Plano, and Laredo are from 2005-2009. Most of the utility profiles included monthly totals of treated water, but Arlington, Beaumont, Corpus, El Paso, Fort Worth, Houston, and Laredo reported total diverted water. Utilities that wholesale water to other utilities generally included that water in the utility profiles.

For a more detailed look at our calculations, please see Appendix A on page 10.

If the population of Texas increases as projected, there will be growing pressure on our cities to build new infrastructure to treat and transport the increased amounts of water to homes and businesses. Creating this new infrastructure will come at a price. For example, the City of Austin's scheduled new water treatment plan is estimated to cost half a billion dollars for construction alone. Treating and pumping water is expensive and energy-intensive—water utilities are responsible for an estimated 3% of energy consumption nationwide.[6]

The good news is that water conservation holds significant potential for reducing the amount of water we use on landscapes. In the remainder of the report, we look at seven techniques with proven track records for reducing the amount of water used to maintain landscapes: improving irrigation systems, development guidelines, landscaping rebates, watering ordinances, progressive rate structures, rainwater harvesting, and education programs. All of these policies are practical, politically feasible, and offer short- and long -term savings to both ratepayers and water utilities.

#1: Irrigation Systems

Irrigation systems are becoming increasingly common in Texas's urban and suburban areas. Many new homes now have irrigation systems as a standard feature because it is considered to be a selling point. Unfortunately, the spread of these automatic irrigation systems could have negative impacts on the state's water supplies. The American Water Works Association (AWWA) estimates that homes with in-ground irrigation systems use 35% more water than homes without such systems. And households that use automatic timers for their irrigation systems use 47% more water than households with in-ground systems operating their systems manually.[7] Staff at the Austin Water Utility have observed water loss of 20% to 50% from inefficient irrigation system design.[8]

Many Texas cities, such as Dallas, Fort Worth, Austin, and San Antonio, offer free irrigation system audits to customers who request them. The audits check for leaks or improperly functioning irrigation system components and recommend improvements to the system such as rain sensors. Inspectors also recommend an efficient watering schedule. These programs, while time-intensive, offer utilities opportunities for significant water savings. For example, the Austin Water Utility estimated that a proposed program requiring large properties with automatic irrigation systems to submit irrigation analyses every three years could save 1.5 million gallons of water a day.[9]

San Antonio and Austin have rebate programs offering cash incentives to customers who have an audit and make the recommended improvements to their irrigation

What utilities can do:
All but the smallest water utilities should implement programs to ensure irrigation systems in their service areas are installed, maintained, and operated as efficiently as possible. Utilities in areas with limited water supplies should place limits on the installation and operation of such systems. Utilities offering rebates to customers who upgrade to more efficient equipment should tie payment to a demonstration of actual water savings for a period of a time.

What you can do:
Water only when and where necessary; hardy lawns and landscapes should be able to survive with once-a-week watering or less, even during the summertime. If you have an irrigation system, make sure you use it efficiently. Most homeowners can save water by turning off the automatic timer, particularly if the system does not have a rain sensor. Be sure you understand your system and the water needs of the different areas of your landscape. Have your system inspected every few years—by your water utility, if possible, or by a certified irrigator—and make the recommended improvements, such as installing a rain sensor. Drip or soaker systems are generally more efficient than systems with spray heads. And, if you don't already have an irrigation system, the most efficient thing to do is not get one.

systems; the Dallas Water Utility is considering a similar program. San Antonio's program is particularly innovative in that receipt of the full rebate is contingent on the customer's water use remaining at or below a recommended level for one year. This ensures the customer establishes new watering habits, in addition to having more efficient equipment.

Unfortunately, many Texas cities are not only failing to limit the installation of new irrigation systems, but actually require irrigation systems in new multi-family and commercial developments. If automatic irrigation systems become more widespread, then Texas' already limited water resources could become severely strained.

Decisions made today about the types of lawns and landscapes to install in new developments have the potential to influence water use for decades to come. *Photo by Dean Terry.*

#2: Rethink the Lawn

Texas is currently gaining population faster than any other state in the country. Over the past five years, permits for close to 600,000 new single family homes were issued in Texas.[10] Decisions made today about the types of lawns and landscapes to install in new developments have the potential to influence water use for decades to come. Unfortunately, most Texas cities currently do little to guide the creation of yards and landscaping in new developments. The creation of large numbers of new lawns with inefficient designs would impose significant costs on water utility customers and on the state's resources.

As the state's population grows, it is imperative that more cities help guide new developments to minimize the need for outdoor irrigation. A handful of Texas cities have already started down this path:

- In 1999, the City of Brownsville passed a landscaping ordinance that, among other requirements, prohibits more than 50% of the area of the "visible landscape improvements" from including "lawn(s) containing grass." The ordinance was not designed with water conservation in mind, but rather to preserve trees, improve the appearance of newly-developed areas, and to "promote a positive city image."[11] Nonetheless, the water savings from this ordinance are likely significant and it shows that strict guidelines on grass can be politically palatable.
- San Antonio restricts the size of new irrigation systems to 10,000 square feet or less, meaning that homes on large lots need to pick and choose which areas will be irrigated with in-ground systems.[12]
- San Antonio also has a restriction on the types of grass allowed to be planted in new developments.

What cities can do

Cities, particularly in regions experiencing rapid growth, should create design guidelines so new residential and commercial developments do not use excessive amounts of water for landscape irrigation. Examples of these guidelines could include limits on the amount or types of lawns that can be planted, and restrictions on the type and/or size of irrigation systems that can be installed.

What you can do

Today, many homeowners are considering their lawn areas carefully when creating their landscaping plans. Think about which areas would really get used as a lawn—there may be areas of your yard that could be attractively planted in natives and other low water-use plants. Where you do use turf grass, use the most drought-hardy variety that you can.

Residential and commercial builders need to select turf grasses from an approved list of drought-tolerant varieties.[13]

- The Austin Water Conservation Implementation Task Force has proposed a water conservation strategy that would limit the size of landscape watered by an automatic irrigation system to 2.5 times the square footage of the footprint of the new home, but this has not yet been implemented.

Rebate programs incentivize the creation of landscapes that need little supplemental water. *Photo by Lacey McCormick.*

Cities should also consider additional restrictions or ordinances based on the circumstances in their region. For example, in much of the Hill Country, lawns cannot grow deep root systems in the thin, rocky soils and turf grasses therefore require significant amounts of water just to stay alive. In such areas, leaving the native landscape intact or planting native or adapted species may be the best option. As an alternative, San Antonio requires builders working in areas with thin soils to add additional soil until the landscaped area has a minimum soil depth of 4". The city of Dallas is considering requiring builders to add organic material to the clay soils prevalent in the North Texas region.[14]

#3: Landscaping Rebate Programs

Many cities, particularly in drier parts of the country, have created programs that compensate customers who remove their turfgrasses and replace them with drought-tolerant landscape plantings. In the Las Vegas area, between 2000 and 2008, the Southern Nevada Water Authority (SNWA) helped replace roughly 125 million square feet of turf, saving nearly 7 billion gallons annually.[15] Landscaping rebate programs are becoming more common in Texas, for example:

- The rapidly-growing city of Pflugerville offers a flexible landscape rebate program, where the city refunds half the cost of trees, shrubs, mulch, and certain types of turfgrasses on its approved plant list up to $500 per customer.[16]
- San Antonio Water System's rebate program has stricter conditions: No more than 50% of the landscape may be planted in turf and all turf must be a drought-tolerant variety. A minimum of 4" of soil must be present under any turf planted. Irrigation systems must pass an inspection; customers with irrigation systems qualify for smaller rebates than those without. Finally, customers need to keep their water use within recommended levels for a year to qualify for the full rebate.[17]

What utilities can do

Water utilities, particularly in areas with limited water supplies, should consider rebate programs or other incentives to encourage customers to replace turfgrass with drought-tolerant plantings or landscape elements such as pathways and decks that do not require irrigation. Landscaping rebate programs need to be carefully designed to ensure they achieve long-term water savings at a reasonable cost to the utility. In order to make best use of limited funds, utilities should consider tying the payment of rebates to actual water savings.

What you can do

Water-efficient landscapes can be attractive and functional. Consider replacing some or all of your high water- use turfgrass with drought-tolerant trees, shrubs, and perennials—your water utility may even offer a rebate program to help you out with the conversion. Native plants generally use less water and provide a source of food for beneficial wildlife such as birds and butterflies. The National Wildlife Federation has a certification program for gardens that incorporate sustainable gardening practices and provide food, water, cover, and a place for wildlife to raise their young.

- The BexarMet Water District also has a landscape program with a maximum award of $300. The water district compares water use in July, August, and September before and after the landscape conversion to calculate the amount of the rebate.[18]
- The El Paso Water Utility used to offer a rebate of one dollar per square foot of turf that was converted to xeriscape. Over the first two years of this program (2001 and 2002), 385 customers removed about 29 acres of turfgrass, saving approximately 23 million gallons.[19] A study published by the University of California–Riverside Turfgrass Research Facility found that El Paso's total costs for the water saved were somewhat higher than the other programs analyzed, because El Paso did not require its customers to install a more efficient irrigation system.[20]

#4: Rainwater Harvesting

Rainwater harvesting has real potential as a source of water for Texas. A report published by the Texas Water Development board estimated that a metropolitan area the size of Dallas could capture roughly 2 billion gallons of water annually if just 10% of the roof area were used to harvest rainwater.[21] Rainwater harvesting systems are becoming more popular across the state, particularly in rural areas where groundwater is limited or there is not a public water system.

Rainwater collection has many benefits. Capturing rainwater from roofs reduces storm water runoff and erosion in urban areas. Rainwater itself is free; the only costs are for the construction and maintenance of the system. Furthermore, rainwater is generally a high-quality, "soft" water that is particularly beneficial for irrigating plants. The easiest application for rainwater is to use it for landscape irrigation. This is an inexpensive way to provide supplemental water to a landscape while reducing the demand on the public water system and on Texas' water resources.

Several cities currently offer rebates on rain barrels. The Austin Water Utility offers a rebate for rainwater harvesting systems covering 50% of the cost of the system up to $5000. Cities elsewhere are going even further: New homes built in the Albuquerque area are required to have a rainwater collection system in place over for at least 85% of the roof area.[22]

What utilities can do
Rainwater harvesting is a promising source of water. Water utilities should actively promote and provide incentives for the construction of rainwater harvesting systems. Texas cities should encourage their permitting staff and building inspectors to become more knowledgeable about rainwater harvesting systems, and ensure city code allows for the installation of rainwater systems in homes and other buildings. Cities in areas using diminishing groundwater supplies or projected to have water shortages should consider requiring a rainwater harvesting system to be installed in conjunction with any new irrigation system.

What you can do
Serious gardeners have long understood that rainwater is more beneficial for plants than treated tap water. Rain barrels are widely available at feed stores, nurseries, and over the internet. Check and see if your utility has a rain barrel program. Setting up a larger rain water harvesting system is a bigger financial commitment, but one that can help you reduce your water bills and protect Texas' rivers, streams, and aquifers.

#5: Rate Structures

Pricing structures are one of the simplest and most effective ways to encourage water conservation both indoors and out. Water utilities should have a rate structure that charges low rates for frugal water users and significantly higher rates to the heaviest

users. This will provide financial encouragement to residential and commercial users to look for more efficient ways to keep their landscapes looking attractive. It will also help to ensure that large users help to pay a fair share for the increased cost of treatment and distribution facilities.

A strongly tiered rate structure is the most equitable way to price water. Most customers use limited amounts of water, placing smaller demands on the system, and should pay lower bills as a result. The San Antonio Water System has found that about 80% of their residential customers do not see any significant rise in their bills during the summertime.[23] This implies that the 30% bump in total water use that San Antonio sees during the summertime is largely caused by a small number of the utility's customers. This is likely true in other cities as well: A 2003 National Wildlife Federation analysis of the Dallas Water Utility's residential accounts shows that the top 5% of water users in that city used more than 25% percent of the water.[24]

What utilities can do
A utility's water rate can have a strong impact on how much water is used outdoors. Water utilities should have a strongly tiered rate structure with affordable prices for those who use water efficiently and significantly higher water rates for customers who use excessive amounts of water. This type of rate design encourages efficient lawn and landscape watering practices.

What you can do
Find out about your local rate structure. If it doesn't include strongly tiered rates, consider advocating for a change. People who are frugal in the use of water may be subsidizing the more profligate water users. An aggressively-tiered rate structure can be highly effective in encouraging water conservation and reducing overall costs.

In our March 2010 report *Drop by Drop,* our organizations analyzed rate structures in 19 Texas cities and found most cities do not have effectively tiered pricing structures. When monthly fees are factored in, heavy users usually pay little more—and often less—per thousand gallons than frugal water users. The only real exception is the Austin Water Utility, which has low-to-average rates for frugal water users and higher rates for excessive users. San Antonio has also recently revised its rates to be more strongly tiered.

#6: Watering Ordinances

Most Texas cities place restrictions on outdoor watering during times of drought, but ordinances regulating landscape watering are also highly effective at curbing water use during normal rainfall years. Outdoor watering ordinances generally come in two forms: a limit on watering during daytime hours and the creation of a weekly watering schedule. These types of restrictions simply reinforce beneficial landscaping practices while cutting overall water use. Well-constructed weekly watering schedules also help to distribute use across the week in order to reduce peak water demand.

Many Texas cities restrict watering during the heat of the day as over half the water used can be lost to evaporation. During the drought of 2005 and 2006, when water use would ordinarily rise, time-of-day restrictions helped customers in the Tarrant Regional Water District service area to cut total water use by 11%.[25]

What cities can do
To ensure that landscaping water is used as effectively as possible, cities should encourage once-a-week watering and should restrict lawn watering to no more than twice a week even during years of normal rainfall. Landscape watering during the heat of the day should be prohibited, subject only to limited exceptions. To help reinforce consistent patterns, the time-of-day restriction should apply throughout the year.

What you can do
Save water and money by not watering during the heat of the day. When you do irrigate, water deeply and infrequently so your grass and other plants develop healthy root systems. If your grass struggles to survive without frequent watering, consider your options: The soil may need amending or the grass may not be the best selection for that location.

Experts recommend watering infrequently so grass and other plants will grow deep root systems that will help them during a long, hot summer. The City of Austin estimates that its recent summer watering ordinance, which set a two-day a week watering schedule, saved between 5 million and 9 million gallons of water a day in the summer of 2008.[26]

Watering during the heat of the day can mean half the water used will be lost to evaporation. Time of day watering restrictions are becoming more common across the state. *Photo by Lacey McCormick.*

#7: Education Programs

Each of the roughly 20 million Texans has already made a series of decisions that ultimately impact outdoor water use. These decisions — where to live, what kind of landscape to have, how that landscape should be watered — are strongly affected by the values and actions of others in the community. While most utilities in the state have something in the way of educational programs, in many cases these programs are not as extensive or as effective as they could be.

To be most effective, educational programs should repeat specific, practical recommendations that water customers can easily understand and apply to their own landscapes. As Karen Guz, conservation director at the San Antonio Water Systems puts it, "We are seeking to change the conversations neighbors are having over the fence…You can change these cultural norms but you have to put a lot of energy into it."[27]

At their best, educational programs create an understanding of the region's water resources and build support for other conservation measures a utility may decide to undertake. Utilities have many potential distribution channels for this information—bill inserts, the utility's own website, elementary school programs, advertising campaigns, demonstration gardens, recommended plant lists, community presentations, articles in the media—and the most effective programs use multiple outlets simultaneously.

Larger utilities often have the budgets to influence the conversation through paid advertising campaigns, such as Dallas' "Save Water, Nothing Can Replace It" effort. Cities on smaller budgets have less expensive, yet effective, ways to get the message out. For example, some cities include information on how a given customer's water use compares to overall use rates in the city along with every the water bill. Many heavy water users likely are simply unaware that their water use is above the norm.

At the end of the day, most people want to use water wisely. Water utilities can and should play an active role in giving people the information they need to make smart decisions about how and when to use water outdoors.

What utilities can do
A well-designed and effective water conservation program can do a lot to inspire customers to take action and reduce their landscaping water use. To change attitudes about outdoor water use, an education program needs to consistently reach out to customers through multiple channels with specific, concrete messages about ways to use water wisely outdoors.

What you can do
Be a part of the conversation. As you explore ways to decrease your outdoor water use, discuss what you have learned and share your experiences with your friends and neighbors.

Appendix A

Calculating the conservation potential

	Column A Average winter monthly use	**Column B** Average summer monthly use	**Column C** Estimated outdoor use: difference between Columns A and B	**Column D** Monthly conservation potential, based on 25% decrease in Column C	**Column E** Daily conservation potential: Column D divided by 31
Arlington	1,305,255,933	2,370,768,800	1,065,512,867	266,378,217	8,592,846
Austin	3,504,919,600	5,231,696,733	1,726,777,133	431,694,283	13,925,622
Beaumont	675,370,800	772,218,333	96,847,533	24,211,883	781,082
Brownsville	561,133,333	639,866,667	78,733,333	19,683,333	634,946
College Station	242,511,589	468,290,304	225,778,715	56,444,679	1,820,796
Corpus Christi	1,938,373,133	2,485,964,200	547,591,067	136,897,767	4,416,057
Dallas	4,835,974,933	7,652,475,400	2,816,500,466	704,125,117	22,713,713
El Paso	2,064,084,400	3,533,008,067	1,468,923,667	367,230,917	11,846,159
Fort Worth	4,103,320,000	7,520,340,000	3,417,020,000	854,255,000	27,556,613
Garland	782,323,600	1,391,750,933	609,427,333	152,356,833	4,914,737
Houston	16,145,057,867	18,333,295,667	2,188,237,800	547,059,450	17,647,079
Katy	49,956,467	83,960,000	34,003,533	8,500,883	274,222
Laredo	910,764,867	1,259,411,067	348,646,200	87,161,550	2,811,663
Lubbock	765,395,333	1,289,262,867	523,867,533	130,966,883	4,224,738
Pflugerville	80,003,000	147,575,422	67,572,422	16,893,106	544,939
Plano	1,265,860,533	2,562,545,667	1,296,685,133	324,171,283	10,457,138
San Antonio	4,546,369,067	5,913,190,933	1,366,821,867	341,705,467	11,022,757
Tyler	496,817,067	830,486,667	333,669,600	83,417,400	2,690,884

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