Albuquerque Bernalillo County
Water Utility Authority

WATER 2120: Securing Our Water Future
Water Conservation Plan Update
March 2018

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EXECUTIVE SUMMARY

This update to the Water Conservation Plan was developed to align the plan with the goals of the new Water Resources Management Strategy adopted in September 2016, "Water 2120: Securing Our Water Future." WATER 2120 addresses the water supply needs for the Water Authority service area through 2120 taking into account climate change and creating an aquifer management level to preserve groundwater resources for future generations. A key element of WATER 2120 is the new water conservation goal of 110 gallons per capita per day (GPCD) by 2037. This update to the Water Conservation Plan addresses Policy D of WATER 2120 "Update and Maintain the Water Conservation Strategy – Implementation of the Water Conservation Plan has been a key aspect of the success of the 2007 Water Resources Management Strategy. Continued progress in conservation to achieve a gallons per capita per day (GPCD) water usage of 110 will further extend water supplies even in the face of climate change. The Water Authority shall utilize the conservation program to reduce GPCD to 110 by 2037." Achievement of this modest increase in conservation efforts will reduce water demand at the end of the planning period of Water 2120 by 50, 000 acre-feet.

To achieve this new conservation goal, the Water Authority will be emphasizing outdoor (consumptive use) savings over indoor (non-consumptive use) savings, because as the climate changes, the demand for outdoor water use will likely increase and because outdoor water use is consumptive there is not opportunity for reuse or return flow credit. The goal to reduce consumptive use will be achieved by building upon the success of the current water conservation program. When the conservation program begun in 1995 the education and incentive efforts resulted in a reduction in per capita water use of 50% from 1994 - 2017. GPCD in the Water Authority service area is currently 128. By fostering a collaborative culture the Water Authority will build partnerships with public agencies, industry, commercial and residential customers to promote water efficiency.

Customer input from the previous Water Conservation Plan update in 2013 as well as from the WATER 2120 (See Appendix B) public process was considered during the development of this update. Additionally, the plan was presented at two Technical Customer Advisory Committee meetings and four public meetings. The Water Authority Water Conservation staff also met with industry, property managers and public agency personnel to gather input on new initiatives.

In order to fund an expansion of outdoor rebates, some indoor rebates will need to be curtailed. An evaluation of participation and the need for indoor rebates was conducted to determine which rebates could be phased out. Rebates for toilets, washing machines, showerheads, swamp cooler thermostats and hot water recirculation units will all be changing in order to generate sufficient funds for new initiatives.

NEW INITIATIVES:

1. Outdoor Education & Rebates – Outdoor rebates and education will receive more emphasis in our effort to align the Water Conservation Plan update with WATER 2120 and create a more resilient community in the face of climate change.

a. Garden Website – Customers will have the opportunity to sign up for a monthly email newsletter and/or visit the Water Authority's garden website. The newsletter will be uploaded as website information and will cover topics on xeric plants for our region, landscape maintenance and irrigation principles.
b. Education – WaterSmart workshops and educational events at garden centers, educational material and training for customers on efficient irrigation, selecting xeric plants and growing food efficiently.
c. Gardens to Go – Customers will be able to choose from a variety of easy, professionally- planned, xeric garden kits and apply for a rebate.
d. Efficiency initiatives – Expanded outdoor rebates to support healthy landscapes by improving irrigation efficiency, increasing moisture content and organic ground cover. Efficient watering of existing landscape will be promoted with rebates for smart irrigation controllers, sensors, and professional landscape dripline.

2. Efficient Irrigation Consultations –Offer free irrigation consultations to xeriscape rebate participants, irrigation controller rebate participants, inefficient water users, high water users and ICI customers. Education will focus on assessing the effectiveness of the irrigation system, identifying items that need repair or could qualify for other outdoor rebates, adjusting irrigation schedules, and explaining how to monitor water use.

3. Public Agency Program – Extend our partnerships with public agencies such as the City of Albuquerque, Bernalillo County and Albuquerque Public Schools by offering irrigation training and developing agreements to use irrigation surcharges to implement water conservation initiatives in order to maintain healthy irrigated landscapes.

4. Industry Partnership – Develop a WaterSmart Academy for local landscaping contractors and promote outdoor rebates at garden centers and irrigation supply stores. Contractors that participate in learning sessions will be included in a water smart contractors list on our website. Workshops will be offered in English and Spanish.

5. Water Efficient Incentive Program – Promote the installation of water efficient technologies by our institutional, commercial and industrial customers with a rebate for efficient devices and technologies that result in at least 100,000 gallons saved annually. This program will pay up to $10 per unit of water saved for the first year of the project.

6. Water Waste Ordinance – Amend the ordinance to reflect an approach that relies less on enforcement and more on education. All customers will receive a warning and an opportunity to correct water waste problems before a fine is issued.

7. Low Income Pilot Program – Develop a pilot program to assist low-income customers in becoming more water efficient. Possible services include low-flow fixtures, efficient irrigation systems, water reduction visits and leak repair.

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History of the Water Conservation Program and Development of this Update

Water conservation has proven to be a powerful tool for managing water resources over the past twenty- one years. Overall, water usage in 2015 was as low as water usage in 1983, despite a 25% increase in population. The Albuquerque Bernalillo County Water Utility Authority (Water Authority) now supplies about 98,000 acre-feet/year of water to more than 678,000 customers in the metropolitan area. Water is supplied from the aquifer, surface water and reuse. About seventy percent of water demand in 2017 was provided from the San Juan – Chama Drinking Water Project (DWP). Additionally, the water use reduction has been supported by projects on the Northside and Southside of Albuquerque that provide non-potable water for many of the green spaces in Albuquerque.

The Water Authority and its predecessor, the City of Albuquerque, have made significant progress in the water conservation program, moving from among the highest municipal water users in the Southwest to among the lowest. When the conservation program began in 1995, the service area's water use was 251 gallons per person per day (GPCD). GPCD is calculated by dividing the total annual production by the total population divided by 365 using a calculator designed by the New Mexico Office of the State Engineer (OSE). Thus, all uses of water including residential, multi-family, commercial, industrial, institutional, and non-revenue are accounted for in the Water Authority GPCD calculation.

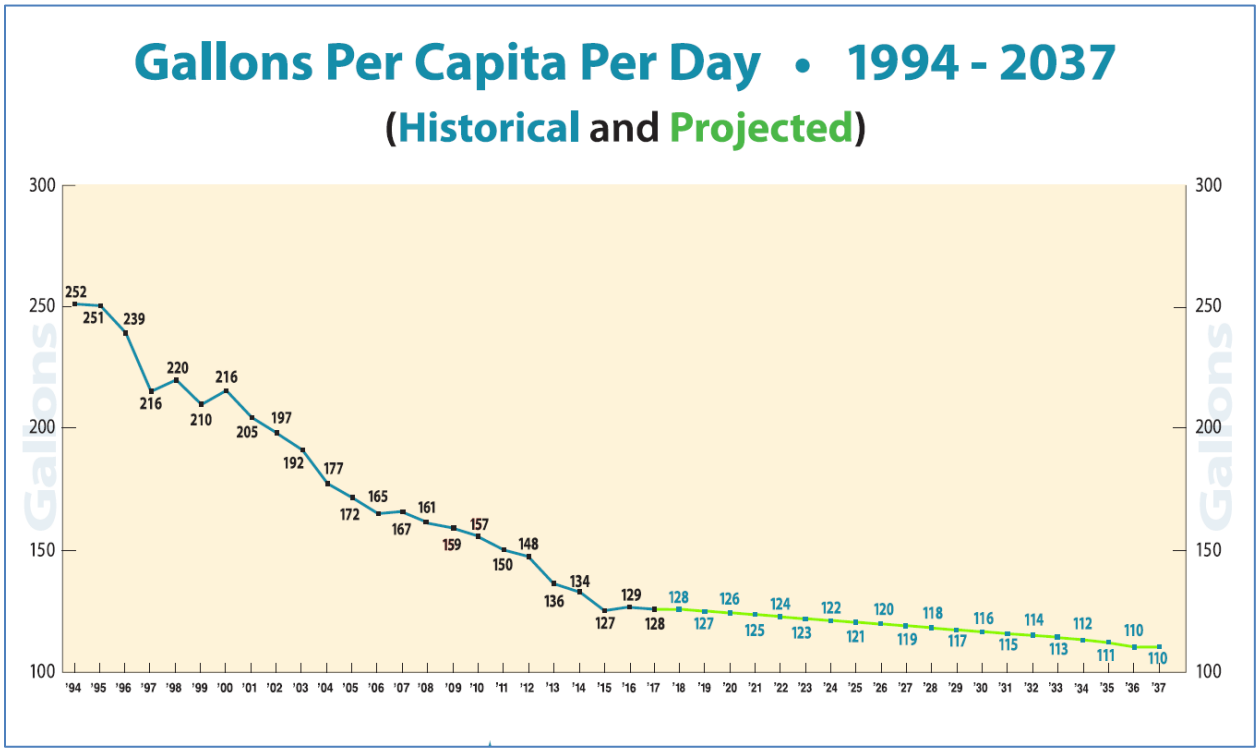
In 1995, the water conservation strategy was first introduced with recommended goals and objectives to identify proven conservation measures, design a program that would reach as many customers as possible and undertake a moderate to aggressive level of program implementation to achieve the highest water savings possible. The initial plan recommended conservation measures and included the Landscape and Water Waste Ordinance, a Xeriscape Program, a Toilet Rebate Program, Customer Education, and an Unaccounted-For-Water Reduction program. As the water conservation program advanced, other initiatives were introduced to further reduce water consumption. Currently the Water Authority has the following water conservation strategies and incentives in place:

- Public education efforts including TV, radio, bill boards, bill inserts and social media
- Water rates that include Conservation Surcharges during irrigation season,
- Water Budgets and Irrigation Surcharges for irrigation only meters,
- Water Waste Enforcement,
- Water Loss Reduction Program,
- WaterSmart Workshops,
- Non-Potable Water for irrigation,

- Water Audits, and
- Indoor and Outdoor Rebates.

The City adopted an ambitious water conservation program in 1995 with the goal of reducing per capita water use by 30 percent to 175 gallons/person/day by 2004. This goal was achieved and the Water Authority established a further goal of reducing water use to 150 gallons/person/day (GPCD) by 2014. That goal was achieved in 2011 and a new goal of 135 GPCD by 2024 was set. That goal was achieved well ahead of schedule in 2014 (See Figure 1). The new water conservation program goal for reducing per capita is 110 GPCD by 2037 (See Figure 1). Achievement of the 110 GPCD goal is key to achieving the goals of Water 2120 thus making our community resilient in the face of the water resource management challenges created by climate change.

Figure 1 – GPCD 1994 – 2037

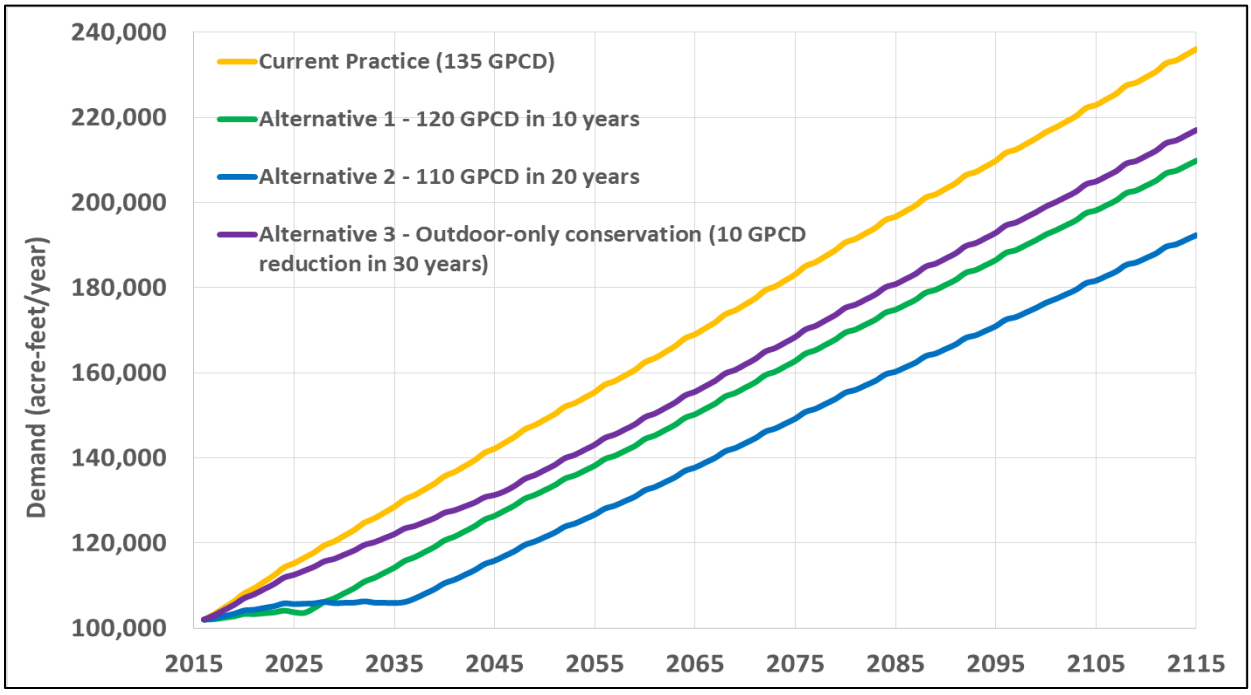


In 2007, the Water Authority adopted a comprehensive Water Resources Management Strategy (WRMS), to update the 1997 strategy adopted by the City and to ensure a safe and sustainable water supply for its customers to the year 2060. The 2007 WRMS consists of thirteen policies and more than sixty recommendations for providing a safe and sustainable water supply. This plan update addresses Policy D, "Update and Implement the Water Conservation Strategy" and Policy M, "Encourage and Facilitate Public Involvement and Support". As recommended in Policy D of the WRMS, the water conservation goal shall be reviewed every five years to ensure that adequate progress is being made to reduce water consumption. Implementation of the first two water resource management strategies, adopted in 1997 and 2007, respectively, have been quite successful.

The latest update to the Water Resources Management Strategy introduced and adopted in 2016, is entitled, "Water 2120: Securing Our Water Future," and outlines a plan to provide its ratepayers a resilient and sustainable water supply for the next century. There was extensive public involvement as part of the development of Water 2120. Input from those meetings was used to update the Water Conservation Plan. The Water 2120 Plan Policy D, "Update and Maintain the Water Conservation Strategy", requires the development of a plan to further water conservation efforts over the 100 year planning period. The Water Authority shall update the Water Conservation Plan at least every ten years, reviewed annually, and the plan shall be consistent with the 110 GPCD by 2037 goal.

During the evaluation of WATER 2120 the public was presented with three future conservation goals. They overwhelmingly selected the most ambitious goal of 110 GPCD by 2037. Achievement of this goal will result in a water savings of 50,000 acre-feet per year at the end of the Water 2120 planning period (Blue line in Figure 2).

Figure 2 - Water Conservation Goals that were considered as part of Water 2120



Current initiatives were evaluated to examine participation rate by customer class and type of rebate and changes to the program or new initiatives development were proposed to the Technical Customer Advisory Committee (TCAC) for approval. Additionally the Water Authority included input provided by industrial, commercial and institutional customers.

Proposed changes to existing rebates and new program ideas were presented to the TCAC on June 1st, 2017 and again on January 10, 2018 for approval. Four public meetings were held in February 6, 8, 13 and 15 of 2018 to present the updates to the plan.

While achieving the 110 GPCD goal by 2037, the Water Conservation Program will adhere to the following guiding principles.

1) All new initiatives will comply with R-10-12, "Enhancing the Water Conservation Program and Establishing a Process for Evaluating and Amending the Program" to ensure that new initiatives provide the same cost benefit as the current initiatives,

2) Water conservation will continue to focus on positive, participatory, choice-based ways to save water rather than prescriptive punitive programs,

3) Outdoor savings initiatives were favored over indoor savings initiatives because outdoor use is consumptive while indoor is not,

4) Residential customers have already dramatically reduced their water use and while initiatives will continue to be offered to all customer classes, new initiatives will target reductions from non-residential customers,

5) Water conservation initiatives will be designed to enhance, support and work conjunctively with all other Water 2120 Plan strategies and proposed policies, and

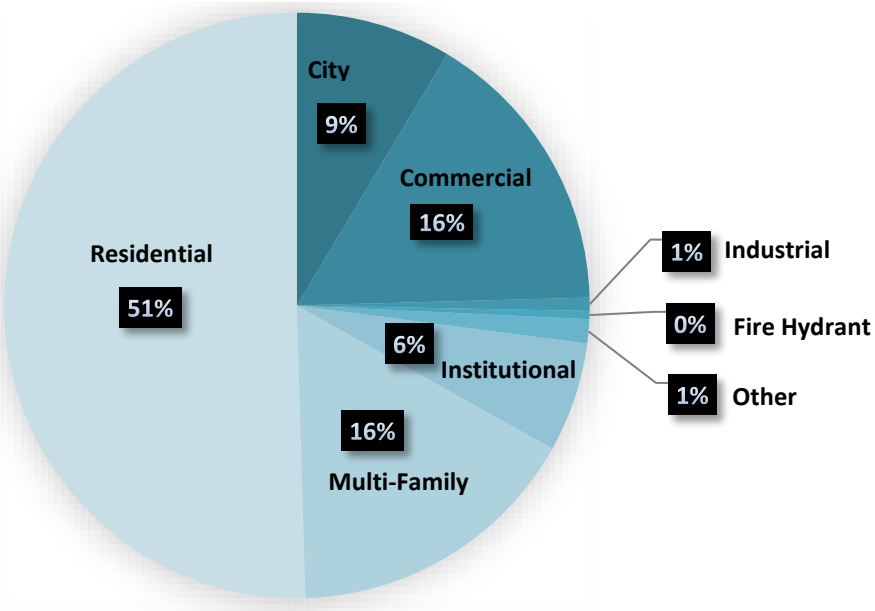
6) While decreasing the water conservation goal to 110 GPCD will provide many benefits through saving both water and money it cannot, and is not intended to, address all of the Water Authority's future water resource planning needs.

Water Conservation Program Evaluation

This update to the Water Conservation Plan was developed to make it consistent with the water conservation goals developed as part of Water 2120. Throughout the process, conservation staff met to evaluate current program participation, evaluate customer input, and confer proposed changes to existing program. This planning strength served as the catalyst for making changes to existing programs.

Current indoor to outdoor water usage ratio is approximately 62 percent to 38 percent, respectively; however it is expected that this ratio will change over time, with a decrease in outdoor water usage relative to indoor usage. It is expected that population growth will be supported by new development, which will use less outdoor water relative to indoor water through reduced landscape size, increase xeriscape and low water use irrigation methods.

Figure 3 - Total Water Use by Customer Class (current)



Because the bulk of the water use in the service area is residential, early water conservation efforts focused on residential customers.

Conservation Rate Structure

The Water Authority uses a rate structure that is designed to encourage water conservation while creating revenue stability to fund safe operation and maintenance of the water, wastewater and reuse systems.

During the non-irrigation season (December – March), the rate structure is flat, meaning that customers pay the same rate for each unit of water no matter how many units they use.
During the irrigation season, a tiered rate structure is used to encourage outdoor water efficiency. The tiered rate structure is based on individual water usage. During the non-irrigation season, a winter average is calculated for most Water Authority customers. This winter average serves two purposes. It is used to determine the sewer charge for the customer during the entire following year of April – March and it is used to establish a conservation average. The conservation average is used to determine how many units of water a customer can use before they start incurring conservation surcharges. Customers can use up to twice their winter average at the regular rate. This sends a strong price signal to customers when their outdoor water use increases during the irrigation season.

Figure 4 – Conservation rate structure

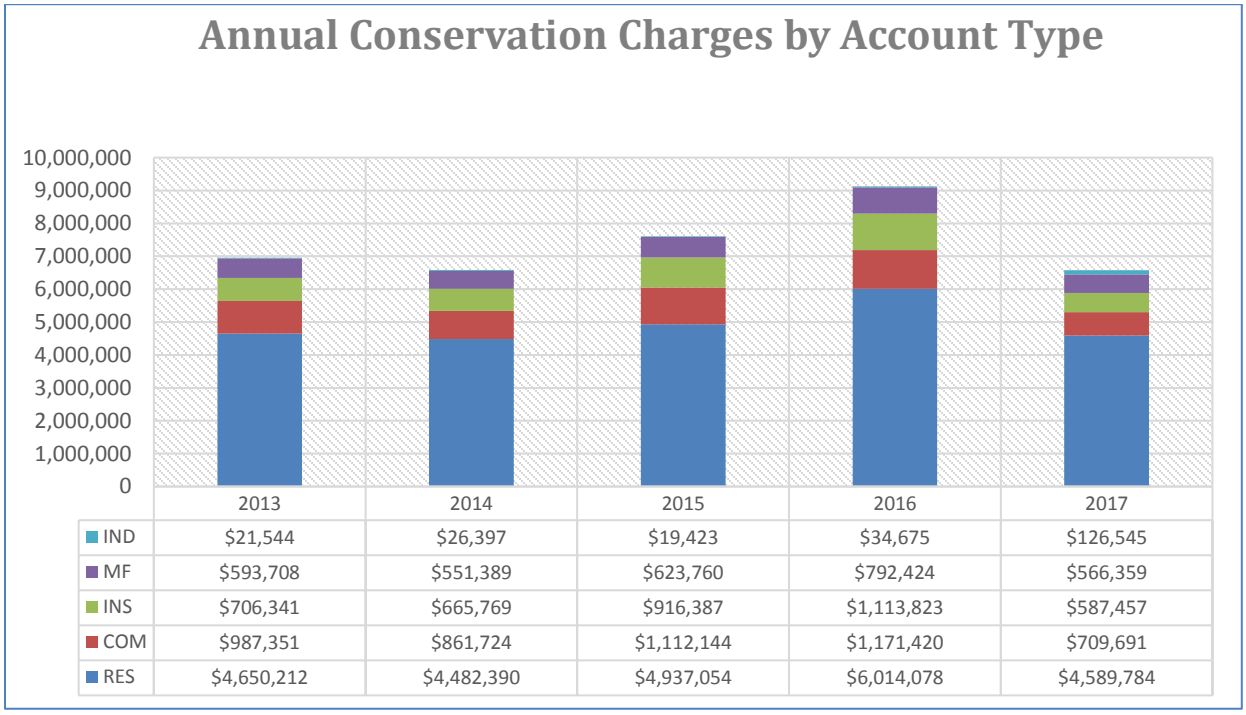
Water Use as a Percent of the Winter Average	Schedule
Up to 200%	None
200- 300%	50% increase of the commodity rate for each unit over 200%
300-400%	100% increase of the commodity rate for each unit over 300%
Over 400%	150% increase of commodity rate for each unit over 400% of budget

For most customers, the winter average and the conservation average are the same. But, for some customers this method doesn't work. So, for customers whose winter average is less than four units (1 unit = 748 gallons), their conservation average is raised to four so that they can use up to eight units of water outdoors before incurring surcharges. Conversely, customers with a high winter average of 15 units or more, have their conservation average set at 15 so that they will receive a price signal when their water use increases.

The Water Authority also gives an incentive to customers who conserve during the irrigation season. Those customers that use less than 150% of their winter average, receive a rebate on their bill on the portion of their water use that was outdoors.

Annual conservation charges for the years between 2013 and 2017 generated close to $30,000,000 in revenue. Figure 5 shows the breakdown of conservation charges by account type.

Figure 5 – Annual Conservation Charges by Account Type



	2013	2014	2015	2016	2017
IND	$21,544	$26,397	$19,423	$34,675	$126,545
MF	$593,708	$551,389	$623,760	$792,424	$566,359
INS	$706,341	$665,769	$916,387	$1,113,823	$587,457
COM	$987,351	$861,724	$1,112,144	$1,171,420	$709,691
RES	$4,650,212	$4,482,390	$4,937,054	$6,014,078	$4,589,784

This winter average method does not work for customers who have irrigation-only accounts. These accounts typically have no or very low winter use, but then must use a lot of water during the irrigation season to maintain their landscapes and support recreation activities. Examples of this type of customer are parks, golf courses and athletic fields. So, a different method is used to access surcharges for these customers. These customers are assigned an annual water budget based on the square footage of their irrigated area. At the end of each year, surcharges are calculated in the same manner as for other customers based on how much water they have used over their budget. For more detail on irrigation budgets see page 20.

The City of Albuquerque Parks and Recreation Department manages nearly 300 facilities, covering approximately 1200 acres with a water allowance budget of 1,317,574 units per year. Typically the City budget is exceeded by 30% every year, accounting for millions of dollars in irrigation surcharges throughout the years. To assist our largest customer in maintaining recreational sites for Albuquerque's area community last year the Water Authority entered into an agreement with the City to utilize surcharge funds to meet mutual goals in maintaining healthy

irrigated landscapes while improving water efficiency. As a result the City has more funding available for the development of water conservation initiatives.

Water Waste Enforcement

In 1995 the City of Albuquerque adopted a long range water conservation strategy for the properties served by the city's water utility, now the Water Authority. The comprehensive plan required that water resources be managed to ensure a permanent, adequate supply. As part of the plan the City implemented measures to reduce water waste, resulting in the adoption of the, "Water Conservation Landscaping and Water Waste Ordinance", City Council Bill 0-80, which made compliance with water conservation measures a condition of water service. This important regulatory tool served to establish the importance of wise water usage stewardship in our community. The ordinance empowers the Water Authority to issue violations and subsequent fines.

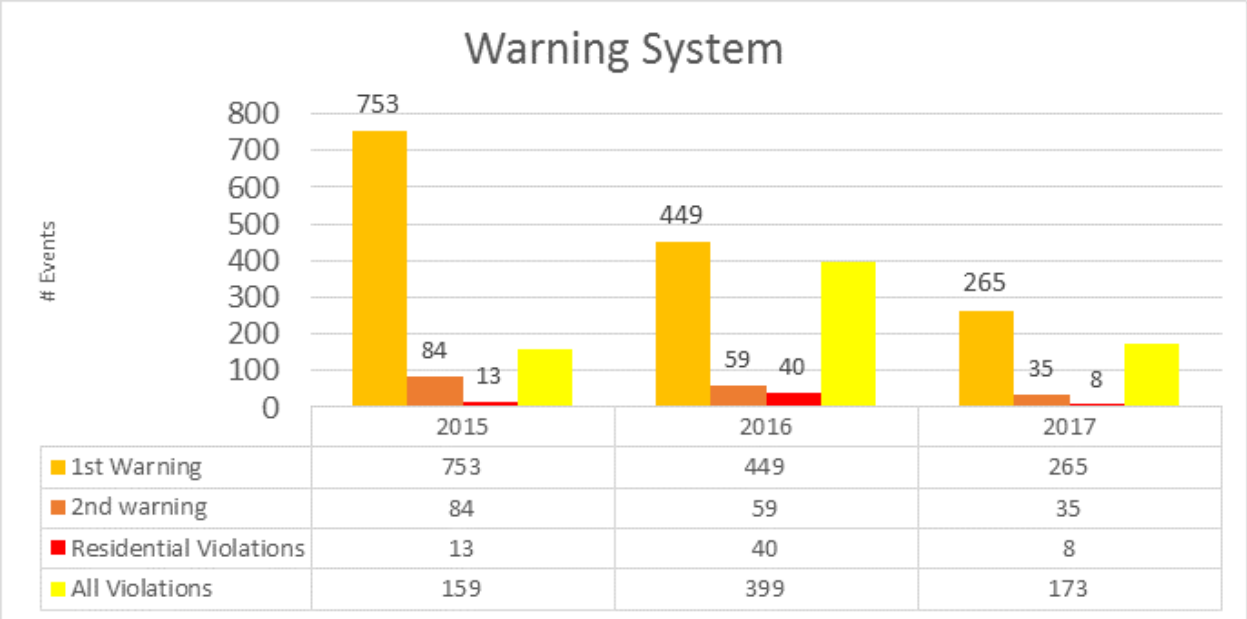
The Water Waste Ordinance goal is to eliminate water waste in the service area. Of course this goal is much like the goal of eliminating all speeding cars from local roads. The water waste ordinance represents more of an effort to move the community toward a goal, but it does not ensure total elimination of water waste. Instead, the water waste ordinance serves as an effective educational tool to change customer behavior by reducing water waste. Over the past 22 years, water use compliance staff have issued thousands of fines that have served to modify costumer water use. The greatest benefit of this effort has been the change in public perception, as people have learned the importance of efficient water use in this desert environment. Through time the ordinance has been modified to allow for better response to violations. The water use compliance team has also built an effective working relationship with our highest irrigation water users, the City of Albuquerque and Bernalillo County Parks and Recreation departments, to reduce response time to wasted water. Due to the success of the Water Conservation Program, water use compliance can take on a role of more education and less enforcement.

The most recent change to water waste was in 2015 with a pilot study to determine if a warning system could be offered in lieu of violations. An educational warning system for residential customers after first complaint was set up in the following way:

A. For the first report of residential water waste an informational post card was mailed to the address where the waste was reported, stating that waste was observed, requesting the customer to inspect their system to resolve the problem, and providing them with Water Authority contact information.
B. For the second report of residential water waste an informational post card was mailed stating that this is the second report of water waste and offering the customer assistance from Water Authority staff to identify the source of the problem.

C. For the third report of residential water waste, Water Use Compliance staff will conduct an inspection and proceed with enforcement of the Water Waste Ordinance as appropriate.

Figure 6 – Only 10% of residential customer warning resulted in violations in 2016



	2015	2016	2017
1st Warning	753	449	265
2nd warning	84	59	35
Residential Violations	13	40	8
All Violations	159	399	173

Because the pilot program was so successful, an amendment to the Water Waste Ordinance (See Appendix B, Water Waste Reduction Ordinance) is proposed to utilize the warning system with all customers.

The changes to the Water Waste Ordinance include:

A. All customer classes will utilize the following system:
   - Reported Warning Notice for first complaint
   - Observed Warning Notice for documented water waste
   - Certified Notice of Violation with an opportunity for an Irrigation Efficiency Consultation
   - Fee assessed if consultation is not scheduled or the problem is not fixed

B. The fee schedule will also be modified. The previous fee schedule had eight sequential violations issued over a period of five years. The proposed new fee schedule will have three escalating fines for each consecutive violation issued within one calendar year and has also been modified to base the fee on meter size (representative of water usage).

Figure 7 - Water Waste Reduction Ordinance fee schedule

Meter size	1st Fee	2nd Fee	3rd Fee
< 1.5"	**$20**	**$50**	**$100**
< 4"	**$100**	**$250**	**$500**
< 8"	**$250**	**$500**	**$1,000**

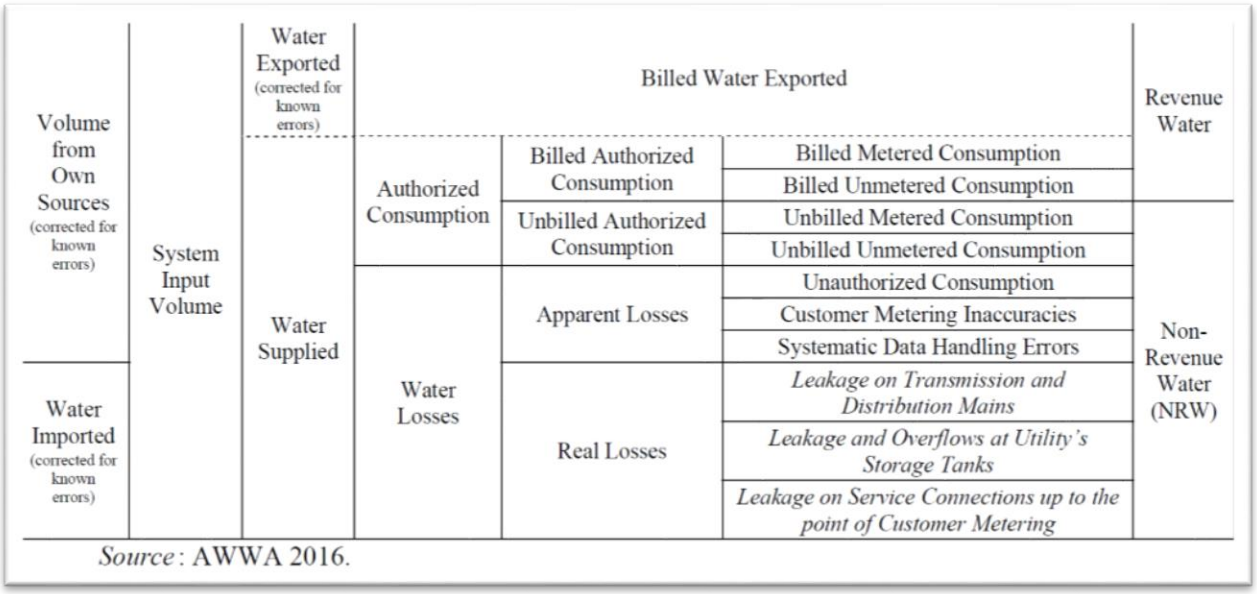
The amended Water Waste Reduction Ordinance will provide the following benefits:

- Emphasize less enforcement and more education
- Create opportunities for more positive interaction with the public
- Increase participation in Efficient Irrigation Audits and education
- Lessen staff tracking efforts
- Increase staff response effectiveness
- Streamline workflow

Water Loss (Non-Revenue Water)

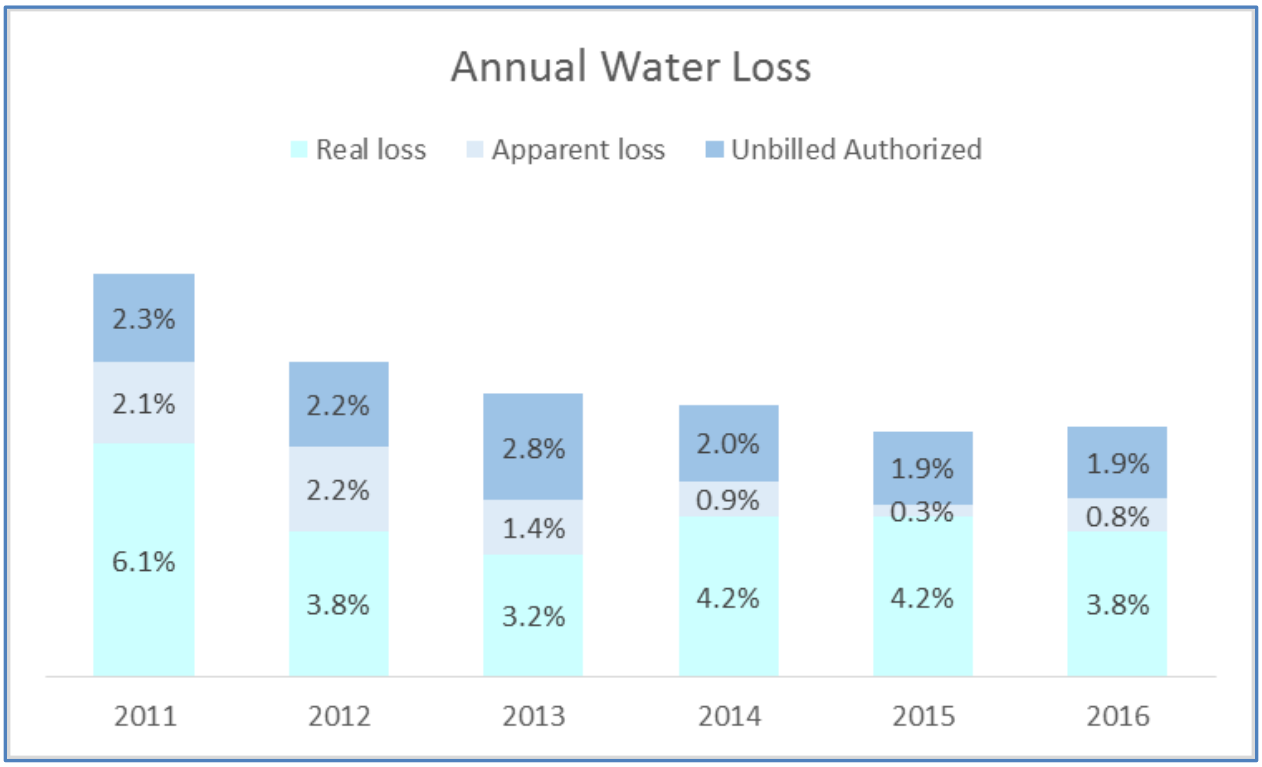
Water Loss is a term used to define an output in the standardized water balance defined by the International Water Association (IWA). State and regional water utility regulatory agencies require water loss reports. These reports aim to evaluate regional water loss and encourage utilities to proactively pursue water loss control, and allocate financial and educational resources to mitigate water loss. The Water Authority employs the AWWA audit every year, recognized as the best tool for accounting for non-revenue water. Starting in 2009, the Water Authority began conducting a validated, internal water usage audit using the American Water Works Association/International Water Association water audit methodology to determine sources of non-revenue water. Non-revenue water is divided into apparent losses (unauthorized consumption, customer meter inaccuracies and systematic data handling errors) and real losses (leakage from distribution lines and mains, leakage and overflow from storage tanks and leakage on service connections).

Figure 8 - Sample of AWWA Water Balance Table



As a result of the audit, the Water Authority has been proactively addressing inefficiencies in the water distribution system. Consequently the Water Authority's efforts to minimize water loss have been recognized as one of the best in the nation. Nearly 75% of the water loss reduction is due to the Water Authority's continuous leak detection program. Additionally, the Water Authority has invested millions of dollars to improve the integrity of distribution lines. Current real losses are only 4.2% of total annual production based on the latest 2016 audit report. Compared to twenty seven utilities in the Nation the Water Authority is among the best when it comes to controlling water loss caused by system leaks and other problems. The National median average water loss for utilities is 46.7 gallons per service connection per day. The Water Authority water loss averages less than 16 gallons per service connection per day.

Figure 9 – Water Authority Annual Water Loss



Main success in minimizing water loss are:

- Reduction of water loss by 3.38 billion gallons/year since 2004
- Water Audit Data validity increased from 74% to 87% since 2010
- Field crews reduced response times to line failures by 30% since 2009

Water Smart Workshops

Since 2008, the Water Authority has offered watersmart workshops to customers to promote outdoor water conservation. These educational workshops covered topics such as lawn watering, drip irrigation and xeriscape conversion. Between 2008-2014 classes on lawn watering reached 4,386 customers. All customers received a rebate of $20, totaling $87,720 given back to our customers to boost conservation knowledge and lawn watering practices that result in conserving outdoor water. During those same years classes were offered on the principles of xeriscaping to customers looking to convert high water use landscapes to xeriscapes.

These classes were offered six times per year at local libraries free of charge. In 2015, classes on practical urban gardening practices were included in the workshop portfolio at the Desert Oasis Teaching Garden. The Water Authority has offered forty classes since the inception of this program, resulting in the participation of approximately 1,800 customers. The workshops are organized to expand customer's knowledge on water-efficient urban gardening techniques to support the growing food movement in Albuquerque. Approximately $36,000 in rebates were distributed via a $20 rebate to each customer attending the classes during these years. For more information on education workshops and program initiatives please visit our website.

Water Audits

Water Audits have been a priority for the program since the beginning and provided for success in lowering water usage as well as identifying leaks.

The primary types of audits are:

- Leak Audits –Requested by customer in response to high consumption; any customer class
- Landscape/Irrigation – Commercial, Multi-Family, Industrial, and Institutional
- Single Family with Irrigation –Single family irrigation system audit and indoor audit
- Large or Small Commercial (typically includes both indoor and outdoor)

On average, people who request a leak audit have already had continuous usage for almost twice as long as people who don't ask for an audit. Once the audit is completed, customers resolve leaks in far less than the average time – 11 days versus 31 days.

All types of audits can result in the discovery of a leak, and 60% of the audits find a leak. For example, it is rare in a large commercial audit not to find a single leaking toilet or faucet. To determine the audit impact, the Water Authority first needed to identify how long the average leak lasts without an audit, in addition to measuring water savings for "normal" use – use that is not the result of a leak. For this purpose, an analysis was done of the 2016 residential Advanced Meter Infrastructure (AMI) meters with continuous usage that lasted at least three days (one or two days might be an anomaly) between March 15th and December 8th. Here are the results:

- Average duration (in days) of continuous usage for 5,526 accounts: **31.7**
- Average days of continuous usage before an audit: **52**
- Average duration of continuous usage after a leak audit: **11.**

On average 200 customers receive leak audits each month. The high consumption letter serves as an alert system to inform customers about an increase in usage and/or potential leaks. When leaks are found most are due to toilet issues (See Figure 10). Additionally, the Water Authority visit an average of 100 more customers per month to conduct water efficiency audits and retrofit with indoor low water use fixtures.

Water audits have mostly focused on indoor activities (See Figure 11). In addition, requests for water audits increase during the summer months and water usage increases and customers receive higher bills (See Figure 12). Because the Water Authority is retrofitting meters with AMI and customers will be able to receive transmission of potential leaks online in the near future leak audits will gradually be phased out.

As an alternative online education and dye tablets will be offered to customers who call with concerns about high water usage or when a potential leak is detected using AMI data. The emphasis will be on outdoor efficiency and irrigation efficiency consultations, particularly for institutional, commercial, industrial and multi-family customers.

Figure 10 - Sources of Leaks (for audits where a leak was found)

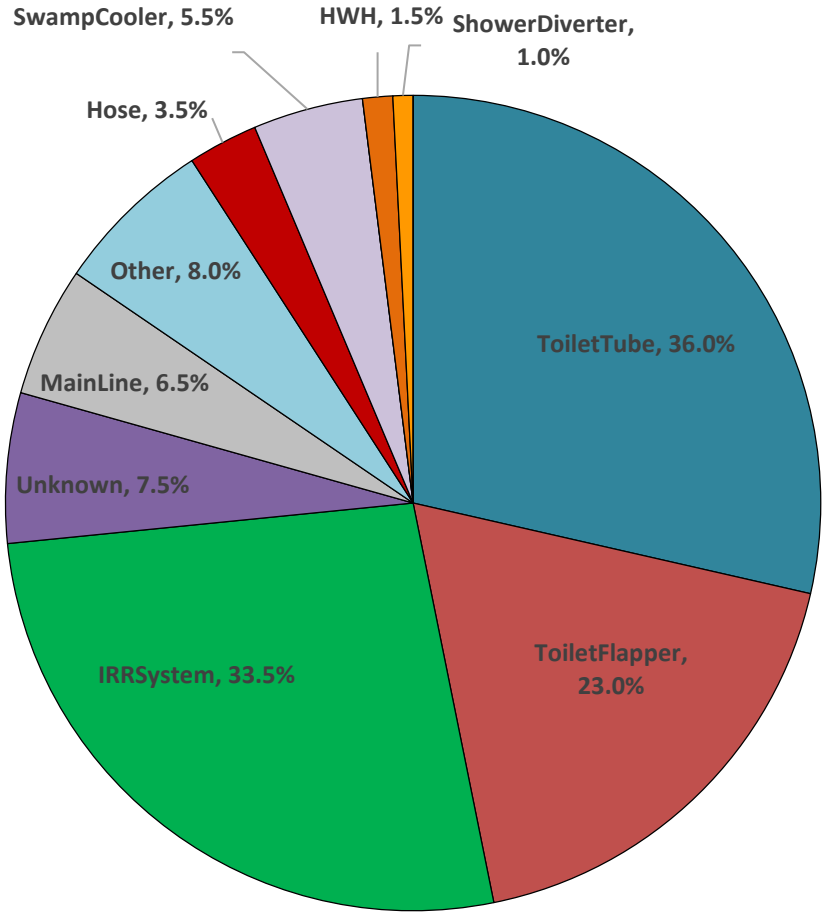


Figure 11 – Audit Trends 2013 – 2016 by Type

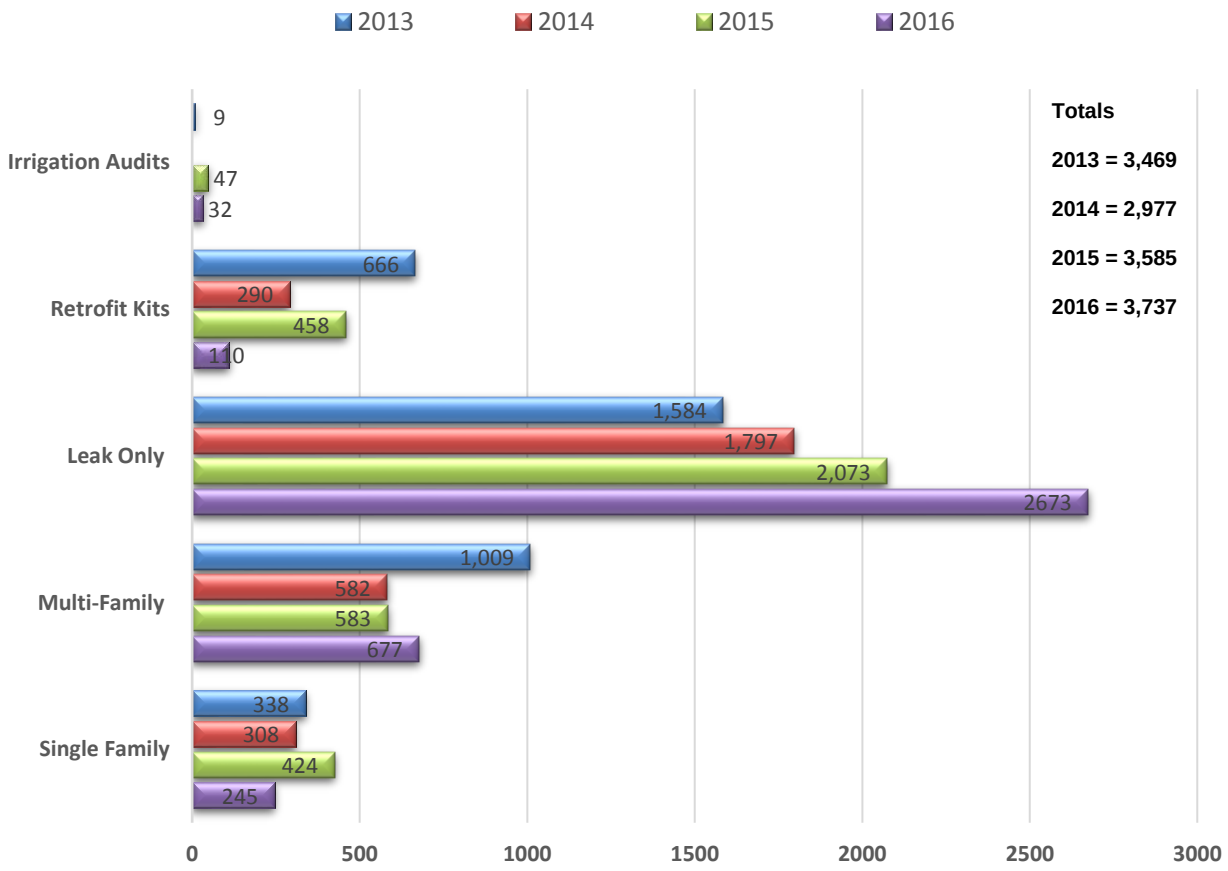
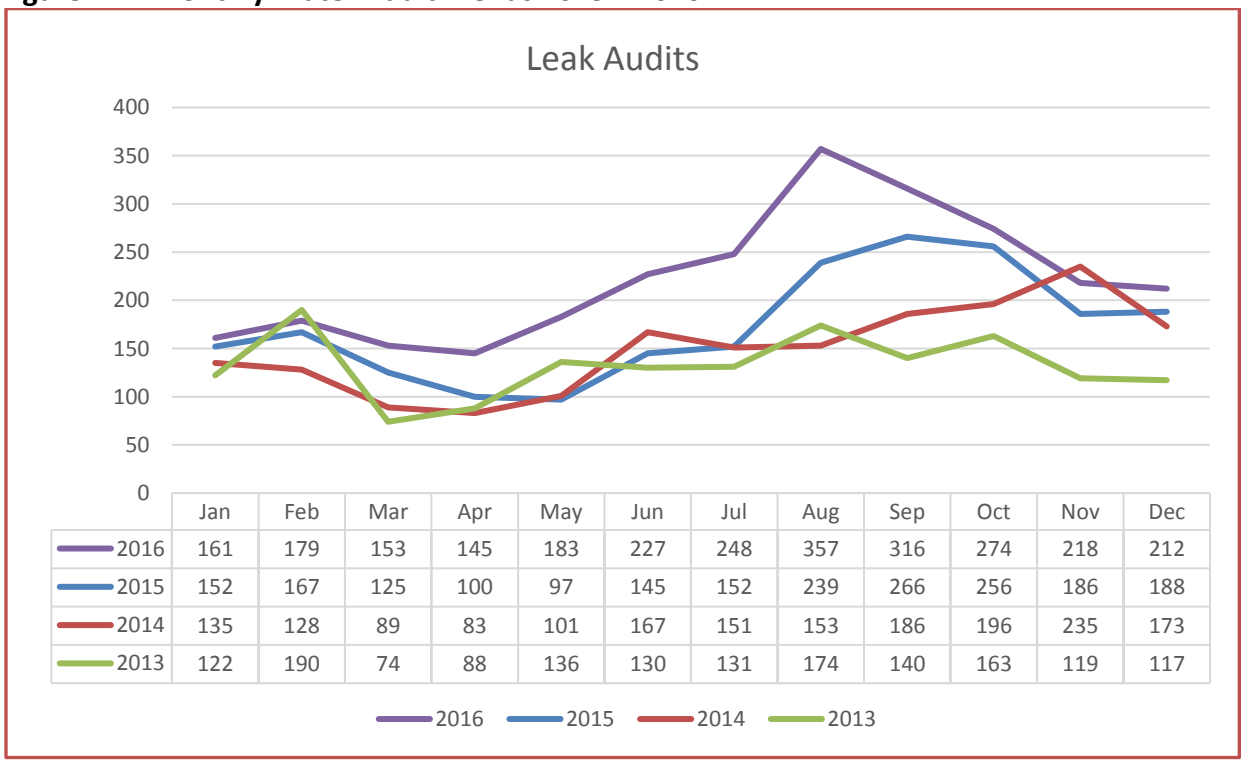


Figure 12 – Monthly Water Audit Trends 2013 – 2016



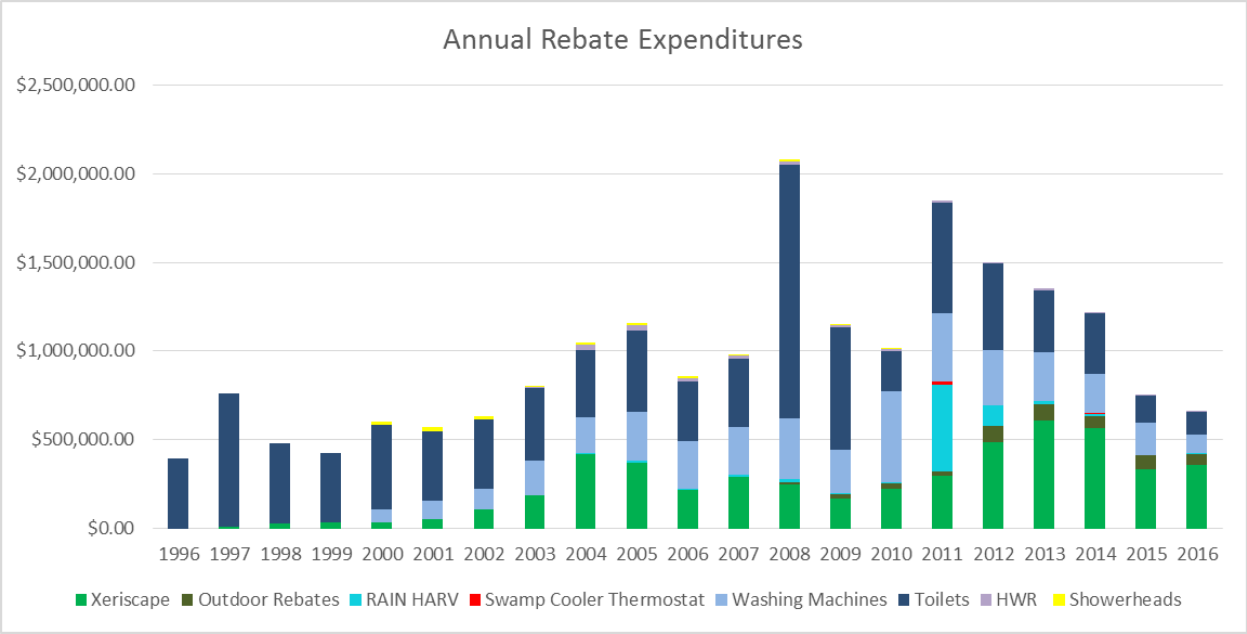
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	161	179	153	145	183	227	248	357	316	274	218	212
2015	152	167	125	100	97	145	152	239	266	256	186	188
2014	135	128	89	83	101	167	151	153	186	196	235	173
2013	122	190	74	88	136	130	131	174	140	163	119	117

*** Notice the increased in audits during the hottest months

Rebate Program Analysis

20 years of rebates have shaped the behavior of the customers in our service area, resulting in both consumptive and non-consumptive reductions over time. Since the inception of rebates into the water conservation program the Water Authority has given back approximately 20.3 million to our customers. On average that amounts to a little over a million dollars per year in rebates.

Figure 13 – Annual rebate expenditures by type



Indoor rebates expenditures (particularly high efficiency toilets) have been much higher than outdoor expenditures. The main outdoor expenditures are for xeriscape rebates through which the Water Authority has converted over 10 million square feet from turf to xeriscape. More than 165,000 rebates have been issued to our customers over the past 20 years. 87% of those rebates have been applied to toilets (90,000) and washing machines (40,000) accounting for the top two type of rebates selected by our customers.

Figure 13a – Customers are gradually reducing participation in indoor rebates

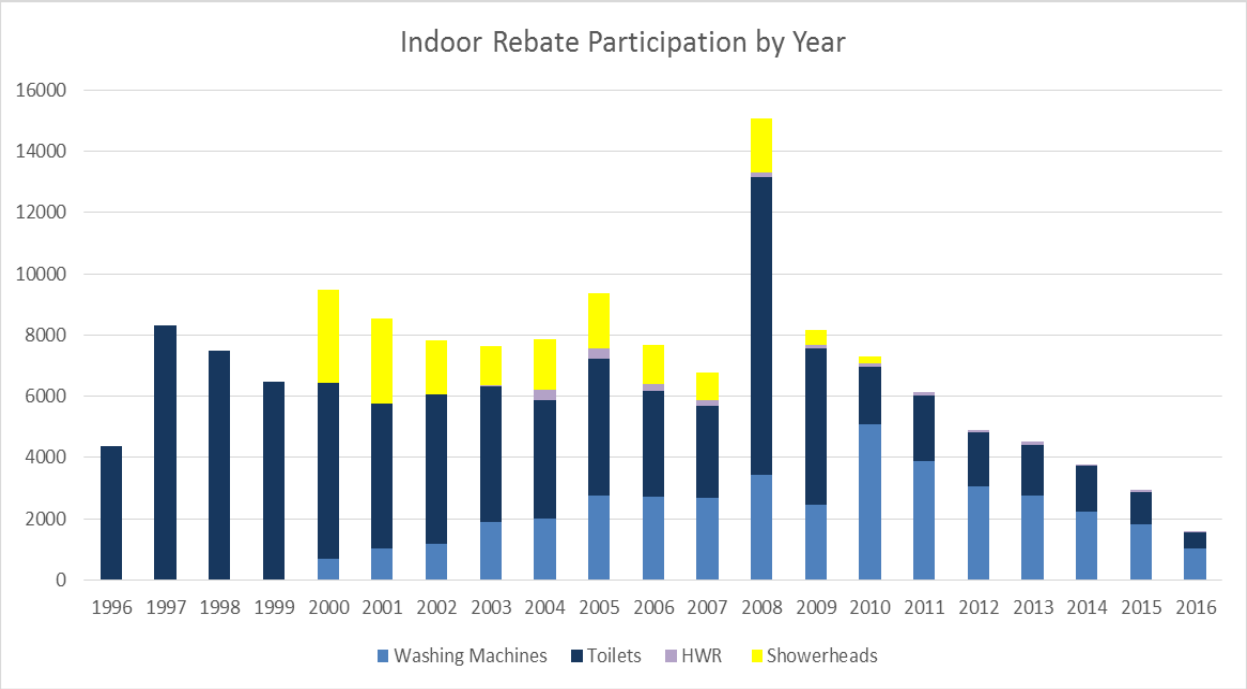
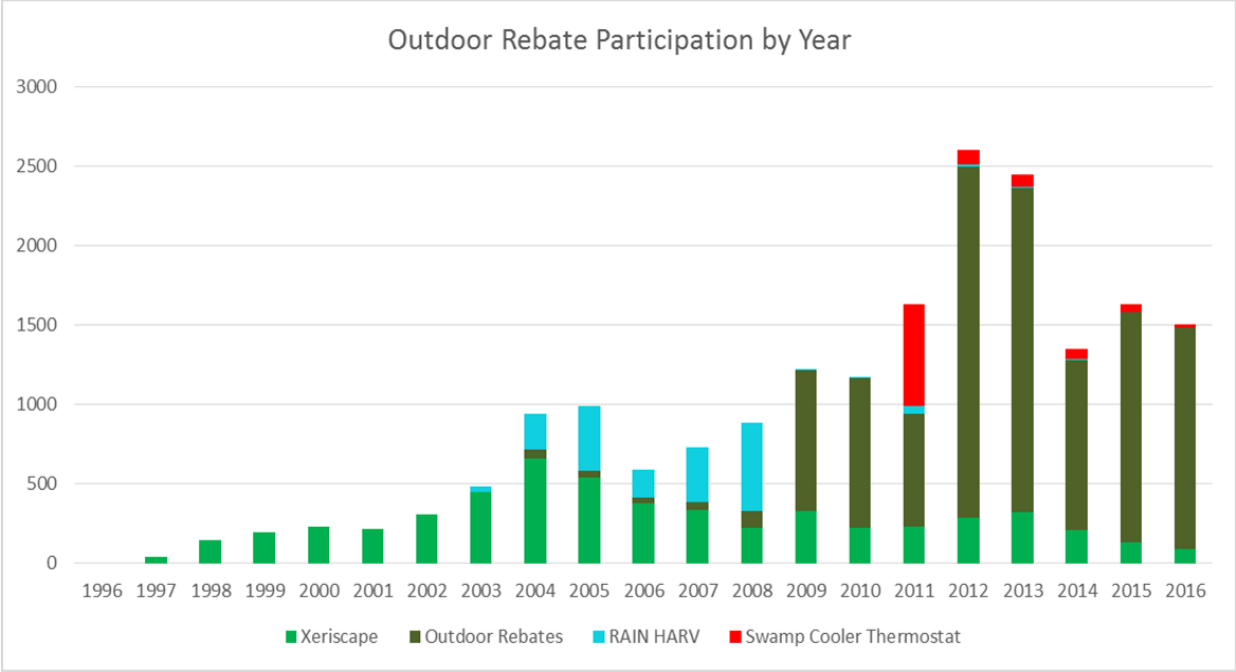
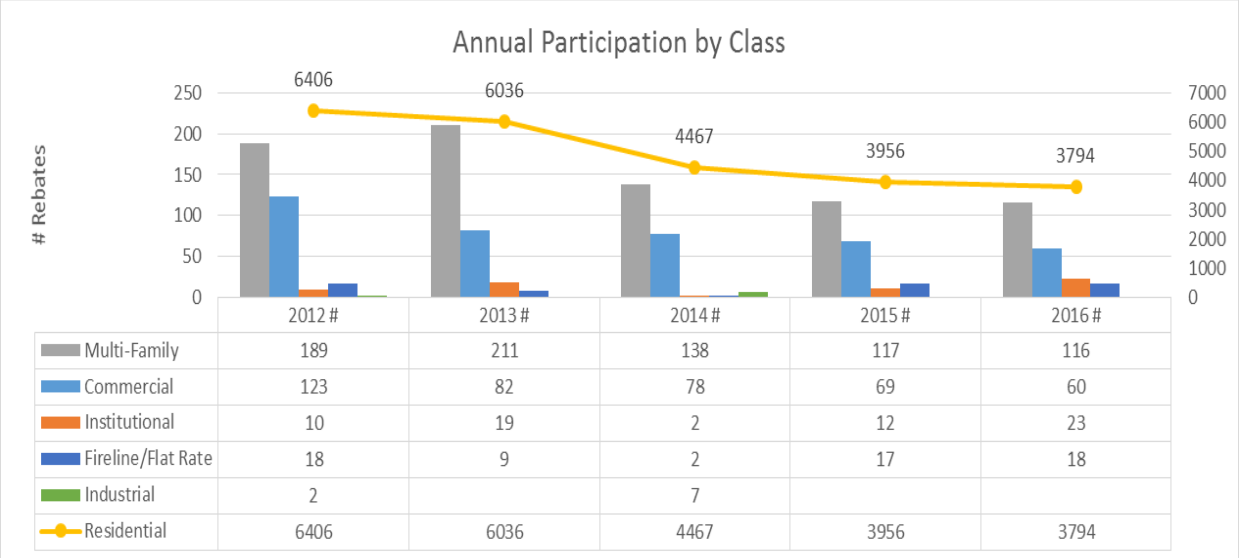


Figure 13b – Customers are gradually participating in more outdoor rebates



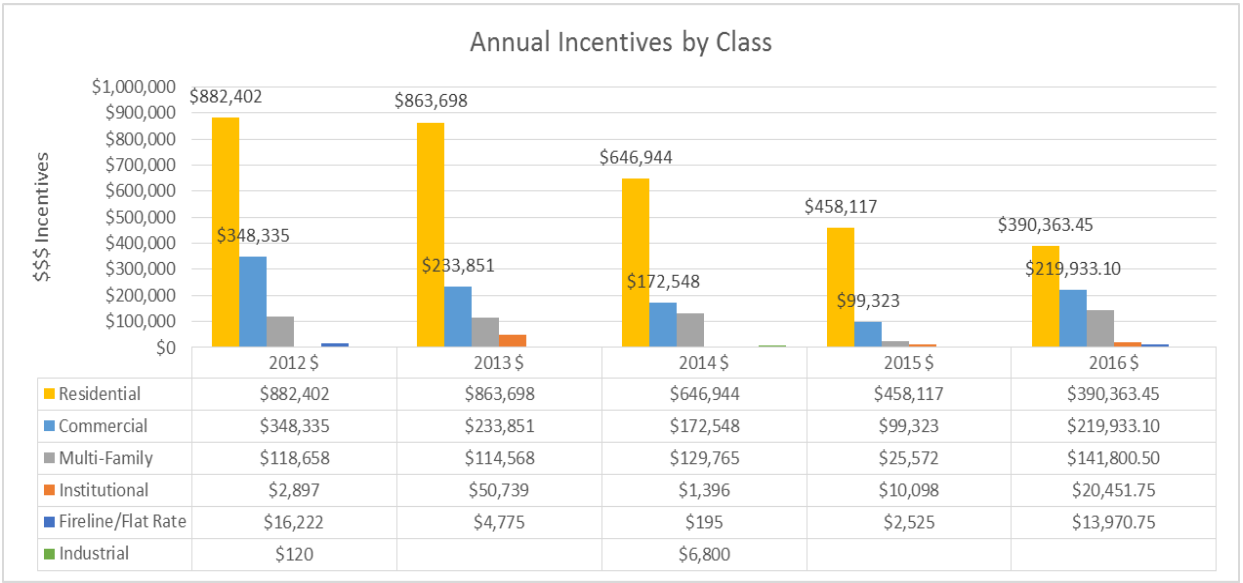
Residential rebate participation has been the highest amongst all customer classes. During the period of 2012-2016 residential customers incentive expenditures totaled 3.2 million compared to 1.7 million for all other customer classes. This is expected since approximately 80% of our customers are residential. Because all other customers manage more irrigated landscape, and because new initiatives will focus on mitigating inefficiency of outdoor usage, an increase in rebate participation for non-residential customers is expected in future years.

Figure 14 – Annual Rebate Participation by Customer Class



	2012 #	2013 #	2014 #	2015 #	2016 #
Multi-Family	189	211	138	117	116
Commercial	123	82	78	69	60
Institutional	10	19	2	12	23
Fireline/Flat Rate	18	9	2	17	18
Industrial	2		7		
Residential	6406	6036	4467	3956	3794

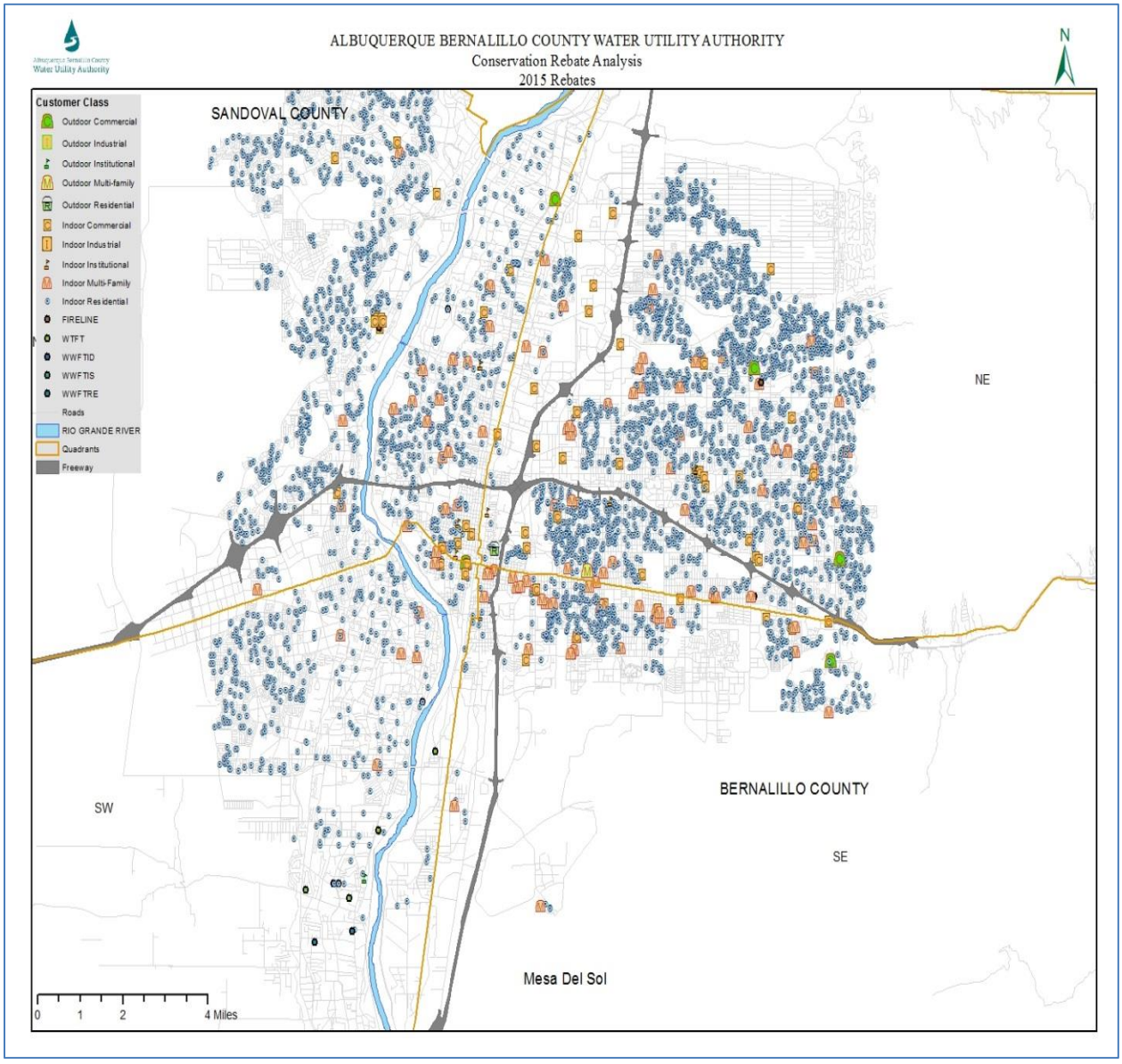
Figure 15 – Annual Rebate Expenditures by Customer Class



	2012 $	2013 $	2014 $	2015 $	2016 $
Residential	$882,402	$863,698	$646,944	$458,117	$390,363.45
Commercial	$348,335	$233,851	$172,548	$99,323	$219,933.10
Multi-Family	$118,658	$114,568	$129,765	$25,572	$141,800.50
Institutional	$2,897	$50,739	$1,396	$10,098	$20,451.75
Fireline/Flat Rate	$16,222	$4,775	$195	$2,525	$13,970.75
Industrial	$120		$6,800		

Spatial analysis shows more rebate program participation in the northern quadrants compared to southern quadrants. In 2015 for example, 1,462 Indoor Rebates were given in the NE quadrant and 758 were given in the NW quadrant, while 294 were given in the SW quadrant and 249 were given in the SE quadrant. Efforts will be made in the future to increase participation in the southern part of the service area by offering more classes in these areas, increasing advertising and offering ads in Spanish.

Figure 16 – Spatial Rebate Participation Distribution



Irrigation-Only Accounts

In the early 2000's irrigation surcharges were instituted by identifying customer accounts that only used water service for irrigation. These customers are classified as irrigation-only accounts. As part of the Water Authority's Water and Sewer Rate Ordinance, irrigated landscape is allowed 35 inches of water per year and athletic fields and golf courses are allowed 45 inches per year. A water budget is set up for each irrigation-only account customer and surcharges are assessed once per year by comparing the entire previous year's usage to the total irrigation water budget. Currently, the Water Authority has 2,524 irrigation-only accounts and each year more are added. This represents 1,412 sites including but not limited to City and County Parks and Recreation facilities as well as APS athletic fields. Surcharges are incurred when a customer's annual water use exceeds the irrigation budget for a given site. Surcharges increase when usage exceeds 150% of the budget and again at 200%.

Figure 17 – Irrigation surcharges rate structure

Annual Water Use	Schedule	Conservation charge & Surcharge
Up to 100%	None	
Up to 150%	50% of commodity rate for each unit over the budget	$1.04/unit from 100-150% of budget
150% -200%	100% of commodity rate for units over 150% of budget	$2.08/unit from 150-200% of budget
Over 200%	150% of commodity rate for units over 200% of budget	$3.12/unit over 200% of budget

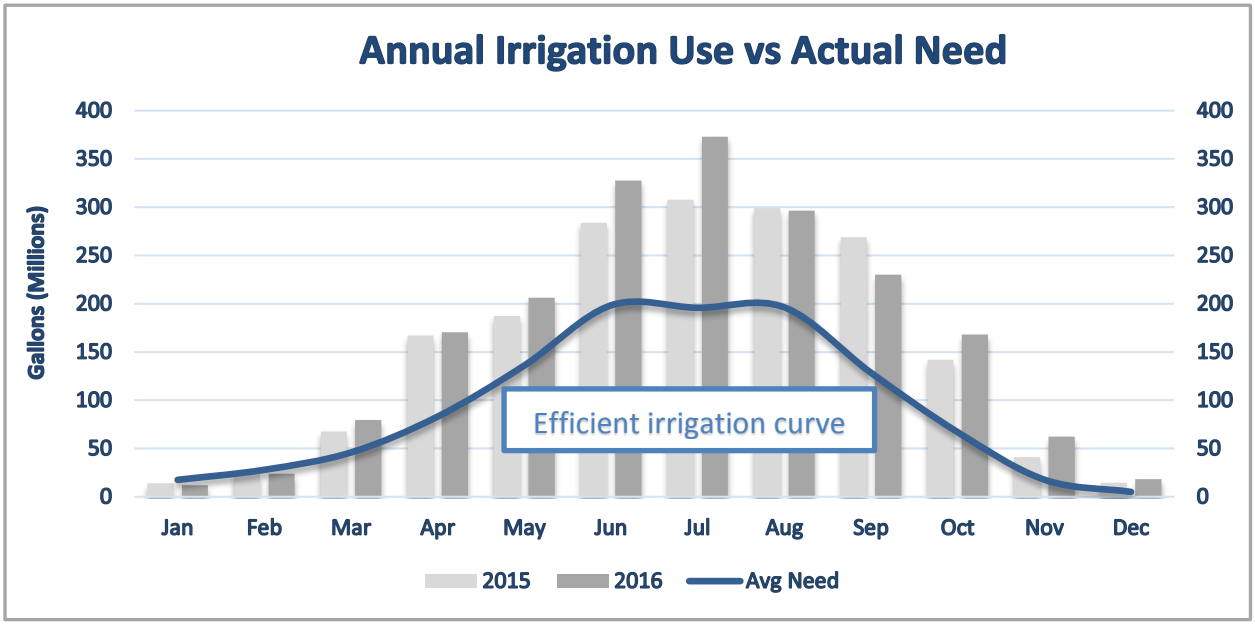
Figure 18 – Irrigation-only accounts budget

ALL SITES	2011	2012	2013	2014	2015	2016
Irrigated Area (Sq. Ft.)	**132,760,995**	**153,962,356**	**159,268,746**	**158,167,231**	**158,533,881**	**162,210,491**
Budget (units/yr)	**4,340,061**	**5,370,932**	**5,177,556**	**5,173,451**	**5,209,565**	**5,212,009**
Use - Units	**4,065,067**	**5,012,178**	**4,652,774**	**4,712,688**	**4,246,899**	**4,675,598**
Budget Utilized	**94%**	**93%**	**90%**	**91%**	**82%**	**90%**
Surcharge	**$824,112**	**$865,950**	**$774,373**	**$954,123**	**$1,037,142**	**$1,185,153**
Total # Sites	**949**	**1,287**	**1,331**	**1,301**	**1,344**	**1,402**
% of Sites Over-budget	**40%**	**39%**	**36%**	**36%**	**31%**	**35%**

% Over 150% of Budget	**19%**	**18%**	**18%**	**18%**	**15%**	**17%**
% Over 200% of Budget	**10%**	**11%**	**10%**	**10%**	**8%**	**9%**

Using the water management tool to identify usage versus actual need, the Water Authority identified that although most of the sites are staying within their yearly irrigation budget, the usage is occurring at inappropriate landscape watering times and using more water than needed. Figure 19 illustrates these inefficient irrigation practices. By working with these customers to increase efficiency, one billion gallons of water per year could be conserved annually. This effort alone could help achieve 110 GPCD by 2037.

Figure 19 – Annual Irrigation Use versus Need (irrigation-only accounts)



The water management tool is a dashboard for:

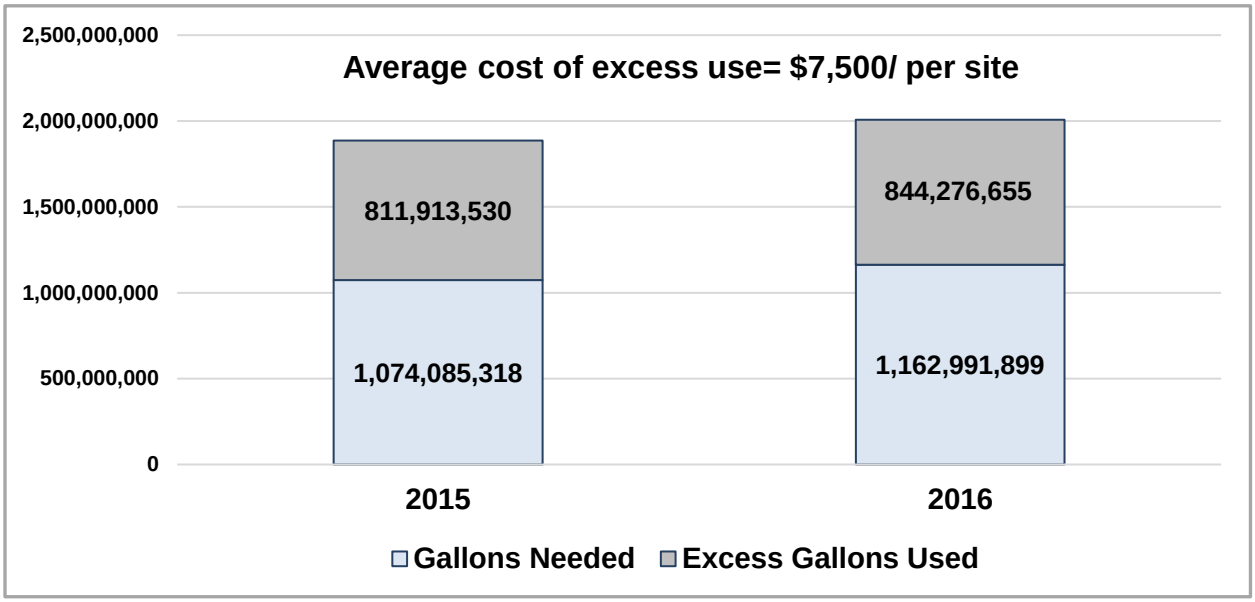
- Monitoring water usage and cost trends, both year to year and month to month.
- Reviewing the water history for all sites as a whole, a group of sites, or any specific site over the last 36 months.
- Creating meaningful metrics to compare one site to another and identify the "outlier" sites that are using excessive water and creating higher than expected charges.
- Comparing the calculated irrigation water need by month for each site, taking into consideration the effective rainfall for that site's zip code and comparing to water use.
- Calculating accumulated irrigation surcharges each month by site.
- Grouping the sites for each customer based on specific customer needs. For example, APS sites are grouped into site types – elementary schools, middle schools, high schools, and administrative sites. Parks are grouped in several ways – by crew, area, year built or

renovated, and by controller type. This allows for easy comparison of one crew to another as well as one area to another.

- Comparing the cost per acre for irrigated areas.

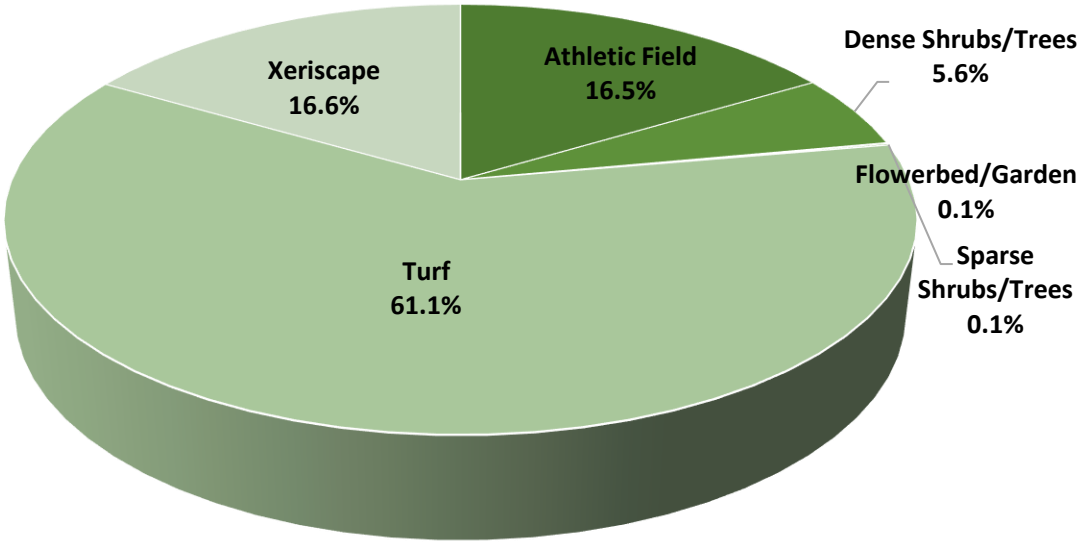
This tool helps inform customers of the cost of irrigation inefficiency. Last irrigation season for example the average savings with proper irrigation could have been $7,500 per customer (see Figure 20).

Figure 20 – Irrigation gallons used in excess of need



The Water Authority will work with these customers to improve water usage efficiency, develop water efficiency initiatives, and promote rebate participation. Currently the main type of irrigation-only customer landscape is turf (61.6%).

Figure 21 - Irrigation-only accounts landscape type



A major focus of this update is to work with these customers to improve irrigation efficiency, identify needed turf and identify areas that could be converted to xeriscape.

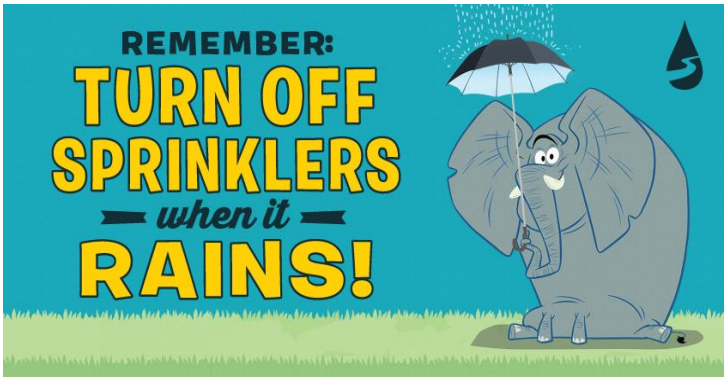
Irrigation efficiency is defined as the ratio of the water stored in the soil depth inhabited with active plant roots to the water applied by the irrigation system. Water applied by the irrigation system and not being made available to the plant roots is wasted and reduces irrigation efficiency. The major causes for reduced irrigation efficiency are runoff due to overspray, lack of spray irrigation distribution uniformity, leaks, improper emitters or overall irrigation system design and scheduling practice. Excess irrigation results in water waste while deficient irrigation practices result in unhealthy landscapes.

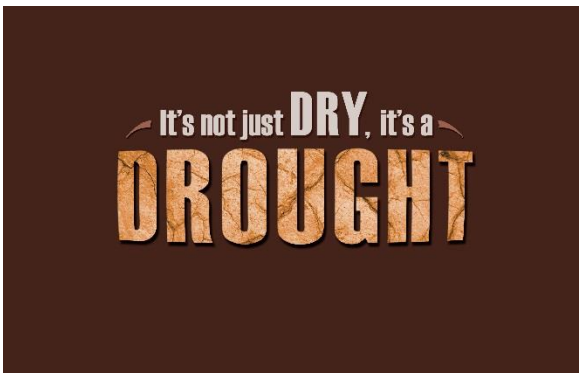
Even with the most modern irrigation systems, cases of irrigation that are 100 percent efficient are practically non-existent. Major difficulties in obtaining high irrigation efficiency stem from the inability to obtain an accurate estimate of the quantity of water needed to recharge the soil root zone depth enough to meet plant's needs. Conservative estimates suggest that even under optimal management practices, the average irrigation efficiency is 70 percent. Thus, the average water loss under sprinkler and drip irrigation is 30 percent. This number could drop to values of over 50 percent when scheduling practices are also inefficient. Water losses of irrigation water in urban landscape could as much as 50 percent of the total applied water.

When these estimates are applied to irrigation practices in Albuquerque, 800 million to 1 billion gallons of irrigation water could be saved every year by implementing new technologies and improving practices to increasing irrigation efficiency.

Public Awareness/Education

The most effective tool for reducing water use has been public education utilizing TV, radio, bill board and bill inserts to inform Water Authority customers of the need to conserve. When the Water Conservation Program began in 1995, public awareness messages were responsible for the rapid reduction in water use that occurred before many customers were participating in rebate programs. Water use went down 36 gallons per person per day in just four years from 252 GPCD in 1994 to 216 GPCD in 1997. During the 2013 drought, water conservation messaging alone was responsible for reducing water use by 12 gallons per person per day in that one year. It is crucial that the Water Authority maintain a conservation ethic among its customer base by continuing to create and disseminate effective water conservation awareness messages so that the public continues to conserve and the 110 GPCD can be achieved by 2037 effectively in the face of climate change. A few examples of past campaign:





Implementation of the Initiatives

The Water Authority will begin implementation of these new initiatives during the 2018 Irrigation Season. The Water Authority will implement new initiatives by evaluating the best launch dates moving forward with the progression of the overall water conservation program plan strategies.

Conservation program progress will be tracked on a regular basis using "conserve track" and evaluated annually. Conserve track is used in the water conservation sector to manage all programs and data in one place. The tool allows for tracking rebates, customer visits, water waste violations, savings, dates, notes, photos and much more. Based on the annual evaluation, changes to programs or new program development may be proposed, if sufficient conservation progress is not being made. Prior to launching some of our initiatives the Water Authority will be developing pilot projects to calculate the potential of conservation in localized areas. Rebates

and initiatives will be added as the Water Authority progress to generate public interest in conservation and as funds become available.

All changes to rebate programs will be made in accordance with R-06-12, "Enhancing the Water Conservation Program and Establishing a Process for Evaluating and Amending the Program, Section 5. Approval of New Rebates and Phasing Out of Existing Rebates." No new rebate program shall pay for more than half the cost of the product, no rebate shall pay more than $20 per anticipated unit (748 gallons) of water saved and customers will be notified six months in advance of the phase out of any rebate program.

EMPHASIZING OUTDOOR IRRIGATION EFFICIENCY EDUCATION & REBATES

Outdoor rebates and education will receive more emphasis in our effort to create a more resilient community in the face of climate change. In order to allocate more funding for the most efficient outdoor rebates and for our overall program the Water Authority will be phasing out some of the other rebates from our incentives portfolio. Typically, outdoor efficiency measures are more costly but will provide the water savings needed to reduce consumptive water use as called for in Water 2120.

As per Water Authority Bill R-06-12, new water conservation rebate programs or the phasing out of existing rebate programs may be proposed periodically as necessary when they are deemed to be unsuccessful due to low participation rates, not meeting the projected cost-benefit analysis or anticipated water savings, or when it is determined that the rebate is no longer necessary to encourage the use of a particular product. As per R-06-12, the Water Authority will inform customers of reduction or elimination of a rebate program, the Water Authority will inform customers at least six months prior to the change taking effect.

CHANGES TO EXISTING PROGRAM

1. **Washing Machine Rebate – effective September 1st 2018** the Water Authority will modify the washing machine rebate to allow only the most water efficient washing machines to receive a rebate. Currently, customers are directed to the monthly list posted on our website prepared by the Consortium for Energy Efficiency (CEE). The list includes all energy efficient washing machines that are currently available. There are three levels of efficiency tiers in the list, and washing machines categorized as a Tier 3 are considered to be the most efficient. While this characterization considers water efficiency, it emphasizes energy efficiency, so not all the washing machines on the list are highly water efficient. Water use efficiency is measured by the gallons used per laundry load, which is called the Integrated Water Factor (IWF). The more efficient a washing machine is in its use of water, the lower the IWF will be. Tier 1 washing machines have an IWF of 3.7 or less, Tiers 2 and 3 maintain an IWF of 3.2 or less. With that said, a Tier 1 may actually have an IWF lower than 3.2 (e.g. 2.6-3.2), but is classified as such due to also having a lower level of energy efficiency. For this reason, the rebate program will now use the IWF to determine which machines qualify for a rebate rather than the CEE rating.

Thanks in part to over 40,000 rebates issued to our customers, amounting to over four million dollars, the Water Authority's Water Conservation Program has contributed to the evolution of the market so that most of the washing machines in stores now have an IWF of 3.8 or less. This makes it unnecessary to offer rebates for these machines. In order to encourage purchase of only the most efficient washing machines, rebates will only be offered for machines with an IWF of 3.0 or lower. We will inform retail stores of the changes and keep our monthly list updated. The rebate will remain at $100 and will be available every five years or when the property is sold. The Water Authority will evaluate the effectiveness of the change to this rebate program at the end of 2020.

2. **Toilet Rebate – effective September 1st 2018** the Water Authority will phase out the toilet rebate program. It will no longer be available as a rebate for our customers. The toilet rebate program has been one of most successful rebates since its inception in 1996. The Water Authority has provided rebates for more than 90,000 toilets, accounting for ten million dollars in toilet rebates. Thanks in part to the successful rebate program, all models found today at stores are considered to be high efficiency toilets with an average price of $150 per toilet. When the toilet rebate program started, the average price was over $300 per low water use (1.6 gallons per flush) toilet. Because of this accomplishment the Water Authority has determined that the toilet rebate is no longer necessary to encourage customers within our community to change this social behavior. This change will allow for more funding for other rebates that will focus on outdoor usage efficiency.

3. **Other changes to indoor rebates** - **effective September 1st 2018** the Water Authority will phase out rebates provided for urinals, showerheads, hot water recirculation systems, and swamp cooler thermostats. Prices per unit in many cases are below the current rebate. Rather than offering a rebate for showerheads and swamp cooler thermostats, the Water Conservation Program will have these items available for customers participating in watersmart workshops, garden center events and by calling our department. This will save staff time by eliminating the handling of applications and adjustments to customer accounts. Based on an analysis performed for customers that participated in the hot water recirculation system, rebate savings did not justify having a rebate. Participation was low regardless and the Water Authority does not anticipate high demand in the future. Commercial customers interested in retrofitting with more efficient items will have the opportunity to do so by signing up for the new Water Efficient Incentive Program.

4. **Other changes to outdoor rebates - effective irrigation season 2019** the Water Authority will phase out pressure regulation valves, backflow prevention valves, and pressure vacuum breaks. They will no longer be available as a rebate for our customers. Price per unit in many cases is well below $25 and participation is low. Incentives are not needed for these units any longer because they have become the norm in efficient irrigation system installations. The rain sensor rebate will continue and two new sensor rebates will be added, in-ground soil moisture sensors and wind sensors to increase the efficiency of irrigation scheduling. The rebate for these units will be limited to a 25% of the cost of the

sensor, with a maximum of up to $100 for residential customers and up to $500 for commercial customers.

5. **Water Waste Reduction Ordinance – effective irrigation season of 2019** the Water Authority will implement the amended ordinance. The Water Authority amended the ordinance to introduce an approach that focuses less on enforcement and more on education. As a balance to water waste fines the Water Authority will extend the educational warning system to all customer classes. Our new program approach will aim to teach customers how to fix irrigation issues. The ordinance represents an effort to move our community toward the goal of irrigation efficiency and will continue to serve as the most effective educational tool to change customer's behaviors. Over the course of 22 years our program has issued thousands of fines that have served to modify consumer attitudes towards water usage. The Water Authority will take advantage of the customer response to the warning or violation advisory by offering irrigation efficiency consultations. The proposed changes to the Water Waste Ordinance are outlined below.

A. All customer classes will receive at least one warning notice prior to a violation:
   - Reported Warning Notice for first complaint
   - Observed Warning Notice for documented water waste
   - Certified Notice of Violation with an opportunity to schedule an Irrigation Efficiency Consultation
   - Fee assessed if no consultation scheduled or problem fixed

B. The Water Authority will also modify the fee schedule to streamline the procedures used to issue fines. The previous fee schedule had eight sequential violations issued over a period of five years. The proposed new fee schedule will have three escalating fines for each consecutive violation issued within one calendar year and has also been modified by meter size (representative of water usage).

Meter size	**1st Fee**	**2nd Fee**	**3rd Fee**
< 1.5"	$20	$50	$100
< 4"	$100	$250	$500
< 8"	$250	$500	$1,000

6. **Multi-Setting Sprinkler Timer - effective irrigation season 2020** the Water Authority will phase out multi-setting sprinkler timers and only accept rebates for Smart Irrigation Controllers. The multi-setting sprinkler timer rebate has been in place since 2007 and technology has improved over time. Smart Irrigation Controllers range from applications that allow the user to adjust irrigation scheduling from a mobile device to more sophisticated controllers that automatically adjust irrigation scheduling based on weather deviations. Smart Irrigation Controllers if programmed and managed correctly could use water more efficiently than traditional timers. Instead of turning on and off based on a programmed schedule, Weather Based Smart Irrigation Controllers for example, monitor weather and other site conditions in real time, then automatically adjust the irrigation system to apply just the right amount of water to meet landscape watering needs. The

Water Authority will be evaluating which Smart Irrigation Controllers work best for our region and type of landscapes by tracking current participation, type of landscape and controller during the irrigation season of 2018 and 2019. Additionally, a pilot program in partnership with Smart Irrigation Controller manufacturers to install units in residential and commercial sites in order to identify the most effective units will be developed. The pilot study requires an investment of $20,000 per year to purchase and install controllers. Smart Irrigation Controllers for residential landscapes range from $100 to $300 and for commercial landscapes from $300 -$3500 per unit. A random sample from the top 5% High Water Users will be offered the opportunity to participate in the study. The rebate for Smart Irrigation Controllers will be limited to a 25% of the cost of the controller with a maximum of up to $100 for residential customers and up to $500 for commercial customers, per account.

NEW INITIATIVES

1. **Irrigation Efficiency Initiatives** – the water conservation trade has transformed the plumbing industry to progress to low water usage fixtures and appliances as well as the landscape industry to offer efficient solutions for managing irrigated landscapes. Water efficiency must be considered from the initial landscape and irrigation system design phase through installation and maintenance to ensure optimal performance. Failure to do so can mean significant losses in system efficiency resulting in wasted water.

   Increasing landscape irrigation efficiency expertise among our customers is essential to future water savings. In order to ensure that the irrigation system hardware is operating efficiently, it is important to follow up with customers for proper irrigation scheduling, which dictates the amount and timing of water applied. The amount of water landscape needs fluctuates with the seasons, as should the irrigation schedule. Many landscapes are watered at the same level all year, adding unnecessary water for months at a time addition to wasting water. Overwatering can cause more damage to plant material than under watering in some cases as well as damage streets, curbs, other pavement and buildings.

   Regardless of the type of landscape and irrigation system used, improving the efficiency of landscapes is a viable solution to reduce consumptive usage over time. Incentives will focus on efficiency in reducing wasted water by providing free irrigation efficiency consultations, tools and an added mix of irrigation efficiency rebates to emphasize the use of the most advanced landscape practices and irrigation technology. The following initiatives will be added to our portfolio:

   A. **Efficient Irrigation and Pre-Xeriscape Conversion Consultations– effective irrigation season of 2018** the Water Authority will add this educational visit to assist customers with topics related to irrigation efficiency, do it yourself turf conversions, and xeriscape principles. These consultations will ensure that customers have both a water efficient and an aesthetically pleasing landscape. Consultations will be offered to xeriscape rebate participants, irrigation controller rebate participants, high water

users, customers who received a water waste violation warning and commercial customers. The visit will focus on assessing the proposed turf conversion area, evaluating the efficiency of the irrigation system, providing low water usage landscape tips, outlining proper irrigation schedules, identifying items that need repair and proposing outdoor rebate participation.

B. **Professional landscape dripline** - **effective irrigation season of 2018** the Water Authority will add this rebate to our portfolio of outdoor rebates. Unlike overhead irrigation, which is subject to runoff and overspray, professional landscape driplines deliver water directly to the root zone of the plant, minimizing evaporation and runoff. This not only saves water, but may prevent vehicular and pedestrian accidents from over spray that causes ice hazards in the winter. The dripline is ideal for replacing spray irrigation in difficult areas where trees exist such as steep slopes, odd shaped narrow areas, medians, and other small areas currently watered by spray irrigation. The average cost per linear foot is $3.00- $6.00 for professional landscape dripline. Only micro irrigation driplines that are 16mm and 17mm, with an integral pressure-compensating system, self-cleaning emitters, check valve and an anti-drain dripper will qualify for the rebate. Qualifying products will be listed on our website.

C. **Flow Sensors** – **effective irrigation season of 2019** the Water Authority will add this rebate to our portfolio of outdoor rebates. The Water Authority has replaced approximately 80,000 conventional water meters with advanced metering infrastructure (AMI) to reduce the time in manually reading meters, improve billing accuracy, and allow for remote collection of meter data. Eventually AMI meters will cover the Water Authority's entire service area. AMI could also support conservation efforts by alerting customers of potential leaks and proper watering schedule.

   AMI does report potential leaks through monitoring continual usage in real time, but does not have the capability to turn the outdoor irrigation system off when a leak is detected. Irrigation flow sensors measure your irrigation water flow and can work with a smart irrigation controller to stop or adjust a zone of the irrigation system, alert the customer of a broken pipe, and prevent plant loss from over or under watering. Large parks and golf courses have been using flow sensors that transmit the flow value data to the controller and master valve for years, but now this technology is more affordable and easier to install for anyone who wants to be smart about their irrigation water use. Flow sensors are offered in various sizes, and should be selected based on the flow rates that need to be measured, not the pipe size. For example, typically a 2-inch flow sensor can easily handle the design flow rate of a 3-inch pipeline without exceeding maximum flow rate and will also measure flow at more critical lower flow rates than a larger sensor would. Flow sensors are available for commercial and residential customers. Prices per flow sensor range from $125 to $750 per unit. The Water Authority will offer a 25% rebate, per controller, up to $100 for residential customers and up to $500 for commercial customers.

D. **Bulk Organic Mulch – effective irrigation season of 2021** the Water Authority will add this rebate to our portfolio of outdoor rebates. This rebate will promote an increase in moisture content, soil buildup, and healthy root establishment in landscapes. The mulch incentive will be available for Xeriscape Rebate and Treebate participants as a heightened rebate to promote organic ground cover in landscapes. Organic mulches are made from natural sources including wood chips, shredded bark, pecan hulls and pine needles. Price per cubic yard varies depending on mulch type, processing, and amount needed. Prices typically run around $25 per yard on material. A 25% rebate up to $100 for residential customers and up to $500 for commercial customers will be added to our portfolio of outdoor rebates.

E. **Soil Moisture Enhancers –effective irrigation season of 2021** the Water Authority will add this rebate to our portfolio of outdoor rebates. Soils play a very important role in storing, regulating, and filtering both air and water resources. As rainwater falls or irrigated water is applied onto the soil surface, it may percolate or runoff the surface, depending on soil properties. This movement is heavily dependent on soil texture, soil structure, slope, bulk density, compaction, surface loading, and vegetation.

Soil properties play an important role in overall health of the landscape and efficient water usage. A soil moisture enhancer rebate will benefit water efficiency in parks, golf courses and other big landscape areas. Soils act like sponges, soaking up rainwater and irrigation water and limiting runoff which leads to wasted water. Soils also impact ground-water recharge and flood-control potentials in urban areas. Additionally soils act like faucets, storing and releasing water and air for plants to use. Landscape managers encounter pre compaction activities daily at their sites. Urban soils that have been disturbed and mixed may no longer possess the natural characteristics needed to support healthy landscapes regardless of how much water is applied. Soil amendments may be required to reestablish plants. In many urban areas, the remaining soil materials must be modified before supporting plant life. Managing efficient landscapes requires consideration of fill consistency, soil moisture, soil porosity, water movement, surface drainage, and increasing water retention. Some of the practices for improving and overall managing of efficient irrigation and health of landscapes consist of adding organic matter to the soil. Both the City of Albuquerque and the Bernalillo County Parks and Recreation Department have this practice as part of their management strategy for sites. Other soil moisture enhancers used by landscape managers include but are not limited to humus, vermiculite, polymers, naturally derived soil surfactants, humectants and hygroscopic compounds. In some cases watering can be reduced up to 50%, providing for drought protection. Because this rebate will be designed for large scale applications starting next season the Water Authority will further evaluate soil moisture enhancers by monitoring current use practices in parks and golf courses and will consider a pilot study to best evaluate the role in lowering water usage. A 25% rebate, per site up to $500 for commercial customers will be added to our portfolio of outdoor rebates.

2. **Education Program** - the Water Authority's new education program includes a garden website with a monthly newsletter, a variety of topics for WaterSmart workshops, education events at garden centers, and educational training for Industry and Institution staff. The Water Authority will also initiate offering contractor's workshops in Spanish.

   A. **Garden Website & Newsletter** – **effective irrigation season 2018** customers will have the opportunity to sign up for a monthly email newsletter available on a new website. The creation of the website will support the efforts of the Water Authority to reach out to more people so we can educate a larger percentage of our customers. The website will cover topics on efficient horticultural practices and maintenance, as well as tips on gardening and irrigation principles. With a new website the Water Authority would be able to foster a culture within our community that increases the awareness of water conservation. A website would also be the central location to house information about water efficient landscaping in the Southwest. It would help the Water Authority to efficiently educate and engage the public, while helping to elevate the overall 'value' of landscape in the minds and hearts of our community. Prior to launching the website the Water Authority will survey customers interested in signing up to find out what kind of landscape related issues customer have. The results of the survey will be compiled into a report. Survey information will then be used to determine content and to create an editorial calendar.

   B. **WaterSmart "Lunch and Learn"** - **effective irrigation season of 2018** the Water Authority Xeriscape Efficiency Advisor will visit landscape professionals and institutional groundskeepers during lunch or morning break to offer presentations. Topics will include applying for rebates, taking advantage of irrigation efficiency tools, showing new technology demos, and explaining rates and how to avoid water waste violations.

   C. **WaterSmart Workshops & Events** – **effective irrigation season of 2018** the Water Authority will continue with gardening workshops emphasizing a broad range of topics to assure successful thriving landscapes and gardens. The Water Authority will offer efficient irrigation classes in all quadrants of the service area to ensure equal participation. Additionally the Water Authority will partner up with garden centers to host events throughout the year. Customers will have the opportunity to join in conversations about how to take advantage of our generous outdoor rebates and learn about efficient landscaping practices and technology.

   D. **WaterSmart Academy** - **effective irrigation season of 2020** the Water Authority will develop an educational academy for local landscaping contractors. Contractors that participate in learning sessions will be included in the water smart contractors list on our website. Workshops will be offered in English and Spanish. The academy will also educate other customers about how to avoid water waste violations and check for leaks.

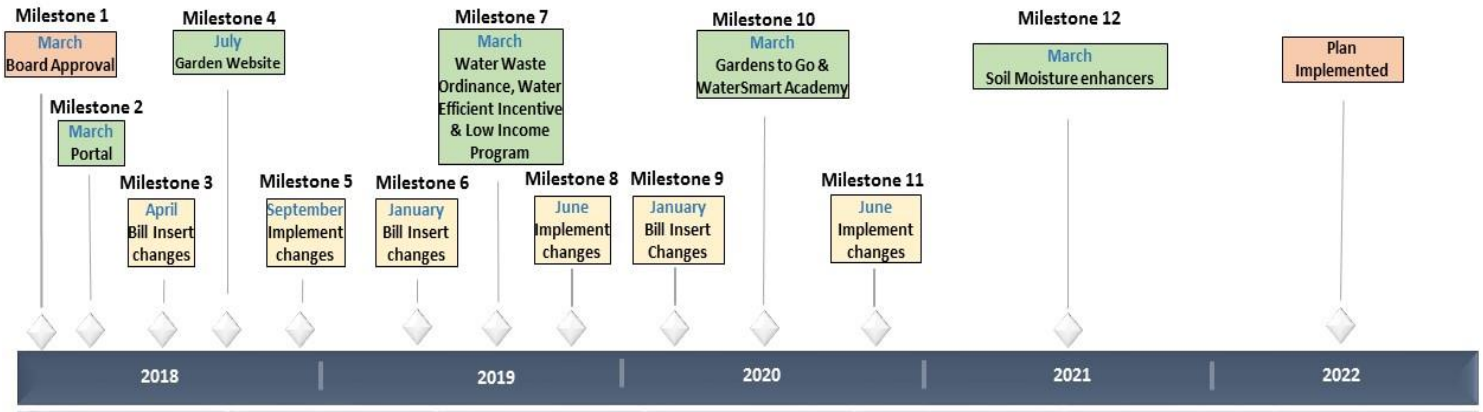
3. **Public Agency Program – effective irrigation season of 2018** the Water Authority will offer partnerships to public agencies currently using the water management tool. The partnerships will allow public agencies to receive irrigation training and to enter into agreements with the Water Authority to use future irrigation surcharges to offset the cost of conservation projects that increase efficiency while maintaining healthy landscape. The water management tool allows agencies to track water use and helps to identify potential leaks. Additionally, the tool calculates accumulated water budget irrigation surcharges each month by site, which helps them avoid a cost at the end of the year.

4. **Water Efficient Incentive Program** - **effective irrigation season of 2019** the Water Authority will support water conservation initiatives such as installing water efficient devices and technologies that result in at least 100,000 gallons saved annually. Approved projects will be evaluated for an incentive of up to $10 per unit of water saved annually. The Water Conservation Program will set aside $200,000 every year for this initiative. Commercial customers could qualify for up to 50% of the cost of the project totaling up to $50,000 per fiscal year. The incentive will be available for replacement of water cooled equipment with new air cooled equipment, process water reclamation systems, capture and reuse of condensation, elimination of water intensive industrial processes, high efficiency indoor fixtures, artificial turf projects, ultra-low commercial water laundry system upgrades or other innovative ideas that result in the savings thresholds. A proposal detailing the retrofit project with expected costs, expected savings including a calculation method, savings tracking procedure, and estimated device or technology life must be submitted for Water Authority approval prior to beginning the work. Under this program, the Water Authority will enter into an agreement with the specific customer after carefully evaluating the proposal. Savings will be calculated after the first year of installation and if savings meet threshold requirements, a one-time credit will be adjusted on the customer's account.

5. **Low Income Pilot Program – effective 2019** the Water Authority will develop a pilot program to assist low income customers with conservation efforts. According to the latest census report 19% of Albuquerque's population is below the poverty level. Currently the Water Authority has approximately 588 customers signed up in the Low Income Credit Program. As part of the program, customers receive a $20 credit on their monthly bill. As part of development of the pilot program, Water Authority staff will evaluate opportunities to provide low income customers with free water audits, low-flow fixtures, efficient irrigation systems and plumbing services to repair leaks.

6. **Gardens to Go – effective irrigation season of 2020** the Water Authority will launch a rebate to raise interest on xeric gardening for customers who do not qualify for the xeriscape rebate. Customers will be able to purchase a professionally-planned, "garden in a box" and receive a rebate. The boxes will come with information on plant water needs and recommended care.

Implementation Timeline



Milestone 1	WC Plan Approval
Milestone 2	Implement Application Portal for Rebates
Milestone 3	Inform changes to Washing Machines, Toilets, Urinals, Showerheads, Thermostats, Hot Water Recirculation, WaterSmart Workshops
Milestone 4	Launch Garden Website & Newsletter
Milestone 5	Implement 2018 changes to rebates
Milestone 6	Inform changes to PRV, BPV and announce new rebates: Treebate and Xeriscape bulk organic mulch and flow sensors
Milestone 7	Water Waste Reduction Ordinance, start Water Efficient Incentive and Low Income Program
Milestone 8	Implement 2019 changes to rebates
Milestone 9	Inform changes to Multi-setting sprinkler timer to Smart Controllers
Milestone 10	Launch Gardens to Go & WaterSmart Academy
Milestone 11	Implement changes to rebate and announce new rebates In-ground Soil Moisture Sensors and Wind Sensing Technology
Milestone 12	Launch Mulch and Soil Moisture enhancer rebate

APPENDIX A

Plan for Customer Demand Reduction During Drought

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EXECUTIVE SUMMARY

This update of the Albuquerque Bernalillo County Water Authority (Water Authority) Drought Management Strategy (Strategy) was developed to conform with the updated Water Resources Management Strategy, "WATER 2120: Securing Our Water Future."

The drought stages and their corresponding water use reduction methods are subject to approval by the Water Authority Board. In adopting drought stages, the Board will consider the severity of the drought, the amount by which annual groundwater pumping goals are projected to be exceeded and the amount by which the annual gallons per capita per day water usage goal are projected to be exceeded.

Water use reduction methods include: public education, increasing water waste fines, rebates for attending a class on drought, mandatory day-of-the-week watering schedules, changing the time of day watering restrictions, distributing low-flow showerheads and offering a rebate to customers who reduce their water use by at least 20%.

Whenever the majority of Bernalillo County is in severe drought according to the National Weather Service, the Water Authority will issue a Drought Advisory to educate the public about drought conditions and encourage voluntary conservation. Whenever a Drought Advisory is in effect, the Water Authority Board will be briefed on water use and drought conditions at the monthly Board meetings.

INTRODUCTION

The Drought Management Strategy (Strategy) provides for a continuation of the drought management measures from the original Strategy adopted by the Albuquerque City Council in April 2003. When the Strategy was adopted, the utility was a part of the City of Albuquerque. The City established a task force to develop and finalize a drought management plan. This plan established four stages of drought and voluntary and mandatory drought response measures to protect and preserve the aquifer. The Water Authority utilized the recommended drought stages and corresponding drought response measures in 2006 and 2011 through resolution as a result of below average precipitation and/or above average temperatures from *La Niña* conditions. In 2008, the Water Authority began utilizing surface water in addition to ground water to provide its customers a safe and sustainable water supply. As a result, the Strategy needed to be updated as the original Strategy's drought stages were structured exclusively on groundwater use. In addition, lessons learned from the 2006 and 2011 droughts were used to design more appropriate drought stages and drought response measures. This latest Strategy update was developed to conform with the update to the Water Resources Management Strategy, "WATER 2120: Securing Our Water Future." Similar to the original Strategy, this updated Strategy was reviewed by the Water Authority's Technical Customer Advisory Committee before being adopted by the Water Authority Board and will be reviewed/updated every five years.

BACKGROUND

The Water Authority now supplies about 100,000 acre-feet/year of water to more than 670,000 customers in the metropolitan area. Water is supplied from both the aquifer and from surface water.

In 2016, the Water Authority adopted a comprehensive Water Resources Management Strategy (WRMS), "Water 2120: Securing Our Water Future" to assure a resilient and sustainable water supply for its customers to the year 2120. Numerous meetings were held throughout 2016 to gather input from customers and other water agencies.

Water 2120 consists of seventy-five policies and sub-policies for providing a resilient and sustainable water supply. This Strategy addresses Policy C of the Water 2120 "Establish and Maintain a Groundwater Reserve" and Policy D "Update and Maintain the Water Conservation Strategy."

Diversifying the water sources used, particularly beginning use of the the San Juan-Chama Drinking Water Project has allowed for recharge of the aquifer. In the United States Geological Survey report, "Water-Level Data for the Albuquerque Basin and Adjacent Areas, Central New Mexico, Period of Record Through September 30, 2015" numerous graphs show water levels increasing or stabilizing in area wells.

Meanwhile, water use has been reduced. The City adopted an ambitious water conservation program in 1995 with the goal of reducing per capita water use by 30 percent to 175 gallons/person/day by 2004. This goal was achieved and the Water Authority established a further goal of reducing water use to 150 gallons/person/day (GPCPD) by 2014. That goal was

achieved in 2011 and a new goal of 135 GPCD by 2024 was set. That goal was achieved well ahead of schedule in 2014 (See Figure 1). During the evaluation of WATER 2120 the public was presented with three future conservation goals. They overwhelmingly selected the most ambitious goal of 110 GPCD by 2037. Achievement of this goal will result in a water savings of 50,000 acre-feet per year at the end of the planning period (see blue line in Figure 2).

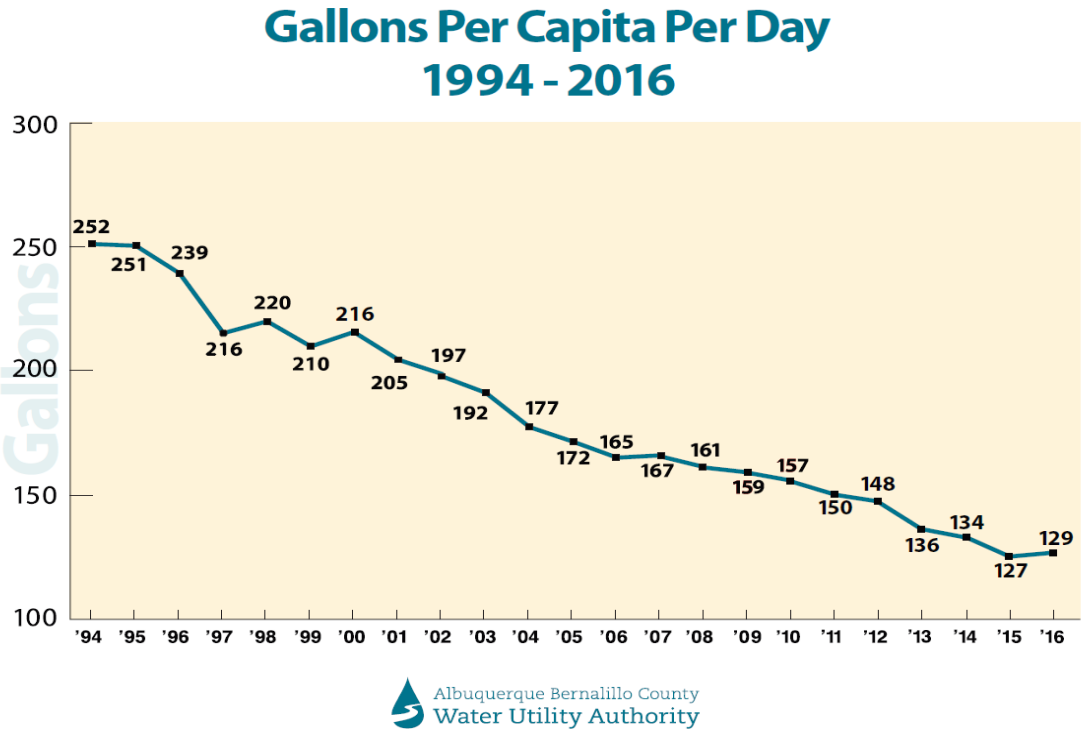

Figure 1. Water Conservation Progress 1995 - 2016

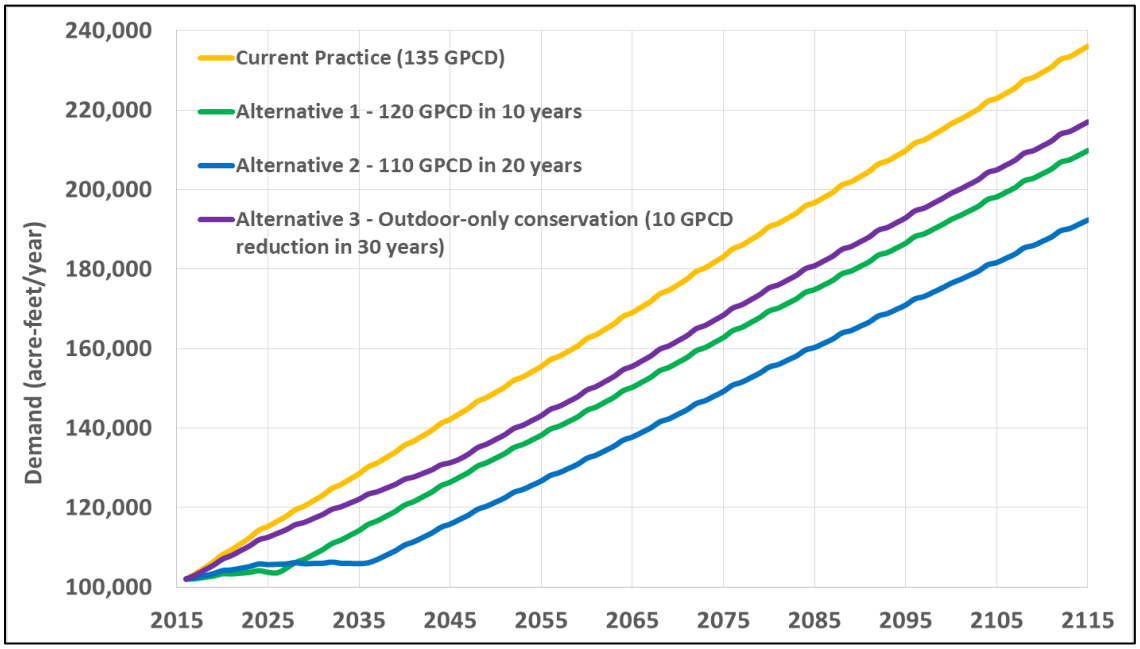

Figure 2. Water Conservation Goals that were considered as part of Water 2120

PURPOSE OF THE DROUGHT MANAGEMENT STRATEGY

The purpose of the Strategy is to reduce water use during a drought consistent with the goals and objectives of WATER 2120. The water savings that are targeted during declaration of various stages of drought are intended to be short-term measures capable of producing water savings over time periods ranging from one month to one year, but no longer.

Implementation of the Strategy should be considered separately from the Water Authority's conservation program. The water conservation program is intended to provide for long-term water savings as opposed to a single year or irrigation season. The public messages for the Strategy will certainly promote education about the long-term need to conserve. However, the Water Authority will strive to achieve higher than average savings during a short period of time during a drought.

ESTABLISHING ANNUAL WATER USAGE GOALS

Each year, staff will establish an annual demand goal pursuant to achievement of long-term conservation objectives. This goal along with the projected annual operations plan for groundwater and surface water usage will be presented to the Water Authority governing board.

The Strategy is intended to address increased water use solely resulting from drought and is not intended to be used to penalize its customers for slight periodic monthly or annual increases in per capita use or for increased groundwater use due to water quality or other unforeseen conditions that prevent diversion and direct use of the San Juan-Chama water as part of the Drinking Water Project.

For example, in 2011 the use of San Juan-Chama water was curtailed due to changes in water quality in the Rio Grande due to upstream fires. These types of issues will occur from time to time, but would not trigger the declaration of a drought.

DECLARING A DROUGHT

Drought in the Water Authority's service area relates to the supply of surface water and the amount of ground water pumped during dry, high-demand periods. Because drought has its greatest impact in the summer and early fall (the highest water demand times of the year) drought mitigation focuses on these time periods and reducing outdoor water use.

When drought conditions exist or are anticipated to develop in our region, the Water Authority Board will be briefed on water usage and predicted drought conditions and will utilize this information to decide when to declare the drought stages. The approval of a drought stage by the Water Authority Board, will authorize the Water Authority's Executive Director to initiate all the measures associated with that drought stage. There are four levels of drought that can be declared and all but the Drought Advisory (a first stage early warning system that calls for increased education on drought and voluntary conservation) must be approved by the Water Authority Board based on water usage information, local and statewide drought conditions as defined by the National Weather Service, groundwater pumping and other information that may be requested or provided by staff or the public.

During drier than normal conditions per capita water demand may increase, and in addition, surface water may not be available. These two conditions combined would result in increased ground-water pumping when compared to normal or expected conditions. All of the drought mitigation measures are aimed at reducing demand, so it is appropriate to invoke these measures when demand has increased as a result of drought.

DROUGHT DECLARATION CRITERIA

Each year the Water Authority sets an operational plan for use of ground water, surface water and reuse. The plan is established to preserve the aquifer for the long-term. The drought stages are tied to the operational plan and increases in customer water use.

There are three drought stages that can be declared along with an early alert system, the Drought Advisory. The Drought Advisory does not require mandatory conservation, but rather calls for increased public education. Each of the drought stages contains mandatory measures that are anticipated to reduce demand back to operational goals. The majority of water usage reduction methods are aimed at reducing outdoor water usage, because this is the use most likely to increase during a drought and because outdoor use is a consumptive use.

Not all of the methods to reduce water use are restrictive. For each drought stage there is a rebate or incentive also being offered to customers to increase their motivation to reduce their water use. This is a unique approach to drought management intended to maintain the positive relationship that has been developed over time with customers regarding water usage reduction.

A Drought Advisory is declared whenever the majority of Bernalillo County reaches Stage 3 – Severe Drought as defined by the National Weather Service, regardless of water usage patterns. Upon declaration of a Drought Advisory, the staff is directed to immediately increase public education on drought. The drought advisory is intended to be an early warning system for customers to alert them to the need for increased awareness of water use because the service area is experiencing a drought before an increase in water usage has occurred.

Use of the Drought Advisory was highly effective at keeping water demand under control during the Extreme Drought experienced by the service area in 2011. For this reason, this stage of drought awareness does not require Water Authority Board approval, so that staff may increase drought awareness quickly and thereby, hopefully, alleviate the need for additional measures.

If declaration of the Drought Advisory is ineffective at keeping water use consistent with the established goals, then further stages of drought may be adopted by the Board. Drought stages are linked to the annual groundwater pumping goal and the gallons per capita per day water usage goal as shown in the chart below.

Both of these criteria are important. The first establishes that groundwater supplies are being depleted and the second that the cause for the depletion is customer behavior. The response of customers to the Drought Advisory would determine whether it would be necessary to enter into any of the restrictive levels of the Strategy. Since this updated Drought Management Strategy was adopted in 2011, it has not been necessary to enter into any of the restrictive levels of the Strategy because Water Authority customers have responded so well to the voluntary measures even during severe drought.

Drought Stage Criteria Chart

Groundwater Pumping /GPCD	Less than 120% of the GW pumping goal	Between 120% and 130% of GW pumping goal	Between 130% and 140% of GW pumping goal	More than 140% of the GW pumping goal
< 2 GPCD over the goal	None	None	None	Stage 1
2-4 GPCD over the goal	None	Stage 1	Stage 1	Stage 2
4-6 GPCD over the goal	None	Stage 1	Stage 2	Stage 3
> 6 GPCD over the goal	Stage 1	Stage 2	Stage 3	Stage 3

Figure 3. Drought Stage Criteria Chart

DROUGHT STAGES AND CORRESPONDING DROUGHT RESPONSE MEASURES

Anticipated savings for the water reduction methods were calculated based on the 1997 Drought Management Strategy, water usage reductions seen in the droughts of 2006 and 2011, water usage reductions achieved by the Water Authority Conservation Program and the anticipated water use level at each drought stage based on the operational plan for 2012-2022. As the Drought Level increases, the anticipated savings from water usage reduction methods that have already been implemented at a lower level decreases.

Finally, the savings shown in the charts below are not cumulative. They are based solely upon the savings anticipated at that particular drought stage and the water use anticipated at that level of drought. Savings were calculated this way, because if the drought stage worsens then the methods being used in the previous drought stage were likely not sufficient to control water usage. Thus, they are anticipated to be not as effective at higher stages. For example: Public education is anticipated to be able to reduce annual groundwater production by 12% when used at the Drought Watch level, but is only anticipated to reduce water use by 2% at the Drought Warning stage. At the Drought Warning stage, customers will have been exposed to two increases in public education, one at the Drought Advisory level and another at the Drought Watch level, if these two educational efforts prove ineffective, it is unlikely that further increases in public education will achieve the necessary reductions in water use.

If the savings anticipated from adoption of the methods at a particular drought stage are not achieving the desired results but water use is still below the next drought stage threshold, the Water Authority Board may adopt an additional water usage reduction method from a higher drought stage or from recommendations from staff without moving to a higher drought stage. The Board may approve maintaining drought restrictions even as a drought decreases in severity in order to achieve the desired savings.

If an increase in funding is needed to accomplish any of the water use reduction methods, it will be presented to the Board for their approval at the time that the Drought Stage is approved.

DROUGHT STAGE 1: DROUGHT WATCH		
Water Use Reduction Method	Savings Goals as a percentage of total annual ground water production	Average Savings Goals in acre-feet (based on 2012-2022 goals)
Increase public education	12%	4,653
Double Fees for Wasting Water	5%	1,938
Offer Drought Smart $20 rebate classes	3%	1,163
TOTAL	20%	7,754

DROUGHT STAGE 2: DROUGHT WARNING		
Water Use Reduction Method	Savings Goals as a percentage of total annual groundwater production	Average Savings Goals in acre-feet (based on 2012-2022 goals)
Increase public education	2%	840
Double Fees for Wasting Water	4%	1,680
Offer Drought Smart $20 rebate	2%	840
Double Surcharges	10%	4,201
Water by the Numbers becomes mandatory	8%	3,360
Change Time of Day Watering Restrictions (no watering 9AM to 9PM)	2%	840
No variances granted to Time of Day Watering Restrictions	2%	840
Distribute low-flow showerheads and/or timers and educate on 5-minute showers	1%	421
TOTAL	31%	13,021

DROUGHT STAGE 3: DROUGHT EMERGENCY		
Water Use Reduction Method	Savings Goals as a percentage of total annual groundwater production	Average Savings Goals in acre-feet (based on 2012-2022 goals)
Increase public education	2%	904
Double Fees for Wasting Water	4%	1,809
Offer Drought Smart $20 rebate	2%	904
Change Time of Day Watering Restrictions (no watering 9AM to 9PM)	2%	904
No variances granted to Time of Day Watering Restrictions	2%	904
Distribute low-flow showerheads and/or timers and educate on 5-minute showers	1%	452
Triple Surcharges	14%	6,333
Reduce mandatory Water by the Numbers by one day/week	12%	5,428
20% Reduction Rebate	2%	904
TOTAL	41%	18,542

If water use cannot be reduced sufficiently with the methods above and additional savings are needed methods may be adopted from the "Table of Options When More Savings Are Needed" found on page 11.

DESCRIPTION OF THE WATER USE REDUCTION METHODS

The graph in Figure 4 shows the anticipated savings from each of the water usage reduction methods at each of the three mandatory drought stages. Details on implementation of each of the water use reduction methods follow below the graph.

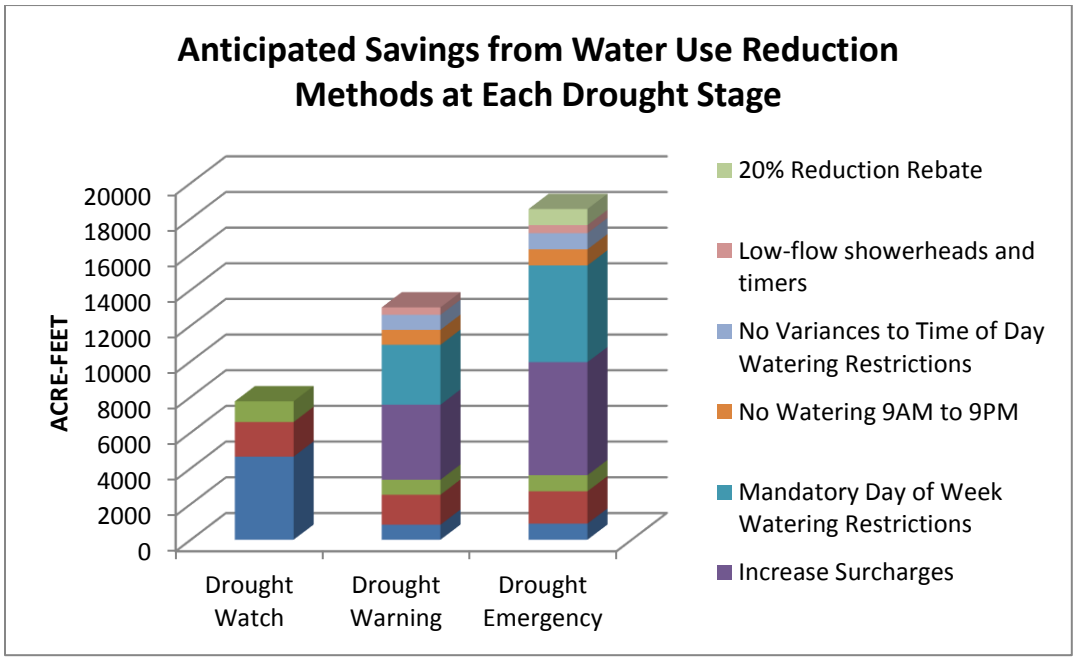

Figure 4. Anticipated Savings from Water Use Reduction Methods at Each Drought Stage

Increase public education: change water conservation communications to customers from the regular yearly message to one that educates on the current drought. A key component of the drought message will be the total number of gallons per day by which each customer needs to reduce his/her use. As drought stages increase, communicate the severity of the drought and the water use reduction methods being enacted. Education about each of the water use reduction methods adopted is critical to their success.

Double fees for wasting water: the Water Authority's Water Waste Ordinance authorizes the imposition of fees for customers who put water into the public right of way, onto other private property or water during the Time of Day Watering Restriction period. Fees start at $20 for the first violation of the ordinance and escalate to $2,000. Under this method, the fee for the first violation would be $40 and would continue to be double for each subsequent level. Eliminating water waste is the first step in reducing water use during drought.

Offer Drought Smart $20 Rebate: the Water Authority currently offers a $20 rebate to customers who attend a one-hour irrigation class called "WaterSmart." During drought, this class would be changed to be "DroughtSmart" and would inform customers how to manage

their landscapes during drought. In addition, a video of the "DroughtSmart" class would be posted on our website to get the information to customers who are unable to attend the class.

Distribute low-flow showerheads and/or timers and education on 5-minute showers: Showerheads and/or timers would be distributed at selected locations and mailed to customers who could not come get them. The Water Authority would also produce information to accompany the showerheads on the savings generated from taking 5-minute showers.

Water by the Numbers Schedules: the water conservation program educates customers year-round on appropriate watering schedules with the Water by the Numbers program, so many customers are already following a seasonal watering schedule. During drought, the Water Authority would establish watering days for even addresses and for odd addresses. Depending on the drought level, customers would be allowed to water on one, two or three of their allowed days. Any customer watering on the wrong day of the week would be issued a water waste fee by the Authority's Water Use Compliance inspectors. Variances by be granted to this policy for large properties to allow them to water the entire landscape provided that no area of the landscape is watered more times per week than allowed by the policy.

Change Time of Day Watering Restrictions (No Watering 9AM to 9PM): regular time of day watering restrictions begin April 1 and end October 31 and prohibit watering from 11AM to 7PM. By adding another three hours to the prohibited period, additional water savings could be achieved because less water would be evaporating.

No Variances Granted to Time of Day Watering Restrictions: from April 1 through October 31 spray irrigation is not allowed from 11AM to 7PM, but customers may request a 30-day variance from this ordinance for re-seeding and planting sod. During a drought warning or emergency these variances would not be granted, except for safety considerations on public or educational playing fields. Variances may be granted for public and educational playing fields to ensure a safe playing surface.

20% Reduction Rebate: this rebate would be offered to customers who sign up for a program pledging to reduce their water use by 20% over last year's use for a given period. The period of the rebate would vary depending on when the drought emergency was adopted. At the end of the set time period, customers who had reduced their use by 20% would receive a credit on their water bill. There may be a cap placed on the number of participants.

Double or Triple Surcharges: customers are assessed surcharges on their water bill for use in excess of two, three and four times their average winter water consumption during the irrigation season as set forth in the Water Authority Rate Ordinance. During a drought warning or emergency, the surcharges at each level would be doubled to encourage customers not to use more than two times their average winter water use during the drought.

TABLE OF OPTIONS WHEN MORE SAVINGS ARE NEEDED

Water Use Reduction Method	**Savings Goals as a percentage of total annual groundwater production**	**Average Savings Goals in Acre-feet (based on 2012 -2022 goals)**
Reduce Surcharge Threshold by 25%	2%	904
Reduce Surcharge Threshold by 50%	3%	1,356
Quadruple Surcharge	18%	8,136
Triple Water Waste Fees	3%	1,356
Reduce Mandatory Water by the Numbers by two days/week	18%	8,136
Increase leak detection services	2%	904
Work with customers to reduce water intensive processes (e.g. fleet washing, nursery plant watering, power washing, construction)	1-4%	452 -1,808
Target large water users in all sectors (initiate/ follow up on audits, call customers to report on progress)	2%	904
Provide water conservation seminars to landscape firms	2%	904
Expand school programs on drought	3%	1,356
Increase an existing rebate to encourage higher levels of participation	2%	904

APPENDIX A
SUMMARY OF CASE STUDIES DEMONSTRATING WATER SAVING METHODS AND RESULTS

The case studies presented below support the water savings goals described in this report. A summary of these findings and comparisons to the Water Authority's Drought Management Strategy (Strategy) are presented in Table 1.

PUBLIC EDUCATION CAMPAIGNS

The city of Cary, North Carolina, put together a water conservation program that looked at the cost-effectiveness of various conservation methods (EPA, 2002). In doing so they evaluated the effectiveness of public education on water conservation and estimated that their planned public education campaign would result in 26 percent of total water savings by the year 2009 and 21 percent of total water savings by 2019. They estimated that the conservation program would reduce retail water production by 16 percent by 2028. Assuming the 2019 estimate of 21 percent water savings from public education would still apply in 2028, they would have achieved 3 percent of this total water savings as a result of the public education campaign alone. This estimate does not directly correlate with the Water Authority's Strategy goals for water savings due to public education during a drought, but it does quantify another water provider's estimate of the effectiveness of public education alone. All other water conservation and drought management plans reviewed in preparation of this section looked at the effectiveness of public education combined with other water saving strategies.

INITIATION OF VOLUNTARY AND MANDATORY IRRIGATION WATERING RESTRICTIONS

Kenney, Klein, and Clark (2004) conducted a study of water conservation measures implemented by several cities in Colorado's Front Range during drought conditions in the summer of 2002. During periods of mandatory restrictions, savings of 18 to 56 percent were seen, while voluntary restrictions saw only 4 to 12 percent savings. Many of the water providers also specified the time of day watering was to occur, special rules for irrigating trees, and allowances for hand watering. Restrictions, both voluntary and mandatory, were combined with public education campaigns and sometimes included other measures (e.g., price increases). Water providers in Thornton, Aurora, Denver Water, and Westminster limited lawn watering to once every three (3) days and saw an average reduction of 22 percent. Water providers in Fort Collins, Boulder, and Louisville limited lawn watering to twice a week and saw an average reduction of 33 percent. Water providers in Lafayette limited lawn watering to once a week and saw a reduction of 56 percent. For these studies, water use was calculated as "expected use per capita", which is a comparison of actual per capita use (deliveries) in 2002 with the level of use anticipated in 2002 had watering restrictions not been in effect and given the adverse climatic conditions associated with drought. They also saw similar results looking at "net use", which is a calculation that compares daily system-wide water deliveries in 2002 to the 2000 to 2001 average for the same dates.

Table 1: Summary of case studies and comparison to the Strategy

Category	Utility	Case Study Summaries		Corresponding Water Authority Goal
Public Education Campaigns	Cary, North Carolina	Estimated 3 percent water savings resulting from public education campaign.		In Stage 1, a 12 percent savings goal from public education. If drought escalates, assume 2 percent savings goal for Stages 2 and 3.
Initiation of Voluntary & Mandatory Irrigation Watering Restrictions	Survey of seven Denver-area water providers	Voluntary watering restrictions	4 to 12 percent water savings	Not Applicable
		Mandatory watering restrictions of once per 3 days	22 percent water savings (average of four water providers)	Not Applicable
		Mandatory watering restrictions of twice per week	33 percent water savings (average of three utilities)	"Water by the Numbers" becomes mandatory (31% percent water savings goal)
		Mandatory watering restrictions of once per week	56 percent water savings	Reduce mandatory "Water by the Numbers" by one day/week (41% percent water savings goal)
Surcharges	Denver Water	Surcharges are more effective when combined with a variety of other drought management options.		The Strategy combines surcharges with a variety of other conservation methods.
		Surcharges should match the severity of the drought.		Surcharges increase with each drought stage.
		Surcharges should be tailored to specific customer groups.		Surcharge volume is based on the amount of water the customer has used over their winter water use, so it is different for each customer.
		Surcharges should be implemented as temporary measures.		Surcharges are implemented with the drought stage and lifted when the stage is over.
Santa Cruz Demand Reduction Program	Santa Cruz, CA	Five stage reduction plan involving a variety of water conservation measures to realize demand reduction up to 50 percent. Plan was developed using estimated water savings achieved in previous drought situations by comparable water shortage management plans.		The Strategy implements similar water conservation methods and sets water savings goals of up to 41 percent.

The Water Authority's Strategy implements similar methods to those described in Kenney, Klein, and Clark (2004) to achieve water savings and presents more conservative water savings goals than those presented above (e.g., The Water Authority lists a water savings goal of 31 percent for making "Watering by the Numbers" mandatory, while the Denver area water providers realized 33 percent average water savings for limiting lawn watering to twice per week.). Table 2 presents a comparison of Water Authority water savings goals to those realized by the municipalities described above.

Table 2: Comparison of Water Savings Realized by Denver Area Water Providers and Water Authority's Strategy Water Savings Goals (NOTE: Each of these providers also implemented a variety of water conservation methods, including public education, rate increases, and water waste fees.)

	Mandatory Irrigation Limit		
	Once Every 3 Days	**Two Days per Week**	**One Day per Week**
Denver Area Water Providers*	22% average reduction realized	33% average reduction realized	56% average reduction realized
Water Authority's Strategy Water Savings Goal	20% (Stage 1 water savings goal)	31% (Stage 2 water savings goal)	41% (Stage 3 water savings goal)

*Kenney, Klein, and Clark (2004)

SURCHARGES

The *American Water Works Association (AWWA) Drought Preparedness and Response Manual* (AWWA, 2011) reported that Denver Water found surcharges are more effective when combined with a variety of other drought management options. By incorporating surcharges into an overall program to increase awareness of drought severity they found customers responded better and believed that this was because they had created an atmosphere where customers recognized the importance of water savings. They recommended that surcharges should match the severity of the drought. They recommended tailoring surcharges to different customer groups, because a one-size surcharge will not work with the variety of customers served. They recommended implementing surcharges as temporary measures and reinforced that the criteria determining when the surcharge is lifted should be specified before the surcharges are imposed to reinforce its temporary nature. These recommendations directly correspond to the methods implemented in the Water Authority's Strategy.

SANTA CRUZ DEMAND REDUCTION PROGRAM

The *American Water Works Association (AWWA) Drought Preparedness and Response Manual* (AWWA, 2011) reported that Santa Cruz, California, updated their drought management plan (DMP) in 2009. They developed a five stage plan using estimated water savings achieved in previous drought situations by comparable water shortage management plans. The water

savings methods implemented at each stage and corresponding water savings goals presented in Table 3.

The water savings goals and methods described in the Santa Cruz DMP are comparable to those presented in the Water Authority's Strategy. The Santa Cruz DMP lists several activities not mentioned in the Water Authority's Strategy, such as coordinating conservation actions with other city departments and encouraging regular household meter reading and leak detection; however, these are actions that the Water Authority completes on a regular basis, regardless of whether they are in a drought situation.

Table 3: Santa Cruz, California, Example Demand Reduction by Stage and Corresponding Water Savings Measured Initiated (AWWA, 2011)

	Stage 1 (0-5% Deficiency)	Stage 2 (5-15% Deficiency)	Stage 3 (15-25% Deficiency)	Stage 4 (25-35% Deficiency)	Stage 5 (35-50% Deficiency)
	Water Shortage Alert	Water Shortage Warning	Emergency Water Shortage	Severe Water Shortage Emergency	Critical Water Shortage Emergency
Demand Reduction	0%	15%	25%	35%	50%
Measures Taken by Stage	• Initiate public information and advertising campaign • Publicize suggestions and requirements to reduce water use • Adopt water shortage ordinance prohibiting nonessential uses • Step up enforcement of water waste • Coordinate conservation actions with other city departments, green industry • Voluntary water conservation requested of all customers • Adhere to water waste ordinance • Landscape irrigation restricted to early morning and evening • Nonessential water uses banned • Shutoff nozzles on all hoses used for any purpose • Encourage conversion to drip, low volume irrigation	• Intensify public information campaign • Send direct notices to all customers • Establish conservation hotline • Conduct workshops on large landscape requirements • Optimize existing water sources; intensify system leak detection and repair; suspend flushing • Increase water waste patrol • Convene and staff appeals board • Continue all Stage 1 measures • Landscape irrigation restricted to designated watering days and times • Require large landscapes to adhere to water budgets • Prohibit exterior washing of structures • Require large users to audit premises and repair leaks • Encourage regular household meter reading and leak detection	• Expand, intensify public information campaign • Provide regular media briefings; publish weekly consumption reports • Modify utility billing system and bill format to accommodate residential rationing, add penalty rates • Convert outside-city customers to monthly billing • Hire additional temporary staff in customer service, conservation, and water distribution • Give advance notice of possible moratorium on new connections if shortage continues • Institute water rationing for residential customers • Reduce water budgets for large landscapes • Require all commercial customers to prominently display “save water” signage and develop conservation plans • Maintain restrictions on exterior washing • Continue to promote regular household meter reading and leak detection	• Contract with advertising agency to carry out major publicity campaign • Continue to provide regular media briefings • Open centralized drought information center • Promote gray water use to save landscaping • Scale up appeals staff and frequency of hearings • Expand water waste enforcement to 24/7 • Develop strategy to mitigate revenue losses and plan for continuing/escalating shortage • Reduce residential water allocations • Institute water rationing for commercial customers • Minimal water budgets for large landscape customers • Prohibit turf irrigation, installation in new development • Prohibition on on-site vehicle washing • Rescind hydrant and bulk water permits	• Continue all previous actions • Develop crisis communications plan and campaign • Establish emergency notification lists • Coordinate with CA Department of Public Health regarding water quality, public health issues and with law enforcement and other emergency response agencies to address enforcement challenges • Continue water waste enforcement 24/7 • Further reduce residential water allocations • Reduce commercial water allocations • Prohibit outdoor irrigation • No water for recreational purposes, close pools • Continue all measures initiated in prior stages as appropriate

REFERENCES

American Water Works Association (AWWA), 2011. *Manual of Water Supply Practices – M60, First Edition, Drought Preparedness and Response*.

Kenney, Douglas S., Roberta A. Klein, and Martyn P. Clark, 2004. *Use and Effectiveness of Municipal Water Restrictions during Drought in Colorado*. Journal of the American Water Resources Association. February.

Environmental Protection Agency (EPA), 2002. *Cases in Water: Conservation, How Efficiency Programs Help Water Utilities Save Water and Avoid Costs*. July.

APPENDIX B

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4-1-1 SHORT TITLE.

This article shall be known as the "Water Waste Reduction Ordinance."

4-1-2 INTENT**.**

(A) To assist in reducing overall per capita water use in accordance with goals adopted by the Water Authority Board. ~~by 40%.~~

(B) To reduce ~~yard~~ spray irrigation and irrigation-related water waste~~,~~. Outdoor usage accounts by about ~~which comprise over~~ 40% of the total annual water usage.

(C) To reduce peak summer usage, which is one and a half to two ~~to three~~ times winter usage and determines the need for capital facilities to adequately meet system demand.

(D) To reduce water waste; i.e., overwatering, inefficient watering, or release of water which generates fugitive water in the public right-of-way, easements, alleyways or onto impervious surfaces.

(E) To reduce damage to publicly owned streets and the public expenditures necessary to repair the damage caused by this wasted water.

(F) To increase street safety by reducing the potential of frozen water in the public right-of-way or on impervious surfaces.

4-1-3 DEFINITIONS**.**

For the purpose of this article, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

WATER AUTHORITY. The Albuquerque Bernalillo County Water Utility Authority or its authorized agent. It includes the water, wastewater and reuse facilities and all operations and management of such facilities necessary to provide water, ~~and~~ wastewater and reuse service in the Service Area.

BARREN. Land which produces inferior or little to no vegetation.

BUBBLERS. Irrigation heads which deliver water directly to the soil adjacent to the heads.

~~CURBSIDE CAR WASHING.~~ VEHICLE WASHING. ~~Car~~ vehicle washing near a public right-of-way, hose sweeping, charity or fundraiser ~~car~~ vehicle washes, ~~car~~ vehicle washing on dealer lots.

CUSTOMER. Any person, association, corporation or other entity receiving Water Authority~~'s~~ service in the Service Area.

DRIP IRRIGATION. Low pressure, low volume irrigation applied slowly, near or at ground level to minimize runoff and loss to evaporation.

DROUGHT. Drought occurs when there is insufficient precipitation combined with other environmental factors that cause an increase of overall water usage.

DROUGHT MANAGEMENT STRATEGY. The Water Authority~~'s~~ Drought Management Plan as adopted by the Water Authority Board. ~~which contains four different drought severity levels, with each level containing increasingly stringent measures to reduce demand on the Authority's water system.~~

EFFICIENT IRRIGATION CONSULTATION. A way to inventory outdoor irrigation practices, identify ways to fix water waste problem to increase water use efficiency.

EXECUTIVE DIRECTOR. The Executive Director of the Water Authority~~'s~~ or his/her designee.

EXEMPTION. A Water Authority approved watering schedule that permits watering during Time-of-Day-Watering Restrictions to establish newly seeded turf or

to support inter-seeding.

FUGITIVE WATER. The pumping, flow, release, escape, or leakage of any water from any pipe, valve, faucet, connection, diversion, well, or any facility for the purposes of water supply, transport, storage, disposal, recreational, cleaning process or delivery onto adjacent property or the public right-of-way.

HAND WATERING. The application of water for irrigation purposes through a hand-held hose, including hoses moved into position by hand and left to flow freely or through a shut-off nozzle.

IMPERVIOUS SURFACES. Solid surfaces, such as asphalt and concrete that do not allow water to penetrate, forcing the water to run off.

INFILTRATION RATE. The amount of water absorbed by the soil per unit of time, usually expressed in inches per hour

INSPECTION. An ~~entry into and~~ examination of ~~premises~~ site for the purpose of ascertaining the existence or nonexistence of violations of this article.

INTER-SEEDED: Seeding of an area within an existing turf area to repair damage. This type of process is also known as re-seeding.

~~MISTER. A device that produces a cooling effect by emitting fine particles of water into the air in the form of a mist~~.

NEWLY SEEDED. Seed planted in a barren area with the intent of establishing a turf area.

NEWLY SOODED. Sodded harvest grass transplanted in a barren area with the intent of establishing a turf area

PUBLIC RIGHT-OF-WAY. The area of land acquired or obtained by the city, county, or state primarily for the use of the public for the movement of people, goods, vehicles, or storm water. For the purposes of this article the public right-of-way shall include sidewalks, curbs, streets, alleyways, easements and storm water drainage inlets.

RESPONSIBLE PARTY. The owner, manager, supervisor, or person who receives the water bill, or person in charge of the property, facility, or operation during

the period of time the violation(s) is observed.

RUNOFF. Water which is not absorbed by the soil or landscape to which it is applied. Runoff occurs when water is applied too quickly (application rate exceeds infiltration rate), particularly if there is a ~~severe~~ slope. This article does not apply to stormwater runoff which is created by natural precipitation rather than human-caused or applied water use.

SERVICE AREA. ~~All parts of Bernalillo County that are served or may be served in the future by the Authority.~~ Those parts of Bernalillo County and contiguous territory served by the Water Authority.

SHUT-OFF NOZZLE. Device attached to end of hose that completely shuts off the flow when left unattended.

SLOPE. A surface of which one end or side is at a higher level than another. For Xeric conversions, anything greater than 6 to 1 grade.

SPRAY IRRIGATION. The application of water to landscaping by means of a device that projects water through the air in the form of small particles or droplets.

VALVE. A device used to control the flow of water in the irrigation system.

VARIANCE. A Water Authority approved deviation from the Time-of-Day Watering Restrictions that allows for irrigation of newly landscaped areas, or long term maintenance.

WATER WASTE. The non-beneficial use of potable or non-potable water. Non-beneficial uses include but are not restricted to:

(1) Landscape water applied in such a manner, rate and/or quantity that it overflows the landscaped area being watered and runs onto adjacent property or public right-of-way;

(2) Landscape water which leaves a sprinkler, sprinkler system, or other application device in such a manner or direction as to spray onto adjacent property or public right-of-way;

(3) Washing of vehicles, equipment, or hard surfaces such as parking lots, aprons, pads, driveways, or other surfaced areas when water is applied in sufficient quantity to flow from that surface onto adjacent property or the public right-of-way;

(4) Water applied in sufficient quantity to cause ponding on impervious surfaces.

(5) Water applied in sufficient quantity to cause ice formation on adjacent

property or the public right-of-way including sidewalks.

4-1-4 WATERING RESTRICTIONS**.**

These restrictions apply to all customers within the Water Authority~~'s~~ service area.

(A) All spray irrigation during the period beginning on April 1 and ending on October 31 of each year must occur between 7:00 p.m. and 11:00 a.m. This restriction shall not apply to drip irrigation and low precipitation bubblers, hand watering, or watering of containerized plants and plant stock.

(B) Shutoff nozzles are required on any hoses used for hand watering, ~~car~~ vehicle washing or other outdoor uses.

(C) If approved by the Water Authority Board under the adopted ~~Under the four levels of Drought defined in the~~ Drought Management Strategy, the Water Authority~~'s~~ may, at its sole discretion, require that customers water every other day. The Authority~~'s~~ may require that customers water no more than one, two, or three time(s) per week. The Water Authority~~'s~~ may also prohibit ~~curbside~~ vehicle ~~car~~ washing if the water used runs off the property.

(D) Restrictions in divisions (A), and (C) above do not apply to the following:

(1) Outdoor irrigation necessary for the establishment of *newly sodded* lawns and landscaping within the first 30 days of planting upon the issuance of a Watering Restriction Exemption;

(2) Outdoor irrigation necessary for the establishment of *newly seeded* lawns within the first 120 days of planting upon the issuance of a Watering Restriction Variance.

(3) Outdoor irrigation necessary for the establishment of *inter-seeded* lawns within the first 45 days of planting upon the issuance of a Watering Restriction Exemption.

(4) Irrigation necessary for one day only where treatment with an application of chemicals requires immediate watering to preserve an existing landscape or to establish a new landscape;

(5) Water used to control dust or compact soil;

(6) Attended watering systems that have one or more repair or maintenance personnel present at the irrigated zone being serviced for purposes of inspecting system condition and function and/or repairing or maintaining the watering system.

4-1-5 WATER WASTE**.**

These restrictions apply to all customers within the Water Authority~~'s~~ service area.

(A) No person, firm, corporation, or municipal or other government facility or operation shall waste, cause or permit any water to be wasted.

(B) No person, firm, corporation, or municipal or other government facility or operation shall cause or permit the flow of fugitive water onto adjacent property, ~~or~~ public right-of-way, or impervious surfaces.

(C) The restrictions in divisions (A), and (B) above do not apply to the following:

(1) Storm runoff allowed under provisions of the City of Albuquerque or

Bernalillo County drainage ordinances as currently adopted or subsequently amended;

(2) Flow resulting from temporary water supply system failures or malfunctions. These failures or malfunctions shall be repaired within 48 hours of notification or the system shut off until repair can be completed;

(3) Flow resulting from firefighting or routine inspection of fire hydrants or from fire training activities;

(4) Water applied as a dust control measure;

(5) Water applied to abate spills of flammable or otherwise hazardous materials, where water is the appropriate methodology;

(6) Water applied to prevent or abate health, safety, or accident hazards when alternate methods are not available;

(7) Flow resulting from routine inspection, operation, or maintenance of a utility water supply system;

(8) Water used in the course of installation or maintenance of traffic flow control devices;

(9) Water used for construction or maintenance activities where the application of water is the appropriate methodology and where no other practical alternative exists.

~~4-1-6 SPECIAL PERMITS~~

~~These restrictions apply to all customers within the Authority's service area.~~

~~(D) Use of Misters~~

~~(1) The use of misters shall require a special permit, issued by the Authority. The Executive Director shall develop regulations and administrative procedures for the issuance and conditions of such permits. The Executive Director shall have the authority to limit the number of permits or revoke permits as deemed necessary to protect the public interest.~~

~~(2) The use of misters without a permit, or in violation of permit conditions, shall constitute a violation of this article and shall be subject to the fee assessment processes described in § 4-1-8 and 4-1-99.~~

~~(3) Any person, firm, corporation, or municipal or other government facility selling, leasing, renting, installing or otherwise making misters available to any other person, firm, corporation, or municipal or other government facility shall provide notification to their customers of the special permit requirement for mister use. Notice may be delivered by prominently posting a sign at the point of purchase or by providing a document to each individual customer. The Authority shall provide approved language for such notification.~~

~~4-1-7~~ 4-1-6 VARIANCES, EXEMPTIONS AND APPEALS

The Executive Director or his/her designee shall be responsible for the enforcement of this article. The Executive Director may prescribe policies, rules, or regulations to carry out the intent and purposes of this article.

(E) Variances or Exemptions to 4-1-4 (Watering Restrictions) and 4-1-5 (Water Waste)~~, and 4-1-6 (Special Permits).~~

(1) Administrative variances or exemptions to the restrictions in §4-1-4~~,~~ and 4-1-5~~, and 4-1-6~~ may be issued by the Executive Director or his/her designee, only for the purposes of installing or retrofitting landscaping, provided that the general intent of this article has been met, compliance with this article is determined ~~proven~~ to cause practical difficulties and unnecessary hardship, and all options for abatement through modified water management have been exhausted. ~~The criteria to determine hardship shall include level of capital outlay and time required to be in compliance with this article.~~ For the purpose of advancing the general intent of this article, the Executive Director may at his discretion waive, credit, and or remove penalty fees or other fees from any account.

(2) Water Waste Variances may be issued for a period not to exceed one year and shall stipulate both short-term corrective measures and a schedule for completion of long-term corrective measures. Variances may be renewed on an annual basis if long-term corrective measures cannot be completed within one year.

(3) Watering Restriction Variances may be issued for a period not to exceed 120 days to establish a turf area on properly prepared barren ground.

(4) Watering Restriction Exemptions may be issued for a period not to exceed 30 days to establish newly *sodded turf* and/or landscape.

(5) Watering Restriction Exemptions may be issued for a period not to exceed 45 days to establish *inter-seeded* areas with an established turf area.

(B) Appeal of 4-1-4 (Watering Restrictions), 4-1-5 (Water Waste), and ~~4-1-6 (Special Permits)~~. Any responsible party may appeal fees for violations of §4-1-4~~,~~ and 4-1-5~~, and 4-1-6~~ to the Executive Director or his/her designee by filing an appeal within seven calendar days of receiving a notice of violation. The notice of violation shall provide information on the right to appeal and the procedures to follow. The appeal shall

identify the property and state the grounds of appeal together with all material facts in support thereof. A non-refundable $50 filing fee of ~~$50~~ must accompany each appeal filed. ~~be added to the water bill in the event the violation is upheld by the Executive Director or his/her designee.~~ When a hearing is requested, the Executive Director or his/her designee shall send written notice by certified mail, return receipt requested, to the appellant of the time and place of the hearing. At the hearing the appellant shall have the right to present evidence as to the alleged facts upon which the Executive Director or his/her designee based the determination of the need for assessment of fee or restriction of service and any other facts which may aid the Executive Director or his/her designee in determining whether this article has been violated. The Executive Director or his/her designee shall, within seven working days following the hearing, issue a written decision specifying the fee, if appropriate, and the action that must be taken to avoid additional penalty. ~~Fees will be void and service will not be restricted if the written decision is not issued within seven working days.~~

(C) Judicial Review. The exclusive remedy for parties dissatisfied with the action of the Executive Director or his/her designee on §4-1-4~~,~~ and 4-1-5~~, and 4-1-6~~ shall be the filing of a petition for a writ of certiorari with the State District Court. The petition for review shall be limited to the record made at the administrative hearing held pursuant to this article.

~~4-1-8~~ 4-1-7 FEES; ASSESSMENT

(A) Fees. Any responsible party who violates any of the provisions of §4-1-4~~,~~ and 4-1-5~~, and 4-1-6~~ shall be subject to progressively higher fees until the violation ceases or a variance is granted. The assessment of fees shall be consecutive for violations separated by less than ~~five calendar years~~ one calendar year. Fees shall be suspended pending the outcome of an appeal or variance request.

(B) Assessment of Fees. Assessment of fees for violations of the regulations in

§4-1-4, 4-1-5~~, and 4-1-6~~ will be through the utility bills for the responsible party's billing account. Fees shall be assessed to the account within 15 days following expiration of the appeal period or issuance of appeal findings~~. Responsible parties shall be notified of the fee through certified mail within 15 days of the assessment.~~ Fees must be paid within the normal payment period allowed by the utility billing system. In the event the

individual property to be assessed a fee is sub-metered through a master meter account(s), the property in violation will be assessed the fee in accordance with this ordinance through the master meter account(s). It shall be the responsibility of the master meter account(s) to assess and collect the fee from the individual sub-metered property.

(C) In lieu of fees for violations of §4-1-4 and 4-1-5, the responsible party may ~~have a landscape water audit~~ schedule an efficient irrigation consultation performed by ~~an authorized~~ a qualified landscape irrigation auditor ~~certified by the Irrigation Association. The audit will be conducted in accordance with the current edition of the Landscape Auditor's Handbook.~~ The ~~audit must be performed~~ consultation must be scheduled within 15 days ~~and performed within 30 days of~~ following the notification of violation and the ~~audit~~ recommendation must be implemented within 60 days of the consultation ~~audit~~. If these deadlines are not met, the fees for violation will apply.

~~4-1-99~~ 4-1-8 PENALTY.

(A) A Warning system will be initiated upon receipt of the first report of Water Waste. A minimum of one warning notice will be issued to the responsible party via USPS mail prior to assessing fees as follows:

(1) Reported Warning Notice - report of Water Waste

(2) Observed Warning Notice - observation and documentation of Water Waste

(3) Certified Notice of Violation – observation and documentation of Water Waste

(B) The schedule for assessment of fees for a violation of ~~§4-1-4,~~ and 4-1-5~~, and 4-1-6~~ that have a meter size of 1.5 inch or less shall be as follows:

~~(1) First observed violation - $20;~~

~~(2) Second observed violation - $50;~~
~~(3) Third observed violation - $100;~~
~~(4) Fourth observed violation - $300;~~
~~(5) Fifth observed violation - $400;~~
~~(6) Sixth observed violation - $600;~~
~~(7) Seventh observed violation - $800;~~
~~(8) Eighth observed violation - $1,000;~~
~~(9) Each observed violation over the eighth - $2,000 each~~

(1) Observed Warning Notice;

(2) First observed violation - $20;

(3) Second observed violation - $50;

(4) Third observed violation - $100;

(C) The schedule for assessment of fees for a violation of §4-1-4 and 4-1-5 that have a meter size larger than 1.5 inch and up to 4 inches shall be as follows:

(1) Observed Warning Notice;

(2) First observed violation - $100;

(3) Second observed violation - $250;

(4) Third observed violation - $500;

(D) The schedule for assessment of fees for a violation of §4-1-4 and 4-1-5 that have a meter size larger than 4 inches and up to 8 inches shall be as follows:

(1) Observed Warning Notice;

(2) First observed violation - $250;

(3) Second observed violation - $500;

(4) Third observed violation - $1,000;

(E) If approved by the Water Authority Board under the adopted ~~Under the four levels of Drought defined in the~~ Drought Management Strategy, the Water Authority~~'s~~ may, at its sole discretion, increase water waste fees described above by a factor of two, three, four or more as may be necessary to assist in water waste reduction

during a drought. During a drought, the Water Authority~~'s~~ shall declare to the public the Drought Level, which can be raised and lowered by the Water Authority~~'s~~, and the proposed increase in water waste fees. The Drought level only applies to the current year and must be approved by the Water Authority~~'s~~ on a year by year basis.

~~The Authority delegates the implementation of the Drought Management Strategy including the increase of water waste fees to the Executive Director. Based on the Drought Level approved by the Authority, the~~ The Executive Director shall direct water waste enforcement staff of the Effective Date of the new water waste fines. Water waste fees, however, shall revert to the fees described in Section ~~4-1-99~~ 4-1-8 after November 1 of that same year.

(F) For the purpose of assessing fees for violations of §4-1-4, 4-1-5~~,~~ ~~and 4-1-6~~, any previous violation shall not be considered if:

(1) A period of ~~five years~~ one calendar year has elapsed since the violation was incurred; or

(2) The property is acquired by a new owner.

(G) Any person who violates the provisions of this article for which no other penalty is set forth, shall be subject to the general penalty provision of this code set forth in ~~4-1-99~~ 4-1-8.