

City of Santa Fe Water Conservation and Drought Management Plan 2015



Prepared by the
City of Santa Fe
Water Conservation Office



Submitted to the
New Mexico Office of the State Engineer
in compliance with
1978 NMSA § 72-14-3.2



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Table of Contents

Table of Contents	iii
Acronyms	iv
Lists of Figures & Tables	v
Acknowledgments	vi
Introduction	vii
1.0 Overview	1
1.1 Purpose of Water Conservation Plan	1
1.2 Santa Fe's Leadership in Conservation	2
1.3 How this Plan is Organized	3
1.4 Planning Team/Public Involvement	4
1.5 Enacting Authority	4
2.0 Local Conditions	5
2.1 Demographics	5
2.2 Housing	6
2.3 Temperature and Precipitation	7
2.4 Water Supply Overview	8
2.5 Water Plans and How the City Manages the Water Supply	13
3.0 Per Capita Demand	17
3.1 Total System Per Capita	17
3.2 Inputs from Census	19
3.3 Single Family Residential Per Capita	19
3.4 Multi-family Residential Per Capita	21
3.5 Industrial, Commercial, and Institutional Per Capita	21
3.6 Other Metered	22
3.7 Reuse	23
3.8 Non-revenue Water	23
4.0 Water Loss	25
4.1 Summary of 2008 AWWA Water Audit	25
4.2 Estimates for 2013 AWWA Water Audit	29
5.0 Water Conservation Goals	31
6.0 Water Conservation Programs	35
6.1 Ordinances that Govern Water Conservation Administration	35
6.2 School Outreach/ Children's Programs	37
6.3 Outreach/Marketing	39
6.4 Residential Programs: Fixtures, Appliances and Surveys	42
6.5 Commercial Survey and Rebates	45
6.6 Multi-family Residential Program	48
6.7 Training/Professional Development	48
6.8 City Properties, Infrastructure and Administration	48
6.9 Rates	51
6.10 Contribution to National Water Efficiency Research	52

Table of Contents (cont'd) & Acronyms

7.0 Drought Management Plan 55

7.1 Declaration of Water Emergency 56

7.2 Emergency Stages and Restrictions 56

7.3 Preparedness 59

8.0 Alignment of Goals & Programs 61

9.0 Conclusions 65

Acronyms

- ACS: American Community Survey of the US Census Bureau
- BDD: Buckman Direct Diversion
- CRWTP: Canyon Road Water Treatment Plant
- ICI: Industrial, Commercial and Institutional
- ILI: Infrastructure Leakage Index
- GPCD: Gallons per Capita per Day
- LC: Los Campanas
- MFR: Multi-family Residential
- MAG: Magnetic Flow Meter
- MG: Million Gallons
- MRC: Municipal Recreation Complex
- NMOSE: New Mexico Office of the State Engineer
- NMSA: New Mexico Statutes
- NRW: Non-Revenue Water
- PNM: Public Service Company of New Mexico
- RWRP: Reclaimed Wastewater Resource Plan
- SFR: Single Family Residential
- SJC: San Juan Chama Project
- TEMP: Treated Effluent Management Plan
- UARL: Unavoidable Real Losses
- USBR: United State Bureau of Reclamation
- WCC: Water Conservation Committee
- WTB: Water Trust Board

Lists of Figures & Tables

List of Figures

Figure 1: City of Santa Fe Annexation, Phase 2	5
Figure 2: Annual Precipitation 2005-2013 (Santa Fe Airport Weather Station)	7
Figure 3: NOAA Drought Outlook, July 17, 2014	8
Figure 4: Santa Fe Water Supply	9
Figure 5: 2014 Projected Monthly Productions by Supply Source	11
Figure 6: 2013 Treated Effluent Distribution	12
Figure 7: Water Conservation Demonstration Garden at the Water Division	16
Figure 8: Consumption per Capita vs. Population Growth	17
Figure 9: 2013 Percent of City Demand by Customer Category	18
Figure 10: 2013 Total System GPCD	19
Figure 11: Single Family Residential GPCD 2002-2013	20
Figure 12: Monthly Single Family GPCD 2010-2013	20
Figure 13: Multi-family Residential GPCD 2006-2013	21
Figure 14: Commercial GPCD, 2002-2013	22
Figure 15: Other Metered GPCD, 2008-2013	22
Figure 16: Reuse GPCD for 2008-2013	23
Figure 17: Water Conservation Booth at CommUNITY Day 2010	24
Figure 18: Water Meter With Automated Meter Reader (AMR) Attached	30
Figure 19: Spooky Showerhead Swap 2013	34
Figure 20: Wanted Poster for the Bad Flapper, 2011	54
Figure 21: Water Restrictions Gauge Used on SaveWaterSantaFe.com	57
Figure 22: Santa Fe River at Bicentennial Park	60

List of Tables

Table 1: 2013 City of Santa Fe Diversions	9
Table 2: City of Santa Fe Water Transfers, 2003-2013	12
Table 3: 2013 Monthly GPCD	18
Table 4: 2013 Data from US Census American Community Survey for 2010-2012	19
Table 5: 2008 Water Supplied	25
Table 6: 2008 Authorized Consumption	26
Table 7: 2008 Water Losses	26
Table 8: 2008 System Data	27
Table 9: 2008 Performance Indicators	28
Table 10: 2013 Water Audit Estimates	29
Table 11: Number of Low Flow Toilet Installations	43
Table 12: Residential Rebates	45
Table 13: Commercial Rebates	46
Table 14: Rate Structures	51
Table 15: Santa Fe's Drought Response Timeline	55
Table 16: Water Restrictions under Normal, Stage Orange and State Red Conditions	58
Table 17: Alignment of Water Conservation Goals and Programs	62

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Introduction

In the state of New Mexico and in the Southwest, Santa Fe is a leader in water conservation. With the adoption and submittal of the Water Conservation and Drought Management Plan 2015, it is anticipated that Santa Fe will be the first municipality that complies with the New Mexico Office of the State Engineer (NMOSE) Technical Report #53, New Mexico's Water Conservation Planning Guide for Public Water Suppliers, published in 2013.

The NMOSE and the Water Trust Board (WTB) have required the use of Technical Report #53, New Mexico's Water Conservation Planning Guide for Public Water Supplier, for all updated plans. Water Conservation Plans which follow the template must be submitted as part of the application process to receive funds from the WTB. Some of the requirements in the guidebook include the use of two tools to analyze water use: 1. the American Water Works Association (AWWA) Water Loss Free Water Audit software and 2. the NMOSE Gallons Per Capita per Day Calculator. The City of Santa Fe Water Division has used both tools in the past; however the results have not been incorporated in detail into a single planning document prior to this 2015 Plan. Chapters 3 and 4 have detailed information on the data used and the results for both of these tools.

As well as the data generated from the tools mentioned above, ordinances and existing planning documents were used to evaluate and revise the Water Conservation Goals. The Goals are now more comprehensive to the entire program rather than just utilizing City Code or existing Ordinances as was the practice in the past. Detailed information on the Goals can be found in Chapter 5.

The 2015 update to the City of Santa Fe Water Conservation and Drought Management Plan also incorporates updates that reflect the progress that has been made over the past 5 years, while retaining the history of the Water Conservation Programs.

A number of the changes were also made at the recommendation of the Water Conservation Committee. Select committee members dedicated time to review the previous plan with Water Conservation staff, and encouraged the use of updated language and data in the report. The City of Santa Fe Water Conservation Office gratefully acknowledges the assistance received from the Water Conservation Committee.

The Water Conservation Program is successful because of a commitment from the entire community; from civic leaders who create the policy, to Water Division staff who implement the programs, to citizens who embrace water conservation as a lifestyle.

The City of Santa Fe Water Conservation Program is successful because of a commitment from the entire community; from civic leaders who create the policy, to Water Division staff who implement the programs, to citizens who embrace water conservation as a lifestyle. The Water Conservation and Drought Management Plan is intended to capture the history of the programs while forecasting water conservation needs into the future by giving direction needed in order for our City to remain a national leader in water conservation.

1.0 Overview

1.1 Purpose of Water Conservation Plan

This report serves multiple purposes: 1. To fulfill regulatory requirements by State of New Mexico Statutes (NMSA §72-14-3.2) , New Mexico Office of the State Engineer (NMOSE) permitting requirements (SP 2847-E, originally numbered SP-4842), Santa Fe Municipal administrative requirements, and Federal grant funding requirements, 2. To describe the relationship between this plan and other existing City of Santa Fe plans and reports and 3. To present the goals and strategies of the Water Conservation Program, the Drought Management Plan and how these are/will be implemented.

State statute NMSA §72-14-3.2 provides that a municipality may submit a comprehensive water conservation plan including a drought management plan to the State Engineer by December 31, 2005 and that after December 31, 2005, neither the NM Finance Authority nor the Water Trust Board shall accept a municipality's water or wastewater facility construction financial assistance application unless the application includes a copy of the municipality's water conservation plan.

The NMOSE Permit # SP 2847-E for the Buckman Direct Diversion (BDD), built to divert San Juan-Chama Project water from the Rio Grande, requires the City to submit progress reports on their Water Conservation Plan and 40 Year Plan on or before January 10, 2010 and every five years thereafter.

The City of Santa Fe Water Conservation and Drought Management Plan was adopted in 2005 (Resolution 2005-101) by the City of Santa Fe Governing Body and is updated on a five year cycle.

Resolution 2005-101, also authorizes the City Manager, or his or her designee, to approve all future addendums and appendixes to the Plan, which are developed by staff and reflect adopted ordinance or resolution changes or statistical facts. Future programs that are approved by the Governing Body for staff implementation will be added to the Plan as it is updated.

The Plan also meets a U.S. Bureau of Reclamation (USBR) requirement for Federal grant funding recipients on USBR projects. The USBR agreement states that prior to the delivery of water provided from or conveyed through federally constructed or financed facilities, the Contractor shall develop a water conservation plan, as required by Section 210 (b) of the Reclamation Reform Act of 1982.

This report presents the goals and strategies of the Water Conservation Program, the Drought Management Plan and how they will be implemented.

Santa Fe's water conservation emphasis has very effectively reduced water use. Santa Fe has achieved one of the lowest per capita water use levels in the Southwest.

1.2 Santa Fe's Leadership in Conservation

Since its purchase of the municipal water utility in 1995, the City of Santa Fe City Council has emphasized and effectively implemented a comprehensive and very aggressive water conservation and water emergency management program in accordance with its goal to "become the water conservation capital of the nation." Santa Fe had already implemented a well-rounded water conservation program prior to enactment of NMSA § 72-14-3.2 and NMOSE Permit # SP 2847-E. The City Council, in 1996 and 1997 respectively, enacted the Emergency Water Regulations Ordinance (Ord. #1996-20) and the Comprehensive Water Conservation Requirements Ordinance (Ord. #1997-17).

Santa Fe's water conservation and water emergency management programs are multi-faceted and include:

- Dedicated water conservation staff
- Landscaping requirements
- Public and school based education programs
- Water efficiency regulatory requirements
- Water waste prohibitions with enforcement
- Effective controls on non-revenue water including water distribution system leaks
- A water rate structure that discourages excessive water use and promotes water conservation
- A system of increasingly restrictive water use prohibitions to address progressively more severe drought water supply conditions
- Comprehensive requirements that new customers offset their new demand on Santa Fe's public water supply

Each of these elements has evolved over time and each may continue to change in accordance with the program's success, policy direction and decisions of the Santa Fe City Council.

Most of the water conservation requirements, new customer requirements, and water rate incentives and disincentives, are mandatory conditions of municipal water service and are implemented by municipal ordinances. Santa Fe's program also seeks and emphasizes voluntary measures and behaviors, including effective public outreach and education and a comprehensive set of water conservation incentives, such as rebates. The City also includes improved water utility management and maintenance elements that have reduced water losses, such as water use audits, improved metering, and leak detection and repair.

Driven by the need to limit overall water use to a level that is sustainable, Santa Fe's water conservation emphasis has very effectively reduced water use. Santa Fe has achieved one of the lowest per capita water use levels in the Southwest, discussed in more detail in Section 3, indicative of full and comprehensive community implementation of water conservation. Similarly, Santa Fe's water emergency management plan has demonstrated its ability to suppress water use to less than the limited supply available under the extraordinary drought conditions of 2002 and the drought years following.

1.3 How this Plan is Organized

The *Water Conservation and Drought Management Plan 2015* is an update of Plans published in 2005 and 2010. It takes into consideration the recommended elements of the NMOSE's New Mexico Water Conservation Planning Guide for Public Water Suppliers published in 2013. This Plan is organized into the following sections:

Section 1, Overview.

This section presents the purpose and organization of the Plan and background information about Santa Fe's leadership in conservation.

Section 2, Local Conditions.

This section examines the local conditions that drive the need for water conservation such as climate, temperature and precipitation as well as conditions that are non-climatological such as housing and demographics.

Section 3, Assessing Public Water Supply Performance - Per Capita Water Demand.

This section is an in depth evaluation of water consumption using the Gallons Per Capita per Day (GPCD) calculation which is required by permit to be submitted on a yearly basis per OSE Permit # SP 2847-E.

Section 4, Assessing Public Water Supply Performance - Water Loss.

This section evaluates the water loss within the utility using the American Water Works Association's (AWWA) water loss methods. Evaluating water loss helps to determine how to manage water conservation programs in the future.

Section 5, Water Conservation Goals.

This section describes the water conservation goals set by the City of Santa Fe using the data from Sections 2, 3, and 4.

Section 6, Water Conservation Programs.

This section presents Santa Fe's historic, current and proposed Water Conservation Programs.

Santa Fe's water emergency management plan has demonstrated its ability to suppress water use to less than the limited supply available under extraordinary drought conditions.

Santa Fe City Council periodically evaluates the effectiveness of its water conservation programs and the impact on citizens and customers.

Section 7, Drought Management Plan.

This section presents Santa Fe's Drought Management Plan.

Section 8, Prioritization of Water Conservation Measures.

This section explains how Santa Fe's Water Conservation Program fits with each of the City's goals and how the programs will be individually and holistically implemented and evaluated.

Section 9, Conclusions.

This section summarizes where results have already been achieved and provides elements that show promise for further advances in conservation.

1.4 Planning Team/Public Involvement

The Water Conservation and Drought Management Plan is a collaborative effort. For the initial Plan, written in 2005 and each additional update, various divisions within the City have contributed data, recommendations, oversight and editing. This includes the following contributing Divisions and Departments:

- Water Resources and Conservation Group
- Utility Billing Division
- ITT Department
- City Attorney's Office
- Wastewater Division

In addition, the City has a Water Conservation Committee (Resolution 2002-25) consisting of key stakeholders. This committee is charged with developing water conservation proposals, promoting water conservation, examining land use building and construction code and policies for water use, and advising city government on water conservation activities. With this committee and staff, the City of Santa Fe City Council periodically evaluates the effectiveness of its water conservation programs and their impact on citizens and customers. The Committee has provided input into the development of this Plan. As in the past, Santa Fe's water conservation programs will continue to expand in scope and vision each year.

1.5 Enacting Authority

The Water Conservation and Drought Management Plan will be brought forward to the Santa Fe City Council for approval via a Resolution at the end of 2014 (Appendix A). Council approval allows the Water Conservation Office to implement the programs outlined within the Plan.

2.0 Local Conditions

Santa Fe is New Mexico's State Capital and the oldest capital in the United States. The City has been the capital for the Spanish "Kingdom of New Mexico," the Mexican province of Nuevo Meji-co, the American territory of New Mexico, (which contained what is today Arizona and New Mexi-co) and since 1912 is the capital of the state of New Mexico. Santa Fe is the site of both the oldest public building in America – the Palace of the Governors – and the nation's oldest community celebration – the Santa Fe Fiesta, established in 1712 to commemorate the Spanish conquest of New Mexico in the summer of 1692.

2.1 Demographics

The City's population was recorded in the US Census American Community Survey (2010-2012) (ACS) as 68,677. In 2013, the population served by the water utility is closer to 80,955 and in-cluded small portions of Santa Fe County. By the end of 2013 the city contained 33,591 acres of land (52.5 square miles) within its corporate limits, Figure 1. According to Census 2010, the city has an overall population density of 1,478 persons per square mile. On January 1, 2014, when the latest phase of annexation officially went into effect the City of Santa Fe increased its popula-tion by 13,200 residents and gained 4,100 acres. At the same time, the water utility relinquished customers to Santa Fe County that are now outside of the new City limits. The water utility did not gain any new customers from annexation. The final phase of annexation is scheduled to occur within the next five years.

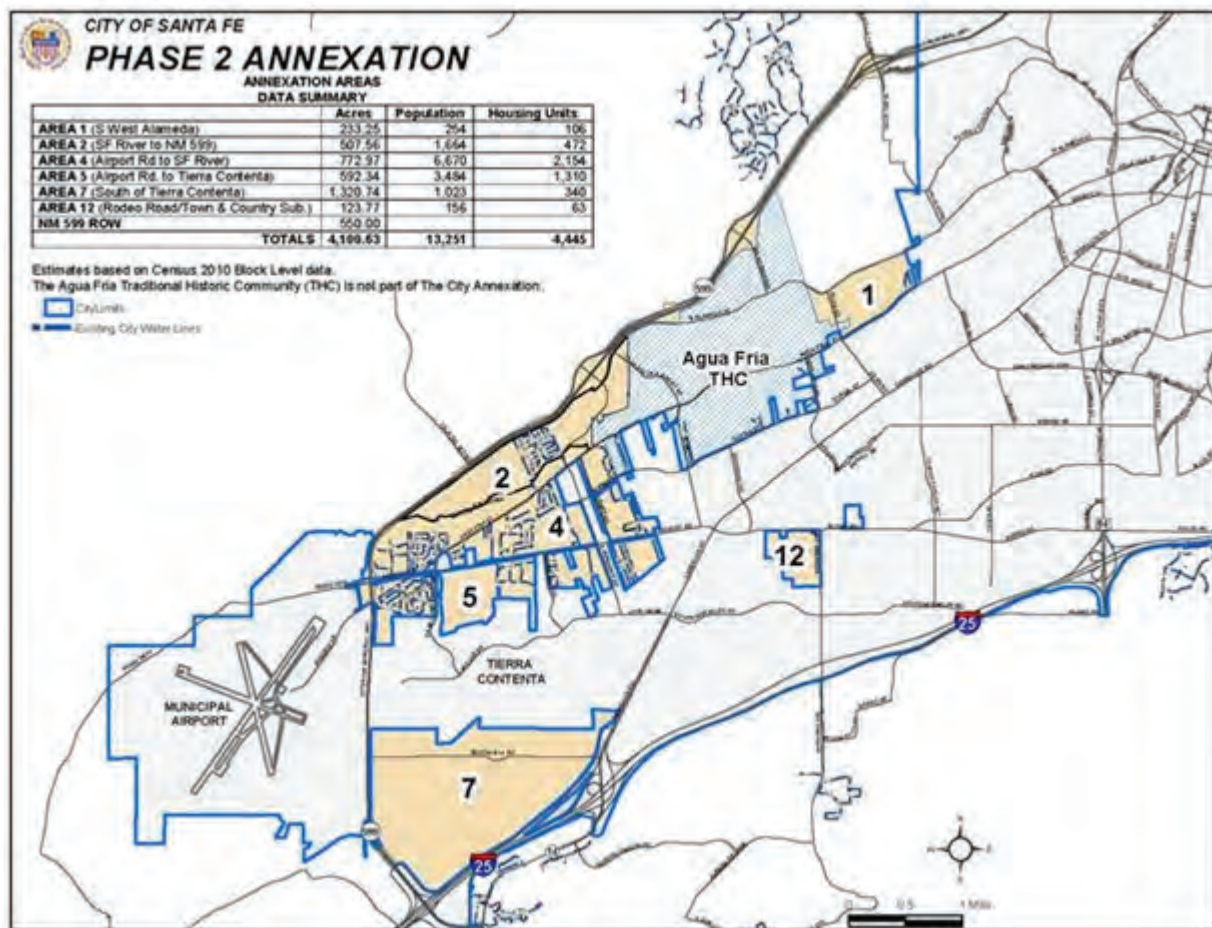


Figure 1: City of Santa Fe Annexation, Phase 2

Santa Fe attracts 1 to 2 million visitors each year. The combination of day visitors and overnight visitors increases the city's population significantly, especially during the summer months.

The City's population is diverse. Using the classifications as they are defined on the ACS, the residents of Santa Fe are approximately 47 percent white only and 48 percent Hispanic/Latino. Ten percent of the total population is classified as noncitizen. About seven percent of the population has migrated to Santa Fe within the last one to four years. Five percent is from a different state and two percent from another county within New Mexico. Approximately 43 percent of the total population has obtained a bachelor's degree or higher, 19 percent lives under the poverty level. The median age for Santa Fe residents is 44.6.

Santa Fe attracts 1 to 2 million visitors each year. Area hotels, motels and bed and breakfasts offer 5,600 rooms, with 1,800 of the rooms located downtown. These lodging facilities generate over 1 million occupied room nights annually. The combination of day visitors and overnight visitors increases the city's population significantly, especially during the summer months.¹

2.2 Housing

There are approximately 37,000 housing units within the City limits. Fifty seven percent of these units are single family detached. The remainder included duplex through fourplexes, condos, townhomes, mobile homes and apartments. Forty-eight percent of all housing units were built prior to 1980. This means that almost 50 percent of the City's housing units are over 30 years old.² During 2013, 175 new housing units were permitted in the city. This represents a one-half percent growth rate in the city housing supply.³

The lots sizes vary as much as the house's age. The historic district includes closely nestled homes, small lots and little or no outdoor areas. This ranges to several standard neighborhoods with traditional sized lots with front and back yards (West Alameda, Historic Guadalupe), to neighborhoods within the City that range from ½ to 5 acre lots (Museum District and Old Santa Fe Trail).

The average household size in Santa Fe is 2.12 persons per household. The rate is calculated by the US Census using occupied housing only. Santa Fe is a large tourism destination, which includes a large volume of seasonal or second homes. The ACS estimates 12,379 seasonal housing units within the City which contributes to the calculated vacancy rate of 15 percent.

¹ Santa Fe Trends 2014. Page 1

² American Community Survey

³ Santa Fe Trends 2014, page 4

Since 2000, the city has added 3.4 million square feet of building floor square footage, including churches, community buildings, stores, offices, etc. During 2013, the city approved 143,570 square feet of new commercial development, most of which is located along South Cerrillos Road and Airport Road.⁴

2.3 Temperature and Precipitation

Santa Fe has a very dry, high desert climate with intense sunlight. On average, the city experiences more than 300 sunny days per year. The highest temperatures in July and August are 80-90 °F with only 3-6 days per year with 90+°F highs. The Santa Fe rainy season is generally July through August when thunderstorms quickly develop in the afternoon. According to the Western Regional Climate Center, Santa Fe receives on average 13.84 inches annually.⁵ Snow season occurs from November through April, with an average of 25 inches of snow in town and up to 300 inches in the ski areas.⁶

According to the National Weather Service, the 24-month period up to December 2012 was the warmest and driest period in New Mexico since the late 1890s, Figure 2. The City received only 47 percent of normal, annual precipitation in 2012.⁷ Drought is a normal recurrent feature in the desert southwest. Additionally, rainfall varies around the City. In 2013 Santa Fe registered 11.02 inches of precipitation from the Santa Fe #2 monitoring station, while the Seton Village station recorded 14.65 inches and Santa Fe Airport recorded 12.22 inches for that year.

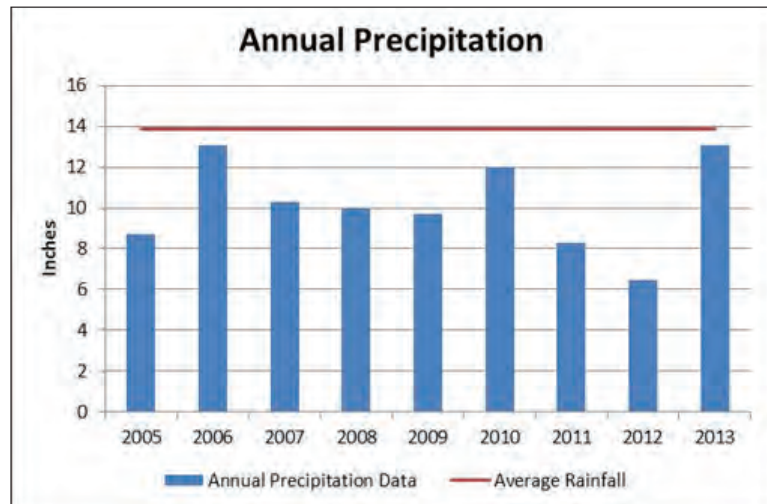


Figure 2: Annual Precipitation 2005-2013 (Santa Fe Airport Weather Station)

In 2014, total precipitation through the month of June was only 3.18 inches at Santa Fe #2 with the other two stations recording a total of 3.56 inches and 3.21 inches, respectively. However, when the monsoons hit in July, Santa Fe #2 received 2.75 inches and Seton Village accumulated 2.86 inches while Santa Fe Airport accumulated 3.61 inches. Thus, to reach the historical annual average Santa Fe still needs between 5.21 and 6.1 inches of precipitation before the beginning of 2015. In past years only about 12 percent of total precipitation for a given year occurred in the months January through June, leaving 88 percent of the annual precipitation to fall during the months of July through December.

Due to the increase in precipitation in July 2014 almost a quarter of the state shifted from severe drought to moderate drought according to the Nation Weather Service.⁸ There was also no part of the state that was in exceptional drought, the most severe drought category, but over 70 percent of the state was still in moderate to extreme drought, Figure 3. These isolated events increased the annual precipitation amounts, however due to the timing they did not pull the City out of the drought.

4 Santa Fe Trends 2014, page 3

5 <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nmsafe>

6 <http://skisantafe.com/index.php?page=facts-figures>

7 2012 Annual Water Report

8 <http://www.srh.noaa.gov/abq/?n=drought>

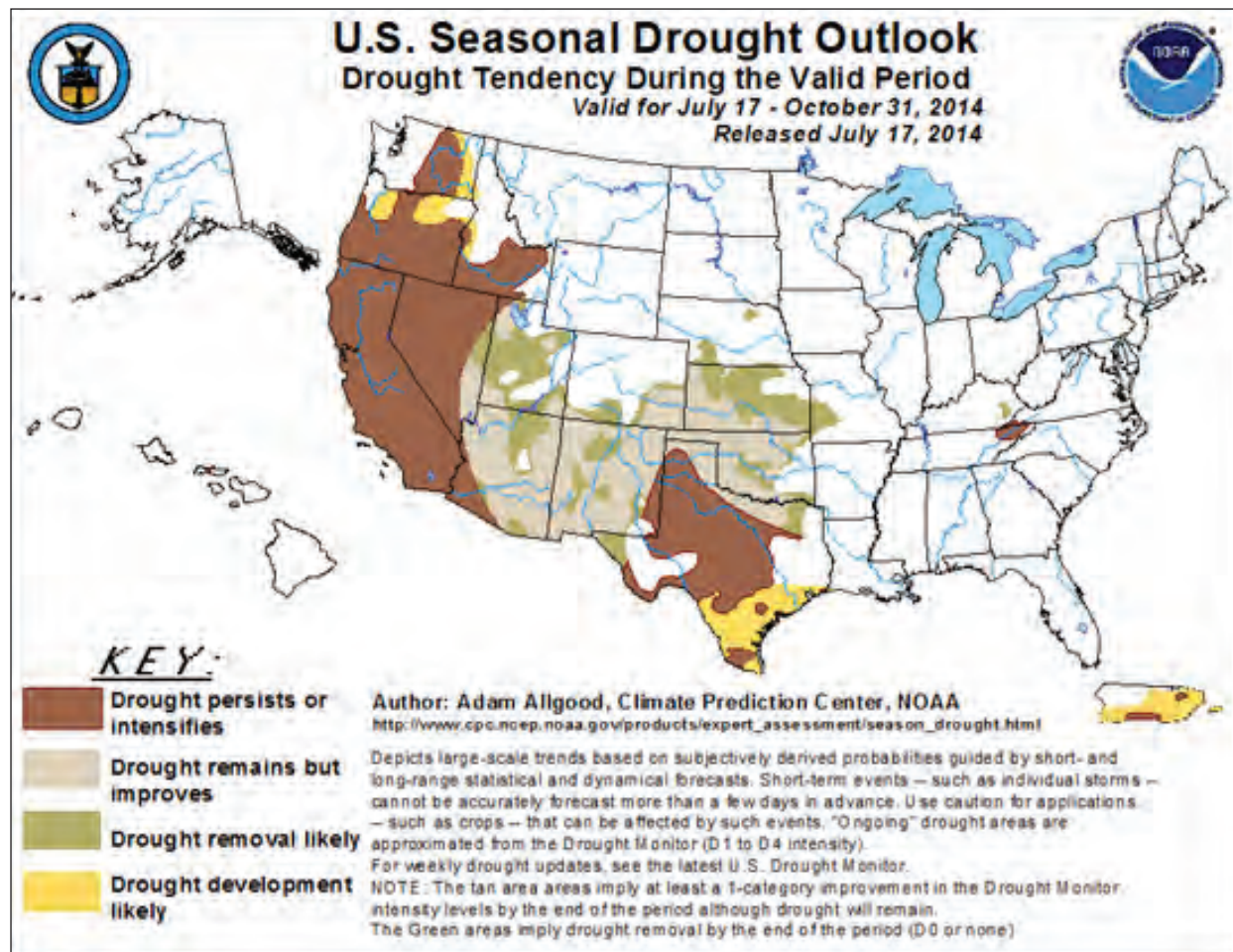


Figure 3: NOAA Drought Outlook, July 17, 2014

Some areas of New Mexico including Santa Fe are predicted to move to the “drought removal likely” category. Most of New Mexico is expected to see the drought remain but improve while a small portion of eastern New Mexico will see the current drought persist or intensify.

2.4 Water Supply Overview

In the early 1990s, the City purchased the privately owned Sangre de Cristo Water Company from the Public Service Company of New Mexico (PNM), which was at the time a large electric, gas, and water utility. Although the purchase agreement was finalized in 1995, PNM continued to operate the water utility under a management contract with the City for five more years. Purchase of the Sangre de Cristo water utility resulted in the conveyance to the City of the utility assets, as well as the duty to serve the customer base, the responsibility and discretion to establish community and utility water policies, and the responsibility to prepare long-term plans to assure that supply is available to meet demand.

2.4.1 Water Supply Sources

The Water Division of the City of Santa Fe produces less than 10,000 acre-feet of water per year, down from about 12,000 acre-feet per year in the early 2000s, to supply nearly 29,030 residential and 3,050 commercial meters. The City’s water supply is provided by: 1. two high mountain reservoirs on the Santa Fe River and the associated Canyon Road Water Treatment Plant, 2. well fields located within the City limits, 3. the Buckman Well Field, which is located near the Rio Grande several miles northwest of the City, and 4. the Buckman Direct Diversion (BDD) and as-

Water Conservation and Drought Management Plan 2015

sociated Buckman Regional Water Treatment Plant that allows the City and its partner, Santa Fe County, to conjunctively manage surface water and groundwater resources, Table 1. The BDD became operational in 2011. The City has a policy to use surface water supplies as a priority over groundwater supplies as needed. The City considers conservation to be its fifth source of water.

City of Santa Fe Diversion Water Rights and Supply Portfolio			
Source	Water Rights (acre feet)	Available Water (acre feet)	Average Yield since 2011 (when BDD came online) in acre feet
Santa Fe River	5,040	Up to 5,040 plus 1,000 to Living River (when available)	2,500
City Wells	3,586*4,865	Sustainable use when needed	2,200
Buckman Wells	10,000	Sustainable use when needed	1,000
Buckman Direct Diversion	5,230**	Less water quality and/or permit restrictions	5,230

*When the City uses the Northwest Well

**City's San Juan-Chama water

Table 1: 2013 City of Santa Fe Diversions

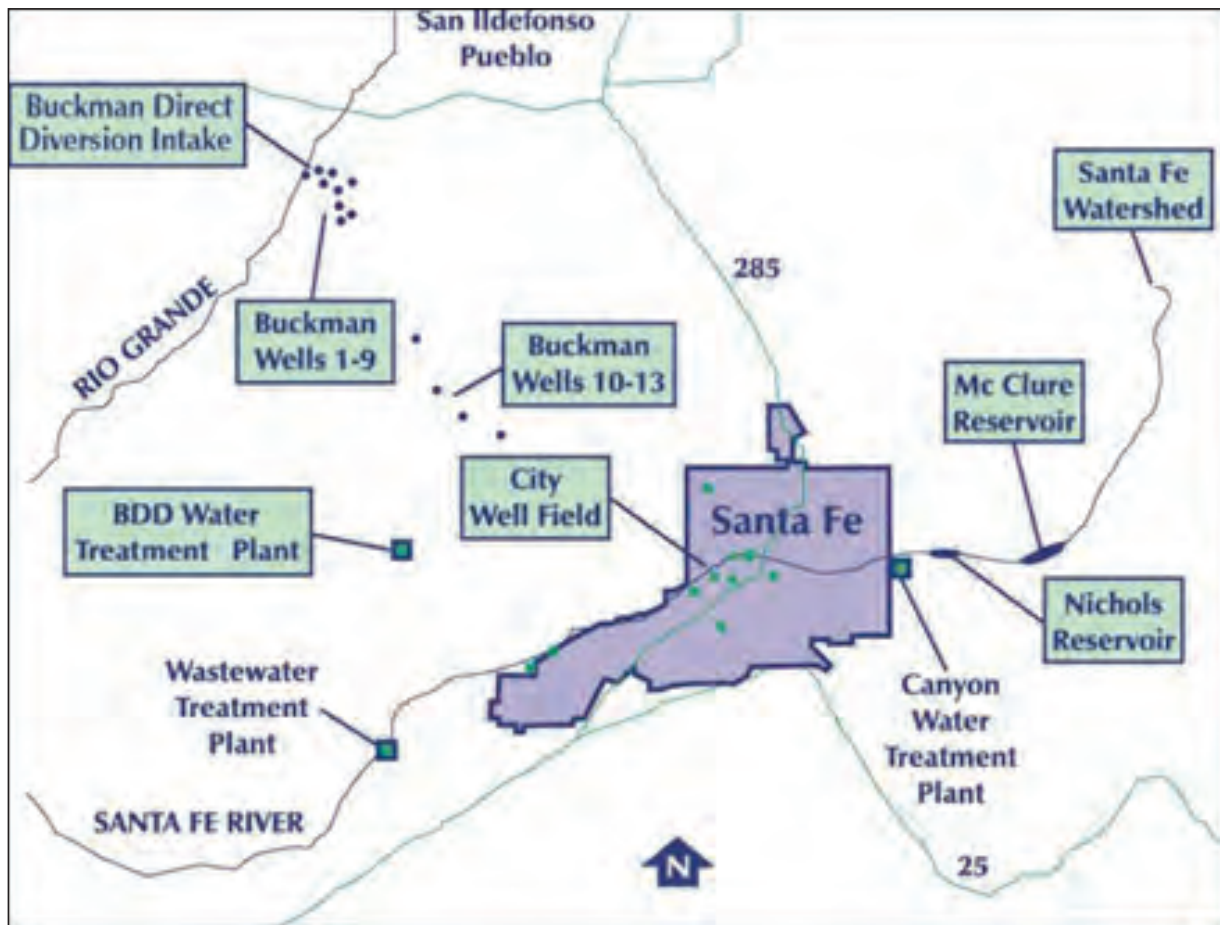


Figure 4: Santa Fe Water Supply

Surface water from the Sangre de Cristo mountain range provided the water supply for the City through the middle of the 20th century.

2.4.2 Surface and Ground Water Sources

Surface water from the Sangre de Cristo mountain range provided the water supply for the City through the middle of the 20th century. In the 1950s a series of wells were drilled along the Santa Fe River to provide access to groundwater in the local aquifer, Tesque Formation. In the 1970s, the City and Santa Fe County contracted for water imported to the Rio Grande from the San Juan-Chama (SJC) Project. The water utility drilled a series of wells 12 miles northwest of the City, in the Buckman Well Field to tap into the regional aquifer.

2.4.3 Conjunctive Use and Sustainability

The City of Santa Fe's Water Division surface water supplies have the advantage of being renewable, high quality, and energy efficient (e.g., gravity flow and solar power). The disadvantage of surface water supplies is the variability from seasonal precipitation and temperature changes. Groundwater availability does not have the fluctuations in variability and is therefore more reliable as long as it is not overused and significant recharge occurs. To have a sustainable and reliable water supply source, the City municipal utility conjunctively uses both surface water and groundwater. Conjunctive management is a water resources principal that espouses maximizing the use of renewable surface water and preserving the groundwater when needed for droughts or emergencies, thereby allowing for its more sustainable use, Figure 5.

2.4.4 BDD and SJC Water

Since 2002, Santa Fe secured Federal and State funding assistance to substantially increased the number and capacity of its wells, and rehabilitated and increased the capacity of its Santa Fe River surface water treatment plant. In 2011, Santa Fe began diverting its SJC surface water from the Rio Grande, treating the water to meet drinking water standards, and delivering the treated water to the existing water distribution system via a new pipeline system extending from the Rio Grande.

The Buckman Direct Diversion⁹ is a \$221-million regional water supply project that allows water customers in the City and County to use renewable surface water instead of relying mostly on unsustainable amounts of groundwater. Construction on the project began in October of 2008 and was completed by December 31, 2010. Initially operated by the Design-Build Contractor beginning in January 2011, the Buckman Direct Diversion (BDD) can produce a total of 4,983 acre feet of high quality drinking

⁹ More information on the project can be found at www.bddproject.org.

Water Conservation and Drought Management Plan 2015

water yearly. Since assuming operational responsibility in May 2011, BDD staff have undertaken a series of high performance strategic initiatives aimed at becoming an industry leader. On-going efforts to establish “world class” maintenance practices will ensure infrastructure reliability and longevity in order to get the most out of the community’s financial investment.

The project includes the following components: a raw water intake on the east bank of the Rio Grande at Buckman; five booster stations; a 15 million gallon per day, \$150 million, state-of-the-art water treatment plant; 31 miles of transmission pipeline (raw and finished), eight million gallon raw water storage tank, four million gallon treated water storage capacity, maintenance facility, administrative facility and two solar arrays. The project is governed by a joint City and Santa Fe County board.

2.4.5 Water Supply Projections

A comprehensive analysis of drought supply yield, commitments to existing and future customers, and conjunctive water resource and water supply management needs prompted changes to land and water regulations. Water resource availability now informs the land use decisions that are brought before the Governing Body. The City Council enacted fundamental changes in its approach to acquiring water rights to serve new development by requiring either that any new water demand be offset by water from conservation within the existing demand or that the new development acquire Rio Grande water rights and transfer them to the City.

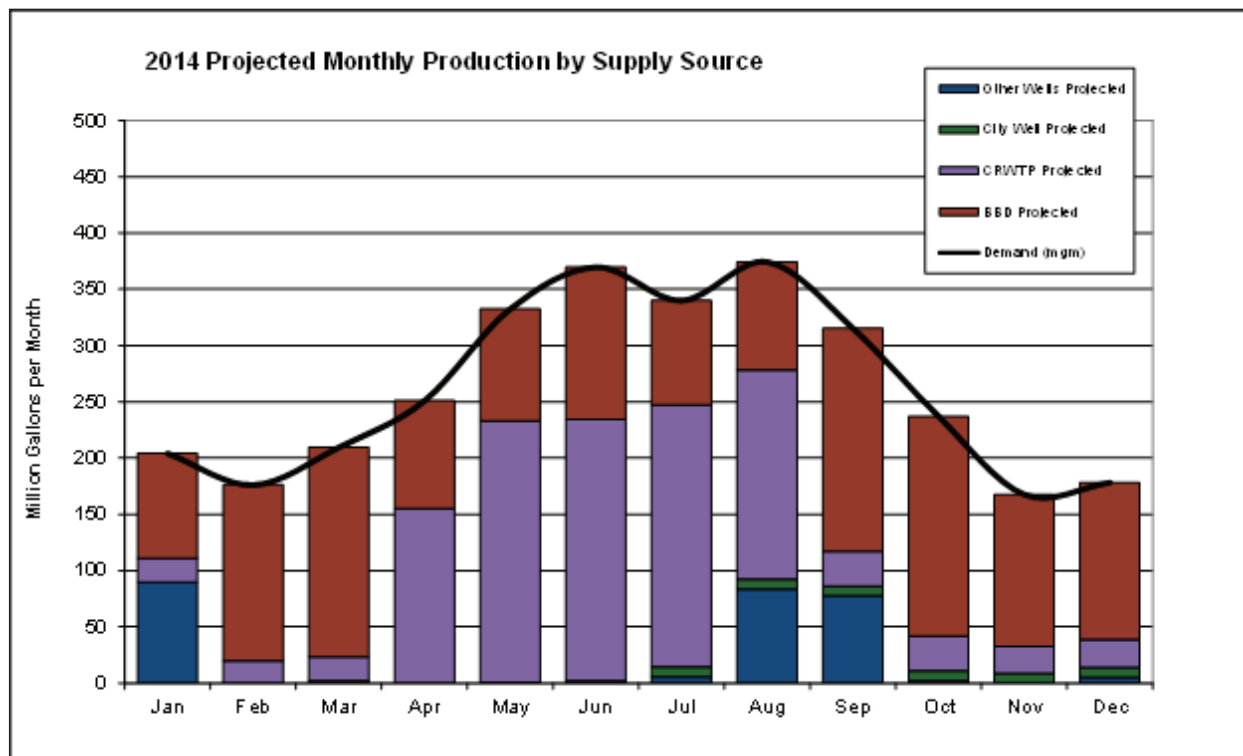


Figure 5: 2014 Projected Monthly Productions by Supply Source

2.4.6 Bulk/ Wholesale Deliveries

Prior to 2012, the City had contracts to deliver wholesale water to Las Campanas and Santa Fe County Utility. Since the completion of the BDD facility in January 2011, the BDD has become the primary source of water for Santa Fe County’s water utility. Las Campanas has become a wholesale customer of Santa Fe County and all potable water needs are met through the Santa Fe County Bulk Water Agreement.

In addition to the BDD, the City and County have a water resources agreement that states the City can provide the County up to 500 acre feet per year of wholesale delivery, with an additional 850 acre feet of groundwater to be made available under drought and emergency conditions.

	LC	SF County	Total
	Deliveries	Deliveries	Deliveries
2003	896.12	269	1,165
2004	528.71	299	828
2005	462.38	370	833
2006	521.30	348	869
2007	495.40	398	893
2008	504.54	437	942
2009	490.71	402	892
2010	408.10	395	803
2011	214.06	102	316
2012	0.00	181	181
2013	0.00	240	240

Table 2: City of Santa Fe Water Transfers, 2003-2013

2.4.7 Reuse and Treated Effluent

The City of Santa Fe includes treated effluent as a vital and valuable water resource that helps the City of Santa Fe meet its current water supply needs. It is considered an additional supply. In 2013, the City of Santa Fe created the Reclaimed Wastewater Resource Plan¹⁰ (RWRP), which replaced the 1998 Treated Effluent Management Plan (TEMP). The City currently produces 1,825 million gallons per year (mg/yr) or 5,600 acre-feet of treated effluent per year. Figure 6, 2013 Treated Effluent Distribution shows dissemination of the 1,092 AF of reuse water actually used that year, including the volume that goes to the Santa Fe River and for nine customers.

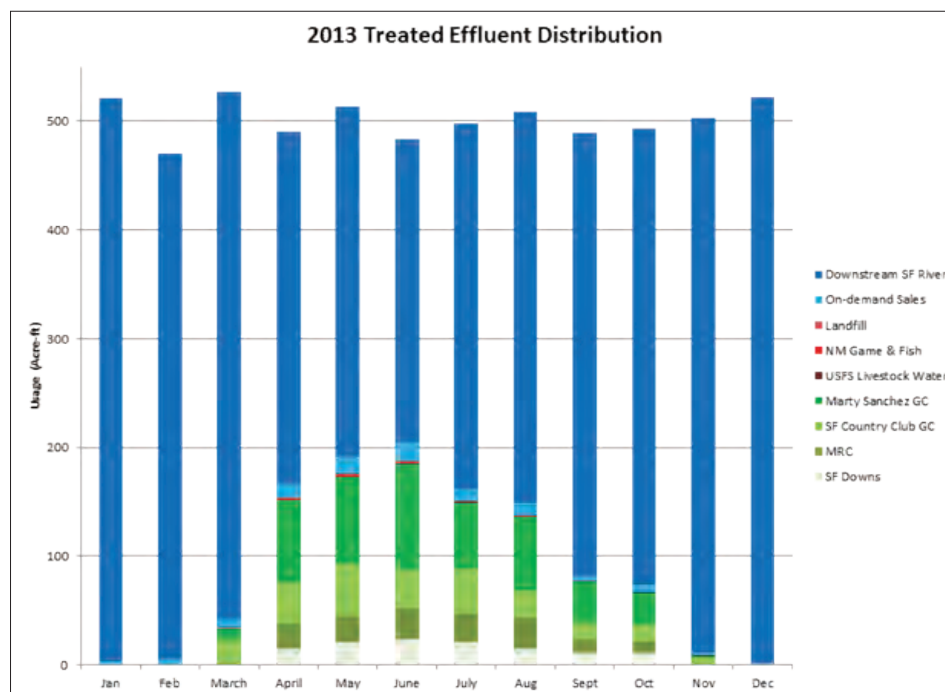


Figure 6: 2013 Treated Effluent Distribution

10 http://www.santafenm.gov/using_reclaimed_wastewater

2.5 Water Plans and How the City Manages the Water Supply

The City of Santa Fe has a variety of planning documents that include components or cross-over with the Water Conservation Plan. This includes participation in regional water planning. These plans are detailed below.

2.5.1 Long-Range Water Supply Plan

Santa Fe's Long-Range Water Supply Plan, adopted by the Governing Body in September 2008 comprehensively addresses Santa Fe's water supply sources, water supply capacity, and a roadmap of projects and programs to reliably and sustainably meet future water demand. The City is moving forward in implementing the eight strategies identified in the Water Supply Plan:

- Continue to improve the City's aggressive water conservation program
- Acquire the necessary water and environmental permits to meet the City's future water demands
- Use groundwater sustainably
- Optimize use of treated effluent
- Optimize use of existing water rights and infrastructure to stretch existing supplies
- Seek to minimize or eliminate the use of emergency drought restrictions
- Provide water to maintain a living Santa Fe River, except under drought or emergency conditions
- Monitor system performance, revisit water needs, adjust actions as necessary to fully meet demands sustainably, and cooperate in securing a reliable water supply for the region

The City will continue to use the dynamic system simulation model, WaterMAPs, developed and used in defining the Long Range Water Supply Plan to assist decision makers with water planning decisions. WaterMAPs models the entire City of Santa Fe water supply system, including Santa Fe's water supply sources and their hydrology, water rights, water systems infrastructure and alternatives for additional water supply sources. This is the first model of its kind to be used in Santa Fe and enables the City to better understand the complex relationships involved in how the water system functions as a whole. Because WaterMAPs simulates the performance and limits of conjunctive use management options for all of Santa Fe's water supply sources, including potential future additional sources, it is a critical component of the Long-Range Water Supply Plan effort.¹¹

¹¹ http://www.santafenm.gov/our_water_future

The City of Santa Fe has a variety of planning documents that include components or cross-over with the Water Conservation Plan.

The purpose of the Annual Water Report is to provide the Santa Fe community with an annual report that summarizes the state of the City of Santa Fe's Water Division and the water resources we depend upon.

2.5.2 Climate Change Update of Long Range Water Supply Plan

Much of the future water supply planning that has been incorporated in the Long Range Water Supply Plan contemplates how the City's water supply needs can be met using our diverse water portfolio under a range of climatic conditions, including drought, while continuing to strive for sustainability. The utility recognizes the need to address potential vulnerabilities in the water system under predicted conditions and to reduce our own greenhouse gas emissions. Using climate modeling and staying abreast of ongoing developments in climate change science are vital for the Water Division to understand the impacts that global warming will likely have on our water supplies and water utility and to communicate that understanding to the community. Consequently, the Long Range Water Supply Plan is being updated to include climate change.

2.5.3 40-Year Plan

The purpose of the forty-year water plan is to show the status of the supply and needed supplies planned for the future. The NMOSE requires municipalities to demonstrate that their water rights holdings do not exceed their projected needs over a 40-year planning period. The report includes a description of the City's water supply components, water rights owned by the City, details about the City Well Field, a summary of Santa Fe's historic uses and the projected utilization of these components in the short term and long term.

Additionally, the forty-year water plan identifies the Mayor's "Four Point Plan for a Sustainable Water Future," which was adopted by the City Council in December 2000. The goal was to prioritize and implement conservation measures that can result in significant demand reduction in the near term, recognizing staffing and funding limitations.

2.5.4 Annual Water Report

The purpose of this report is to provide the Santa Fe community with an annual report¹² that summarizes the state of the City of Santa Fe's Water Division and the water resources we depend upon. This report compiles and summarizes information about the City of Santa Fe's Water Division including water demand, conservation, water supply, water rights, offsets and credits, types of water use, water quality, system maintenance, energy use, climate change, and utility financial information.

¹² http://www.santafenm.gov/how_much_water_do_we_use_reports_and_studies

Water Conservation and Drought Management Plan 2015

- This report fulfills the reporting requirements of the City of Santa Fe Ordinance 2009-38 “Water Budget Requirements” and includes production projections
- Status of Water Bank and the amount of Conserved water that is deposited into the bank
- Watershed management
- Annual GPCD
- Precipitation data

2.5.5 Reclaimed Waste Water Reuse Plan

Reclaimed wastewater (RW) is a vital and valuable water resource that helps the City of Santa Fe meet its current water supply needs; it can also play a critical role in meeting future potable water supply demand. In 2013 the City of Santa Fe created the Reclaimed Wastewater Reuse Plan (RWRP), which replaces the 1998 Treated Effluent Management Plan (TEMP). The RWRP allocates the reclaimed wastewater among the current needs and reserves 2,200 acre-feet to meet future potable water demand.

The RWRP provides detailed information on:

- Specific volume available for non-potable reuse
- Estimates future reclaimed water availability
- Identifies current and potential future options for reclaimed water use
- Develops and applies a methodology and criteria to rank the options
- Determines a roadmap on how to use reclaimed water today and in the foreseeable future
- Recognizes the economic value of reclaimed water
- Incorporates Reclaimed Water quality considerations in present and future planning
- Delineates RW use strategies and implementations

2.5.6 Jemez y Sangre Regional Water Plan

Santa Fe has implemented each of the applicable recommended water conservation measures contained in the Jemez y Sangre Regional Water Plan accepted by the New Mexico Interstate Stream Commission in 2004. The Jemez y Sangre Regional Water Plan Update Report, Phase 1, (DBS&A and Lewis 2008¹³) shows that Santa Fe’s water conservation successes and the construction of the Buckman Direct Diversion project (BDD) have significantly contributed to the closing of the forty-year supply shortfall ‘gap’ in the Santa Fe subregion.

13 http://www.ose.state.nm.us/Planning/RWP/region_03.php



Figure 7: Water Conservation Demonstration Garden at the Water Division

3.0 Per Capita Demand

Per capita water use is the key performance measure of any municipal water conservation program. Historically, the City of Santa Fe computed its per capita water use as the daily average of annual total water diversions from all sources of supply, less bulk deliveries, divided by the estimated customer population served. In 2008, the City assisted the New Mexico Office of the State Engineer (NMOSE) in pilot testing a new methodology. In 2009, the methodology was published by the NMOSE and adopted by Santa Fe as required under the City's San Juan Chama permit (SD-2487-E). This method uses the number of residential connections and multi-family units along with persons per household, vacancy rates and group quarters from the US Census to calculate population. The City's per capita demand was back calculated using this method to 2002, Figure 7. The inputs and outputs for the NMOSE methodology are detailed in sections 3.1.1 through 3.1.5.

3.1 Total System Per Capita

Santa Fe's annual per capita demand for 2013 was 101 gallons, down from 168 in the mid-1990s (a 40 percent reduction), Figure 7. Another measure of Santa Fe's conservation success is the reduction in total annual water production to 9,414 acre-feet in 2013 compared to 13,180 acre-feet in 1995 (a 29 percent reduction) while the number of customers served by the utility increased from an estimated 67,839 in 1995 to 80,955 in 2013, a 16 percent increase.

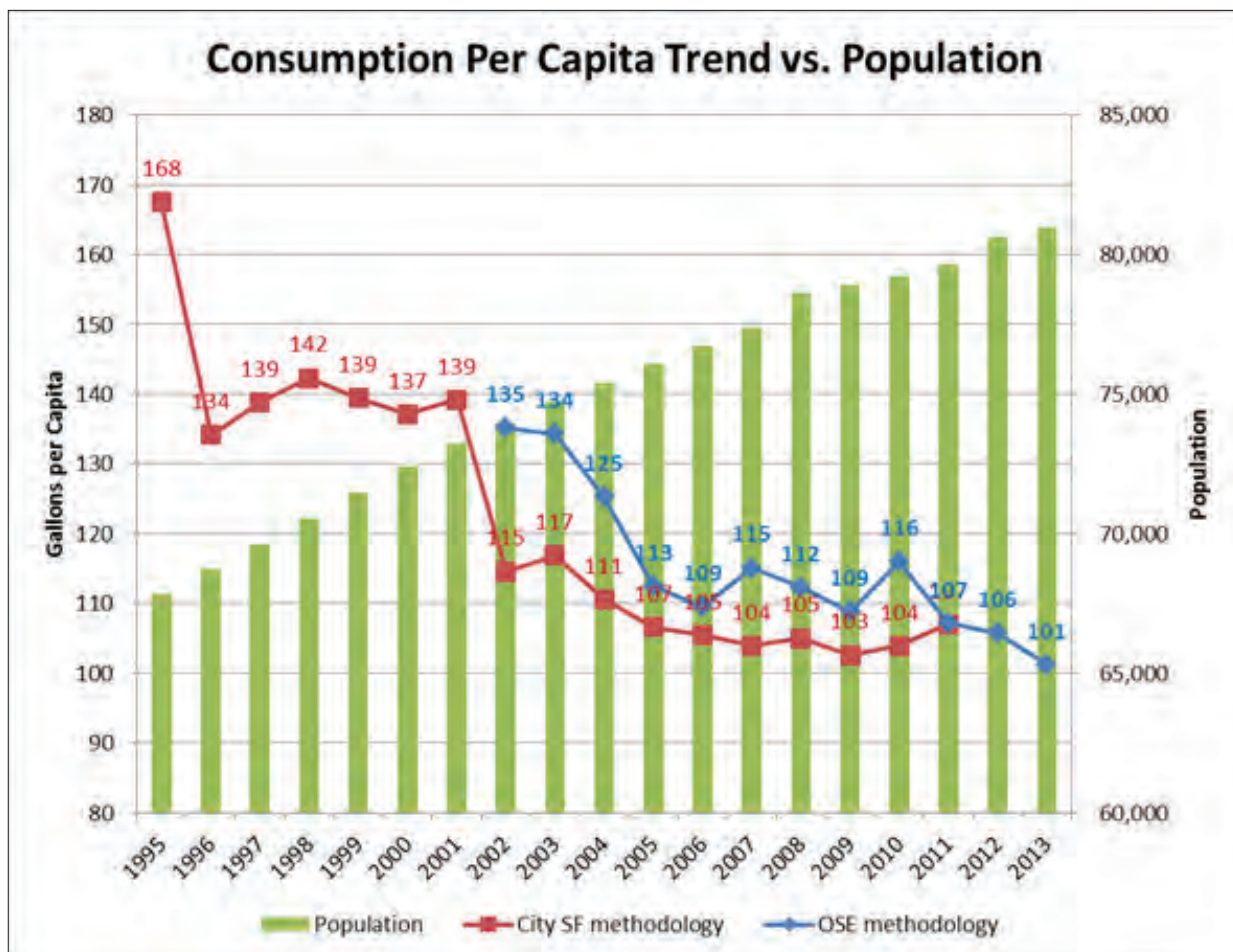


Figure 8: Consumption per Capita vs. Population Growth

In 2012, a policy decision was made to discontinue the calculation and use of the internal methodology of GPCD calculation after the 2011 calculations for both methodologies resulted in 107 gallons. Water Resources and Conservation staff reviewed all data inputs and found the NMOSE methodology for tracking GPCD more transparent and replicable.

City of Santa Fe water customers are categorized into the following user types: Single Family Residential, Multi-Family Residential, Commercial, Irrigation, and Fire. Irrigation and Fire are included together in Other Metered. Non-revenue water, as calculated in the GPCD Calculator, includes volume of water supplied minus the volumes in each category. The percentage of total water supplied that is sold to each category is represented in Figure 8.

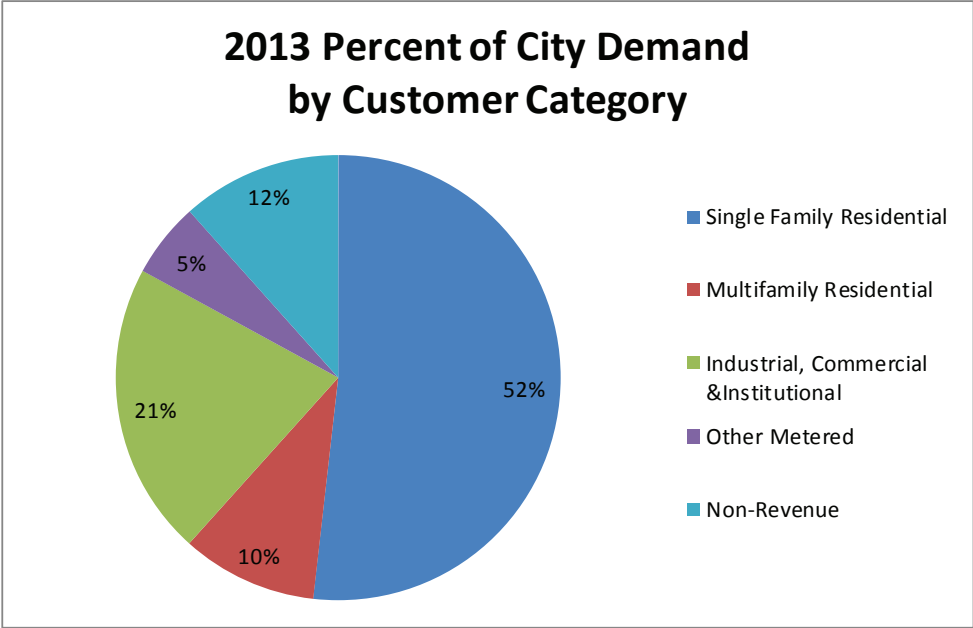


Figure 9: 2013 Percent of City Demand by Customer Category

Monthly	Total System GPCD
January	80
February	76
March	82
April	100
May	130
June	149
July	122
August	133
September	110
October	91
November	71
December	70
Average	101.17
Peak/Ave	1.47

Table 3: 2013 Monthly GPCD

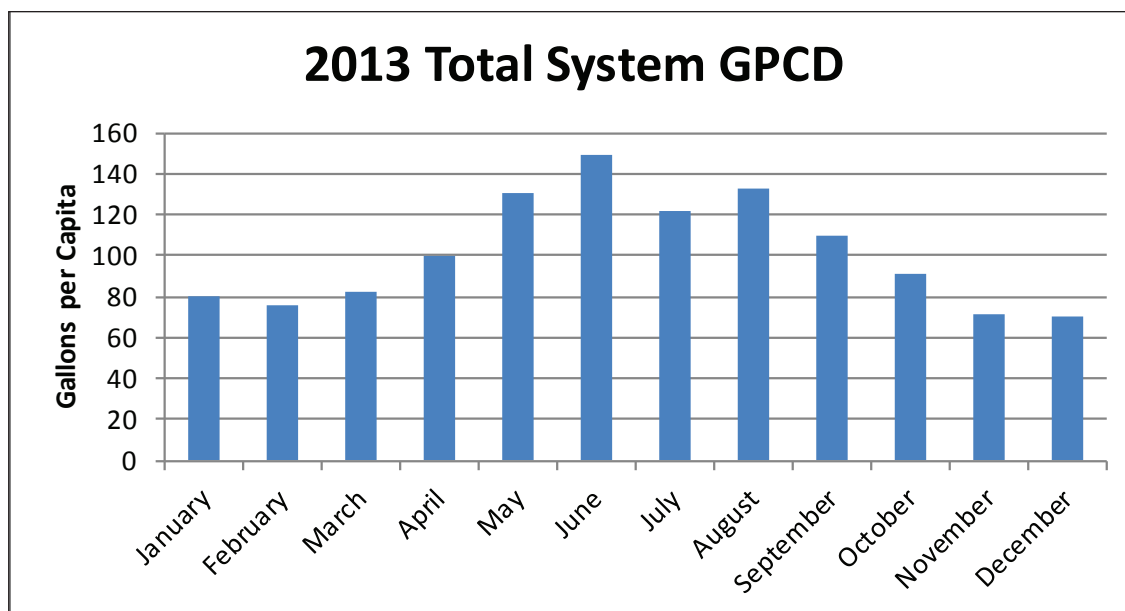


Figure 10: 2013 Total System GPCD

The City's monthly water use in 2013 shows the baseline indoor water use around 75 gallons per capita with a summer spike in June of 149 gallons. The peak to average use was 1.47. This means that the June 2013 usage was 147 percent of the City's average use, Table 3 and Figure 9.

3.2 Inputs from Census

The NMOSE method requires data from the US Census. The 2000 Census was used for 2002 through 2010. The 2010 Census was used for the 2011 per capita calculation and all data since the 2010 Census has utilized the most recent US Census American Community Survey's (ACS) 3-year estimate. For example, the 2013 per capita water use was calculated using the 2010-2012 ACS 3-year estimates.

Category	2013 Data	
Group Quarters	1,624 persons	
Occupancy Status	37,134 housing units	Calculated vacancy rate 15%
	31,570 occupied	
	5,564 vacant	
Avg Household Size	2.12 owner occupied	Weighted calculation 2.12409 persons per household
	2.13 renter occupied	

Table 4: 2013 Data from US Census American Community Survey for 2010-2012

3.3 Single Family Residential Per Capita

The NMOSE methodology calculates a per capita for single family homes. The calculation uses the single family residential (SFR) population divided into the volume of water billed under the City's residential category. The population living in single family homes is calculated by the number of residential single family connections in the billing system times the person per household calculated from the US Census. The SFR per capita calculation provides a clearer understanding of the water use in the residential category.

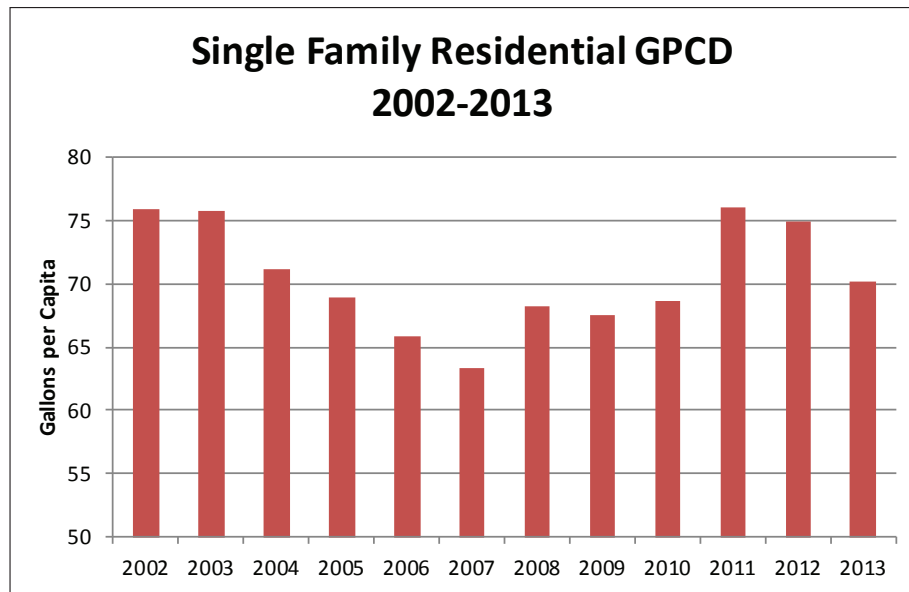


Figure 11: Single Family Residential GPCD 2002-2013

The City's annual single family residential (SFR) per capita use has gone as low as 63 gallons in 2007, and was 70 in 2013. The summer water uses in recent drought years (2011-2013) are driving up the annual average. In July 2011, the first year of the latest drought, the single family residential monthly use was 115 up from 104 the year before. Santa Fe continues to implement drought focused educational programs and public outreach during these times and the summer uses are slowly declining to resemble the pre-drought years from 2005-2009.

The indoor use, which is represented in the winter baseline, has been stabilized through programs like the toilet retrofits and clothes washer rebates. The indoor use reached a low of 48 GPCD in March of 2013.

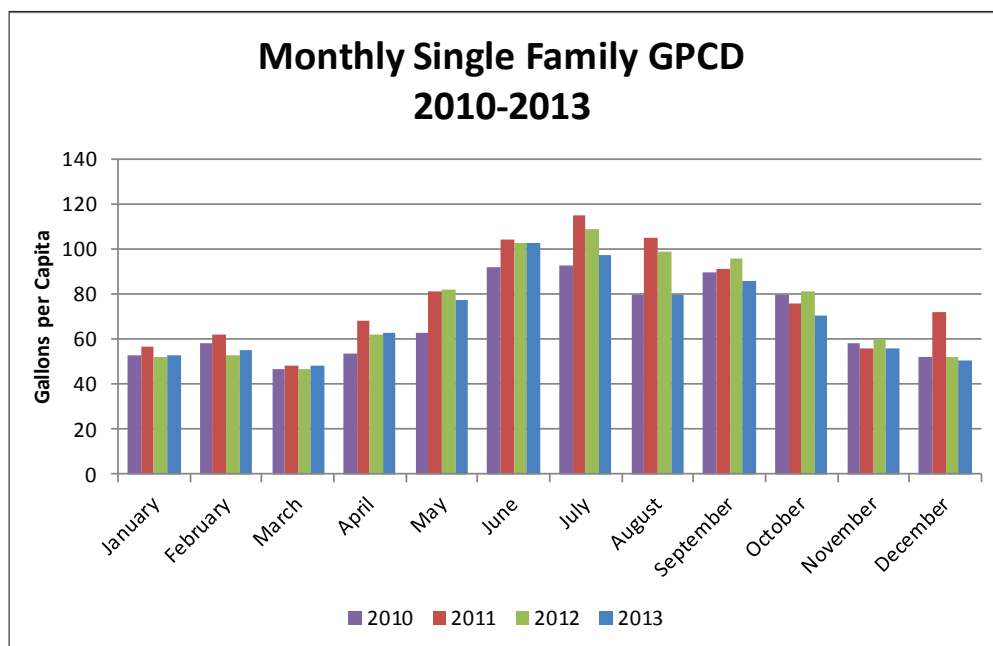


Figure 12: Monthly Single Family GPCD 2010-2013

3.4 Multi-family Residential Per Capita

The multi-family residential (MFR) per capita primarily represents apartment complexes, condos, retirement communities and complexes that consist of two or more housing units per meter. The per capita use for MFR was first calculated for 2006. The population calculation relies on US Census data to determine the number of multi-family units within the City. A unit includes each separate apartment or condo within a complex. This is different than the SFR population which is determined by SFR connection. The population in these multi-family units is calculated by number of units times US Census persons per household minus a vacancy rate. The per capita is determined by dividing the population into the volume of water diverted to those categorized by the City as multi-family accounts .

The annual MFR per capita has fluctuated over the years due to the variances in the way the multi-family units were calculated. The original figure in 2006 was a rough estimate. This resulted in MFR being added as a new customer class in 2006. This number was increased slightly from 2006-2010 by applying the percentage of new SFR connections to the MFR units. This assumes that both sectors are growing at the same rate. In 2011, when the most current census data was available the switch was made to the ACS 3-year estimates for MFR units. Future improvements to the MFR designation include performing an audit of the number of MFR units within the distribution system and possible reclassification in the new billing system.

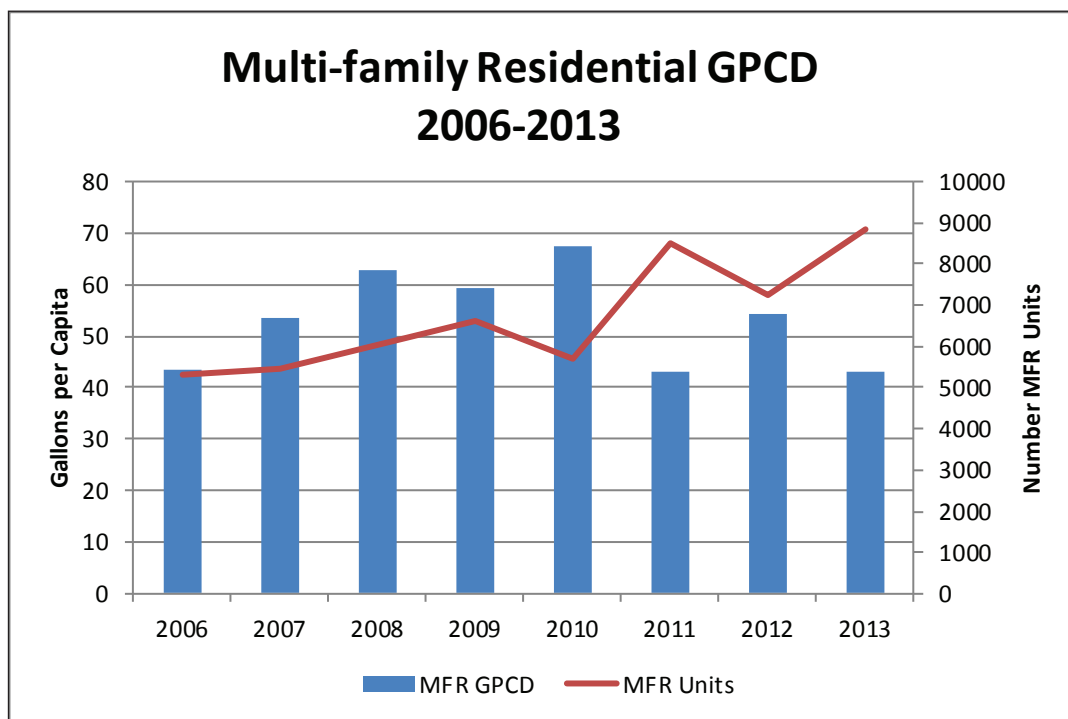


Figure 13: Multi-family Residential GPCD 2006-2013

3.5 Industrial, Commercial, and Institutional Per Capita

In the City of Santa Fe, the Industrial, Commercial and Institutional (ICI) Sector includes primarily commercial accounts, such as hotels and restaurants. Traditional “institutional” categories, such as schools, churches or government buildings are classified as commercial with a few of the smaller users falling into the residential category. An institutional designation does not exist within the current billing system. All of these categories are under review as the City is upgrading its billing system.

Commercial water use has gone from 60 GPCD in 2002 to 22 GPCD in 2013, a 63 percent drop. This classification has shown the largest decrease over the time frame that it has been calculated. One explanation in the decrease in use may be imposition of water restrictions which lasted from 2000-2007 and then the increase in water rates which began in 2007 with a yearly increase of 8.2 percent until 2013.

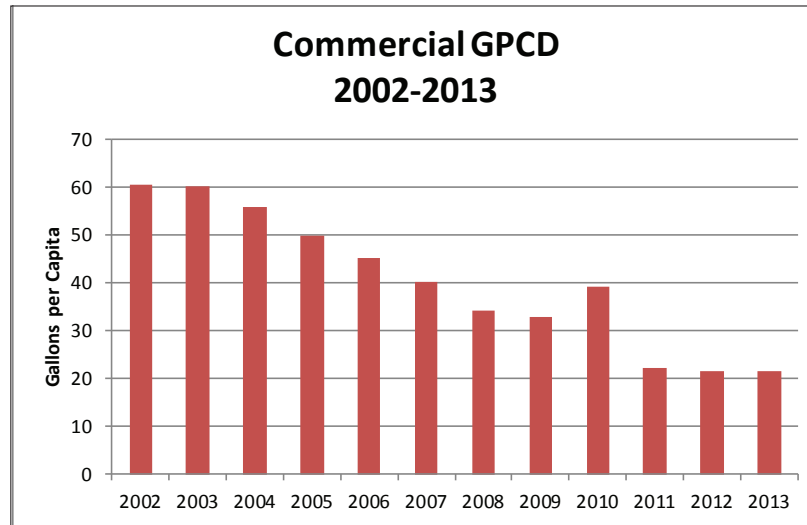


Figure 14: Commercial GPCD, 2002-2013

3.6 Other Metered

Other Metered category includes Fire and Irrigation metered accounts. Irrigation meters include those for City Parks, private parks belonging to HOAs, golf courses and school playing fields both public and private. Fire meters are accounts for fire protection and show use during line flushing and emergency response. The consumptive amounts for Fire and Irrigation meters are added to the Other Metered category in to NMOSE calculator. This category was added to the GPCD calculations in 2008.

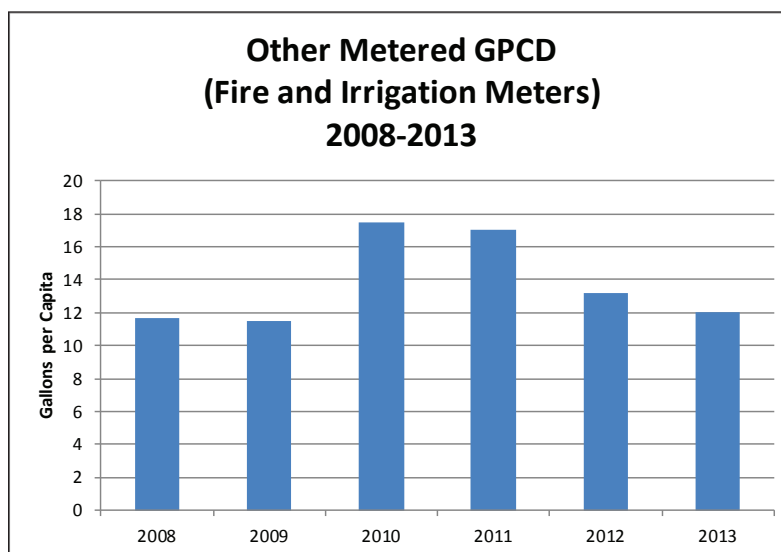


Figure 15: Other Metered GPCD, 2008-2013

3.7 Reuse

The NMOSE GPCD calculator provides a worksheet to track water reuse and its GPCD using the utility's population served. A reuse GPCD is calculated based on the amount of reuse or recycled water that is sold. For 2013 the reuse was 12.04. Additional detail regarding the City's reuse program can be found on the City's website.

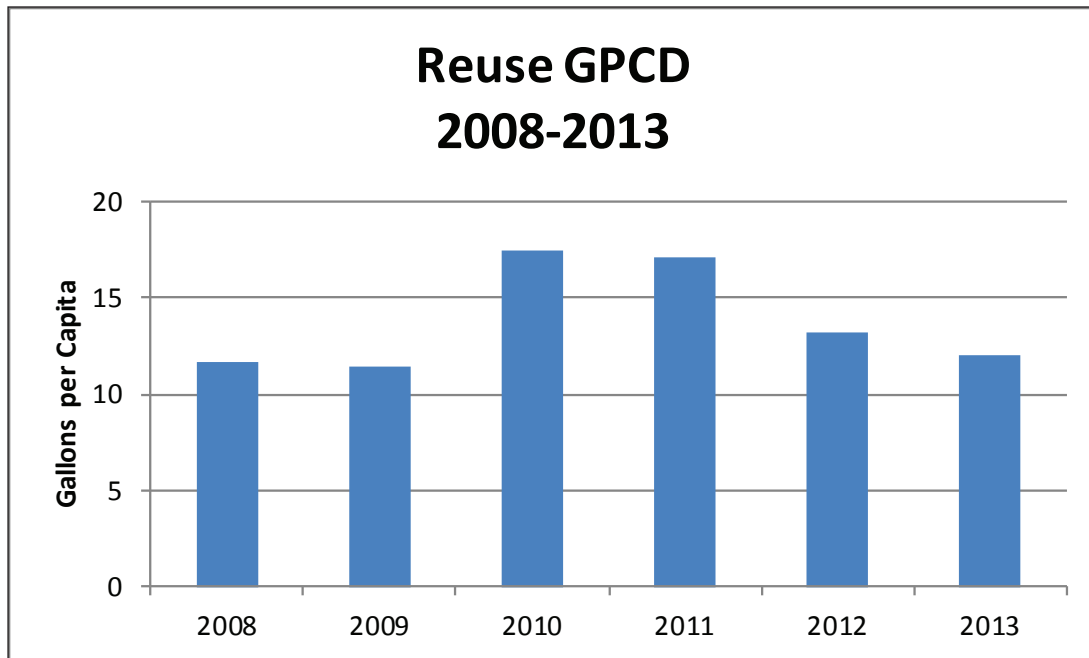


Figure 16: Reuse GPCD for 2008-2013

3.8 Non-revenue Water

The NMOSE GPCD calculator performs an internal calculation of non-revenue water using the annual volume of total water supplied minus the annual volume for the four categories (SFR, MFR, ICI and Other). The 2013 volume for non-revenue water was 347.12 million gallons. This is about 12 percent of the total supplied or 11.75 GPCD. This correlates to the non-revenue water calculated in Chapter 4 using the AWWA Water Loss Audit.



Figure 17: Water Conservation Booth at CommUNITY Day 2010

4.0 Water Loss

The City of Santa Fe completed a water audit published in December 2010, City of Santa Fe Water Audit 2008 Summary Report (The 2008 Report). The 2008 Report was completed in house using the AWWA Water Audit Software, v4.0 and 2008 water supply and use data. This was Santa Fe's second audit; the first was completed in 2005 using an outside consultant. The City is scheduled to complete a new water audit every five years.

4.1 Summary of 2008 AWWA Water Audit

The 2008 water audit used a combination of actual data, calculations and assumptions made from a 2005 audit, and calculations and assumptions made specifically from 2008 information. This provided the City with a total data validation score of 87 out of 100 for the 2008 audit. The total data validation score is an accumulation of individual data score for each data entry. The City uses a metric provided within the audit spreadsheet to determine how sound each data entry is from a range of 1-10, with 10 being a perfect score. The individual data validation scores are weighted and added for a total score.

4.1.1 Water Supplied

The City's total water supplied in 2008 was 3,011.98 million gallons (MG). This volume was adjusted from the volume from own sources (master meter total = 3,321.58 MG) by subtracting the 306.09 MG exported to Santa Fe County and Las Campanas, the changes in tank storage volume from January 1, 2008 to December 31, 2008 (-6.13 MG), and production losses of 1.48 MG. It was also adjusted by adding 4.1 MG that was calculated as not recorded during an extremely low-flow day on the 24inch magnetic flow meter (Mag meter) at the Canyon Road Water Treatment Plant (CRWTP).

The City includes third party testing on all of the master meters annually awarding a score of 9 out of 10 for data validity. The 2008 Report concluded that since master meters are tested annually, the manufacturer error of ± 1.5 percent could be used. The 2008 Report also concluded that "the total error on all production meters have been assumed for the purposes of this water audit to cancel each other out." Therefore, only the low flow from CRWTP was included in the master meter adjustment.

Category	Data Validity Score	Volume in MG
Master Metered		3,321.58
Total Storage Volume		-6.13
Production Losses		-1.48
Volume from Own Sources (Subtotal)	9	3,313.970
Master Meter Error Adjustment	9	+4.1
Water Exported	10	-306.090
Water Supplied		3,011.09

Table 5: 2008 Water Supplied

4.1.2 Authorized Consumption

The City of Santa Fe calculated 2,836.177 MG in authorized consumption in 2008. This includes 2,805.55 MG from the five billing metered categories (fire service, irrigation, residential, commercial, and multi-family). These original figures were supplied by the City's Billing Department, and an adjustment was made for lag time in meter readings. The unbilled metered total is 22.347 MG which was calculated from the master meters of the treated water delivered to the three acequias within the system. A fourth acequia that receives raw water was not included in the calculation. The unbilled unmetered calculation of 8.28 MG was estimated from firefighting/prevention/train-

ing, main flushing, street cleaning, and water quality and meter testing. Only the main flushing and water quality estimate were documented. The data validity scores are also not documented.

Category	Data Validity Score	Volume in MG
Billed Metered	9	2,805.550
Unbilled Metered	10	22.347
Unbilled Unmetered	7	8.280
Authorized Consumption		2,836.177

Table 6: 2008 Authorized Consumption

4.1.3 Water Losses

Water loss is calculated from water supplied minus authorized consumption. It includes apparent losses and real losses. The City of Santa Fe maintains records of all reported and identified leaks. These include main breaks and service leaks. This database was used to estimate losses based on pipe diameter, estimated flow and assumed duration of break. This is reported as 2.04 MG. In addition, a leak detection survey was conducted in 2008, using the identified leaks found by auditing 11 percent of the system. The 2008 Report calculated an estimated loss for the entire city of 3.46 MG. This gave the City a calculated real loss of 5.50 MG.

Apparent losses were divided into customer meter errors of 109.96 MG, low-flow inaccuracies of 11.05 MG, and illegal connections and theft of 1.49 MG. All of these estimates used the 2005 Water Audit performed by Goff and Associates. The meter errors were estimated using the under-registered flow based on typical (turbine) meter inaccuracies. As turbine meters age, the mechanisms wear down. The low-flow estimates were based on evaporative cooler data usage from Public Service Company of New Mexico and the estimated number of evaporative coolers in Santa Fe.

The remaining volume of water losses was placed into database error, 47.810 MG. This is a deviation from the AWWA water audit methodology. In the AWWA method, the utility provides an estimate for data base error with the remainder of water losses going into real losses.

AWWA Category	SF Category – Sub category	Data Validity Score	Volume in MG
Apparent Losses			
Unauthorized Consumption	Illegal Connections	8	1.490
Customer Meter Inaccuracies	Estimated Customer Error	6	109.96
	Additional Losses to Low-flow Inaccuracies		11.05
Systematic Data			
Handling Errors	Database Errors	5	47.810
Subtotal Apparent Losses			170.310
Real Losses	Reported Water Loss		2.04
	Identified Water Loss		3.46
Subtotal Real Losses			5.50
Total Water Loss			175.803

Table 7: 2008 Water Losses

4.1.4 System Data

The 2008 system data was recorded in the water audit spreadsheet. The revenue data was documented in Appendix C of the 2008 Report. The annual cost of the operating system and the variable production cost for the audit spreadsheet are based on a calendar year. Since the City's fiscal year is July 1 – June 30, the Report used an average value based on FY07 and FY08 expenses. The origin of the remaining system data was not documented in the 2008 Report. The connection density is calculated within the spreadsheet by dividing number of connections by miles of lines. The average length of customer service line represents the distance from street curb to water meter. Since Santa Fe's meters are at the curb this is zero in the AWWA software.

Category	Data Validity Score	Value
Length of Mains	9	561.0 miles
Number of Active and Inactive Connections	5	33,152
Connection Density		59 connections/ miles
Average Length of Customer Service Line	10	0 feet
Average Operating Pressure	6	90.2 psi
Total Annual Cost of Operating System	10	\$19,644,713
Customer Retail Unit Cost	9	\$4.75/1,000 gallons
Variable Production Cost	9	\$1,160.17/MG

Table 8: 2008 System Data

4.1.5 Performance Indicators

The performance indicators are categorized by financial indicators and operation indicators. These calculated indicators will be used by the City as a baseline from which the system can improve. The indicators are represented in both per capita and percentage formats. The percentage indicators should be used with the understanding that percentages can change based on the volume of water supplied or sold even if no improvements have been made to the system.

The two main financial indicators are the annual cost of apparent losses and the annual cost of real losses. The apparent losses for 2008 were \$808,973. This is calculated by the total apparent losses and the retail unit cost. This dollar amount represents water that has been treated and delivered but not billed due to theft, incorrect customer metering or database issues. Because the apparent loss numbers were calculated using an estimate volume of real loss with the default volume assigned to database errors, this number is likely high. The real losses for 2008 were \$6,373. This is calculated using the real losses and the variable production costs. It represents water that is treated then lost within the system prior to being delivered to an end user. Santa Fe keeps records of all reported leaks and estimates a volume lost from these leaks. However, the volume of leaks is difficult to calculate. The variables used to estimate volume of water lost include duration of leak and pressure. Leaks will often go unnoticed or unreported, making the time variable an approximation. For many utilities this is standard practice as most do not have surveillance cameras or sophisticated equipment. These approximations are the only option. These values should be used with caution.

The remaining financial indicators for 2008 are for non-revenue water. Non-revenue water includes both apparent losses and real losses but also includes authorized uses that are not billed (unbilled unmetered and unbilled meter). The non-revenue water by volume of water supplied is 6.9 percent or 207.8 million gallons. The non-revenue water by cost of operating system is 4.3 percent as line item on the spreadsheet. This calculates to \$844,722.

The operational efficiency indicators are calculated using system data such as number of connections, pressure, and miles of line. Similar to the gallons per capita per day calculation, the operational efficiency data provides a standardized metric by which Santa Fe can evaluate future performance and compare it to other systems.

The AWWA Water Loss Committee in 2013 compiled water loss data from 26 utilities nationwide. The utilities that contributed data ranged in size from 850 connections to 500,000. The apparent losses per service connection for these utilities ranged from 2 to 40 gallons per connection per day with an average of 11.5 gallons per connection per day. The City of Santa Fe ranks slightly above average for their 2008 apparent losses. The real losses for this same group ranged from 16 to 135 gallons per connection per day with an average of 56 gallons per connection per day. Santa Fe's real loss estimate of 0.45 gallons per connection per day is not within this range. This also applies to the unavoidable real losses (UARL) and the infrastructure leakage index. The UARL represents the technical low limit of leakage, meaning anything beyond that could not be recovered using known technology. It is calculated using lengths of mains, number of services connections, and pressure. The AWWA spreadsheet is calculating a UARL loss for Santa Fe of 263.67 MG which is higher than the volume input for actual real losses of 5.493 MG.

Financial Indicator	Value
<i>Non-revenue water as percentage of volume of Water Supplied</i>	6.9%
<i>Non-revenue water as percentage by cost of operating system</i>	4.3%
<i>Annual cost of Apparent Losses</i>	\$808,973
<i>Annual cost of Real Losses</i>	\$6,373
Operational Efficiency Indicator	
<i>Apparent Losses per service connection per day</i>	14.07 gallons/connection/day
<i>Real Losses per service connection per day</i>	0.45 gallons/connection/day
<i>Real Losses per service connection per day per psi pressure</i>	0.01 gallons/connection/day/psi
<i>Unavoidable Annual Real Losses</i>	263.67 MG/year
<i>Infrastructure Leakage Index</i>	0.02

Table 9: 2008 Performance Indicators

4.1.6 Priority Areas for Attention

The results of the AWWA software are evaluated using a data validity scoring system. Each value entered into the spreadsheet requires a comparison to a preset scoring chart provided with the software. This allows the utility to authenticate their data and identify areas for improving the data therefore improving their results. Santa Fe achieved an overall data validity score in 2008 of 87 out of 100. In addition, the software identified three priority areas for attention:

- customer metering inaccuracies,
- volume from own sources and
- systematic data handling errors.

Since 2008, Santa Fe has worked towards addressing these issues. The customer metering errors in 2008 came predominantly from problems associated with the installation of new automatic meter reading (AMR) equipment. Over time the AMR manufacturer changed the way the AMRs were manufactured, this led to the AMRs malfunctioning. Interestingly enough the AMRs that were installed first showed no signs of these malfunctions. At this time the City no longer uses the AMR devices. In 2014, the Water Division selected a new vendor to install Automatic Meter Infrastructure (AMI), along with the replacement of all residential customer meters. Phased installation

will begin in 2015. The installation of new meters along with the AMIs will provide better accuracy in customer water use.

To address the “volume from own sources”, Santa Fe has a third party annual testing of all master meters. This testing started in late 2007. These results will be integrated into the master meter error for future water audits.

A new Utility Billing/Customer Information Software is currently being implemented which will enable staff to provide quality customer service and accurate bills to our utility customers. This system will also provide our customers the ability to update personal user information, view bills, and make payments. The billing system portal, called Infinity Link, provides two-way communications compatibility between the City and the customer. The benefit to the customer is user-friendly 24/7 access to historical data, consumption data, and online bill payment, as well as having the ability for the customer to create service orders online. Infinity Mobile will allow service orders and real time data to be pushed out to City workers in the field on their mobile devices.

4.2 Estimates for 2013 AWWA Water Audit

Using the water supply and billed metered data for 2013 and basic assumptions from the 2008 audit, the following is a rough estimate of all volumes of water in 2013 water balance. The water supplied and the billed metered data were pulled from the 2013 GPCD Report to the NMOSE. The water losses were based on percentages by sub category of water losses in the 2008 Report (illegal connections in 2008 was 1.49 MG or 0.05 percent of water supply, 2013 estimate is 0.05 of 3067.488 MG = 1.53 MG). The estimates are marked by an “*”. Real losses were calculated using water supplied – authorized consumption – apparent losses.

AWWA Category	Volume in MG
<i>Volume from Own Sources</i>	1,665.588
<i>Master Meter Error</i>	0
<i>Imported Water</i>	1,401.900
<i>Exported Water</i>	(78.2)
<i>Water Supplied</i>	2,989.288
<i>Billed Metered</i>	2,642.1722
<i>Unbilled Metered*</i>	22.69
<i>Unbilled Unmetered*</i>	8.28
Authorized Consumption	2,673.1422
<i>Unauthorized Consumption/Illegal*</i>	1.53
<i>Customer Meter Inaccuracies*</i>	123.31
<i>Systematic Data Handling Errors*</i>	48.77
Apparent Losses	173.61
Real Losses	142.5358
Non-Revenue Water	347.1158

Table 10: 2013 Water Audit Estimates

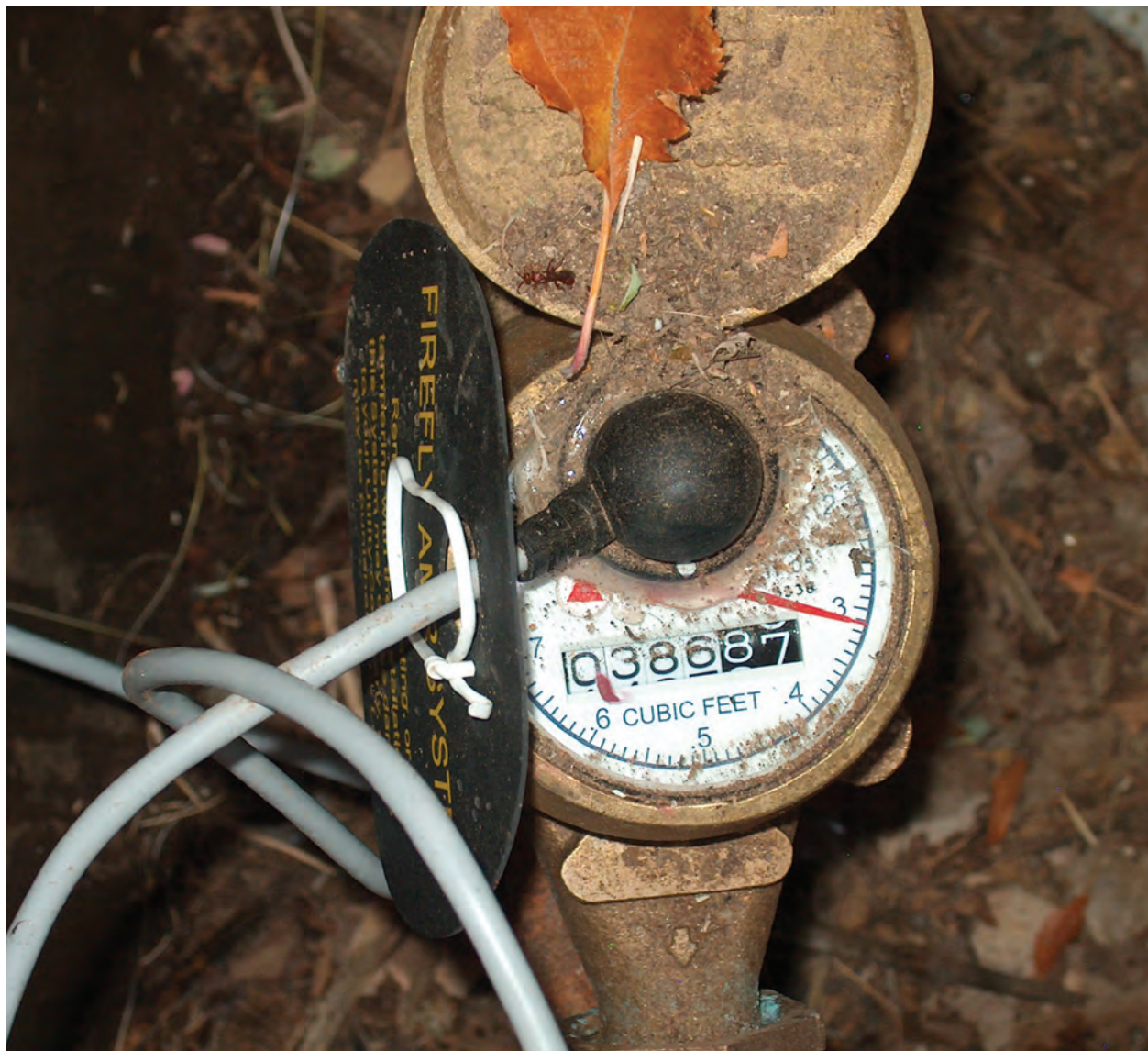


Figure 18: Water Meter With Automated Meter Reader (AMR) Attached

5.0 Water Conservation Goals

Water conservation goals will be important drivers for the City of Santa Fe Water Conservation Program for the next five years. The goals listed below derive from the data discussed in Chapters 2-4, other water and municipal planning documents already approved by the City, existing ordinances, and the City Water Division's Mission, Goals and Objectives (MGO) statement.

The Comprehensive Water Conservation Requirements ordinance (SFCC 1987 § 25-2.2) was designed to provide the city the means to reduce per capita water demands and the Water Regulations Ordinance (SFCC 1987 § 25-5) allows more severe water-use restrictions to be implemented as necessary to ensure that demand does not exceed sustainable, available supply and production capacity during times of drought or water supply emergency. These ordinances are the basis for the development of the City's goals, objectives and programs.

Following each goal, listed below is an explanation of its origin, including any metrics by which to measure its progress. Each goal will establish clear conservation objectives followed by programs that will keep staff on task for the next 5 years. The correlation between the goals and the Water Conservation Office's programs are charted in Chapter 8.

City of Santa Fe Water Conservation Program Goals

1. *Continue to maintain the already low GPCD.*

The City's 2013 total system GPCD was 101, with a five year average of 108. This low per capita use is reflective of the values of the community. This represents a steady decline in per capita use since 1995 when the City was at 168 GPCD. Since 2002, the City has stayed within a 101-116 GPCD. This number fluctuates slightly due to drought conditions but has stabilized around 108.

Per capita use as a goal is mentioned in the Comprehensive Water Conservation Requirements, in the Long-Range Water Supply Plan, and in the MGO.

2. *Increase participation in rebate programs and incentive programs to maintain the Water Bank reserve of 25 AF (Water Bank Ordinance).*

The Water Bank Ordinance calculates the savings from every rebate in order to utilize the saved water for other City priorities, such as a living river and low-income housing, with some savings available for purchase by developers. This allows the City to stabi-

Water conservation goals
will be important drivers
for the City of Santa
Fe Water Conservation
Program for the next
five years.

lize the water use and still allow water for economic growth and environmental uses.

The rebate programs have contributed to the City's low single family residential use of 70 GPCD with indoor residential base line use of under 50 GPCD. The Water Conservation Office is looking for ways to extend these programs to outdoor uses which almost double the GPCD in the summer, and to find creative rebates in commercial, industrial and institutional areas.

3. Reduce summer peak demand from the 2009-13 average level.

The average peak demand for the past 5 years has been 1.5 times the average GPCD. This represents a 50 percent increase in water use during the summer months. The Water Conservation Office is looking for ways to help reduce the summer usages by developing outreach and incentive programs that target outdoor irrigation.

4. Improve data validity, conduct annual internal auditing, and complete third part AWWA water audits every 5 years to reduce non-revenue water losses.

According to the 2005 and 2008 AWWA water loss audits, the City's non-revenue water by volume is estimated to be between 6 to 10 percent. The utility will continue to pursue the best available practices to identify and reduce the sources of non-revenue water.

5. Be proactively implementing emergency and non-emergency programs to improve drought preparedness.

As Santa Fe experiences the fourth consecutive year of drought, effective and efficient water conservation programs should be identified to help mitigate these seasonal extremes. Preparedness includes coordination with other City departments, providing up-to-date customer service and information about water conservation programs and incentives to the public, in an easy to find and efficient manner.

Operational Objectives from the City's Mission, Goals and Objectives

Mission, Goals and Objectives (MGO) is an overall mission statement for the entire City of Santa Fe Water Division.

Efficiently manage and deliver an adequate, reliable, safe and sustainable water supply to meet community and customer needs in accordance with City of Santa Fe policy.

Each Section of the Water Division has a specific goal. The goal for the Water Conservation Office is:

To manage and reduce our customer demands through the development and implementation of water conservation programs and enforcement of water use ordinances.

The objectives listed in the MGO under water conservation are provided below.

Several strategic objectives of this plan also relate directly to water conservation but are interconnected with other aspects of the Utility. The goals from this plan that relate to the MGO objectives are provided by number in the parenthesis following the goal. Additional comments that explain the objectives' relationships to water conservation are contained within parentheses and printed in italics immediately following several of the objectives.

- To conjunctively manage and operate the sources-of-supply available to the City of Santa Fe to maximize efficiency, maximize use of renewable water resources, minimize power costs and uses (such as off peak and solar), and maintain ability to reliably meet annual and peak daily customer water demand. (Goals 3, 5)
- To write and approve annual operating plans to strategically use available sources of supply considering hydrology, demand, and legal constraints and preferred use of renewable resources. (Goals 3, 5)

Water Conservation and Drought Management Plan 2015

- To minimize loss of water from the utility system through effective maintenance and operations including ongoing unaccounted water tracking and analysis, a leak detection program, leak tracking, and prompt repairs of leaks. Replace water lines that are tracked and marked as trouble areas through different areas in the City. (Addressing water distribution system leaks is one of the specific requirements specified at 1978 NMSA § 72-14-3.2 D. (2) (e) (Goals 1, 4, 5)
- To quantify and reduce sources or causes of non-revenue water by replacing the 10 least accurate large meters in 2015, and continue to implement a formal comprehensive meter testing program analysis of results, and guidance for large meter replacements and repairs. The city plans to replace all small meters with new AMI meter system by 2018. The meter shall help customers keep track of water and help the water division monitor usage and water loss. Non-revenue water production, which is the amount of total water production that was not metered and sold to customers, shall decrease profoundly after meters have all been changed to the new AMI. (Accurate customer water use metering is necessary to maintain unaccounted-for water at an acceptable level.) (Goals 1, 4)
- To continue distribution flushing cycle annually as water is available. Upon completion, evaluate with respect to water quality and amount of water used. Improve the next flushing cycle by addressing, area by area, the drivers for flushing and the flushing frequency. (Water used for distribution flushing, which is a best management practice pertaining to water quality, increases the per capita water production.) (Goals 1, 4)
- To continue implementation of new customer outreach communications and use the website as a tool to promote it for both internal and external customer communications. (Customer opportunities and duties include participation in water conservation incentive programs and adherence to water conservation requirements and mandates.) (Goals 1, 2, 3, 4, 5)

Other Sections within the City have goals that directly link to water conservation. These are mostly internal. Work flow goals have not been included in this plan.

The Water Conservation Office considers the goals developed for the 2015 Water Conservation Plan to be complimentary to the goals in the MGO. The Water Conservation Plan goals are more specific and consider the data developed as part of this document.

The goal for the Water Conservation Office is to manage and reduce customer demands through the development and implementation of water conservation programs and enforcement of water use ordinances.



Figure 19: Spooky Showerhead Swap 2013

6.0 Water Conservation Programs

The following is a list of the historical and currently running water conservation programs. Each listing includes details regarding when the program began and how it is being run. All programs are ongoing within the existing budget, unless otherwise noted.

Santa Fe's water conservation program is comprised of many interrelated measures or elements that comprehensively address:

- Customer education and incentive programs to implement voluntary conservation elements and improve efficiency of water use,
- Customer water conservation requirements,
- Water rates to provide conservation incentives, and
- Incentives and other requirements that mandate new development and implement stringent water conservation measures and other steps to offset the new demand on the existing water system.

6.1 Ordinances that Govern Water Conservation Administration

The City has passed several ordinances that help define the water conservation and drought/emergency programs. Over the years, these ordinances have gone through several revisions and have been adopted as amended in Chapter 25 of the City Code. The Santa Fe City Code Chapter 25, known as the "Water Chapter" governs water regulations. Chapter 14 of the City Code is the "Land Use Chapter" where water conservation for new developments including water demand-offset requirements can be found. Details have been provided regarding their history and current forms. All ordinances can be found on the City's website at <http://www.santafenm.gov/santa-fe-city-code>.

SFCC 1987 § 25-2.2 Comprehensive Water Conservation Requirements Ordinance

The Water Conservation Ordinance was signed on June 25, 1997. It is designed to provide the city the means to reduce per capita water demands by requiring its citizens and businesses to comply with prescribed water conservation regulations and to establish financial incentives for water conservation.

This Ordinance mandates:

- Water conservation signage and/or literature distribution for public spaces, hotels/motels, plant nurseries and landscapes
- Indoor conservation including fixing detected leaks on

The Water Conservation Ordinance is designed to reduce per capita water demands by requiring citizens and businesses to comply with prescribed water conservation regulations.

service lines, plumbing standards for new construction and remodels, water on request in restaurants, and limited linen changes in hotel/motels

- Outdoor conservation including time of day watering restrictions, covering swimming pools, restrictions on vehicle washing and power washers, and discouraging cool season grasses.
- Turf restrictions
- Setting up a means to develop rebate or voucher programs
- Domestic leak repair loan program, and
- Water waste prohibitions.

The domestic leak detection loan program was transitioned to a local non-profit, Homewise, in 2005.

SFCC 1987 § 25-5 Emergency Water Regulations Ordinance

The Emergency Water Regulations Ordinance was originally adopted in 1996. This ordinance allows more severe water-use restrictions to be implemented as necessary to ensure that demand does not exceed sustainable, available supply and production capacity during times of drought. The Ordinance was updated in 2006.

The Emergency Water Ordinance specifies how a water emergency can be declared and what actions must be taken during each implementation stage. For more details on the Emergency Water Ordinance see Chapter 7.

SFCC 1987 § 14-8.4 Landscape and Site Design Regulations

The Landscape and Site Design Regulations were established to foster the creation of regionally appropriate, sustainable landscapes. This regulation was signed on July 25, 2001 and led to the development of the Landscape Irrigation Design Standards (LIDS). LIDS is a detailed technical document that includes efficiency concepts for sprinkler systems, design standards for drip irrigation systems, details on irrigation system components and irrigation scheduling. It recommends the utilization of water harvesting and encourages the development of other alternative sources of landscape irrigation water.

City Water Budget Ordinance

The City Water Budget Ordinance #2009-38, adopted on August 12, 2009, became effective January 1, 2010, replacing the Annual Water Budget Ordinance. The City requires that the impact of new development be offset either through conservation in existing development or transfer of water rights to the City. The ordinance is organized into the following components:

Development Water Budgets and Building Permit Requirements (SFCC 1987 § 14-8.13).

Applicants either are required to offset their demand to obtain a building permit through dedication of water conservation credit or transferred water rights.

City's Water Budget (SFCC 1987 § 25-9).

This is the annual process that City water managers undertake to account for current and projected water supplies and demands. This also includes the process by which the Governing Body allocates available water made available from City water rights purchases, leases, and City conservation measures to meet its priorities, including affordable housing.

City Water Bank (SFCC 1987 § 25-10).

Water credit held in the City Water Bank is derived from conservation programs or from water rights transfers for future water demand offsets. Some of the water in the water bank is available either for purchase by developers for projects or for allocation by the Governing Body to a project of their choice. Additionally, water rights are reserved for specific projects (e.g., when a developer for a future project transfers water rights). All water credit held in the water bank is accounted for in consumptive use acre-feet per year.

Conservation Credit Programs (SFCC 1987 § 25-11).

Two programs generate conservation credit; water conservation rebates and water conservation contracts. Conserved water generated to offset new demand on the City's water system is referred to as water conservation credit.

Water Rights Transfer Program (SFCC 1987 § 25-12).

The Water Right Transfer Program requires new development that will use more than five-acre-feet for commercial projects and more than ten-acre-feet for residential acquire and transfer water rights to the City of Santa Fe before building permits may be issued.

6.2 School Outreach/ Children's Programs

Children's Water Fiesta

The first Santa Fe Children's Water Fiesta was held on March 13 & 14, 2003, and has been held annually ever since. It is a fun, hands-on, water related event for 4th grade students. Every year approximately 600 students from about 10 different Santa Fe Public Schools (SFPS) attend one of the two days. Students rotate through five activities presented by 15 different organizations that donate their time and effort for this two day event. All participants receive free water saver kits which include low flow showerheads, toilet leak detection dye tablets and faucet aerators.

The Fiesta is run by Conservation Program staff. This program is well liked by the schools and the City. It is within the existing budget and scheduled to continue.

Calendar and Poster Contest

The annual water conservation calendar, a favorite in the Santa Fe Community, features the winning artwork from the previous year's Poster Contest, and includes monthly water saving tips. Eighteen posters are selected each year for use in the calendar and the grand prize winner's poster is also featured on the back of a city bus for one year. The contest includes an awards ceremony held at a City Council meeting. Trophies and prize bags are distributed to the winners and the winning posters are displayed at City Hall for a month.

The 11th annual contest was held in 2014 with the theme of "Saving Water is Always in Season". The contest received approximately 300 posters submitted by 1st-6th grade students from SFPS and other charter and private schools. City Council Members, City Managers and staff and Water Conservation Committee members have helped with the judging.

The annual water conservation calendar is a favorite in the Santa Fe Community. It features the winning artwork from the previous year's Poster Contest and includes monthly water saving tips.



Some of the latest winners include:

11th Annual Poster Contest (2014)
Theme: Saving Water is Always in Season!
Grand Prize Winner: Molly Murphey
4th grade
La Mariposa Montessori



10th Annual Poster Contest (2013)
Theme: Show Us Your Water Appreciation
Grand Prize Winner: Tristen Lujan
3rd grade
La Mariposa Montessori



9th Annual Poster Contest (2012)
Theme: Living in a Drought!
Grand Prize Winner: Sabrina De Domenico
6th Grade
Santa Fe School for the Arts and Sciences



8th Annual Poster Contest (2011)
Theme: Fix a Leak
Grand Prize Winner: Alicia Stewart
6th Grade
Santa Fe School for the Arts and Sciences

The poster contest and calendar are run by Conservation Program staff. The calendar design and printing are included in the annual operating budget. This program is within the existing budget and scheduled to continue.

RiverXchange

This was a pilot program in 2012, which provided a year-long curriculum for students to explore key water concepts through study of their local river ecosystem, hands-on activities, field trip and service project.

- 125 5th grade students participated
- Field trips to the Santa Fe River, Buckman Regional Water Treatment Plant and Waste Water Treatment Plant

- Guest speakers from 5 partner agencies, including the New Mexico Office of the State Engineer, New Mexico Environment Department, presented on water conservation, water quality, stormwater, river ecosystems and wastewater treatment.

This program was discontinued after one year due to the high cost, limited access and lack of teacher participation.

6.3 Outreach/Marketing

All outreach and marketing events are subject to annual review. The events will be maintained or implemented if they remain viable. The Water Conservation Programs maintains a marketing budget and will develop new programs as needed.

6.3.1 Public Outreach and Events

Fix A Leak Week

Fix-A-Leak Week, is an annual nationwide EPA WaterSense campaign. New Mexico implemented the program in 2010, and the City has held annual events. In 2011, the City produced and helped with broadcasting a commercial featuring the “Bad Flapper”, a 1920’s silent-movie style villainess. The campaign included: Commercials shown on KOAT channel 7, commercials in both DeVargas and Regal Santa Fe Theaters, newspaper ads, bill inserts, radio commercials, and toilet leak detection tablets featuring the “Bad Flapper”. In spring 2014, the “Bad Flapper” returned for another commercial, where she creates noisy nighttime toilet leaks.

This program will be evaluated on an annual basis. Existing commercials will continue to run in movie theaters as part of the existing media budget. Participation in local events will vary depending on staffing and budget.

Showerhead Giveaway

“Spooky Showerhead Swap” is held around Halloween each year. The Water Conservation Office employees dressed in costume and give out WaterSense approved water conserving showerheads (1-2 gpm) in exchange for old, inefficient showerheads. In 2013, the first year the event was hosted, the Water Conservation Office swapped out 67 spooky showerheads for WaterSense labeled two gallon per minute showerheads; the savings was calculated at 2,900 gallons per household, or 194,300 gallons per year of water savings for the City.

This program is within the existing budget and will continue as long as there are participants.

Weekly Radio Talk Show

In 2014, “Water Talk” marked its 12th year in production. “Water Talk” is a 30 minute weekly radio show on KSWV

The City has produced two commercials featuring the “Bad Flapper”, a 1920’s silent-movie style villainess.

810 AM co-hosted by Joe Abeyta and Laurie Trevizo. The program includes discussion of water conservation trends locally, regionally and globally, provides information about upcoming events and educational programs, and frequently includes guests from various organizations that participate in water conservation and environmental education.

This program is within the existing budget and will continue as long as there are available guests.

Water Conservation Website

The www.savewatersantafe.com website was launched by the Water Conservation Office on May 26, 2013. This website is a clearinghouse for City of Santa Fe water regulations, rebate program information, and information about source of supply and ways to save water.

This is an ongoing program of the City of Santa Fe.

Demonstration Gardens and Water Conservation Median

As part of leading by example, the Water Conservation Office has developed several demonstration areas to showcase the many ways to make landscaping more water efficient.

- Water Division Office has a recycled water feature powered by solar, themed plantings and efficient irrigation with a weather based controller
- Water Conservation Office has an active water harvesting system with two 1,000 gallon tanks which collect stormwater runoff from the parking lot. This water will be used on future plantings at the Water Conservation Office.
- Median on St Michaels Drive at Calle Lorca was redesigned to capture 1,200 gallons of stormwater runoff and planted with drought tolerant trees and shrubs.

This is an ongoing program within the existing budget. The demonstration gardens require coordination between conservation and parks staff.

Adult Education Programs

The City Water Division developed a series of home landscaping classes to promote water conservative gardening and landscape planning. Water Division staff and local experts from the community taught classes on xeriscape principles, xeriscape plant selection, sprinkler irrigation, drip irrigation, and water conservation through permaculture.

This program ran from 2007-2010. It was discontinued due to limited staff. The program was re-introduced in 2013 as a professional certification program, Qualified Water Efficient Landscaper (QWEL), see section 6.6.

Media Campaign

The City has a strong media campaign. The media and advertisement placement are strategically targeted to specific demographics based on potential impressions, gender, age and social interests. Key messages are woven into all releases, interviews and articles. The purchased advertising includes radio advertisements, National Cinemedia (commercials shown in local movie theaters), regional trade publications, an annual insert in the Santa Fe Reporter, and bus wrap advertisements.

To remain relevant and proactive, in 2013 the conservation program was re-branded and included a new logo with a single call to action: Save Water Santa Fe. A key element of this effort was the eight-page newspaper insert, Save Water Santa Fe. Because Santa Feans are already among the most water conscious in the Southwest, it was necessary to use this publication to thank residents for their efforts so far, explain why more was necessary, and provide tips on how to go from casual water saving to intense water saving.

The City's introduction of 2014 Campaign "There's a Drought On. Turn the Water Off" is a prime example of the inventive and progress media campaign. The ads are in response to Resolution

Water Conservation and Drought Management Plan 2015

2013-52 which states that high demand watering season campaigns will incorporate outreach and communication strategies. The ads, with the catchy tag line “Drought On. Water Off,” convey the message that 2014 is the time to practice water saving measures and to change behavioral habits. Images appeared in many local print publications, bill inserts, bill envelopes, online banner ads, the City of Santa Fe Facebook page, side of the bus and bus stop ads and local events such as the Rodeo de Santa Fe. Other themes have included: “Saving Water Is Always in Season”, “Keep it Up. Keep it Down.” and “Water for the Future.”

The media campaign has been a successful program and since its launch water demand has dropped 4.8 percent from 10.4 million acre-feet per year in 2012 to 9.9 acre-feet in 2013. Rebate incentive program participation increased 40 percent, saving 2.1 million of gallons.

Earned Media

The City has a schedule of press releases that includes at least one per month, for around 18 per year. These are used to advertise events and campaigns as well as timely messages. In 2013, some of the topics covered included: Fix a Leak Week, summer watering recommendations, drought awareness, new website, calendar contest, and winterizing your irrigation system.

More than 500,000 print and broadcast media impressions were garnered in less than a year (2013), including two positive editorials and dozens of print articles in the Santa Fe New Mexican, Albuquerque Journal North, Associated Press, Santa Fe Reporter, Green Fire Times, EcoTrend, Edible Santa Fe as well as several public radio interviews and local TV news coverage. In addition to the local media’s regularly picking up the City’s press releases, Santa Fe has received national attention on water conservation within the last year from The Wichita Eagle “Keys to Making Water Conservation Successful is to involve community. Santa Fe: A lot of carrot” and the Saint Paul Pioneer “Santa Fe Shows the Nation How to Save Water”.

Spanish Language Materials

The Water Conservation Office has limited materials in Spanish and recognizes that 49 percent of the population is Hispanic. Future plans include Spanish translated and targeted water saving materials. Additional research is needed to determine the best ways to reach this audience.

New Customer Packets

Everyone opening a new customer account with the City receives a new customer packet. The packets are distributed by the Customer Service Representatives and include information about Santa Fe’s watering restrictions, xeriscaping, finding and fixing residential leaks, and rebates.

6.3.2 Commercial Outreach and Events

Green Lodging Initiative

More than one million tourists visit Santa Fe each year. They are welcomed and are an important part of the economy; however their presence places considerable pressure on the City’s environmental resources—particularly water. The Santa Fe Watershed Association received an 18-month grant from the US Environmental Protection Agency for a pilot project to reduce the environmental impacts of the lodging industry in Santa Fe. The Watershed Association contracted with Hospitality Green LLC to certify participating facilities through their Green Concierge program. The Water Conservation Office participated in working group meetings by providing information about local water conservation requirements, as well as resources and incentives that are available in Santa Fe.

There were 14 lodging facilities that participated in the Initiative, representing almost 50 percent of Santa Fe’s hotel rooms. Of those facilities, 12 earned the Bronze Level certification from the Green Concierge Certification program. The La Fonda Hotel replaced 172 toilets with HET models as part of their certification and received a Water Conservation Rebate.

The grant was completed in 2013. The City continues to provide technical support through best management practices to all commercial properties in the City. See section 6.5.1

Commercial Direct Mailing

Starting in 2012, the Water Conservation Office included 5,500 letters with business license renewal notices sent out annually in December. The letters provided the City of Santa Fe Comprehensive Water Conservation Requirements, information about rebates, and contact information to order restroom signage. As a result of the letter, local businesses requested 422 water conservation signs in 2013.

This is a cost effective way to reach commercial businesses within the City of Santa Fe. This outreach technique will continue as long as Finance Department is willing to remain a partner.

6.3.3 Miscellaneous Outreach and Events

Water Conservation Committee

The Water Conservation Committee (WCC) was established in 2002 under Resolution 2002-25. The WCC is made up of 10 members that represent different areas of the City and various occupations. Since its creation, the WCC has provided valuable guidance and made numerous contributions to the City's water conservation efforts. Some of the most recent contributions include:

- Developing a formally approved water conservation presentation for use by WCC members and City staff
- Creation of a water conservation brochure
- Development of a water use rating system for new construction
- Collaboration with Sustainable Santa Fe Commission
- Collaboration with the Climate Action Task Force
- Collaboration with Parks and Open Space Advisory Committee
- Ongoing analysis of the City's rebate programs

Santa Fe Master Gardener Association

The Conservation Staff provides drip irrigation presentations a couple of times per year to the Master Gardener Association Intern Class. A Master Gardener is someone who has been trained in basic horticulture by the NMSU Cooperative Extension Service, and in return, shares their knowledge with the community. The focus of the course is on sustainable gardening and topics covered by the class include Soils, Basic Botany, Xeriscape, Responsible Plant Selection, Composting, and Pest Management, among others.

Mayor's Challenge for Water Conservation

This is an annual friendly competition between U.S. cities, sponsored by a non-profit organization, The Wyland Foundation, to see which city can be the most water conscious. 2013 was the 2nd year participating in this water conservation pledge campaign. The campaign requires the public to pledge to take activities to conserve. The City Water Conservation Office in coordination with the Multi-Media Office uses social media and marketing to engage the public to take actions. The City of Santa Fe placed in their category in both 2012 and 2013, demonstrating our residents' commitment to water conservation.

6.4 Residential Programs: Fixtures, Appliances and Surveys

In 2013, single family residential water customers comprise 52 percent of water users within the City of Santa Fe. This is the largest customer class with the potential for the most water savings. The single family residential user class already has a relatively low consumption at 70 GPCD. This may be due to the fact that past programs that have targeted this group have been geared toward fixture replacement. Many of the programs offered by the Water Conservation Office have been successful because there has been constant participation in these programs from this sec-

Water Conservation and Drought Management Plan 2015

tor. To reduce the 70 GPCD, the Water Conservation Office will likely need to focus on outdoor incentive programs, as well as indoor fixture replacement programs.

6.4.1 Residential Retrofits

The City defines retrofit program as direct installations or purchases by the City. Residential rebate programs are outlined in section 6.4.2.

Residential Surveys

The water conservation survey and retrofit program began in 1997 by providing in-home surveys conducted by Water Division staff. The survey covers the home interior and exterior and included checking for leaky fixtures, installing devices such as low flow showerheads, faucet aerators, and toilet displacement bags. It also included toilet leak tests, garden watering system analysis, and, where appropriate, instruction in using irrigation timers. Educational literature was given to the customer, along with a 13-month history of their water use. The service, hardware, and literature were free to customers. This program was advertised through billing inserts, newspaper advertising, and radio announcements.

The residential survey program was managed by the City but operated through a contract with a consulting firm. The program was expensive to run and was transitioned into various rebates and incentives program listed below.

Low Flow Toilets

The Water Wise Santa Fe Toilet Replacement Program began in 2002 under Resolution #2002-55 which requires that all new construction served by the Santa Fe water utility, whether located within or outside the City limits, implement stringent water conservation requirements and offset any new demand on the water system supplies through retrofitting existing high-flow toilets (typically 3.5 or 5 gallons per flush) with low-flow toilets (1.6 gallons per flush).

The City set a goal to replace 10,000 1.6 gallon per flush toilets. The toilets were made available for individuals or plumbers to purchase and install. An aggressive advertising campaign included a new logo, "reduce your use-go with the flow." Upon confirmation of installation of the low-flow toilet, a certificate of completion was issued. The water savings or credit from that installation was available for dedication to another use. Some of the credits are also available for purchase by developers.

It is estimated that the City saved 1 AF per day from the conversion of 10,000 six gallon flush toilets to the 1.6 gallon flush. With these 10,000 low-flow toilets and the Federal Plumbing Standard requirements on low-flow toilets, it is believed that the vast majority of old, high water use toilets in the City have been replaced. This program has been discontinued.

Customer Type	Number of LFT Installations
<i>Single Family Residential</i>	3,722
<i>Multi-family Residential</i>	1,786
<i>Commercial</i>	2,479
<i>Non-profit</i>	80
Total	8,067

Table 11: Number of Low Flow Toilet Installations

Rain Barrels

A pilot program for distributing rain barrels was launched in June 2002. The program was intended to introduce the concept of on-site rainwater harvesting to Santa Fe residents. One inch of rain can provide 625 gallons of water from a 1,000-square-foot roof.

The City offered participants the opportunity to purchase one 75-gallon rain barrel for \$35. Only

single-family residential customers were eligible. The City distributed 1,000 Deluxe Rain Barrels, which the City purchased for a cost of \$74.25 each. The City offered the rain barrels for \$35, subsidizing the difference of \$39.25.

Although the Rain Barrel Distribution Program was a great success, the City Council opted to implement a rebate program in 2003, thereby including local vendors into the sale of rain barrels.

6.4.2 Residential Rebates

Single-Family Residential Water Conservation Survey and Retrofit Program

This program, which ended in February 2003, provided free conservation assistance to the highest-volume residential customers in the form of free interior conservation devices, literature, leak inspection, irrigation inspection, and “hands-on” assistance. A City of Santa Fe contractor conducted 1,000 survey/retrofits among the 15 percent highest-volume residential water users. In addition to conserving water, the City used this program to learn where these high-volume households were using water in order to develop effective conservation measures. The contractor obtained demographic information to aid the City with long-term residential water conservation program planning. The City hopes to put the rebate application forms in an on-line format in the near future.

Phase 1: Single-Family Residential Rebates

The first rebate went into effect on September 8, 2003. A single-family residential water customer of the City of Santa Fe Water Utility was eligible for one \$30 rebate for the purchase of a rain barrel with a permanent child/pet safety device. High-efficiency washing machine and hot water recirculation system rebates went into effect on November 1, 2003. A residential water customer was eligible for one \$100 rebate for the purchase of either water conserving device or a total of \$200 for both devices. These programs continued through 2009 with a conserved water savings from the combined rebates of 67.26 AF.

Phase 2: Single-Family Residential Rebates

Beginning January 1, 2010, the City received grant funds through the American Recovery and Reinvestment Act (ARRA), to develop a new and expanded incentive and rebate program. The water savings were incorporated into the Water Bank, which tracks conserved water to offset new development. That program included high-efficiency toilets, high-efficiency clothes washers, water free urinals, and rainwater harvesting. Due to the popularity of the program, the ARRA funding was quickly depleted and the program ended in July 2010. The total water savings from the ARRA funding was estimated at 20.0858 AF.

Phase 3: Single-Family Residential Rebates

On May 1, 2011, a program for the same device types as Phase 2 was reinstated, with the funding being provided by an annual water conservation fee charged to all customers of the Water Division. The incentive amounts were reduced from the 2010 program; however the rebate program still remains well developed, robust, and generous. All rebates are administered as a credit on customers' water bills. Terms and conditions apply to each device type. Rebate offers remain in effect as long as funds are available. Phase 3 is ongoing but has already saved 25.2155AF of water.

Irrigation Efficiency

In 2014, the City offered the Summer Irrigation Efficiency Rebate from May 1 through October 31. To qualify for a rebate the City's water customer must have an existing irrigation system (not a new install) and must have an irrigation efficiency audit completed by a certified Qualified Water Efficient Landscaper (QWEL). Irrigation equipment upgrade rebates range from \$40 to \$750 depending on device type.

The Water Conservation Office is training QWEL landscapers to perform the irrigation efficien-

Water Conservation and Drought Management Plan 2015

cy audits. The new rebate was launched on May 1, 2014 and published in existing marketing campaigns. This is a brand new program and had limited participation from the public in the first summer.

The Water Conservation Office is planning a proactive evaluation and marketing plan to specifically target professional landscapers and residents with water intensive landscaping. Feedback will be solicited from landscapers and the public on how the program might be improved and participation increased. The results of the evaluation will determine if it should continue into subsequent years.

Fixture	Rebate Amount \$	Number of rebates	Estimated Water Saved
Phase 1 (2004-2009)			67.26 AF
Washing Machine	\$100	2,462	61.14
Rain Barrels	\$30	1,711	0.26
Hot Water Recirculators	\$100	265	5.73
Phase 2 (2010, ARRA Funding)			20.0858 AF
HET Residential	\$175	236	1.2508
HE Clothes Washer	\$480	782	18.2206
HE Clothes Washer	\$180	35	0.3080
Rain Barrel 50-99 gallon	\$12	415	0.0120
Rain Barrel 100-199 gallon	\$25	45	0.0075
Rain Barrel 200-499 gallon	\$50	19	0.0589
Water Harvesting	\$400	2 (15,200 gallons total)	0.2280
Phase 3 (2011 – ongoing)**			25.2155
HET	\$175	1179	6.2487
HE Clothes Washer (Tier 3)	\$350	749	17.4517
HE Clothes Washer	\$150	124	1.0912
Rain Barrel 50-99 gallon	\$12	137	0.1096
Rain Barrel 100-199 gallon	\$25	18	0.0270
Rain Barrel 200-499 gallon	\$50	7	0.0217
Cistern (500 gallons or more)	\$0.25 x gallon	9 (17,705 gallons total)	0.0865
Irrigation Efficiency	\$40 - \$750	1	

**Most recent data available (as of Oct 31, 2014)

Table 12: Residential Rebates

6.5 Commercial Survey and Rebates

Water use incentives offered to commercial customers will help reduce the City's overall gallons per capita per day (GPCD) water use amount, further solidifying the City of Santa Fe as a leader in water use and conservation. The reasons to incentivize this customer class is the commercial and institutional sector is the second largest consumer of publicly supplied water in the United States, accounting for 17 percent of the withdrawals from public water supplies. According to Santa Fe's 2013 GPCD calculation, commercial and institutional is 20 percent of the City's use. Development of a commercial rebate program (Water Efficient Commercial and Industrial Water Use Processes) that provides an incentive for commercial and other large water users such as

institutional water customers will allow the commercial sector to be innovative in the evaluation and use of conserved water. Santa Fe has set up transparent and measurable program that recognizes that commercial, industrial and institutional processes are unique and provide year-round opportunities for water conservation.

Commercial Toilets

The City of Santa Fe's commercial toilet rebate program targets commercial users, with a focus on large, heavily used facilities such as hotels/motels and office buildings. The program provides reimbursement for replacement of existing fixtures with new, high efficiency fixtures such as Flushometer, Tank HET, Hotel/Motel HET, Water Free Urinal. Water saving credits derived from this program are deposited in the City's Water Bank Program and may be allocated for programs including affordable housing and the Living River. Some of the credits are also available for purchase by developers.

The program was initially implemented with funding in part with a grant from the American Recovery and Reinvestment Act of 2009. The initial program was ended in July 2010 due to depletion of funds. The program was reestablished in Fiscal year 2010/2011 utilizing funding from the City's Water Conservation Fund, which is subsidized through an annual charge to all water customers in the City's service area.

<i>Fixture/Appliance/Process</i>	<i>Rebate Amount \$</i>	<i>Number of rebates</i>	<i>Estimated Water Savings-AFY</i>
Phase 1 (2004-2009)			9.8
<i>Washing Machine</i>	<i>n/a</i>	<i>0</i>	
<i>Rain Barrels</i>	<i>n/a</i>	<i>0</i>	
<i>Air Cooled Ice Machines</i>	<i>\$400</i>	<i>6</i>	<i>0.67</i>
<i>Commercial Dishwasher</i>	<i>\$400</i>	<i>1</i>	<i>2.53</i>
<i>Pre-rinse Spray</i>	<i>\$25</i>	<i>30</i>	<i>6.6</i>
Phase 2 (2010)			12.3768
<i>HET Tank-type</i>	<i>\$504</i>	<i>192</i>	<i>3.2256</i>
<i>HET Hotel/Motel</i>	<i>\$504</i>	<i>459</i>	<i>1.0098</i>
<i>HET Flushometer</i>	<i>\$504</i>	<i>197</i>	<i>6.6192</i>
<i>Water Free Urinal</i>	<i>\$630</i>	<i>24</i>	<i>1.0080</i>
<i>HE Clothes Washer- replaces top-loader</i>	<i>\$480</i>	<i>2</i>	<i>0.0466</i>
<i>HE Clothes Washer-replaces front-loader</i>	<i>\$180</i>	<i>2</i>	<i>0.0176</i>
<i>CPE</i>	<i>\$874</i>	<i>1</i>	<i>0.4500</i>
Phase 3 (2011 – ongoing)*			2.7118
<i>HET Hotel/Motel</i>	<i>\$125</i>	<i>822</i>	<i>1.8084</i>
<i>HET Tank-type</i>	<i>\$250</i>	<i>22</i>	<i>0.3696</i>
<i>Flushometer</i>	<i>\$500</i>	<i>2</i>	<i>0.0672</i>
<i>Water Free Urinal</i>	<i>\$500</i>	<i>10</i>	<i>0.4200</i>
<i>Clothes Washer (Tier 3)-replaces top-loader</i>	<i>\$350</i>	<i>2</i>	<i>0.0466</i>
<i>Clothes Washer-replaces front-loader</i>	<i>\$150</i>	<i>0</i>	
<i>COM Process Efficiency Rebate</i>	<i>\$375 per 0.025 AF</i>	<i>0</i>	

****Most recent data available (as of Oct 31, 2014)**

Table 13: Commercial Rebates

Water Conservation and Drought Management Plan 2015

Water-Efficient Commercial and Industrial Water Use Processes

The Commercial Process Efficiency program for commercial, industrial, and institutional customers was implemented in 2008 and again in 2010. During this time the application period was very short and contained an expiration date. The ordinances outlined a multi-stage program for commercial water conservation where the applicants outline their processes for conserving water on site. The City received three applications; each was evaluated on a case-by-case basis.

Ordinance # 2013-27, was approved June 2013 to update the previous Commercial Processes Rebate Ordinances to allow commercial rebates without an end or an expiration date. Other revisions to the ordinance include requiring a pre-application meeting, annual monitoring, and post inspection to verify equipment and water savings achieved. Some eligible fixtures and devices include:

- Replacement of water-cooled equipment with new air-cooled equipment
- Process water reclamation systems
- Elimination of water intensive phases of industrial processes
- Cooling tower modifications
- Industrial laundry equipment upgrades or reuse systems
- Large-scale irrigation improvements to existing landscapes (monitoring of water savings will be two watering seasons)

As of Fall 2014, there have been two pre-application meetings but no formal applications as of yet. The program will be evaluated to determine if the upfront capital costs incurred by the customer to receive a rebate are discouraging customers from applying. A possible solution may be to determine whether some of the incentive should be received in partial payments throughout the installation of the water saving device or fixture. The Water Conservation Office will solicit feedback from commercial customers to determine what improvements need to be made to continue the program.

Commercial Landscape Irrigation Audit

As a result of high consumption or other water use anomalies, Water Division staff will conduct irrigation audits and recommend minor repairs and parts replacement. The customer is taught how to program the irrigation system controllers for maximum efficiency and receives site-specific irrigation schedules showing proper watering regimes. Irrigation auditing services have been offered to state facilities, City parks and cemeteries.

This program was discontinued due to volume of staff time required. It was transitioned into the Qualified Water Efficient Landscaper program, see section 6.7.

New Construction and Existing Commercial Users

All existing commercial water users were required to retrofit their facilities with low flow plumbing fixtures (1.6 gpf toilets, 2.5 gpm showerheads and faucets) by January 1, 2003. In August 2003, this section of the ordinance was amended in response to enforcement difficulties with an additional citable violation. Beginning in September 2003, commercial water users failing to retrofit their facilities were subject to enforcement penalties that were increased four-fold. There were approximately 2,200 commercial accounts affected by the retrofit requirement. Additionally, after receiving a citation, the non-compliant customer had 60 days to retrofit or be disconnected from water service. To date, 99.8 percent of these commercial accounts were inspected and are compliant.

This program has been completed and consequentially discontinued.

6.6 Multi-family Residential Program

Starting in 1997, apartment complexes and condominiums were offered participate in the water conservation survey and retrofit program. To encourage multi-family participation, all retrofit supplies and conservation information packets were provided free of charge. Where appropriate, Water Division staff trained the facility staff to perform the installation and leak tests. The City provided sample letters to inform the residents of the inspection. In addition, Water Division staff conducted landscape surveys and analyses, educating facility owners or maintenance staff regarding how they can improve their irrigation efficiencies. When facilities already have some water-efficient devices in place, the Water Division provided any missing water efficient hardware. This program was advertised through direct letters to the facility managers, presentations to homeowner associations, newspaper advertising, and radio announcements.

The project was completed in 2004. The funding shifted from contractor based audits to rebates directed toward the consumer. According to the GPCD calculations for 2013, multi-family accounts for 10 percent of the City's customer use. The City is looking for ways to reinstate the multi-family programs. Future considerations for an end user study are needed to determine how Santa Fe's multi-family residents are using their water and what types of programs would be helpful. The research needed for this sector is not included in the existing budget. The City is looking for additional funding to complete this study.

6.7 Training/Professional Development

Qualified Water Efficient Landscaper (QWEL) Certification Training

As the climate grows hotter and drier, the demand for "smart" irrigation technology and efficient irrigation methods is increasing. With it comes a need for "smart" landscape professionals who understand new technologies, local soil and weather conditions, and trends in water-efficient irrigation systems. The City sponsored the first Qualified Water Efficient Landscaper (QWEL) training in New Mexico in the spring of 2013. QWEL is an approved US EPA WaterSense Irrigation Auditor certification program.

The City holds classes spring and fall of each year, targeting landscape professionals. The professionals include private contractors and city park employees. The City subsidizes the class to keep the cost low for the landscapers. The class must be taught by a QWEL certified instructor. This is currently a combination of private contractors and City staff. The City has a contract in place for two trainings per year for the next two years. The City will provide ongoing evaluate of the effectiveness of the program.

Project WET

Project WET (Water Education for Teachers) is an international organization dedicated to educating teachers, students, parents and communities about water. The City provides Project WET Workshop in cooperation with the Santa Fe Public Schools (SFPS) science coordinator. These workshops are taught by the City and their Project WET partners within the state. Activities presented at these workshops focus on local issues such as conservation, water rights, water management and drought. They provide an opportunity for teachers to learn about the Project WET 2.0 Curriculum Guide and begin using it to enrich their students understanding of water properties and resources.

Project WET trainings will be held on an as-needed basis as determined by the City and SFPS.

6.8 City Properties, Infrastructure and Administration

Demonstration Garden

A demonstration garden at the Water Division office building on San Mateo features water harvesting techniques including a recycled water feature powered with solar. The garden consists of

Water Conservation and Drought Management Plan 2015

several areas designed behind a theme (e.g., desert rose garden, shades of purple, high desertscape, “zero-scape”, etc.) and incorporates efficient irrigation including a weather-based controller.

Water Division Adopted Median

The median located at Calle Lorca and St. Michaels was re-designed in September 2012 to capture 1,200 gallons of stormwater runoff and planted with drought tolerant trees and shrubs. Planting in fall allows for plants to establish for new spring growth. Re-designed signage included solar lights for nighttime viewing. The success of this re-design was due to contributions of other City Offices, including the Water Division’s Transmission and Distribution, Custodial Services and City Parks employees.

In the Fall of 2014, Water Conservation adopted medians received US EPA’s People’s Choice Award for Green Infrastructure and Low Impact Development.

Park Maintenance

The City Parks Department maintains an extensive system of parks, sports fields, rights-of-way, and street medians. The 2002 Water Division irrigation audits of parks and medians revealed marginal system design, improper installation, misaligned heads, obstacles blocking heads, and improper scheduling on the timers

In 2013, the Water Conservation Office initiated a Qualified Water Efficient Landscaper (QWEL) certification program. In an agreement with the Parks Department, their staff will be trained on water efficient irrigation techniques and technologies, how to perform annual uniformity audits, and how to improve the system for water efficiency. The Park’s staff has plans to perform annual irrigation audits throughout the City’s maintained parks. Water Conservation staff is committed to working with Parks to continue this program and implement future programs.

Buildings

The City of Santa Fe Facilities Department initially had replaced toilets and faucet aerators of City-owned buildings in 2002 in conjunction with the “Water Wise Program.” Many of these buildings are open to the public for 12 or more hours of the day and have high traffic such as recreation facilities. These fixtures have lots of wear and tear and will likely need to be replaced after 12 years.

Future plans include re-evaluating the fixtures in City buildings, beginning with those in high traffic high use areas to determine if replacement is required. Potential grant funding will be sought to replace fixtures as this expense is not included in the Water Conservation Office operating budget.

Billing System Updates

In the fall of 2013, City Council approved a new Utility Billing and Customer Information Software system to enable staff to provide higher quality customer service and accurate bills. The system will also provide customers with the ability to update personal user information, view bills and make payments. The software contractors have worked with Public Utilities staff (Utility Billing, Customer Service, Collections, Metering and Water Conservation) to make improvements and create operational procedures that will streamline workflows for all departments involved. Water Conservation staff was present at these meetings and made recommendations to improve access to consumption data, customer billing classes, administering rebates and work orders.

The system is in Beta Testing with the Utility Billing Department and is scheduled to be operational beginning March 2015.

Water Distribution Leak Repair

Santa Fe’s water system management policies call for unyielding actions by maintenance crews to repair leaks. Santa Fe systematically surveys about 20 percent of its distribution system annually for leaks using state-of-the-art leak detection methods . Leaks found during the survey are repaired immediately. Leak detection surveys were completed in:

- early 2010
- late 2011
- early 2012
- mid-year 2013
- late 2014 (as a result only 4 small leaks were found and repaired immediately)

In addition, Operations is looking for ways to improve the next flushing cycle by addressing area-by-area, the drivers for flushing and the flushing frequency. Currently the distribution flushing cycle is performed annually as water is available. Upon completion of each flushing, evaluations are completed with respect to water quality and amount of water used. Water used for distribution flushing, which is a best management practice pertaining to water quality, increases the per capita water production and non-revenue water.

In order to determine the volume of water lost to leaks (real losses), Santa Fe has completed the American Water Works Association water loss audits. The first was completed in 2006 using data from 2004. This audit determined 9.8 percent non-revenue water and provided specific recommendations to reduce the non-revenue water to an even higher degree. A second audit was performed using 2008 data. This audit uses the fundamentals of the AWWA method but diverted when calculating apparent and real losses. The non-revenue water from the 2008 audit was estimated at 6.9 percent. The City is planning for an audit of the 2014 data.

Automatic Meter Reading/ Advanced Metering Infrastructure

In September 2014, the City completed a grant from the US Bureau of Reclamation (Grant Agreement Number: R12AP40036), Implementation of Automatic Meter Reading (AMR) devices on City residential water customer's meter. This funding was used to install 1,600 automatic meter reading (AMR) devices which will better account for water used by both the City of Santa Fe and its residents.

AMR technology allows the meter reading to be sent through radio waves to a receiver in a truck that is driven within range of the transmission. The 1,600 meters installed are a little less than 5 percent of the entire water system of 34,000 meters. The old meters required visual reads on usually hand written spreadsheets. This process was subject to errors. In addition, the old meters have lost their calibration over time and were likely under registering. This also prevents customers from detecting small leaks that won't register on worn turbine meters. The new AMRs installed have shown an estimated two percent increase in revenue and an overall 99.9 percent accuracy of water consumption. The improved accuracy of the meters allows the billing system to collect accurate payments for usage and customers are responding by reducing their water use.

According to the City's AWWA water audit calculation, overall non-revenue for water within the City of Santa Fe ranges between 6.9 to 9 percent. Non-revenue water includes unbilled authorized uses such as firefighting and line flushing, as well as the real losses (leaks) and apparent losses (meter reading errors, database errors and theft). The continued purchase and installation of the AMR meters will help further decrease this overall non-revenue water in the apparent loss category.

With the successful preliminary results of the AMR program, the City decided to go forward with a similar but the newer meter reading technology called Advanced Metering Infrastructure (AMI). AMI technology increases the distance of the signal transmission, allowing the meter readings to be sent to a central location. This eliminates the need for the meter readers to drive by to pick up the signal. AMI will also allow for daily readings, further enhancing the Utility's ability to manage leaks and overall water loss. The AMI installation plan includes replacement of the 10 least accurate large meters in 2015 and replacement of all small meters by 2018.

Water Conservation and Drought Management Plan 2015

In 2014, a Request for Proposals was issued for a Meter Reading Infrastructure system and associated implementation services. The evaluation team consisted of members from the following sections within the Water Division: Public Utilities, Transmission and Distribution, Water Resources, Meter Reading and Water Conservation. A vendor was selected with a system that has the following capabilities:

- Infrastructure – use of existing cellular towers located throughout the city
- Enhanced Customer Service - offers customer web portal and cell phone application with real-time data with customizable dashboards and unique alert conditions to define and monitor exceptions
 - Consumer engagement platform that enables customers to view and understand their usage through graphs
- Hourly consumption data allows for:
 - Faster leak detection, water conservation clarity, easier compliance reporting and enhanced customer service.
- Easier compliance reporting and seamless integration with your billing system
- Efficiencies to the City of Santa Fe through re-purposing of meter reading staff due to automation of meter reads.
- Decreased fleet services and streamlined work flow for meter reading staff, and
- Improved meter accuracy by installing new meters.

6.9 Rates

In 2007, the City of Santa Fe implemented a pricing structure that encourages water conservation. High water rates along with surcharges for water use beyond limits defined by the City Council have greatly influenced the success of Santa Fe's Water Conservation and Drought Management Programs.

The rate structure adjusts seasonally to allow for additional water usage during the months when irrigation systems are typically in use. From May 1st to August 31st, residential water customers can use up to 10,000 gallons per month at the first tier rate, while the rest of the year only 7,000 gallons can be purchased at the first tier rate. In 2013, the first tier rate was \$6.06 per 1,000 gallons, and the second tier was \$21.72 per 1,000 gallons.

Effective Date	First tier	Second tier
March 1, 2009	4.43 per 1,000 gallons	15.84 per 1,000 gallons
January 1, 2010	4.79 per 1,000 gallons	17.14 per 1,000 gallons
January 1, 2011	5.18 per 1,000 gallons	18.55 per 1,000 gallons
January 1, 2012	5.60 per 1,000 gallons	20.07 per 1,000 gallons
January 1, 2013	6.06 per 1,000 gallons	21.72 per 1,000 gallons
Note: Monthly fixed fees for all meter sizes increase by 8.2% each year		

Table 14: Rate Structures

In 2009, a 5-year series of rate increases was established to pay for the construction of the Buckman Direct Diversion, one of the City's newest sources of supply, as well as to cover increasing operating and maintenance costs for the water infrastructure, which is a necessary part of a safe, reliable and sustainable water supply. The rates increased 8.2 percent per year, with 2013 marking the last year of scheduled rate increases.

Additional information about water rates can be found on the website at http://www.santafenm.gov/water_division, and select the link labeled "What are the Water Rates?"

6.10 Contribution to National Water Efficiency Research

As a national leader in water conservation, the City of Santa Fe is often approached to participate in research projects. This research allows the City to continually improve the existing water conservation programs, identify areas for improvement, and provides an avenue to share the City's successes and lessons learned.

Demand Elasticity

In 2011 the City of Santa Fe was approached to participate in the Demand Elasticity Study. This study looks at water demand responses to drought within City's that have a strong water conservation program. The study included seven other case studies (municipalities) and is sponsored by the Alliance for Water Efficiency (AWE) and the Walton Foundation. The goal of the study is to determine the extent of demand elasticity during a drought as influenced by demand management (conservation) programs implemented by a water utility prior to and post drought events.

The original research was not completed. However, as of October 2014 the AWE has met with all stakeholders and has begun reworking the study with the purpose to address two key questions:

1. Does the long term increase in water use efficiency influence an area's ability to adapt to water shortages?
2. Is customer willingness and ability to scale back consumption less now than before because of participation in conservation programs?

Upon completion of the demand elasticity study, the Water Conservation Office will evaluate the results for relevance to the City's programs.

Residential End Use Water Study (REUWS)

In early 2011 the City of Santa Fe was approached to participate in an update to the 1999 Residential End Use Study. This study investigates water use patterns in residential housing across the US and Canada. The City of Santa Fe was featured as a case study in the original 1999 study.

The City of Santa Fe's Water Division is a Level 2 participant, providing in-kind services with Information Technology Division (ITT) queries of the billing system. The research for this study largely follows the methods established in the 1999.

- North American mail survey (Level 2)
- Research database
- Data analysis and modeling to answer a broad range of research objectives
- Establishment of efficiency benchmarks
- Comprehensive and accessible final report

The draft report is expected in late 2014 and will include information on saturation rates for toilets, clothes washers and showerheads based on region. Preliminary results indicate that additional water savings have occurred in residential use since the 1999 study. The Water Conservation Office will use the results of this data to determine future residential indoor water use programs to offer City of Santa Fe water customers.

Water Demand Offset Policies

The Alliance for Water Efficiency (AWE) received funding from The Walton Family Foundation to review the conceptual framework of water demand offset policies for new development that require a "net zero" impact on total service area water demand. Ultimately, AWE's goal is to create a methodology for cost-effective implementation in other parts of the country, and particularly in the Colorado River Basin. The City of Santa Fe was asked to participate in this framework as a result of the City's Water Bank Program. The Water Bank contains accounts of consumptive water right holders, holders of water credits, and water conservation credits. Water conservation credits may be added to and purchased from the bank, and water rights may be transferred to and from it.

Water Conservation and Drought Management Plan 2015

The continuing work will require additional funding and partnerships with other organizations. At this time the City of Santa Fe has agreed to contribute in-kind services in the form of data and staff time.

NEW MEXICO OFFICE OF THE STATE ENGINEER

WANTED “BAD” FLAPPER



AGE:
Unknown

DESCRIPTION:
Noisy, Cracked, Grimy

CRIME:
Wasting Water

REWARD:
Saving Water, Saving Money!
This reward will be received
for capture and replacement
of a bad toilet flapper.

**Is Your Toilet Flapper
an Offender?**



IF SO, CAPTURE IT NOW!

— To learn how, visit www.fixaleaknm.org —

SPONSORED BY THE NEW MEXICO OFFICE OF THE STATE ENGINEER AND USBR



Figure 20: Wanted Poster for the Bad Flapper, 2011

7.0 Drought Management Plan

Since 1995, the City of Santa Fe has made significant progress in planning and implementing solutions to its complex water challenges, including drought. Santa Fe's Emergency Water Regulations Ordinance was originally enacted by the City Council in June 1996—a year of drought that followed many consecutive extraordinarily wet years. The Comprehensive Water Conservation Requirements Ordinance was passed in 1997. Both Ordinances have been extensively augmented and amended in subsequent years.

<i>Timeline</i>	
<i>Early '90s</i>	<i>City purchases Utility from PNM, subcontracts with PNM for operation</i>
<i>1995</i>	<i>City takes over full management of utility</i>
<i>1996</i>	<i>Emergency Water Regulations Ordinance</i>
<i>1997</i>	<i>Comprehensive Water Conservation Requirements Ordinance passed</i>
<i>2002</i>	<i>City of Santa Fe Drought of Record, City implements Mandatory Drought Restrictions</i>
<i>2006</i>	<i>Updated Emergency Water Regulations Ordinance</i>
<i>2006</i>	<i>Revision Water Emergency Management Plan</i>
<i>2007</i>	<i>Mandatory Drought Restrictions lifted</i>
<i>2011</i>	<i>BDD treatment plant becomes operational</i>
<i>2011</i>	<i>Another Hydrologic Drought starts</i>
<i>2013</i>	<i>Nichols Reservoir Improvements Started</i>
<i>2014</i>	<i>Nichols Reservoir Improvements Completed</i>
<i>2014</i>	<i>McClure Reservoir Improvements Started</i>

Table 15: Santa Fe's Drought Response Timeline

The demand for potable water in the Santa Fe region had grown in the 1980s and 1990s to depend on a surface water yield that was not available in 2002. The watershed reservoirs can provide up to 50 percent of the annual demand under conditions of normal precipitation. In 2002, the surface water yield was at a historical low of 740 acre-feet, only six percent of unrestricted normal water demand. Santa Fe successfully addressed its drought emergency by relying on the water conservation improvements it had previously implemented and by triggering the demand management elements provided by the emergency water regulations.

The drought of 2002 highlighted the need for long-term sustainable water resource planning and the limits of existing water resources. Santa Fe's addressed this by reducing demand through expansion and refinement of its successful water conservation and drought management program and addressing water supply issues.

The strategies the City implements to mitigate the effects of drought, include:

- Emergency water regulations (i.e., demand management)
- Conjunctive use of surface and groundwater
- Long-term sustainability of the groundwater resources
- Storage of surface water
- Municipal reservoir management
- Target flows in the living Santa Fe River
- Treated effluent for irrigation
- Additional water supply projects to meet future drought scenarios

The City has not needed to impose emergency demand management restrictions on its customers since lifting them in 2007. This is due to the City's overall and peak daily demand dropping and its overall and peak production capacity increasing. Nonetheless, the Emergency Water Regulations Ordinance revised in 2006 remains an important component of the tools the City has to manage drought. This ordinance revised the stages to the user-friendly orange and red levels. It allows increasingly stringent water-use restrictions to ensure that demand does not exceed sustainable available supply and peak production capacity.

The purpose of the Emergency Water Regulations Ordinance "is to provide the city the means

The City has not needed to impose emergency demand management restrictions on its customers since lifting them in 2007. Nonetheless, the Emergency Water Regulations Ordinance remains an important component of the tools the City has to manage drought.

to implement measures for controlling water use in response to water-system-related emergencies or catastrophic events that may disrupt systems operations.” (SFCC 1981 § 25-5.2) The Water Emergency Management Plan (SFCC 1987 § 25-5) was last updated August 2006, revising general regulations, comprehensive water conservation requirements, water waste, and emergency water regulations.

7.1 Declaration of Water Emergency

The city manager is authorized to determine and declare that a water emergency exists in any and/or all parts of the city or county of Santa Fe that is served by the city water system if any of the following occur:

- A. The water division director reports the occurrence of any of the following:
 1. A general water supply shortage due to increased demand or limited supply;
 2. Distribution or storage facilities of the city water system are inadequate to meet demand or minimum quality standards; or
 3. A disruption of the supply, storage, or distribution facilities of the city water or wastewater systems.
- B. An unforeseeable disaster or water emergency such as an earthquake, or other catastrophic event affecting the Santa Fe or Rio Grande river watershed, or groundwater supply, or other major disruption in the water supply.
- C. A foreseeable water emergency, such as extended drought conditions.

The water shortages are calculated under Section 25-5.7 SFCC 1987 (adopted as Ordinance No. 2006-53). The process looks at usable reservoir storage, SNOTEL data, groundwater management plans, and anticipate supply based on population.

7.2 Emergency Stages and Restrictions

The current Emergency Water Regulations Ordinance (updated August 2006) includes two Water Emergency Management Stages, each with increasingly stringent water use restrictions focusing primarily on outdoor use (e.g., landscape watering and vehicle washing), Table 16. Grey water use is not restricted by this ordinance and generally may be used in accordance with State regulations.

Water Conservation and Drought Management Plan 2015

- Stage “Water Warning – Orange” mandatory compliance – mandates landscape watering no more than twice a week
- Stage “Water Crisis – Red” mandatory compliance – restricts all outdoor irrigation using potable water (some exemptions apply)



Figure 21: Water Restrictions Gauge Used on SaveWaterSantaFe.com

Difference in Potable Water Use Restrictions between Emergency Stages, proposed in current Chapter 25 Amendments				as
	Non-emergency	Emergency		
Stages	NORMAL green	WARNING orange	CRISIS red	
Triggers	Supply \geq Unrestricted Demand	Supply is 80-100% Unrestricted Demand	Supply is 0-80% Unrestricted Demand	
Change-of-stage authority		City Manager based upon supply/demand data from Water Division director	City Manager based upon supply/demand data from Water Division director	
Rate	Inclined seasonal block	Inclined seasonal block	Inclined seasonal block	
Surcharges	none	none	none	
Stage-sensitive conservation measures				
Vehicle washing with positive shut off nozzle	yes	yes	no	
Days of week watering using potable water	Recommended limit of no more than three days per week	2	none	
Planting of all other vegetative materials	yes	yes; strongly discouraged; must comply with 2 day/week watering	no	
Planting of warm-season grasses	yes	yes; must comply with 2 day/week watering	no	
Planting of cool-season grasses	Strongly discouraged	no	no	
Swimming pools and spas	yes	1 initial filling only	no	
Water features	yes	yes	no	
Building restrictions	none; must comply with WBAO	none; must comply with WBAO	none; must comply with WBAO	
Posting of water emergency signs in public	no	yes	yes	
Sales of potable water outside of service area	yes	yes	no	
Year-round, stage-insensitive conservation measures				
Eating establishments serve water only upon request				
Lodging facilities to change linens no more than every four days				
Outdoor irrigation prohibited 10am-6pm from May 1 thru October 31				
Turf grass or seed mixes shall not contain more than 25% Kentucky Bluegrass				
Cleaning of outdoor hard surfaces with water is prohibited				
Swimming pools must be covered when not in use				
Fugitive water is prohibited				
Specified construction must use treated wastewater				
Public bathrooms exhibit 'water conscience' signage				

Table 16: Water Restrictions under Normal, Stage Orange and State Red Conditions

One of the keys to the success of the Emergency Demand Reduction Contingency Plan has been diligent enforcement through community policing. City of Santa Fe water conservation staff enforces applicable ordinances both by responding to specific complaints received on its water violations hotline and by patrolling the city to look for violations. Violators may be issued verbal or written warnings or citations that levy fees on the violator's water bill. Fees associated with citations start at \$20 for the first violation and become progressively higher, reaching \$200 for fourth and subsequent citations.

7.3 Preparedness

Santa Fe is continually working to secure its water supply. Under conjunctive management, surface water is primarily used when it is available, thus preserving groundwater as a drought reserve. The overall goal is to use groundwater on average at a sustainable level, potentially using more during drought and emergencies, and therefore using less when surface water is readily available.

When SJC Project water, conveyed via the BDD, came online in 2011, the City secured a second source of surface water from the Rio Grande (in addition to native Rio Grande water). The SJC water diversion improves the water security for City of Santa Fe and Santa Fe County customers. It is less vulnerable to drought than the Santa Fe River supply, due to the firm yield of SJC Project water which smooths the highly variable inflow to Heron Reservoir from the San Juan tributaries.

The City currently stores its SJC water in Abiquiú and Elephant Butte Reservoirs. The City plans to use this and future stored water to offset pumping impacts on the Rio Grande and to mitigate the effects of drought shortages on the SJC Project water and Santa Fe River. This number is constantly changing. By the end of 2010, the City will had over 33,000 AF of SJC water stored, whereas, on Oct 14, 2014 there was just under 20,000 AF.

The municipal reservoirs (McClure and Nichols) on the Santa Fe River can be managed in ways to help the City manage drought. Both reservoirs are undergoing improvements in 2013-2015 to automate levels and releases. Historically, the water system operators have targeted a carry-over storage level of 40 percent, thereby guaranteeing that even in years of low watershed yield; the Santa Fe River together with the reservoirs could contribute water to Santa Fe water supply. Using a specialized complex dynamic systems model, WaterMAPS, the City will analyze what role the reservoirs can best play in mitigating drought effects in combination with the BDD.

Santa Fe is continually working to secure its water supply. Under conjunctive management, surface water is primarily used, when it available, thus preserving groundwater as a drought reserve.



Figure 22: Santa Fe River at Bicentennial Park

8.0 Alignment of Goals & Programs

The purpose of this Chapter is to align the goals outlined in Chapter 5 with both Chapter 6 Programs and Chapter 7 Emergency Management Plans. Table 17 shows how the Water Conservation Office goals interface with the many programs that the Water Conservation Office and the Water Division provide. Each of the goals has multiple programs associated with it and many of the programs address more than one goal. All of the programs listed below are ongoing or will be under development within the next five years. Furthermore, while the existing programs are already included in the operating Water Conservation Office budget, new or future programs not included in this plan will require some budgetary increase or potential grant funding.

The goal which addresses non-revenue water (Goal 4 outlined in Chapter 5) is handled throughout the Water Division's supply side offices such as Source of Supply, Transmission and Distribution, and Meter Reading rather than coming from customer side efficiencies. Planning and coordination between the different Water Division sections is key to addressing non-revenue water. Most of the programs that the Water Conservation Office currently oversees are end-user or water customer based programs to target water efficiency at residential water use.

The programs that address education and outreach to specific groups such as children, the general public and professionals can have both quantifiable and non-quantifiable water savings. Education programs create an awareness that water is an important resource.

Emergency water restrictions are necessary depending on whether the water supply can meet demand. Emergency regulations are a tool to reduce water in short-term or emergency situations; however, programs that target peak demand and prepare residents for drought will have long standing water savings regardless of whether drought occurs.

Overall the programs outlined below have also relied on the multiple partnerships that have been created by the Water Conservation Office. The partnerships range from other City departments and offices, non-profit organizations, state and federal agencies as well as other municipalities throughout the state. These partners help the Water Conservation Office achieve all of the goals outlined in Chapter 5.

Emergency regulations are a tool to reduce water in short-term or emergency situations; however, programs that target peak demand and prepare residents for drought will have long standing water savings regardless of whether drought occurs.

Program	Description	Goal 1: Maintain low GPCD	Goal 2: Increase Water Bank/ rebates	Goal 3: Reduce Peak Demand	Goal 4: Reduce Non-Revenue Water Losses	Goal 5: Improve Drought Preparedness
Ordinances						
	SFCC 1987 § 25-2.2 Comprehensive Water Conservation Requirements Ordinance	X		X		X
	SFCC 1987 § 25-5 Emergency Water Regulations Ordinance (see Chapter 7)	X		X		X
	SFCC 1987 § 14-8.4 Landscape and Site Design Regulations	X		X		X
	City Water Budget Ordinance(s)		X	X		
	SFCC 1987 § 25-12 Water Rights Transfer Program		X	X		
	SFCC 1987 § 25-10 City Water Bank		X	X		
	SFCC 1987 § 25-11 Conservation Credit Programs		X	X		
	SFCC 1987 § 25-12 Water Rights Transfer Program		X	X		
School Outreach/ Children's Programs						
	Children's Water Fiesta	X		X		X
	Calendar and Poster Contest	X		X		X
Outreach/ Marketing						
Public Outreach and Events						
	Fix A Leak Week	X		X	X	
	Showerhead Giveaway	X		X		
	Weekly Radio Talk Show	X	X	X		X
	Water Conservation Website	X	X	X	X	X
	Demonstration Gardens and Water Conservation Median	X		X		X
	Adult Education Programs	X	X	X		X
	Media Campaign	X	X	X	X	X
	Earned Media	X	X	X	X	X

Water Conservation and Drought Management Plan 2015

Program	Description	Goal 1: Maintain low GPCD	Goal 2: Increase Water Bank/ rebates	Goal 3: Reduce Peak Demand	Goal 4: Reduce Non-Revenue Water Losses	Goal 5: Improve Drought Preparedness
	Spanish Language Materials					
	New Customer Packets		X	X		X
Commercial Outreach and Events						
	Green Lodging Initiative	X	X			
	Commercial Direct Mailing	X	X			
Miscellaneous Outreach						
	Santa Fe Master Gardener Association	X		X		X
	Mayor's Challenge for Water Conservation	X				X
Residential Rebate Programs						
	High Efficiency Clothes Washers	X	X	X		
	Rain Barrels	X	X	X		
	Irrigation Efficiency	X	X	X		
Commercial Rebates						
	Commercial Toilets/ Urinals	X	X	X		
	High Efficiency Clothes Washer	X	X	X		
	Rain Barrels	X		X		X
	Commercial Process Efficiency (CPE)	X	X	X	X	X
	Commercial Landscape Irrigation Audit and equipment Rebates	X	X	X		X
Multi-family Residential						
	Future study to determine water saving potential of Multi-family residences	X	X	X	X	X
Training/ Professional Development						
	Qualified Water Efficient Landscaper certification	X		X		X
	Project WET (Water Education for Teachers) Workshops					X

Program	Description	Goal 1: Maintain low GPCD	Goal 2: Increase Water Bank/ rebates	Goal 3: Reduce Peak Demand	Goal 4: Reduce Non-Revenue Water Losses	Goal 5: Improve Drought Preparedness
Maintenance of City Property						
	Demonstration Garden	X		X		X
	Water Division Adopted Median	X		X		X
	Park Maintenance*	X		X	X	X
	Buildings*	X		X	X	X
	Billing System Updates*				X	
	Water Distribution Leak Repair*				X	
	AMR/AMI*	X			X	
Rates		X			X	
Contribution to National Research						
	Residential End Use Water Study	X	X	X	X	
	Demand Elasticity-Hardening Study	X		X	X	X
	Water Offset Study		X		X	

*These programs are the responsibility of other departments within the City of Santa Fe. Their efforts contribute to the WC&DMP goals.

Table 17: Alignment of Water Conservation Goals and Programs

9.0 Conclusions

The Water Conservation program would not be as successful if it were not for the Santa Fe community's embrace of water conservation as a lifestyle. Since 2002, when the City enacted water restrictions, the community has recognized that drought is a way of life in Santa Fe. Drought is not the only driver of emergency restrictions; City Code reflects many conditions that constitute an emergency. With this in mind, the goals, objectives and subsequent programs are reflective of community participation.

When the region experiences drought conditions, regardless of the scale, the community responds by increasing participation in water conservation programs. The water conservation programs that have remained in place for over 10 years are those with the most community participation, such as rebates and incentives, the Children's Poster Contest and Calendar, and the Children's Water Fiesta. The Water Conservation Office modifies programs as needed to adapt to community needs; for example, the Children's Poster Contest was changed from the Spring to the Fall at the request of teachers to accommodate spring testing schedules, and the types and values of the rebates program have also changed over the years as a result of changes in technologies and funding sources.

One of the most measurable aspects of the success of the Santa Fe Water Conservation Programs is the reduction in the GPCD; in fewer than 5 years the City has been able to lower its GPCD by 5 percent. Water demand dropped 4.8 percent from 10.4 million acre-feet per year in 2012 to 9.9 acre-feet in 2013. However, when increases in population are taken into account, water use as measured by gallons per person per day dropped 5 percent. During that same time period participation in rebate and incentive programs increased 40 percent, saving 2.1 million gallons of water.

The use of the NMOSE GPCD Calculator has aided in the transparency and reproducibility of the data provided. It also takes into account all uses of water whereas, other some water systems calculate GPCD based on their residential uses and do not include system uses such as flushing and line loss. After review of GPCD methodologies from other utilities it was determined by Water Conservation Staff that the NMOSE Calculator provides a very comprehensive look at how Santa Fe uses water.

The use of the NMOSE GPCD Calculator has aided in the transparency and reproducibility of the data provided. After review of GPCD methodologies from other utilities it was determined that the NMOSE Calculator provides a very comprehensive look at how Santa Fe uses water.

Since the City of Santa Fe 2013 GPCD of 101 is already a low number, the way that Water Conservation programs are approached in the future will need to be more comprehensive to make sure all water users and demographics are being reached. The programs will continue to be adapted to community needs and changes in technologies. This Water Conservation and Drought Management Plan is a living document that will continue to be updated to reflect the changes occurring in the City of Santa Fe and beyond.

The way that Water Conservation programs are approached in the future will need to be more comprehensive to ensure that all water users and demographics are being reached.

Water Conservation and Drought Management Plan 2015

Appendix A: Authorization of 2015 Water Conservation and Drought Management Plan

CITY OF SANTA FE, NEW MEXICO

RESOLUTION NO. 2005-101

INTRODUCED BY:



A RESOLUTION

ADOPTING, APPROVING AND AUTHORIZING SUBMISSION OF A
COMPREHENSIVE WATER CONSERVATION AND DROUGHT MANAGEMENT
PLAN.

WHEREAS, The 2003 State Legislature of New Mexico has passed Senate Bill 554,
which allows municipalities, counties and other covered entities to adopt Water Conservation and
Drought Management Plans;

WHEREAS, neither the Water Trust Board nor the New Mexico Finance Authority will
accept applications from a covered entity for financial assistance unless a water conservation plan
is included;

WHEREAS, future Federal funding requests may not be accepted unless submitted with
a water conservation plan;

WHEREAS, the City of Santa Fe encourages the community to conserve water in
various ways;

WHEREAS, the City of Santa Fe has through its water conservation programs and

ordinances, achieved a very high level of conservation and drought management;

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF SANTA FE that:

Section 1. The Governing Body adopts the 2005 Water Conservation and Drought Management Plan for the City of Santa Fe;

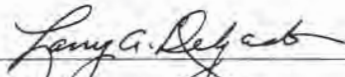
Section 2. That all future addendums and appendixes, which reflect adopted ordinance or resolution changes or statistical facts, which are developed by staff, be implemented upon approval by the City Manager or his or her designee.

Section 3. That future programs that are approved by the Governing Body for staff implementation, be added and submitted to the conservation plan.

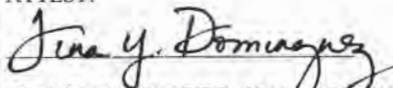
Section 4. The Water Division staff are hereby directed and requested to administer the Water Conservation and Drought Management Plan as set forth in this resolution.

Section 5. This resolution shall take effect immediately upon its adoption.

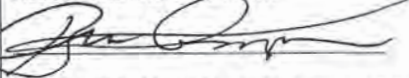
PASSED, APPROVED, and ADOPTED this 14th day of December, 2005.


LARRY A. DELGADO, MAYOR

ATTEST:


TINA Y. DOMINGUEZ, CMC ACTING CITY CLERK

APPROVED AS TO FORM:


BRUCE THOMPSON, CITY ATTORNEY

Irene/Resolution/Water Conservation Plan