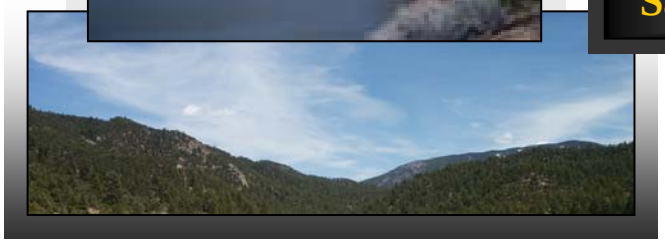
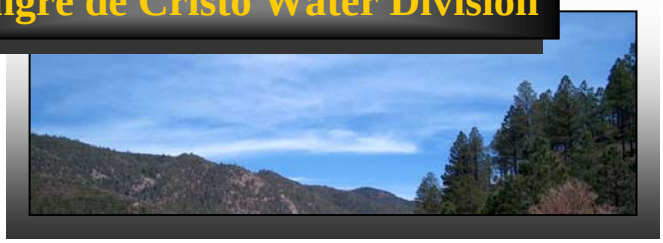
City of Santa Fe Water Conservation and Drought Management Plan

Sangre de Cristo Water Division





Submitted to the

New Mexico Office of the State Engineer

In compliance with

1978 NMSA § 72-14-3.2

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1. OVERVIEW

1.1. THE PURPOSE OF THIS REPORT

The 2005 Water Conservation and Drought Management Plan was adopted (Res. #2005-101) by the City of Santa Fe Governing Body in compliance with the state statute regarding municipal water conservation and drought management plans enacted in 2003 and complied at 1978 NMSA §§ 3-17-7 and 72-14-3.2. (Appendix A contains a copy of the enacted legislation). This Plan also meets a U.S. Bureau of Reclamation requirement for grant funding recipients.

With resolution #2005-101, the City Manager is authorized, or his or her designee, to approve all future addendums and appendixes, which reflect adopted ordinance or resolution changes or statistical facts, which are developed by staff. Future programs that are approved by the Governing Body for staff implementation will be added and submitted to the conservation plan.

The state statute provides that a municipality may submit a comprehensive water conservation plan including a drought management plan to the State Engineer by December 31, 2005; that the manner in which a municipality develops, adopts, and implements a comprehensive water conservation plan is at the discretion of the municipality; and that after December 31, 2005, neither the State Engineer 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 state statute requires that a municipality, in preparing a comprehensive water conservation plan, shall consider and, if appropriate, incorporate into its comprehensive water conservation plan the following elements:

- Ordinances and codes to encourage conservation measures
- Water efficient fixtures and appliances, including toilets, urinals, showerheads, and faucets
- Low water use landscaping and efficient irrigation
- Water-efficient commercial and industrial water use processes
- Water reuse systems for both potable and non-potable water
- Distribution system leak repair

- Dissemination of information regarding water-use efficiency techniques, including public education programs and demonstrations of water saving techniques
- Water rate structures designed to encourage water-use efficiency and reuse in a fiscally-responsible manner
- Incentives to implement water-use efficiency techniques, including rebates to customers or others, to encourage the installation of water-use efficiency and reuse measures

Additionally, 1978 NMSA § 72-14-3.2 requires that a municipal water conservation plan shall contain a section that references the state-accepted Regional Water Plan for the area and that cites conservation guidelines contained in the Regional Water Plan that have been adopted into the municipality's water conservation plan.

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. 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 had implemented the entire water conservation program elements identified in the state statute prior to the statute's 2003 enactment.

Santa Fe's water conservation and water emergency management programs are multi-faceted and include important elements not mentioned in the state water conservation plan statute. These elements include:

- Landscaping requirements
- 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 penalizes 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 policy direction and decisions of the Santa Fe City Council.

Most of the water use restrictions, new customer requirements, and water rate incentives and disincentives, are mandatory conditions of municipal water service, 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 system of water conservation incentives. It also includes improved water utility management and maintenance elements—such as water use audits, improved metering, and leak detection and repair—that have reduced water losses.

Driven by the need to limit overall water use to a level commensurate with the reduced water supply available during the recent drought, Santa Fe's water conservation emphasis has very effectively reduced water use. Santa Fe is one of the few New Mexico communities that has achieved a level of low per capita water use, discussed in more detail in Section 1.7, 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.

The state statute (1978 NMSA § 72-14-3.2) provides for submittal of municipal water conservation and drought management plans. The City of Santa Fe has already successfully implemented comprehensive water conservation and water emergency management programs. Therefore, this "Plan" document reports on these ongoing programs with reference to each of the applicable statutory requirements, as well as other important elements not mentioned in the statute. This Plan also indicates areas of desired continuing improvement to Santa Fe's successful water demand management program.

1.3. HOW THIS PLAN IS ORGANIZED

This Plan is organized into the following sections:

Section 1.0, Overview and Relation to Other Santa Fe Water Plans. This section presents the purpose and organization of the Water Conservation and Drought Management Plan and its relationship to Santa Fe's other key water plans. It demonstrates that Santa Fe has successfully implemented both a Water Conservation Plan for normal water supply conditions and a Water Emergency Management Plan to respond to reduced supplies available in times of drought or water supply shortages. It also presents Santa Fe's per capita water demand performance target by reducing annually; two gallons per capita per day (gpcd) under conditions of normal hydrology.

Section 2.0, Water Conservation Program. This section presents Santa Fe's water conservation program goals and describes the water conservation measures (elements) comprising Santa Fe's current Water Conservation Program. Subsections address each of the water conservation elements required pursuant to 1978 NMSA § 72-14-3.2.

Section 3.0, Drought Management Plan. This section presents Santa Fe's Drought Management Program.

Section 4.0, 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 2008) 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.

Section 5.0, Plan for Continued Improvements. Despite its major achievements, Santa Fe plans to evaluate and further improve its water supply, conservation, and demand management programs.

Section 6.0, Conclusions. This section summarizes where results have already been achieved and elements that show promise for further advances in conservation.

The Conservation Plan is limited to the specific water conservation and drought management subject matter addressed in 1978 NMSA § 72-14-3.2. However, this plan goes hand-in-hand with two other Santa Fe water-planning documents: the Long-Range Water Supply Plan and the Forty-Year Water Development Plan.

1.4. 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. Detailed information regarding Santa Fe's water supply system, water demand, supply forecasts, and long-range water supply plans are contained in the 2008 Long-Range Water Supply Plan. 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 and revisit water needs, and 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, WaterMAP, developed and used in defining the Long Range Water Supply Plan to assist the decision makers with water planning decisions. WaterMAP 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 WaterMAP 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. It is available on the City's website at http://www.santafenm.gov/index.aspx?NID=1030.

1.5. OSE-MANDATED 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 State Engineer 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. This plan included three types of demand management measures:

- Regulatory – mandated requirements
- Financial incentives and disincentives – toilet rebates and conservation-targeted water rate structures
- Promotion/public education – publicity, literature, workshops, etc.

Other conservation measures identified in the "Four Point Plan" include:

- Revise Water Shortage Emergency Ordinance
- Revise on-going conservation ordinance
- Continue to expand home conservation assistance program
- Develop a comprehensive public information campaign
- Continue existing enforcement efforts
- Establish landscape ordinance task force

- Cost-of-service rate analysis/rate restructuring

To show how Santa Fe will beneficially use our water rights within a 40-year planning period, Santa Fe will update its Forty-Year Water Development Plan for submittal to the State Engineer, basing demand projections on the Long-Range Water Supply Plan results and the per capita demand levels established in that plan.

Note that the key common element of per capita water use directly links all three plans.

1.6. BACKGROUND

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 Mejico, the American territory of New Mexico, (which contained what is today Arizona and New Mexico) and since 1912 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.

Figure 1, Palace of the Governors 1900

The City of Santa Fe is located in the high desert of northern New Mexico. Its economy is largely based on tourism, the arts, state and local government. The Sangre de Cristo Water Division of the City of Santa Fe produces approximately 10,000 acre-feet of water per year to supply nearly 32,000 residential and 3,800 commercial meters. The City's water supply is provided by two high mountain reservoirs on the Santa Fe River and the associated surface water treatment plant, a

well field located within the City limits, and the Buckman Well Field, which is located near the Rio Grande several miles northwest of the City. The planned BDD is a Rio Grande surface water diversion project that will allow the City and its regional partner, Santa Fe County, to conjunctively manage surface and groundwater resources in order to provide, including in times of drought, a long-term sustainable water supply. The BDD is expected to be operational in May of 2011.

The history of water use in the Santa Fe area dates back four hundred years to the settlement of the town and the subsequent growth of the area under Spanish, Mexican, and American governments. 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 alignment of the Santa Fe River to access groundwater in the local aquifer. 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 adjacent to the Rio Grande to tap into the regional aquifer, which was thought to be hydrologically connected to the Rio Grande. These wells use a portion of the SJC water to offset the annual Buckman well field pumping impacts on the Rio Grande.

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. In contrast to the growing trend in the national and international economy towards the privatization of utility service, the City of Santa Fe acquired the water utility after the City Council and the local electorate approved the purchase and financing decision. This 'public-ification' 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. The City has not opted into the Public Regulation Commission (PRC) review process.

Since 1995, the City of Santa Fe has made significant progress in planning and implementing solutions to its complex water problems. Santa Fe has planned and implemented several

related and inter-dependent initiatives addressing both supply and demand. Demand management initiatives include Santa Fe's long-standing water conservation and water emergency management program. 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 have been extensively augmented and amended subsequently. Water emergency management of customer demand was crucial during the severe drought in 2002 and the persistent drought years following.

In a nutshell, 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 successful water conservation and drought management program is only one of several essential programs Santa Fe is undertaking to assure that its available water supply will meet its aggregate customer water demand.

Santa Fe also is working hard to increase its water supply. Since 2002, Santa Fe has secured federal and state funding assistance, has substantially increased the number and capacity of its wells in the Buckman Well Field, and is rehabilitating and increasing the capacity of its Santa Fe River surface water treatment plant. In 2011, Santa Fe will divert its SJC surface water from the Rio Grande, treat the water to meet drinking water standards, and deliver the treated water to the existing water distribution system via a new pipeline system extending from the Rio Grande.

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 regulation. 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 either by requiring any new water demand to offset the water from conservation within the existing demand or through the acquisition of Rio Grande water rights.

Current long-term water supply planning is focused on long-term sustainable water supply and conjunctive use management of surface and groundwater supplies. Santa Fe annually summarizes the status of its water supplies, projects, and water resources management planning in our Annual Water Report in order to inform its customers and others interested in these topics. (Appendix B contains a copy of the 2010 report, which is also available on the City's website at http://www.santafenm.gov/index.aspx?NID=1030).
Thus, Santa Fe's water conservation and drought management program is a vital and effective component of the City's comprehensive efforts to provide a reliable and sustainable water supply. Demand management has been and will continue to be a key success factor and an integral part of Santa Fe's water resource strategy. Furthermore, recent droughts and the imperative of long-term planning have led the Santa Fe City Council to continue with additional planning and development of new analytical tools, infrastructure, regulatory structures, and regional agreements.

The City of Santa Fe is truly proud of its water conservation programs and the community participation that is the key to water conservation success.

1.7. PER CAPITA WATER DEMAND

Per capita water use is the key performance measure of any municipal water conservation program. The City of Santa Fe computes its per capita water use as the daily average of annual total water diversions from all sources of supply, less bulk water deliveries to the Santa Fe County and Las Campanas, divided by the estimated customer population served (Figure 2). In recent years, the City has also been calculating per capita water use using a methodology adopted by the State Engineer (Figure 2) and required under the City's SJC permit (SD-2487-E). This method uses number of residential and multi-family water utility customers and per household and vacancy estimates from the US Census to calculate the population.

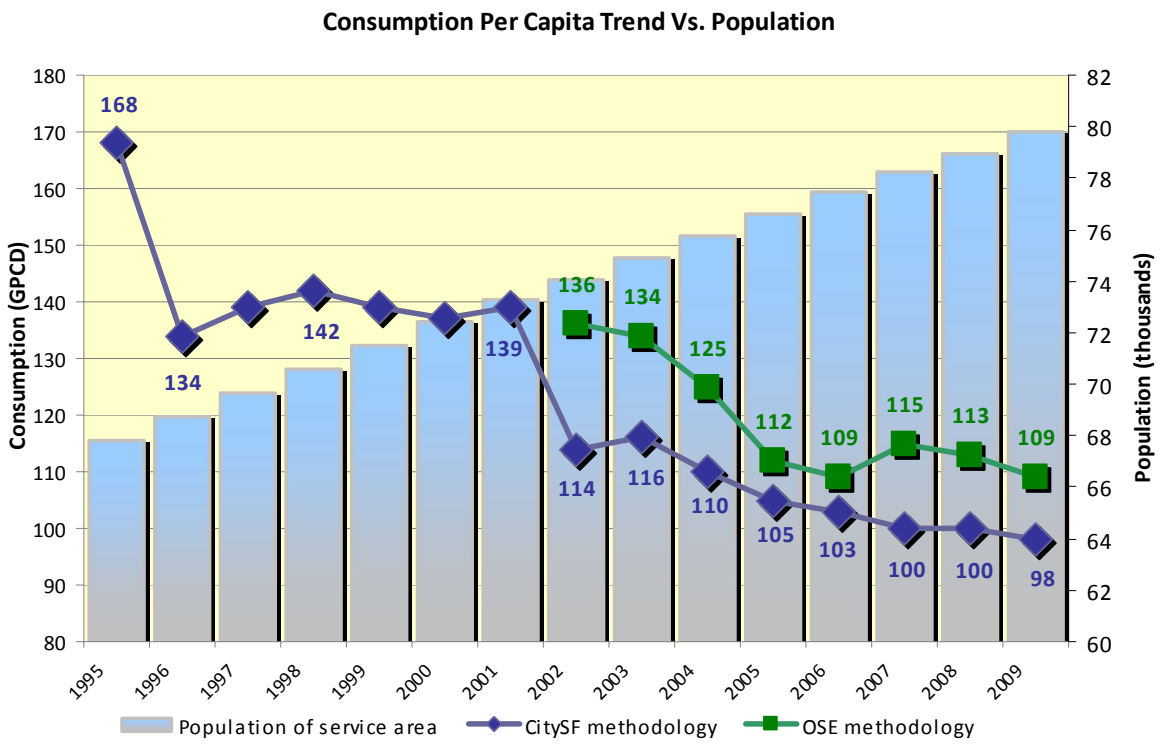

Figure 2, City of Santa Fe per Capita Water Demand from 1995-2009

Santa Fe's average annual per capita water demand for the last year has fallen to less than 100 gpcd, down from 168 gpcd in the mid 1990s (a 42% reduction). Another measure of Santa Fe's conservation success is the reduction in total annual water production to 9,978 acre-feet in 2009 compared with 13,180 acre-feet in 1995 (a 24% reduction) while the number of customers served by the Santa Fe municipal water utility increased from an estimated 67,839 in 1995 to 79,808 people in 2009 (a 15% increase).

After emergency and comprehensive water conservation requirements were adopted in 1996 and 1997, Santa Fe's per capita water demand dropped sharply from 168 gpcd in 1995 to an average of about 140 gpcd. Substantially smaller surface water supplies in 2002 prompted Santa Fe to implement the emergency provisions of its drought management plan. This included stringent mandatory water use restrictions and surcharges for monthly water use above threshold levels. Santa Fe also took additional steps, including a leak survey conducted for all 466 miles of its distribution pipelines and all of its 30,000 service connections.

The combination of prior water conservation measures, emergency requirements, and reduction in water losses resulted in total water production in 2002-2004 averaging only 116 gpcd. This extraordinarily low per capita demand persisted after the emergency requirements were relaxed in 2003 due in large part to ongoing savings provided by conservation "hardware" improvements such as low-flow toilets and reuse of treated wastewater effluent to irrigate large turf areas previously irrigated with City potable water supplies. Since 2005, Santa Fe continued a multi-faceted conservation program, discussed in detail in Section 2.0, which has resulted in a gpcd in 2009 of 98.

Current uses of treated wastewater effluent to irrigate large turf areas and for other uses totaled about 1,443 acre-feet in 2009 compared to 1,670 acre-feet in 2004. These current uses are highly seasonal and include little reuse during winter months. On an average annual basis from 2004-2009, irrigation and non-potable reuse of treated wastewater effluent (not including deliveries to Las Caompanas) totals about 12 gpcd. This per capita per day non-potable reuse is not included in the per capita water demand from potable water supplies (rivers and aquifers), as shown in Figure 2 and discussed in this section. Nonetheless, non-potable reuse is an important component of the Santa Fe water supply and has contributed to Santa Fe's extraordinarily low potable water per capita demand.

1.7.1. TARGET PER CAPITA DEMAND

The target level of per-capita demand of 110 gpcd (reduced to 100 gpcd under emergency management restrictions) and 12 gpcd of treated effluent use (Figure 3) was adopted by Santa Fe's City Council in the Long-Range Water Supply Plan. This key policy element is common to Santa Fe's water conservation and drought management plan, its water supply plan, and its water right development plan. This 110 gpcd as the target for Santa Fe's municipal water use

does not include the amount of water that Santa Fe provides on a bulk delivery basis to the County of Santa Fe and Las Campanas.

The City of Santa Fe has successfully achieved and exceeded the target of 110 gpcd. Future policy decisions include whether to set the gpcd more ambitious for potable and effluent use during non-drought-periods. With the update of this Plan, the Water Division's per capita demand goal is to reduce gpcd by two gpcd per year, which would reduce Santa Fe's gpcd to 88 gpcd by the end of 2014.

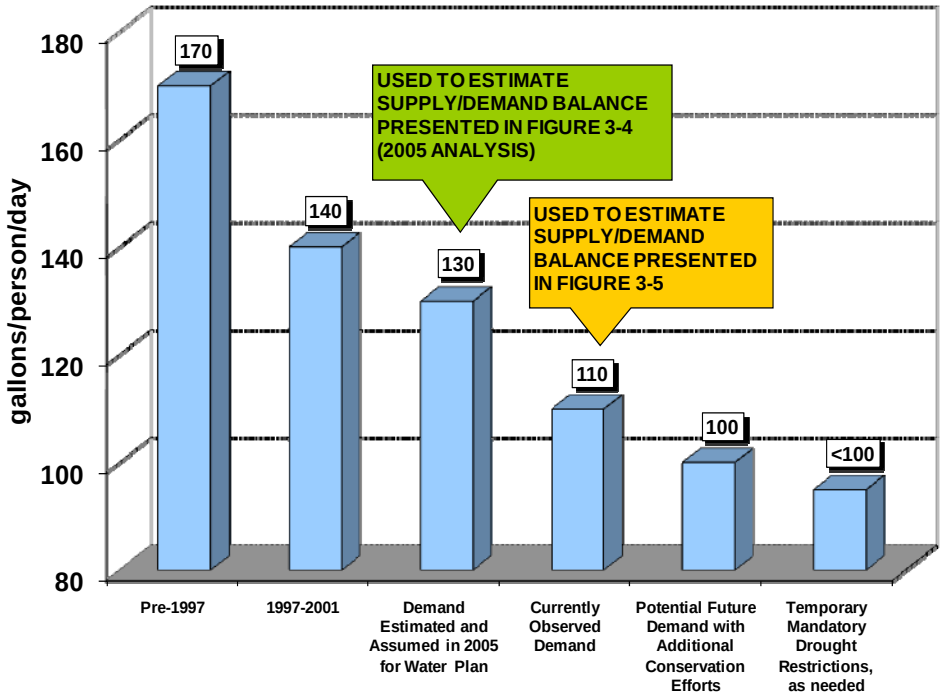

Figure 3. Historical and Projected Per Capita Potable Water Demands

Santa Fe's bulk deliveries of water to Santa Fe County and Las Campanas are included in neither the per capita demand history of the last decade nor the future targets. Both Santa Fe County and Las Campanas are independently regulated by the State of New Mexico, own water rights, own and operate water utility infrastructure, and provide service to and collect water bills from their own customers. Each is responsible for developing its own water conservation plan to meet applicable water conservation requirements and for maintaining its own infrastructure. The City of Santa Fe cannot require consumers served by these two public

water utilities to adhere to Santa Fe's water conservation and drought management requirements as a condition of continued provision of bulk deliveries.

Las Campanas was originally owned by the Public Service Company of New Mexico (PNM) and was served under a contract between Las Campanas and the Sangre de Cristo Water Company, also owned by PNM. Today, Santa Fe provides metered bulk deliveries of potable water and treated effluent to Las Campanas under the terms of a 2003 settlement agreement that ended litigation over the interpretation of the contract and Santa Fe's authority to place water conservation limits on Las Campanas' water use. As per the settlement agreement, once the BDD project is operational in 2011, Las Campanas will no longer be a potable water customer of the City.

The County owns its own public water utility and receives water both from the City of Santa Fe as metered bulk deliveries and from the operation of its own wells. The County has developed its own water conservation and drought management requirements that apply to the County water utility and its customers and to residents of unincorporated areas of Santa Fe County. Today, Santa Fe provides bulk deliveries to Santa Fe County pursuant to several formal agreements between the two parties, which are 500 AFY wholesale and up to 850 AFY in drought protection water (if needed). However, once the BDD is operational Santa Fe County will rely on the new regional water supply facility for the majority of its water needs (Santa Fe County Conjunctive Management Plan for the Santa Fe Basin, January 2009).

2. WATER CONSERVATION PROGRAM

This section presents Santa Fe's water conservation program purposes, goals, objectives, and elements. Subsections address each of Santa Fe's water conservation program elements presented in the same order that these elements are listed in 1978 NMSA § 72-14-3.2.

2.1. WATER CONSERVATION PROGRAM PURPOSE, GOALS, AND OBJECTIVES

The City of Santa Fe Governing Body has established by ordinance the overarching set of purposes for Santa Fe's water conservation program. The purpose of the Comprehensive Water Conservation Requirements Ordinance "is 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 by establishing financial incentives for water conservation." (Appendix C contains the text of the ordinance SFCC 1987 § 25-2.2)

The purpose of the Emergency Water Regulations Ordinance "is to provide the city the means to implement measures for controlling water use in response to water-system-related emergencies or catastrophic events that may disrupt systems operations." The ordinance defines that a water service emergency includes a general water supply shortage to increased demand or limited supply. (Appendix D contains the text of the ordinance SFCC 1987 § 25-5)

The purpose and intent of the Landscape and Site Design Regulations established by ordinance are to "foster the creation of regionally appropriate, sustainable landscapes, [and recommend] the utilization of water harvesting and [encourage] the development of utilization of other alternative sources of landscape irrigation water, because potable water is an increasingly scarce resource. Water conservation, water harvesting, and irrigation efficiency shall guide landscape design, installation, and maintenance to foster a responsible and judicious use of our water…" (Appendix E contains the text of the ordinance SFCC 1987 § 14-8.4)

The City Water Budget Ordinance requires the establishment of an annual water budget that allocates water for new residential and non-residential development connecting to the City of Santa Fe water system. Its purposes include increasing Santa Fe's water conservation efforts, including mandatory water saving strategies for new connections, such that new water

demands will be offset by conservation results so as not to increase the total water system demand. (SFCC 1987 § 14-8.13 and SFCC 1987 § 25-9)

An overarching City of Santa Fe goal for its water conservation plan and program is to meet the potable per capita water demand targets for normal water supply conditions as established by the Governing Body. Through the adoption of the 2005 water conservation plan and the Long-Range Water Supply Plan, the Governing Body established this goal at a level of 110 gpcd. The new goal associated with the update of this Plan is to reduce gpcd by two gpcd per year.

The Sangre de Cristo Water Division updated its strategic plan developed in April 2004 with 2010 Mission, Goals, and Objectives (MGO). It articulates the Water Division's 14 overarching goals, one of which addresses demand management and conservation. That goal and the six associated objectives are as follows:

Water demand management and conservation goal—to manage and reduce our customer demands through the development and implementation of water conservation programs and enforcement of water use ordinances.

- To update water conservation and drought management plan and submit to the State Engineer and Bureau of Reclamation in 2010
- To maximize portion of acequia deliveries from non-potable water
- To Identify high water users and determine how to address them
- Provide increased customer outreach and marketing of water conservation customer opportunities
- To set target for quantity of conserved water for development bank (annually)
- To evaluate the contribution of various water conservation programs

Several strategic objectives of this plan also relate directly to water conservation but are associated with other operations goals. These objectives are listed below. 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 maintain ability to reliably meet annual and peak daily customer water demand.

- To write and approve annual operating plans to strategically use available sources of supply considering hydrology, preferred use of renewable resources, demand, and legal constraints.
- 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. *(Addressing water distribution system leaks is one of the specific requirements specified at 1978 NMSA § 72-14-3.2 D. (2) (e)*
- To conduct non-revenue water audit on an annual basis as a division-wide program including comprehensive meter testing program and distribution system leak detection and be at or below industry average by 2012.
- To quantify and reduce sources or causes of non-revenue water by replacing the 10 least accurate large meters in 2010, and create and implement a formal comprehensive meter testing program analysis of results, and guidance for meter replacements. *(Accurate customer water use metering is necessary to maintain unaccounted-for water at an acceptable level)*
- To complete distribution flushing cycle originated as result of 2004 MGO. 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. Evaluate beneficial reuse of flushing water. *(Water used for distribution flushing, which is a best management practice pertaining to water quality, increases the per capita water production)*
- To implement 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)*
- To initiate or participate in regional planning and management as a rational, fair, and responsive partner (e.g., Jemez y Sangre, EBTAG, Santa Fe County, LANL, OSE, EBRIF, Pueblos, Aamodt, Anaya, SJC contractors). *(Addressing water conservation alternatives and recommendations in the Regional Water Plan is a specific requirement of 1978 NMSA § 72-14-3.2 E)*

2.2. WATER CONSERVATION PROGRAM ELEMENTS

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
- Requirements that new development implement stringent water conservation measures and take other steps as required to offset the new demand on the existing water system

For the convenience of reviewers in relating this water conservation plan to the requirements of 1978 NMSA § 72-14-3.2, each subsection below describes these elements as they relate to state statute requirements. Subsections are titled with language contained in the state statute.

2.2.1. ORDINANCES AND CODES TO ENCOURAGE CONSERVATION MEASURES

The state water conservation plan statute language is "to encourage" water conservation through ordinances and codes. The City of Santa Fe has enacted several ordinances and resolutions that go well beyond "encouragement." Santa Fe has achieved the extraordinarily low per capita water demand levels described previously because the Santa Fe Governing Body has enacted and implemented a comprehensive set of ordinances that require Santa Fe's citizens and businesses comply with a comprehensive set of water conservation requirements and pay water rates designed to provide financial incentives to conserve water. Most elements comprising the Santa Fe water conservation and drought management program are mandatory, necessitated by drought-reduced water supplies that have not been adequate to meet the previously normal levels of demand.

Water ordinances and regulations are complied in Chapter 25 of the Santa Fe City Code. Water conservation and demand-offset requirements relating to new development are complied in Chapter 14. The water conservation and drought management sections within these two chapters of the Santa Fe City Code effectively are Santa Fe's water conservation plan.

Comprehensive Water Conservation Requirements Ordinance

On June 25, 1997, the City's City Council adopted a comprehensive water conservation ordinance. This ordinance prescribes regulations and provides financial incentives for water customers to reduce their water use. The ordinance is amended and changed as new programs are added. (Appendix C contains the text of the ordinance SFCC 1987 § 25-2.2)

Emergency Water Use Ordinance

The City's primary drought management tool is the Emergency Water Regulations Ordinance, which was adopted in 1996. This ordinance allows the imposition of more severe water-use restrictions as necessary to ensure that demand does not exceed sustainable available supply and production capacity during years of low snowfall in the upper Santa Fe river watershed. (Appendix D contains the text of the ordinance SFCC 1987 § 25-5)

Landscape and Site Design Ordinance

The Governing Body established a Landscape and Site Design Ordinance Task Force, which was charged with "reviewing and making recommendations on the proposed Landscape and Site Design Ordinance." The Task Force was appointed in October of 2000 and held 13 public meetings beginning November 6, 2000. The Landscape and Site Design Ordinance was collaboratively written by City planning staff and Task Force using the 1997 Draft Landscape and Site Design Ordinance as a baseline document. The Landscape and Site Design Ordinance was adopted by the City Council at the July 25, 2001, meeting and was effective as of August 6, 2001. (Appendix E contains the text of the ordinance SFCC 1987 § 14-8.4)

Annual Water Budget Ordinance

The 2003 Annual Water Budget Ordinance and the associated regulations and procedures that the Governing Body adopted by resolution #2002-55 September 25, 2002, and revised by resolution # 2003-106 December 10, 2003, requires that all new construction to be 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-use toilets (typically 3.5 or 5 gallons per flush) with low flow toilets (1.6 gallons per flush). In 2005, the Water Rights Transfer Program (SFFCC 1987 § 25-12) modified the 'offset' requirements in this ordinance by mandating that development projects with large water budgets (five acre-feet for commercial and ten for residential) 'offset' their future demand with

Middle Rio Grande valley surface water rights instead of water conserved through toilet retrofits. Additional discussion of this ordinance follows in a subsequent section.

By explicitly stated legislative findings, purpose, and intent, this ordinance clearly states the need to pursue available avenues for increasing the City's water supply to quantify total system water supply and demand, and to develop annual water budgets reflecting current water supply and demand information. The ordinance explicitly recognizes that the water use of current customers has decreased by their heroic conservation efforts to the point that quantification of future system demand must consider the pent-up water demand of these customers. This recognition by the Governing Body relates to the discussion of per capita demand targets in the introductory section of this plan.

In 2009, the City updated a 1998 analysis of water use by customer sectors necessary for the City's use in creating development water budgets. The Water Use in Santa Fe II analysis is available on the City's website at http://www.santafenm.gov/index.aspx?NID=1030.

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). 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 brings 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. (Appendix F contains the text of the ordinance SFCC 1987 § 25-9)

2.2.2. WATER EFFICIENT FIXTURES AND APPLIANCES, INCLUDING TOILETS, URINALS, SHOWERHEADS, AND FAUCETS

The City began a water conservation survey and retrofit program in 1997. This program provides free water conservation assistance to residential customers, providing them with interior conservation devices and literature, a thirteen-month summary of water consumption, leak inspection, irrigation inspection, and "hands-on" conservation assistance (e.g., adjusting toilet water levels, repairing minor leaks, etc.).

The residential customers are divided into two groups: single-family, and multi-family. Each group participates in the water conservation survey and retrofit program as described below:

Single-family Residential Program

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

Multi-family Residential Program

Apartment complexes and condominiums may participate in the water conservation survey and retrofit program. To encourage multi-family participation, all retrofit supplies and conservation information packets are provided free of charge. If necessary, Water Division staff will train the facility staff to do the installation and leak tests. The City provides sample letters to inform the residents of the inspection. In addition, Water Division staff will conduct 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 provides any missing water efficient hardware. This program is advertised through direct letters to the facility managers, presentations to homeowner associations, newspaper advertising, and radio announcements.

Ultra Low Flush Toilet Retrofits

The City set a goal in April 2002 to replace 10,000 high-flush toilets with ultra-low flush toilets (ULFTs) by August 2002 thereby conserving 300,000 to 400,000 gallons per day. Along with the toilet installations, low flow showerheads and faucet aerators were installed.

The Water Wise Santa Fe Toilet Replacement Program began with an aggressive advertising campaign including a new logo “reduce your use-go with the flow.” Advertisements included radio, newspaper, and information on racks located throughout the City. Applications/vouchers could be obtained at scheduled Saturday events, at the Water Division, Water Wise Program Office, or by calling the City of Santa Fe Water Wise Program. Water Wise program costs totaled $830,000.

Number of ULFT installations: Commercial: 2,479; Residential: 3,722; Non-profit: 80; Multi-family: 1,786; Total: 8,067 installations.

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. The program was advertised through letters sent directly to the highest-volume water users.

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.

New Construction and Existing Commercial Users

The Comprehensive Water Conservation Requirement Ordinance provides that newly constructed buildings must have water-efficient fixtures and water saving devices.

All existing commercial water users were required to retrofit their facilities with ultra low flow plumbing fixtures (1.6 gpf toilets. 2.5 gpm showerheads and faucets) by January 1, 2003. This retrofit requirement may be the only one of its kind in the country. 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. The remaining accounts were vacant and must be compliant before they receive new service.

2.2.3. LOW-WATER-USE LANDSCAPING AND EFFICIENT IRRIGATION

The comprehensive water conservation ordinance and the landscaping and site design ordinance discussed in section 2.2.1 have water conservation elements addressing requirements for low-water-use landscaping and efficient irrigation. Additional conservation program measures addressing these topics are described below.

Conservation in City Parks

The City Parks Department maintains an extensive system of parks, sports fields, rights-of-way, and street medians. The City identified problems and barriers impeding rehabilitation of the irrigation systems used in these areas, including:

- Antiquated irrigation systems and manual controllers
- Little or no budget for rehabilitation beyond routine care
- No accountability for the water bills
- Inadequate staff education in current irrigation management and equipment
- No guidelines for irrigation systems on lands dedicated to the City
- Under-utilized irrigation management equipment
- Public perception of water wasted in the parks and on the medians

Water Division irrigation audits of parks and medians revealed marginal system design, improper installation, misaligned heads, obstacles blocking heads, improper scheduling on the timers, etc. A report was prepared suggesting short-term and long-term improvements.

Water Division staff has inspected several medians with the Parks Department field crews, noting problems and procedures currently in use. The field crews have been responsive to the input and analysis provided. Irrigation audits are being conducted on a park-by-park basis with participation of Parks Department staff.

The Water Division received a federal grant to produce and publish a guidebook to establish irrigation equipment standards for the City. Irrigation designers and installers are encouraged to use the City of Santa Fe Landscape Irrigation Systems Standards as a guide to minimum specifications for irrigation systems. Setting standards for new acquisitions will eliminate substandard and incompatible materials, and in some cases, have proper designs include

remote monitoring equipment. The guidebook, "Landscape Irrigation Design Standards," is available on-line at http://www.water2conserve.com/lawn_garden/irrigation_efficiency.html.

On December 2, 2002, Parks & Recreation Department submitted the long-range plan for park rehabilitation that included installation of synthetic turf, turf reduction and rehabilitation. The plan proposed to reduce the total turf acreage by ten percent (about 30 acres), to use evapotranspiration (ET) based irrigation scheduling including utilization of four weather stations and to fine-tune the irrigation systems. This would save an estimated 20 million gallons of water annually, a 25 percent savings.

Adult Education Classes

Summer outdoor water use is typically the largest single water use in a home or office and occurs during the peak of annual water demand. 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. These classes were initially advertised through the annual City of Santa Fe Parks and Recreation Activity Guide. In addition, flyers were distributed in the information racks throughout the city, and notices were posted in the event calendars in local newspapers.

The Water Conservation Office received a resolution from the Governing Body to develop a "Water Smart" education and rebate program. Staff was directed to develop classes on how to conserve water in the landscape through proper irrigation design and techniques. The incentive for participation would be a rebate on water bills or water conservation devices for their toolbox. As a result, two new classes were implemented in 2008; a two-hour drip class for homeowners and a one-day irrigation class for contractors. Water Conservation staff teach both classes.

Commercial Landscape Irrigation Audit

On request, Water Division staff 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.

2.2.4. WATER-EFFICIENT COMMERCIAL AND INDUSTRIAL WATER USE PROCESSES

Most of Santa Fe's commercial water use occurs at government buildings, multi-family housing, hotels and motels, restaurants, and schools. There are a few small, water-intensive industries within the City dedicated to food processing and beverage bottling.

Santa Fe's commercial water uses have been addressed pursuant to the City comprehensive water conservation ordinance as described in section 2.2.1. Requirements include mandatory retrofits of water fixtures and other water-saving measures. Incentives, audits, water rate surcharges, and education have also targeted this sector.

State government buildings that have not retrofitted their fixtures remain as one of the incomplete water conservation opportunities in this category.

The Commercial Process Efficiency program for commercial, industrial, and institutional customers was implemented January 1, 2010, and is a multi-stage program with each application evaluated on a case-by-case basis. A free service to Santa Fe Water Utility commercial customers is available to evaluate all aspects of their water consumption to determine how their business uses water. Auditors will suggest opportunities for reducing water consumption and discuss their eligibility for special commercial rebates.

Automated Meter Reading Program

In 2004, the City approved funding for a Remote Water Meter Reading Pilot Project for $216,000 to install 1000 Datamatic Firefly Automated Meter Reading Devices (AMR) into on a select group of residential and commercial customer water meters. This pilot project proved to be effective at educating customers and reducing water usage. In 2006, the city implemented the project citywide and it was completed in less than two years. The total cost of the project was approximately $3.6 million dollars.

The AMR program benefits both the city and its customers, in terms of active water conservation:

- by alerting the Meter Reading section to an intermittent or continuous leak (a minimum of ten gallons of water per hour for a 24-hour period) at a residence or business, thus quickly identifying a leak rather than having it go unnoticed for months
- by recording up to 72 days of hourly consumption and flow data for each meter
- by allowing the "profiling" of water usage for customers to analyze usage trends and patterns of each utility account, including time of day and volume
- by allowing the "right sizing" of water meters by examining the daily consumption of water and insuring that the customer's meter is of the appropriate size for their usage of water and ensuring that all water usage, both low flow and high flow, is being accurately recorded and billed
- by alerting the Meter Reading Section of any tampering or theft of service at the water meter
- by assisting the water conservation enforcement effort, through profiling, to determine if and when irrigation is occurring in violation of the city's water conservation ordinances, including adherence to odd/even watering days
- by using the profiling component of this system to further educate customers on their water usage and water conservation responsibilities

City staff is developing a replacement program since the AMR program is quickly approaching five years of existence. The battery life for the AMR's is 15 years and is warranted for ten. Since automated meter reading technology is constantly changing, city staff is exploring other options that are available to us that will enhance our service. For example, a tool that interfaces with the AMR to produce water use information for the water user without the need to open the meter can lid, which allows the water user to know how much water they are using monthly, weekly, daily, or hourly.

Multi-family Residential Program

This program provided free water conservation assistance to multi-family customers at seven sites with 100 or more units. A contractor to the City conducted surveys and provided retrofits on 20 units per site, including leak inspection, determination of water conservation potential at site, landscape and irrigation audits, recommendations, and showerhead and aerator retrofit. The landscape audit included up to three zones and recommendations for efficient water use. The City contractor presented survey and audit results to the complex manager.

Commercial Training

This program provided 12 half-day training workshops designed for specialty sectors: the hospitality industry, the restaurant industry, schools, and Government. The workshops were available to accounts that will not receive an audit. Materials were provided to attendees on how to determine their water conservation potential and equipment and water-saving system recommendations applicable to their business sector. The workshops were held as follows: Hospitality Industry July 2002; Restaurant Industry October 2002; General Commercial Business February 2003.

Commercial Audits

A City of Santa Fe contractor conducted water use audits for many of Santa Fe's highest-volume commercial customers, including five major facilities such as large hotels, St. Vincent's Hospital, and others. The contractor audited six of the largest restaurant accounts, 12 college and office buildings, and 70 small businesses. Audit reports included recommendations for efficient water use and identification of the continued monthly water bill savings resulting from changing toilets to ultra-low-flush models.

2.2.5. WATER REUSE SYSTEMS FOR POTABLE AND NON-POTABLE WATER

The City has agreements to distribute treated wastewater effluent for irrigation use to various locations in the Santa Fe area, including Las Campanas, the Municipal Recreation Complex, the Santa Fe Country Club, the Santa Fe Horse Park, and The Downs of Santa Fe Race Track. The average volume of effluent reused in 2001-2004 was 1,330 acre-feet per year. 2005–2009 averages were 1,464 acre-feet per year.

Most of treated effluent is used to meet irrigation needs during the growing season from May to October. Nearly all of the City's treated wastewater is discharged into the Santa Fe River during the winter months, with the exception of treated effluent sold for construction and road maintenance.

Santa Fe also encourages water harvesting, which is a type of non-potable water reuse, with rebate incentives as described in section 2.2.9.

In the Long-Range Water Supply Plan, the City considered the costs, benefits, and issues associated with treatment of its wastewater to meeting drinking water standards and using the treated water as the supply for an aquifer storage and recovery program. This alternative did not survive the screening level evaluations due to high cost, public acceptability issues, and the availability of superior alternatives.

2.2.6. DISTRIBUTION SYSTEM LEAK REPAIR

A City of Santa Fe contractor completed a leak detection survey in September 2002 of almost the entire municipal water distribution system. Approximately 483 miles of pipe were surveyed. Leaks detected on the utility side of water meters were repaired. Customers were notified and requested to repair leaks detected on the customer side.

Santa Fe's water system management policies call for aggressive actions by maintenance crews to repair leaks. Santa Fe plans to systematically survey about 20 percent of its distribution system annually for leaks using state-of-the-art leak detection methods. Leak detection surveys were completed in late '07/early '08, late '09/early '10, and will happen in late '10/early '11. Leaks found during the survey are repaired immediately.

Santa Fe also contracted for a comprehensive audit of its water supply system, which was completed with a report dated July 26, 2005. The auditor's job was to evaluate the system's water use efficiency using standard methods prepared by the American Water Works Association. The auditor reviewed all water production and consumption data for fiscal year 2004. Non-revenue water production, which is the amount of total water production that was not metered and sold to customers, was 9.8 percent of total water production, which is slightly better than the 10 percent AWWA national guideline recommendations. The City has evaluated and implemented specific recommendations of the auditor to reduce the non-revenue water to an even higher degree. These recommendations include large meter testing, replacement of residential meters after their useful life, increased use of effluent for irrigation purposes, performing regular leak detection surveys, and performing annual water audits. The water audits for 2008 and 2009 are being finalized for inclusion into an annual internal water audit program.

2.2.7. DISSEMINATION OF INFORMATION REGARDING WATER-USE EFFICIENCY TECHNIQUES, INCLUDING PUBLIC EDUCATION PROGRAMS AND DEMONSTRATIONS OF WATER SAVING TECHNIQUES

Santa Fe's conservation ordinances mandate dissemination of information regarding water conservation.

Public Restrooms: An 8 ½" x 11" conservation message must be posted in all public restrooms. The City provides the signs or language (below), to be used if the customer elects to design their own materials.

> *Saving Water is always in season! Santa Fe is located in a high desert area with limited water supplies. Regardless of weather conditions or reservoir levels, water should always be treated as a precious natural resource. Whether you live here or are just visiting our fine city, please help preserve Santa Fe's future by conserving water whenever you can. Thank you for helping to keep Santa Fe a "water friendly" community!*

Retail Plant Nurseries: These businesses must provide conservation information to their customers. The City provides literature for distribution. In cooperation with the City, area nurseries are also beginning a program to tag or label low-water-use plants.

Landscape Contractors and Architects: These businesses must provide their clients with low-water-use landscaping literature. The City provides literature for distribution.

Real Estate and Permitting Transactions: Persons conducting real estate transactions, applying for building permits or initiating City water service receive City-provided water conservation literature.

Literature Racks: Water conservation literature is placed in easy-to-see racks in strategic locations around the City in places such as City Hall, libraries, grocery stores, City-owned gyms and other businesses.

Public Outreach

Water conservation promotion has been and will continue to be extensive. Several media are used: radio advertisements, newspaper ads and articles, water bill inserts, distribution of literature via information racks located throughout the City, distribution of promotional items and participation in community events such as Earth Day, Community Day, Gardening Week, Home Shows, Health Fairs, etc. Additional public outreach efforts include large exterior bus ads, television commercials on Comcast, radio advertisements, newspaper ads, and promotional commercials in local movie theaters. Advertisements in local media are a useful tool to reach a large audience regarding time-sensitive material such as the declaration of water restrictions.

"Water Talk with the City of Santa Fe," weekly on KSWV Radio AM81, hosted by Joe Abeyta has been a very positive and successful outreach tool for the Water Conservation Office. The show first aired in April of 2003 and has become a resource for information related to water, current events, and the City in general. Guest speakers have included the Mayor, City Manager, Division Directors, Supervisors, Dignitaries, and City staff.

Free water saver kits have been distributed to customers at the Water Division office and at special events, such as health fairs home improvement shows, and the Children's Water Fiesta. Kits contain a low flow showerhead, toilet leak detection dye tablets, faucet aerators and a magnet showing outdoor watering days.

Education Programs

Water conservation education occurs on several levels. The Water Division sponsors in-school learning units, teacher training, adult education classes, brochures, and other public outreach.

A group effort between the City of Santa Fe and the Office of the State Engineer (OSE) produced a training DVD "Irrigation Maintenance 101." The training targets the maintenance worker such as Parks personnel, State personnel, and contractor laborers that work in the field on sprinkler systems.

In-School Learning Units and Teacher Training

In-school program offerings are designed to increase student awareness of the importance of water conservation, and to expose students to this message several times throughout their education.

In 2004, the Santa Fe Public Schools ran a water education summer school for grades K-8. The Water Conservation Division in partnership with the State Engineer trained 60 teachers to use six water curriculums for their summer programs and designed a weekly program for each teacher on water themes.

City staff continues to promote the inclusion of a water unit in elementary school teaching plans. Initially, the Center for Hands-On Learning Kits have been offered to teachers to provide them with easy-to-use materials and equipment. The kits include the basics of water science (hydrologic cycle, how water moves through the ground, watersheds, etc.) and gives an overview of how water treatment plants work. Training in Project WET (Water Education for Teachers) has been offered to Santa Fe teachers. A number of City staff have been trained as facilitators in Project WET and in turn have trained teachers to fully incorporate water education into their classrooms. Teachers must attend a one-time six-hour workshop to receive the Project WET Activity Guide that contains more than 90 water education activities. Teachers are provided with an incentive of $50 to attend the training.

The City hopes to purchase additional water conservation curriculum for teachers to check out for all grade levels and all disciplines. Along with the kits and offering Project WET training, a classroom presentation by water conservation staff is offered to each teacher every year.

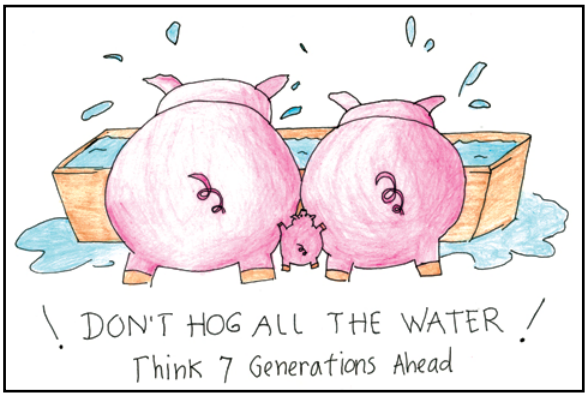

Figure 4, First Grand Prize Winning Poster

Poster Contest

In 2004, the City of Santa Fe sponsored its first Annual Water Conservation Poster Contest. The contest is open to all Santa Fe elementary school children and asks students to express what water conservation means. There are 18

winners, three from each grade. Each first place winner receives a $100 US Savings Bond, second place $75 US Savings Bond, and third place $50 US Savings Bond. All winners receive a trophy with their poster image embossed and a water conservation prize package. First and second place winning posters are featured in each year's water conservation calendar. One Grand Prize winner is awarded each year and this poster image is displayed on the back of a City bus for one year.

Children's Water Fiesta

The first Santa Fe Children's Water Fiesta was held on March 13 & 14, 2003, at the Sweeney Convention Center where students and teachers gathered to celebrate water. The Santa Fe Children's Water Fiesta continues to be a growing success. Educating students and teachers about water and its relationship to human and other natural resources in a fun and interactive atmosphere is the primary goal of the event. The activities are designed to help students understand that water is an essential and limited resource and teach what each of us can do to protect and conserve our precious water.

Traveling Earth Week Water Festival

In partnership with the New Mexico Environment Department Water Quality Bureau, the City of Santa Fe Water Division hosts a Traveling Earth Week Water Festival for fourth graders, including a variety of activities. This event is designed to reach as many students as possible in a short time to demonstrate how water issues surround the basic premise of Earth Week and what each individual can do to help.

Conferences

Educating landscape contractors and maintenance personnel led the way to a very successful New Mexico Landscape Training Conference "Saving Every Drop" November 5-7, 2007. The conference was made possible through a cooperative effort between the City of Santa Fe and the New Mexico Water Conservation Alliance. The conference focused on current and advanced technologies intended to address efficient water use. The one-day conference was followed by two days of Irrigation Association (IA) classes.

The Santa Fe Water & Energy Summit and Expo was a combination of events held April 24-27, 2010, at the Hilton Santa Fe Historic Plaza in partnership with Santa Fe County and the Santa Fe

Area Home Builders Association. The purpose of the events was to bring together agencies, organizations, and individuals to learn about the close relationship between water and energy, and to provide tools and information about resource conservation.

The Water & Energy Summit was designed for individuals interested in the water and energy conservation fields. The Water & Energy Expo was a free program featuring workshops, presentations, and booths from local businesses and non-profits. Additionally, the American Rainwater Catchment Systems Association (ARCSA) held a two-day accreditation course, which was designed for individuals desiring to pursue a career in rainwater management.

Guest Lectures and Demonstrations

Water conservation staff serves as guest conservation lecturers for civic groups, schools, radio talk shows, homeowner associations, and conferences. This opportunity is anticipated to grow as additional groups become aware of this service.

A 3-dimensional groundwater model was purchased to illustrate water movement through aquifers. This has been used at public demonstrations and children's special events.

Demonstration Gardens

Three gardens are in the development stage for demonstration purposes. A small median at the intersection of Calle Lorca and St. Michaels will demonstrate a precipitation only garden. The project will incorporate soil improvements, design elements, and plant selection.

The Water Conservation Office building has a demonstration garden in progress showing permaculture techniques. The area includes use of a pumice wick that collects water from the roof and channels it to vegetation. The Water Conservation Office plans to incorporate drip irrigation, low water use grass, and water harvesting catchment system to display rainwater collection and storm water reduction. Additional plans include implementing evapotranspiration (ET) technology, developing a brochure describing the garden and providing gardening tips, and providing information on the water conservation web site for use as a training tool.

Another demonstration garden at the Water Division is under way. This garden will feature water harvesting techniques including a water feature powered with solar. The garden will consist of several areas designed behind a theme (e.g., desert rose garden, shades of purple, high desertscape, zeroscape, etc.) and will incorporate efficient irrigation including a weather based controller. Signs and brochures will be developed to educate the public including information on the water conservation web site.

2.2.8. WATER RATE STRUCTURES DESIGNED TO ENCOURAGE WATER-USE EFFICIENCY AND REUSE IN A FISCALLY-RESPONSIBLE MANNER

As described in section 2.2.1 regarding conservation ordinances and in Section 3.0 describing the ordinance that sets forth the City of Santa Fe's drought management plan, the City of Santa Fe has implemented a pricing structure that encourages water conservation. High water rates along with surcharges for water use beyond limits defined by the Governing Body have greatly influenced the success of Santa Fe's water conservation and drought management programs. (Appendix G contains the history of water rates in Santa Fe effective July 1, 1995)

2.2.9. INCENTIVES TO IMPLEMENT WATER-USE EFFICIENCY TECHNIQUES, INCLUDING REBATES TO CUSTOMERS OR OTHERS, TO ENCOURAGE THE INSTALLATION OF WATER-USE EFFICIENCY AND REUSE MEASURES

A goal for the City of Santa Fe is to be the "Conservation Capital of the Nation." To be the leader in water conservation, the City must keep up with "Cutting Edge" technologies. The City has enacted ordinances allowing residential Water Utility customers to receive rebates for retrofitting water conservation devices in an effort to maximize water efficiency and to conserve our present and future water supply. Rebate offers remain in effect as long as funds are available.

Rain Barrel Distribution Program

A pilot program for distributing rain barrels was launched in June 2002. The program seeks 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 at a cost of $74.25 each to the City. 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, thereby including local vendors into the sale of rain barrels.

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.

The current rebate program updated January 1, 2010, offers customers several rebates that replace and expand on the previous program to encourage water conservation. The program offers rebates for the retrofit of efficient technologies, both indoor and outdoor, and does not apply to purchases for new homes or new construction and development.

The rebate program is designed to offer true incentives to save water as apposed to rewards for doing so. The rebates offered are based on the cost of the saved water, which makes the rebate amount typically higher than other rebate programs. With the implementation of the rebate program customers have an incentive to retrofit water conservation technologies that maximize efficiency at their homes or businesses. The rebate program includes incentives for retrofitting:

- Clothes washers
- High-efficiency toilets (HETs)
- Water free urinals
- Water harvesting
- Commercial process efficiency
- Irrigation efficiency upgrades

3. DROUGHT MANAGEMENT PLAN

While the city's year-round conservation program has successfully made Santa Fe one of the lowest water-consumption communities in the Southwest, the city remains vulnerable to water shortages. In the Long-Range Water Supply Plan, the City has evaluated the Water Division's ability to supply water under a variety conditions, including short droughts and a multi-year prolonged drought.

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

3.1. EMERGENCY WATER REGULATIONS

As the City's overall and peak daily demand has dropped and its overall and peak production capacity increased, the City reliance on emergency water regulations has diminished. The City has not needed to impose emergency demand management restrictions since removing them in 2007. Nonetheless, the Emergency Water Regulations Ordinance adopted in June 1996 remains an important component of the tools the City has to manage drought. This ordinance allows the imposition of increasingly stringent water-use restrictions as necessary to ensure that demand does not exceed sustainable available supply and peak production capacity. (Appendix D contains the text of the ordinance SFCC 1987 § 25-5)

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

service emergency exists under conditions that include "a general water supply shortage due to increased demand or limited supply." (SFCC 1981 § 25-5.4 (1)

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. The revisions to Chapter 25 provided a much-needed clean up by adding clarity and moving language to appropriate sections as well as re-writing sections. The changes helped water conservation staff with enforcement of the chapter and reduced interpretations of the regulations.

To eliminate duplications and allow for the continued success of low per capita per day water use when the city is not in an emergency, provisions were moved from Stage 2 and Stage 3 to year-round requirements. The stages 2, 3 and 4 were condensed into two stages and re-named 1) "Orange - Water Warning" and 2) "Red - Water Crisis."

The original Emergency Water Regulations Ordinance included four Water Emergency Management Stages, each with increasingly stringent water use restrictions focusing primarily on outdoor use (e.g., landscape watering, vehicle washing, washing hard surfaces, etc.)

- Stage 1 – Water Watch voluntary compliance - all elements of Stage 2 apply on a voluntary basis
- Stage 2 – Water Alert mandatory compliance – mandates landscape watering no more than three times a week
- Stage 3 – Water Warning mandatory compliance – allows watering only once a week
- Stage 4 – Water Emergency mandatory compliance – all outdoor irrigation of turf and ground cover is prohibited (some exceptions apply)

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).

- 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)

Grey water use is not restricted by this ordinance and generally may be used in accordance with state regulations.

3.1.1. IMPLEMENTATION OF EMERGENCY WATER REGULATIONS

In 2000, winter snow pack was about half of the average. As a result, on June 7, 2000, the City declared Stage 1 conditions under the ordinance, and declared Stage 2 on June 28, 2000, and Stage 3 on August 9, 2000. With aggressive enforcement, the water emergency ordinance was very successful in reducing demands. Before declaration of Stage 1, demand stood at 14 to 18 million gallons per day (mgd). With the introduction of Stage 3, demand was brought down to 10 and 11 mgd. This allowed the Water Division to ration the remaining reservoir supply, maximize groundwater production, and sustain the water supply until the fall season when demands are naturally lower.

Figure 5, Past Reservoir Level at 100% Reservoir Level at 30% on 3/15/2002

While the emergency demand reduction program was very effective, it was also very controversial. The planting and watering restrictions heavily impacted the business community, Landscapers, and nurseries and as a whole put pressure on the city to avoid future declarations of water shortage emergencies.

3.1.2. ENFORCEMENT OF EMERGENCY WATER REGULATIONS

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.

3.2. CONJUNCTIVE MANAGEMENT OF SURFACE AND GROUNDWATER

Under conjunctive management, surface water is primarily used when it is available, thus preserving groundwater as a drought reserve. Every year the City plans to use as much water from the Santa Fe River system as possible by maximizing its water rights, its treatment capacity, or the water available.

When the Buckman Direct Diversion on the Rio Grande is completed, the City will have a second source of surface water available from the Rio Grande. The SJC water diverted for City of Santa Fe customers will be less vulnerable to drought than the Santa Fe River supply, because the firm yield of SJC Project water will smooth the highly variable inflow to Heron Reservoir from the San Juan tributaries.

The Long Range Water Supply Plan analyzed the reliability of the surface water supplies and optimized ways to balance surface and groundwater use.

3.3. SUSTAINABLE MANAGEMENT OF CITY'S GROUNDWATER RESOURCES

In the Long-Range Water Supply Plan, the Santa Fe City Council adopted a sustainable groundwater management policy that intends to increase the longevity of the regional groundwater for future generations. 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. The criteria for determining sustainable levels are complex and being discussed and analyzed.

3.4. STORAGE OF SJC WATER

The City currently stores its SJC water in Abiquiu 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. By the end of 2010, the City will have over 33,000 acre-feet of SJC water stored.

3.5. ADDITIONAL WATER SUPPLY PROJECTS

According to the Long-Range Water Supply Plan (2008), the City has a gap of 2,700 acre-foot between existing available supplies (including the BDD) and future projected demands, which may appear as soon as 2020 if it is a drought year. The Plan identifies three options in which the 'gap' can be accommodated: increasing conservation levels, purchasing additional Rio Grande water rights for diversion through the BDD, and returning treated effluent to the Rio Grande in exchange for divertible river water (known as return flow credits), or any combination thereof. However, since adoption of the plan in 2008, decreased growth rate have extended the timeframe of when the 'gap' appears. Additionally, decreased demand has reduced the overall magnitude of the gap.

3.6. MUNICIPAL RESERVOIR MANAGEMENT

The municipal reservoirs (McClure and Nichols) on the Santa Fe River can be managed in ways to help the City manage drought. 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 some 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 once the BDD comes online.

3.7. TARGET FLOWS IN THE SANTA FE RIVER

For the past three years, the City of Santa Fe has targeted between 200 and 800 acre-feet of water to bypass the municipal reservoirs in an effort to revive a living Santa Fe River; there is great community and elected official support to continue this program. In 2010, more than 2500 acre-feet of bypass flow was released into the river. A large portion of bypass river flows infiltrate

into the ground and the local aquifer. By following the path of the infiltrated water, the City may be able to 'salvage' the river flows either within the existing City well field or depending upon the travel fate of the water, by installing new production wells. In any case, the river flows are a passive aquifer storage and recovery (ASR) program that may benefit the City's ability to rely on groundwater during drought years.

3.8. TREATED EFFLUENT FOR IRRIGATION

Appropriate use of treated effluent for irrigation is another component of the City's drought management plan. Currently the City uses treated effluent for about 10 percent of its demand, primarily for the irrigation of playing fields and golf courses. Treated effluent is also used for construction when possible. Because treated effluent will largely be available even during drought, it is a good drought management policy to diversify water supply sources to include treated effluent.

4. IMPLEMENTATION OF REGIONAL WATER PLAN CONSERVATION MEASURES

The state statute that addresses municipal water conservation plans requires reference to the regional water plan in the area that have been accepted by the New Mexico Interstate Stream Commission. The Jemez y Sangre Regional Water Plan pertains to the region surrounding Santa Fe. It covers all or parts of three counties, two incorporated municipalities, all or part of eight Pueblos, a multitude of historic and traditional villages, and some of the fastest growing areas of the state. The purpose of the Jemez y Sangre Regional Water Plan is to assess the available supply of clean, usable surface water and groundwater, to determine the present and future demand for water and to identify methods for meeting the projected demand through conservation, management, and/or acquisition of water or water rights. The Interstate Stream Commission accepted the plan in 2004.

Several sections of the Jemez y Sangre Regional Water Plan are directly applicable to the City of Santa Fe and this water conservation and drought management plan. The Jemez y Sangre Regional Water Plan devotes about ten pages to water conservation and drought management. More than half of this material is a description of Santa Fe's water conservation and drought management programs, including a presentation of the recent annual values for Santa Fe's per capita water demand. The plan cites Santa Fe's successes in this area as follows: "an emergency demand reduction ordinance and a comprehensive water conservation ordinance, adopted by the City in 1996, have served to dramatically reduce the city's per capita rate of water consumption."

Section 6 of the regional water plan contains a forecast of the future water demand in the Santa Fe subregion area. The Santa Fe subregion, as defined in the plan, includes all of Santa Fe. The regional water plan projects a gap between municipal and domestic water supply and water demand of about 15,000 acre-feet in 2060 based on "most-likely" population projections and a per capita demand for the City of Santa Fe of 163 gpcd (stated in the Jemez y Sangre Regional Water Plan as 0.183 acre-feet per person per year). Santa Fe's achievement of its water conservation program goals of 110 gpcd of water supply diversions and 100 gpcd during drought cut that future water supply gap for the Santa Fe sub region to less than one-half as

touted in the Jemez y Sangre Regional Water Plan Phase 1 Update (Daniel B. Stephens and Associates, 2008). In fact, because of successful conservation and the planned use of San Juan Chama water, Santa Fe sub-region 2040, average-year 'gap' identified in the 2003 Plan has been reduced from 14,400 acre-feet to around 4,500 acre-feet.

The Jemez y Sangre Regional Water Plan addresses recommendations grouped into five categories. Recommendations under categories I, II and III describe actions that address management, protection and restoration of water supplies. Recommendations under categories IV and V describe actions that will address the projected water supply/demand gap as discussed in the plan. The following are recommendations from the regional water plan that are addressed by the City of Santa Fe's current water management programs.

Category I: Recommended Actions to Protect Existing Supplies

Watershed restoration

Develop conjunctive use strategies

Category II: Recommended Actions to Improve System Efficiency

Encourage wastewater reuse

Encourage rainwater collection

Leak detection and repair leaks in water system

Category III: Recommended Actions to Address Drought

Develop drought contingency plans

Category IV: Recommended Actions to Reduce Projected Demand

Pursue water conservation

Pursue growth management to reduce demand

Category V: Recommended Actions to Increase Water Supply

Utilize San Juan-Chama Project water as appropriate

5. PLANS FOR CONTINUED IMPROVEMENT

5.1. CLASSIFICATION STUDY OF COMMERCIAL ACCOUNTS

In April 2003, a contractor assisted the City in preparing and sending a survey to every commercial account. This survey classified each account into one of 11 commercial groups containing more than 60 sub-categories. Depending on their category, some additional questions were asked about their business or physical plant that could have an impact on water consumption. Three thousand six-hundred questionnaires were sent out and 1,111 surveys were returned, giving a 29 percent response rate. The data estimates total city water consumption attributable to each group (Figure 6). Figure 7 shows the percent of total use for each group.

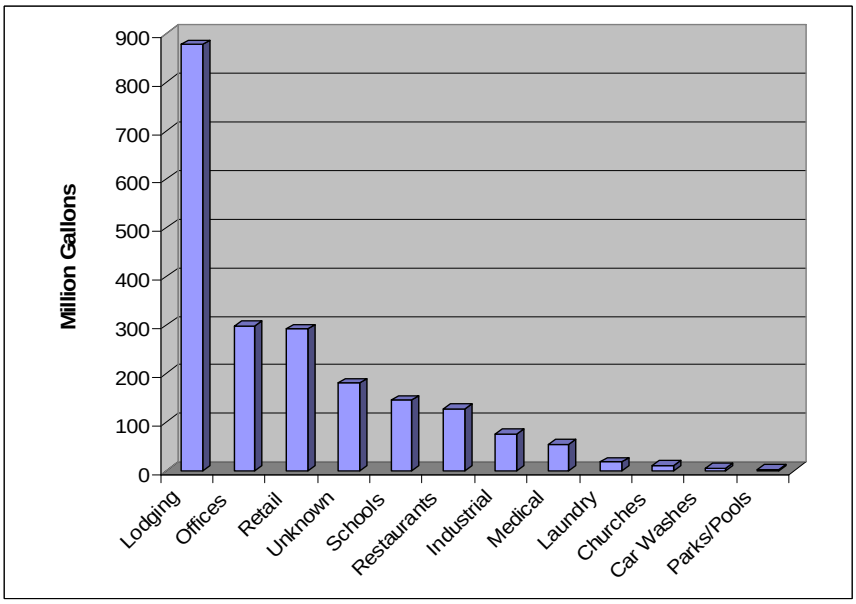

Figure 6, 2002 Commercial Water Use by Customer Group

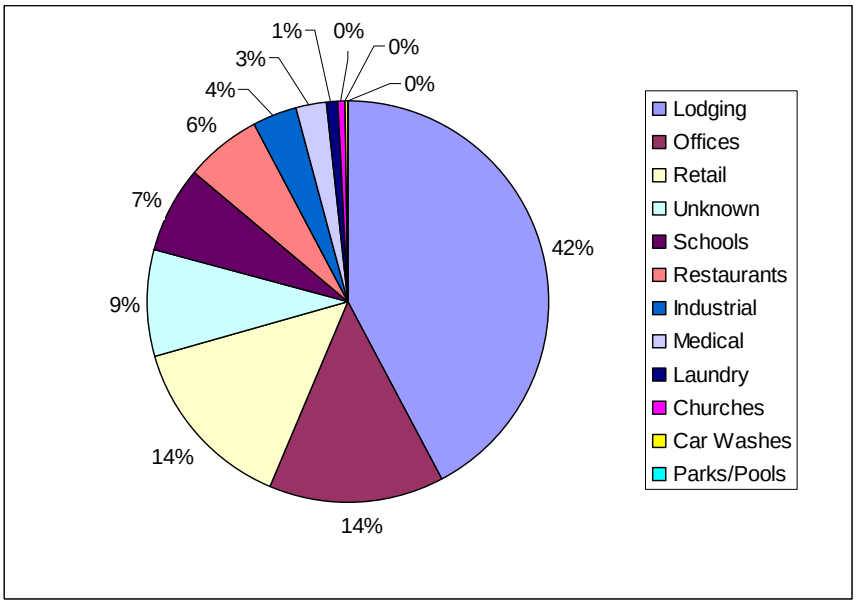

Figure 7, Percentage Commercial Water Use by Customer Group

5.2. COMMERCIAL PROCESS EFFICIENCY PROGRAM

Commercial customers are not created equal and require evaluations of their water use by class, category, group, and individual needs. A high water user may not mean that they are water wasters. Sangre de Cristo Water is committed to helping business save water and offers incentives for water-saving projects to help offset the cost of installing or upgrading equipment.

The Commercial Process Efficiency program for commercial, industrial, and institutional customers is a multi-stage program with each application taken on a case-by-case basis. A free service to Santa Fe Water Utility commercial customers is available to evaluate all aspects of their water consumption to determine how their business uses water. Auditors will suggest opportunities for reducing water consumption and discuss their eligibility for special commercial rebates.

5.3. QUANTITATIVE EVALUATION OF WATER CONSERVATION MEASURES

Although Santa Fe can already point to major accomplishments in the area of conservation, further measures may be warranted to ensure water supplies for generations to come. In an effort to measure the impacts or effects of various water conservation measures, the New Mexico Office of the State Engineer (OSE) hired a consultant to compile and analyze available data related to the City's water demand. The resulting report "Quantitative Evaluation of City of Santa Fe's Demand Management Program" October 2, 2007, describes the statistical analysis of daily system water demand for the period January 2000 through February 6, 2006, and analysis to measure the effects of seasons, climate (temperature and precipitation), emergency drought stages, and time on daily system demand.

Based on statistical analysis of daily system demand, indoor water use decreased from 7.31 million gallons per day (mgd) During Analytical Year 2000-01 (March 1, 2000, through February 28, 2001), to 6.74 mgd in 2005-06 despite increases in population; this is likely due to the cumulative effect of the City's conservation efforts.

Daily demand has decreased annually for all seasons except summer, that is, as slight downward trend is evident in spring, fall, and winter data. However, daily system demand

during summer months is increasing with time; this is likely due to the offset program, which has offset new demand, both indoor and outdoor, with indoor water use.

The analysis on the effect of Emergency Water Regulations determined that the largest decrease in weekly system demand occurred between Stage 1 and Stage 2, with a much smaller decrease achieved between Stage 2 and Stage 3. Furthermore, daily system demand was higher on Stage 3 water days than during Stage 2.

5.4. WATER CONSERVATION COMMITTEE

In May of 2002, the City of Santa Fe City Council approved Resolution 2002-25 establishing a City of Santa Fe Water Conservation Committee. This committee is charged with developing water conservation proposals, promoting water conservation, examining land use building and construction code and policies in 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. As in the past, Santa Fe's water conservation programs will continue to expand in scope and vision each year.

5.5. FUTURE PROGRAMS

This plan documents past and present water conservation efforts in Santa Fe for the past 15 years. New programs are vital to continued success with water conservation. The City of Santa Fe has demonstrated an impressive indoor water use reduction. Water conservation programs will continue to address indoor water use; however, outdoor water use will become a focus. A reduction in outdoor water use will relieve the stress on the infrastructure by reducing the peak water use during the outdoor watering season. New programs introduced in 2010 include irrigation efficiency upgrades and water harvesting incentives.

Education is an important and necessary component of new programs initiated. The City's web site is an important tool for education. The Water Conservation Office implemented a new and improved web site. The water conservation pages will be an ongoing project; creating and maintaining an interactive and user-friendly site. Elements will include landscape help, an

irrigation scheduler, irrigation design guidelines, rebate information, water saving information, activities for children, and much more.

In order to implement water conservation programs, seeking funding will be a priority. Efforts will be taken to search all avenues for funding including a levy fund, grants, public/private partnerships, and sponsorship within the community to bring new and innovative ideas and technologies to the Sangre de Cristo Water Customers.

Rainwater Harvesting

Rainwater harvesting is an alternative source of water for consideration. There are three potential sources for harvesting the rain: direct rainfall, street harvesting, and rooftop harvesting. Passive rainwater harvesting includes systems that use no moving parts and store the water in the soil rather than a tank. Some common landscape elements that utilize passive rainwater collection are:

- Rain gardens
- Swales
- Permeable pavement
- Detention basins

A second source of rainwater is the street (storm water). Streets are not flat; the grade typically flows water to the curb, down the block to a gutter, and into the storm drain. The storm drains and the polluted water runs straight into the nearby river. By cutting curbs and digging sunken basins into the "right-of way" or "parkway" area of the sidewalk, you can turn street rainwater from a problem to a resource. Diverted rain that falls on streets can nourish plants, protect rivers, and contribute to a cleaner city.

The third source of rainwater is the rooftop. Even in areas with low rainfall, there is an enormous potential for harvesting rainwater. This water can be used for landscape irrigation (irrigation disconnect form City water) and indoor use such as flushing toilets. In addition to incentive programs, education and demonstration pilot projects will be considered to encourage water harvesting.

Grey Water Reuse

Grey water is also an alternative source of water. Unlike many ecological stopgap measures, grey water reuse is a part of the fundamental solution to many ecological problems and will probably remain essentially unchanged in the distant future. For municipal treatment systems, decreased wastewater flow means higher treatment effectiveness and lower costs. Less energy and chemicals are used due to the reduced amount of both freshwater and wastewater that needs pumping and treatment. Grey water can be reused in the landscape or for toilet flushing (tap to toilet).

For years, the City has implemented many different strategies for reducing water consumption in our community, including public education, direct assistance and training programs, and via specific water conservation ordinances. By codifying these water conservation strategies into law, there is an assurance that these policies will remain active and enforceable. The City of Tucson successfully implemented an ordinance requiring the installation of grey water stub-outs in residential construction; all new single-family homes and duplexes must include, on the plans, plumbing for future grey water distribution.

Target high water users

In order to ensure the water conservation survey and retrofit program has the greatest opportunity to make a significant change in Santa Fe's overall water use, Sangre de Cristo Water will provide free conservation assistance to the highest-volume residential customers. The top five percent of residential water customers use approximately 23 percent of all residential water use. These water users typically have the greatest opportunities for reductions in overall water use. These customers will receive a letter inviting their participation in the program. Even though the initial invitations will be targeted at high water users, the program will be open to all water customers.

Landscape and Irrigation Efficiency Education

There has been an effort across the country to ascertain qualified professionals in the irrigation industry. Certification for irrigation designers and contractors needs to be a goal, not only for Santa Fe, but also for the State. Certification gives assurance of quality, credibility, and consideration for the environment. The City will increase its efforts to promote the certification of irrigation designers and contractors within Santa Fe and throughout New Mexico.

An education campaign on landscaping and irrigation introduced into the local community college to educate the public on the aesthetics of Xeriscape and irrigation efficiency will be a step forward to reducing outdoor water use. Additionally, a Xeriscape contest designed to recognize and showcase homeowners and professionals who have implemented Xeriscape principles and used low water-use plants in their landscapes will increase awareness of innovations in landscaping and water-use efficiency.

New programs will be designed for landscape water conservation and education that provide workshops, seminars, rebates for efficient irrigation design, and field instruction specifically designed for Green Industry professionals and residential water users in the Santa Fe area. The goal is to promote efficient water use in the landscape, which in turn has the potential to create savings in water, cost, maintenance, and energy.

Professional classes will include training programs for landscape professionals and landscape irrigation auditor training. Residential classes will include drip irrigation and controllers, principles of Xeriscape, rainwater harvesting for landscape use, rain gardens, and irrigating with grey water.

6. CONCLUSIONS

The City of Santa Fe has planned and successfully implemented comprehensive water conservation and drought management programs. The water conservation program has achieved a high degree of success, as indicated by the per capita per day water production statistics shown previously in Figure 2.

These low per capita per day water production statistics are among the lowest in New Mexico and the Southwestern United States. Santa Fe has achieved a per capita per day water production level of water conservation that is significantly lower than any requirement or suggestion that the New Mexico State Engineer has applied or sought from any other community. Santa Fe is one of the few communities in New Mexico that have achieved a level of low per capita water use indicative of full and comprehensive community implementation of water conservation. Similarly, Santa Fe's water emergency management plan has been demonstrated to meet its need to suppress the community water demand to a level that was less than the limited available supply under the extraordinary drought conditions of 2002 that have persisted subsequently.

The City of Santa Fe Governing Body considers the effectiveness of its water conservation program and the impact of the water conservation measures on its citizens and customers. It has added and changed specific water conservation programs and elements and will continue to evaluate and improve its program for effectiveness. Santa Fe's water conservation programs continue to expand in scope and vision each year. The City of Santa Fe is truly proud of its water conservation programs and the community participation that is the key to Santa Fe's water conservation success.