

# Santa Fe County Water Conservation Plan 2010



Santa Fe County  
Water Conservation Program





The symbolism of the Santa Fe County Water Conservation Logo is representative of the hydrologic cycle. The words conserve, preserve and sustain are reminders that as a community when we conserve water we will eventually preserve our natural resources so they can be sustained over time.



## Executive Summary

The Santa Fe County Water Conservation Plan will describe Santa Fe County as a unique ecological environment containing five unique County sub-basin areas or watersheds. It will also outline practical mechanisms to be employed by single-family, multi-family, commercial, industrial, public, and institutional customers to not only value but to conserve our natural resources. The intention of the Plan is for long-term heightened awareness and active stewardship of our County land and resources, through symbiotic participation amongst diverse populations within each sub-basin and the County as a whole.

The purpose of this document is twofold: 1) to meet the requirements set out by the U.S. Bureau of Reclamation for Water Conservation Planning; and 2) to fulfill the statutory requirement for water conservation planning for the state of New Mexico in response to NMOSE permit SP 4842, Condition 11. The requirement will be fulfilled when it is approved in conjunction with the required 40-year water plan.

Specifically, the Santa Fe County Water Conservation Plan is defined and organized by sub-basins within the Santa Fe County boundaries. Ecological, communal and resource development will be discussed graphically along with supporting description and analysis as follows:

- Description of natural resources within each sub-basin or watershed;
- Description of existing community, educational and public service resources;
- Description of economic context within each watershed; and
- Recommended solutions and practical implementation approaches tailored for each watershed, in consideration of its ecological, communal, and geographic settings.

The Plan will also include existing water conservation ordinances, ways to expand on the existing water conservation practices, future planned initiatives, as well as an implementation schedule and funding sources. Future implementation activities include: 1) identifying water conservation audiences; 2) technical assistance; 3) ordinance development of rain, storm, grey and black water harvesting; and 4) water conservation research programs.



## Acknowledgements

Santa Fe County appreciates the support of the small group of volunteers who have made a commitment of their time in hopes that Santa Fe County becomes a more water conscious community. The Water Conservation Working Group Members are:

Laurie Trevizo, Santa Fe County Water Conservation Program

Arnold Valdez, Santa Fe County Planning Division

Christie Green, Down to Earth Landscapes

Richard Jennings, Earthwrights Design

Charlie Nylander, Watermatters, LLC

Lonnie and Joan Burke, Resource Wise

### **Santa Fe County Staff who contributed to the Water Conservation Plan are:**

Water and Wastewater Utility: Patricio Guerrerortiz, Karen Torres, Marvin Martinez, Paul Casaus, Millie Valdivia, Doug Sayre

Open Space and Trails: Colleen Baker

Land Use: Jan Daniels, Shelley Cobau, Wayne Dalton

GIS: Debra Garcia

IT: Casey Lengacher

### **A special thanks to the Santa Fe County Board of County Commissioners:**

Harry Montoya, Commission Chair, District 1

Virginia Vigil, Commissioner District 2

Mike Anaya, Commissioner District 3

Kathleen Holian, Commissioner District 4

Liz Stefanics, Commissioner District 5

Katherine Miller, County Manager

Santa Fe County sincerely appreciates this opportunity provided by the US Bureau of Reclamation Water Conservation Innovation Funding Opportunity number No. 08-FG-40-2763. Without this funding the Santa Fe County Water Conservation Plan would not have been written.



# Table of Contents

<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 <i>How is the Santa Fe County Water Conservation Plan Organized .....</i>	2
1.2 <i>Santa Fe County Water Conservation Goals .....</i>	2
<b>2 DESCRIPTION OF SANTA FE COUNTY .....</b>	<b>3</b>
2.1 <i>Geography .....</i>	3
2.2 <i>Topography .....</i>	3
2.3 <i>Physiographic Provinces .....</i>	5
2.4 <i>Soil Classification .....</i>	5
2.5 <i>Ecoregions .....</i>	6
2.6 <i>Threatened and Endangered Species .....</i>	7
2.6.1 <i>Threatened and Endangered Fauna .....</i>	11
2.6.2 <i>Threatened and Endangered Fauna .....</i>	11
2.7 <i>Historic and Cultural Content of Santa Fe County .....</i>	12
2.7.1 <i>Tribal Culture .....</i>	13
2.7.2 <i>Historical Irrigation Practices: Acequias in Santa Fe County .....</i>	14
2.8 <i>Water Resources .....</i>	16
2.8.1 <i>Surface Water .....</i>	16
2.8.2 <i>Groundwater .....</i>	16
<b>3 SANTA FE COUNTY WATERSHEDS .....</b>	<b>18</b>
3.1 <i>Cundiyo/Santa Cruz Watershed .....</i>	20
3.2 <i>Pojoaque/Nambe/Tesuque Watersheds .....</i>	22
3.3 <i>Santa Fe River Watershed .....</i>	24
3.4 <i>Galisteo Watershed .....</i>	27
3.5 <i>Estancia Basin .....</i>	29
<b>4 SANTA FE COUNTY WATER UTILITY .....</b>	<b>32</b>
4.1 <i>Water Supplier Profile .....</i>	32
4.2 <i>Santa Fe County Water Service Rates .....</i>	34
4.3 <i>Water Resource .....</i>	35
4.3.1 <i>Water Demand and Production .....</i>	35
4.3.2 <i>AWWA Water Audit .....</i>	36
4.3.3 <i>Wastewater Facilities .....</i>	37
4.3.4 <i>Future Water Management Strategies .....</i>	38
<b>5 SANTA FE COUNTY WATER CONSERVATION PROGRAM.....</b>	<b>39</b>
5.1 <i>Existing Water Conservation Ordinances and Regulation .....</i>	39



Santa Fe County  
Water Conservation Program

5.2 Water Conservation Program Outline .....	41
5.3 Water Conservation Program Implementation Schedule .....	45
5.4 Resource Development .....	48
5.4.1 Economic Value of Water Conservation .....	49
5.5 Drought Management .....	50
<b>6 COMMUNITY COHESION IN WATERSHEDS .....</b>	<b>51</b>
6.1 Public Service Agencies Within Each Watershed .....	51
6.2 Governing Agencies .....	51
<b>7 APPENDICES .....</b>	<b>55</b>
7.1 List of Santa Fe County Ordinances .....	56
7.2 San Juan – Chama Project .....	63
7.3 List of Water Systems within Santa Fe County .....	64
7.4 Santa Fe County Water/Wastewater Utility Operations Billing and Accounting Procedures .....	67
7.5 Santa Fe County Community, Education, and Public Service Agencies .....	69
7.6 Santa Fe County Open Space and Trails Restoration Activities .....	71
7.7 Existing Water Conservation Outreach Materials .....	73
7.8 Historic Climate Data .....	78
7.9 Santa Fe County 5-Year Water Use History .....	83
7.10 List of Acequias within Santa Fe County .....	97
7.11 AWWA Water Audit Reporting Worksheet .....	99
7.12 Santa Fe County Rainwater Harvesting Design Recommendations .....	100
7.12 References .....	107
Santa Fe County 40-Year Water Development Plan (April 28, 2010) .....	attached

## List of Figures

FIGURE	PAGE
Figure 1: Map of Santa Fe County .....	4
Figure 2: Soil Runoff Potential Classifications in Santa Fe County .....	6
Figure 3: Ecoregion Designation from SWReGAP Analysis .....	9
Figure 4 Species Diversity from SWReGap Analysis .....	10
Figure 5: Acequia Landscape .....	15
Figure 6: Aquatic, Wetland and Riparian Features .....	17
Figure 7: Site Map for Santa Fe County Major Watersheds .....	20
Figure 8: Site Map for Cundiyo Watershed .....	21
Figure 9: Site Map for Pojoaque - Nambe - Tesuque Watershed(s) .....	22
Figure 10: Site Map for the Santa Fe River Watershed .....	25
Figure 11: Site Map for the Galisteo Watershed .....	27



Figure 12: Site Map for the Estancia Basin Watershed .....30  
 Figure 13: Santa Fe County Water Utility Service Areas.....33  
 Figure 14: Santa Fe County Residential 5-Year Water Use History .....35  
 Figure 15: Santa Fe County Total 5-Year Water Use History.....36

## List of Tables

TABLE	PAGE
Table 1: Historic Populations in Santa Fe County.....	3
Table 2: Soil Classifications in Santa Fe County.....	5
Table 3: Santa Fe County Ecoregions.....	7
Table 4: List of Threatened and Endangered Species in Santa Fe County.....	11
Table 5: Rare and Endangered Plants in Santa Fe County.....	12
Table 6: Tribal Lands Located within Santa Fe County.....	14
Table 7: Santa Fe County Watersheds.....	18
Table 8: Cundiyo -Santa Cruz Watershed Information.....	21
Table 9: Pojoaque -Nambe - Tesuque Watershed Information.....	23
Table 10: Weather Data for Tesuque Area.....	24
Table 11: Santa Fe River Watershed Information.....	26
Table 12: Galisteo Basin Watershed Information.....	28
Table 13: Edgewood Climate Data.....	29
Table 14: Estancia Basin Information.....	31
Table 15: Santa Fe County Water Utility Water Rates (as it appears in bill inserts).....	34
Table 16: Santa Fe County Water Conservation Ordinances.....	40
Table 17: Water Conservation Phased Implementation Schedule.....	46



# 1. Introduction

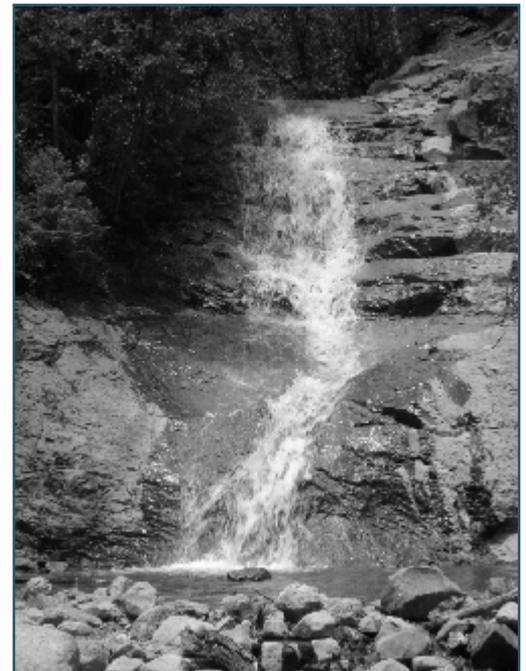
Santa Fe County is prone to extended and severe drought and regularly experiences water shortages. Irrigated agriculture, residential, and tourism uses create the most water demand in the county. Conserving water and increasing supply-side water management infrastructure can help curtail these problems. However, water conservation is by far the most low-cost, environmentally sound option. Even with double-digit population growth predicted over the next decade, a comprehensive water conservation program could help meet water needs without having to increase supply. Water conservation is achieved through a combination of lifestyle changes, utilizing gray/reclaimed water and minimizing water use through incentives, increased efficiency, and more accountability. The benefits of water conservation are vast and include reduced costs for infrastructure, improved environmental quality, and lower water bills for the public.

The Santa Fe County Water Conservation Plan is a comprehensive document providing information and guidance on watershed issues, identifying and prioritizing projects to address those issues, and recommending means for project implementation.

The Santa Fe County Water Conservation Plan includes all aspects of the county water conservation. The Plan will consider the following issues that affect water conservation:

- Climate Change
- Watershed planning
- Previous and current county planning efforts
- Regional planning issues
- Agriculture, acequia and senior water right holders
- County land development submittal process and implementation
- Phased implementation of the water conservation program
- Funding strategies
- Community participation

This Plan was written in a way that provided a forum for planners, scientists, elected officials, members of the public, and other interested parties, to discuss the challenges our county faces in deciding the future direction of water. This document captures all of the technical data, analysis, and strategic planning in order to develop a Water Conservation Plan that the entire County can support and implement.





### 1.1 HOW IS THE SANTA FE COUNTY WATER CONSERVATION PLAN ORGANIZED?

The Plan is not limited to the Santa Fe County Water Utility, who serves a limited number of residents within the county; it also incorporates water conservation practices in each major watershed within the county.

The plan includes data and information as required by agencies such as the U.S. Bureau of Reclamation. The format however was derived by the Water Conservation Steering Committee, who chose to look at water conservation based on the individual watersheds within Santa Fe County. From North to South, the watersheds are as follows:

- Cundiyo or Santa Cruz River
- Pojoaque- Nambe - Tesuque
- Santa Fe River
- Galisteo
- Estancia Basin

### 1.2 Santa Fe County Water Conservation Goals

These goals are identified within the County, based on community values and outcomes.

- **Conserve Water:** Current ordinances and programs are in place to conserve water and future ordinances and regulations will be developed as needed.
- **Provide Guidance on Best Water Management Practices:** Ordinances and policy can be updated to incorporate best water practices.
- **Incorporate New Water Conservation Technologies:** As new technologies are developed for water conservation, new housing developments and all new construction should be open to incorporating them into new buildings.
- **Integrate Low Water Use Practices:** Indigenous people of this area practiced many techniques to harvest water without mechanical needs. These techniques can still be practiced today and should be preserved as a cultural heritage.
- **Protection of Water Resources:** The water available from surface water, springs, acequias and aquifers should be preserved.

Major challenges face the water resources of Santa Fe County, including increased development throughout the County, recent drought, and the increasing pressures of extractive industries. In order to mitigate the current conditions, water conservation measures (on multiple levels) are required.



## 2 Description of Santa Fe County

Santa Fe County is the 3rd largest county in New Mexico, after Bernalillo and Dona Ana. The population taken by the US Census Bureau in 2008<sup>1</sup> was 147,741. The County includes the City of Santa Fe, portions of the City of Espanola and the Town of Edgewood. Historical Population trends reveal that the population density has increased from less than 7 persons per square mile in 1900 to almost 77 persons per square mile in 2008. Current Population growth has averaged 1.3 % rate of growth per year from 2000 through 2008. The highest population density is in the City of Santa Fe, and approximately 2,800 newcomers moving to Santa Fe annually.

HISTORIC POPULATION OF SANTA FE COUNTY*	
Population (year)	Population Served
1950	38,153
1975	63,000
2000	129,292
2008	147,741

Table 1: Historic Populations in Santa Fe County  
 \*US Census Bureau, 2008

### 2.1 Geography

Santa Fe County is located at 35° 37' N 106° 5' W, in north central New Mexico (Figure 1). The City of Santa Fe, the capitol of New Mexico, is the largest municipality in the county. The Rio Grande is the geographic boundary to the northwest corner of the county. The Sangre de Cristo Mountains form the eastern boundary. The major road systems within Santa Fe County are I-25 (predominately east west), US 285/64 (north south), and I-40 at the southern tip of the county (running east west). Neighboring counties include: Bernalillo, Los Alamos, Rio Arriba, Torrance, San Miguel and Sandoval.

Santa Fe County has a total area of 1,911 square miles. Approximately 1,909 square miles of it (99.92%) consists of land and 2 square miles of it (0.08%) consists of water. Its population density is approximately 68 persons per square mile.

### 2.2 Topography

The land forms for Santa Fe County range from the upper highlands of the rugged Sangre de Cristo Mountains to the banks of the Rio Grande in the northern areas. The highest point in the County is the summit of Santa Fe Baldy (12,622 ft.). Midway, the landscape transitions from the plains at Cochiti pueblo, to La Bajada Mesa, and traverses along the Santa Fe River valley towards the foothills at the east. Further south, in the Galisteo Basin, the Cerrillos Hills, and Ortiz Mountains are prominent landforms adjacent to arroyos and flatlands. The

southernmost section of the County is the Estancia Basin area with mostly flat land and a few drainage channels flowing south.

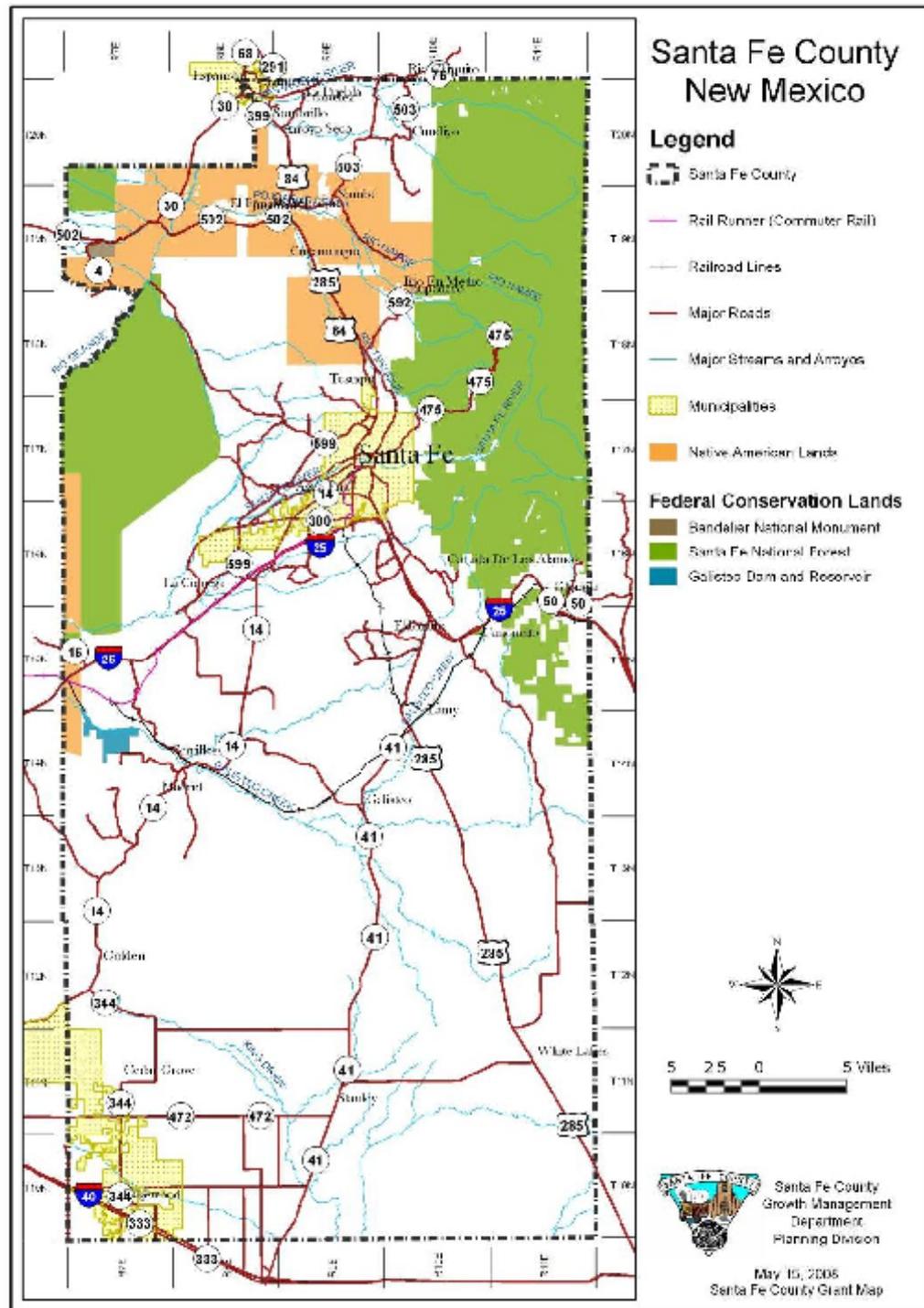


Figure 1: Map of Santa Fe County



### 2.3 Physiographic Province

Santa Fe County encompasses several major physiographic provinces within its boundaries.

Basin and Range style physiographic provinces are:

- Espanola Basin, Galisteo Basin, and Estancia Basin

The Great Plains style physiographic provinces are:

- The Glorieta Slope part of the Pecos Valley

The Southern Rocky Mountains province includes:

- The southwestern Sangre de Cristo Mountains

### 2.4 Soil Classifications

The Natural Resources Conservation Services have determined that there are approximately 172 different kinds of soils in a survey area that comprise a total of 182 individual map units.

The soils vary widely in their texture, color, natural drainage, slope, and other characteristics; Figure 2 indicates the soil run-off potential. The soils in the northern portion of the survey area are at the lowest elevations; gently sloping to rolling with steep breaks occurring in some areas. The soils in the eastern region of the survey area exist at higher elevations and are generally steeply sloping and high in rock fragments. <sup>2</sup> The soil type determines the amount of runoff a given area will have. Table 2, is a classification of the runoff potential in Santa Fe County.

<b>SOILS RUNOFF POTENTIAL CLASSICATIONS IN SANTA FE COUNTY, WATERSHED ANALYSIS UNITS (numbers in acres)<sup>1</sup></b>						
<b>WATERSHED ANALYSIS UNIT</b>	<b>A Low Runoff Potential</b>	<b>B Moderate Runoff Potential</b>	<b>C Medium Runoff Potential</b>	<b>D High Runoff Potential</b>	<b>No Runoff (U.S. Forest)</b>	<b>TOTAL ACREAGE</b>
Cundiyo	4,997.8	12,912.6	10,559.2	11,432.7	48,469.6	88,371.9
Estancia	59,288.1	171,374.7	28,653.4	20,686.3	386.1	280,388.6
Galisteo	4,775.9	205,059.9	77,084.0	111,171.1	13,000.2	411,091.0
Pojoaque	22,270.0	42,368.0	5,830.3	9,737.5	43,843.0	124,048.8
Santa Fe	3,552.4	104,195.3	1,926.0	13,457.2	32,552.2	155,683.0
Upper Pecos	0.0	690.5	1,284.9	7,059.6	36,317.1	45,352.0
Rio Grande	17,414.2	36,060.7	3,086.3	13,780.7	48,037.1	118,379.0
<b>Total</b>	<b>112,298.5</b>	<b>572,661.6</b>	<b>128,424.1</b>	<b>187,325.0</b>	<b>222,605.1</b>	<b>1,223,314.3</b>

**Table 2: Soil Classifications in Santa Fe County**

<sup>2</sup>Soil Survey of Santa Fe County Area, New Mexico, Charles D. Hibner, Natural Sources Conservation Services <http://soildatamartnrnc.usda.gov/manuscript/NM687/0/SantaFe.pdf>

<sup>3</sup>U.S. Dept. of Agriculture, Natural Resources Conservation Service Soils GIS Data (SFC Growth Management Dept.)

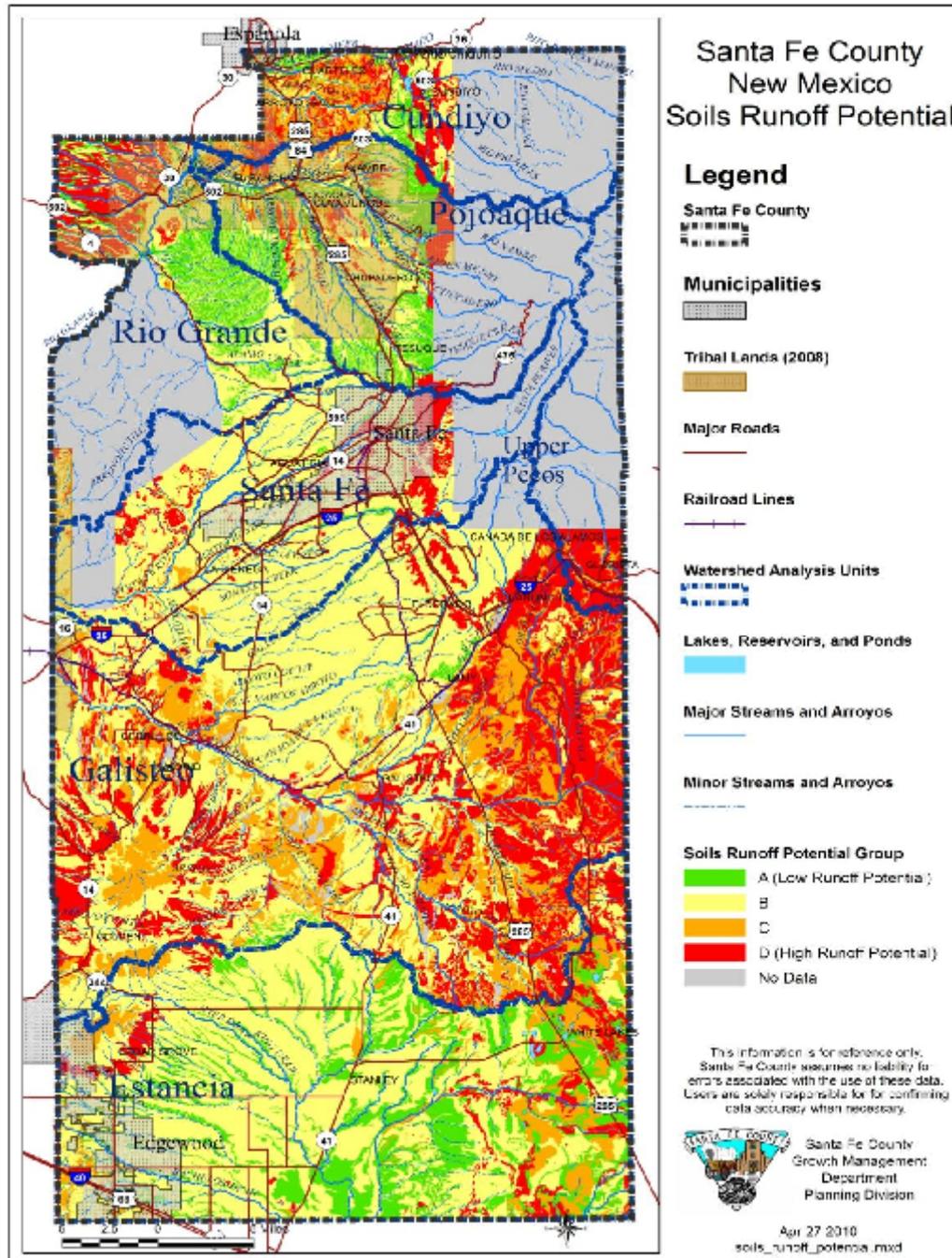


Figure 2: Soil Runoff Potential Classifications in Santa Fe County

## 2.5 Ecoregions

An ecoregion is a recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterize that region. There are 14 different ecological regions in Santa Fe County (Table 3).

SANTA FE COUNTY ECOREGIONS AND ACREAGE	
Ecoregions	Acreage
Foothill Shrublands	217,346.64
Sedimentary Mid-Elevation Forests	55,802.80
North-Central New Mexico Valleys and Mesas	82,452.48
Rio Grande Floodplain	3,752.66
Crystalline Subalpine Forests	6,508.49
Crystalline Mid-Elevation Forests	9,301.61
Sedimentary Subalpine Forests	3,471.53
Alpine Zone	753.64
Albuquerque Basin	171,481.64
Pinyon-Juniper Woodlands and Savannas	86,118.92
Conifer Woodlands and Savannas	38,689.16
Rocky Mountain Conifer Forests	1,669.79
Central New Mexico Plains	434,005.99
Pluvial Lake Basins	27,351.70

Table 3: Santa Fe County Ecoregions

Within an ecoregion are areas where there is spatial coincidence in geographical characteristics associated with differences in the quality, health, and integrity of ecosystems. Geographical characteristics include geology, physiography, vegetation, climate, hydrology, terrestrial and aquatic fauna, soils, and the impacts of human activity (e.g. land use patterns, vegetation changes).

### 2.6 Threatened and Endangered Species

Santa Fe County lies at the convergence of multiple ecosystems. This unique intersection provides for a high level of biodiversity including large and small mammals; as well as native vegetation. Natural features allow for the presence of native plants and wildlife. Migration of wildlife and native vegetation should be protected as ecological and ecotourism assets. The 1973 Endangered Species Act,<sup>4</sup> through federal action and by encouraging the establishment of state programs, for the conservation of ecosystems, upon which threatened and endangered species of fish, wildlife, and plants depend. The Act: authorizes the determination and listing of species as endangered and threatened; and prohibits:

The Rio Grande silvery minnow and The southwestern willow flycatcher, Two species that live in the Rio Grande River, are included on the federal and State Endangered species list

<sup>4</sup> U.S. Fish and Wildlife Service. Endangered Species Act 1973 as Amended by the 108<sup>th</sup> Congress. U.S. Department of Interior

- Unauthorized taking, possession, sale, and transport of endangered species;
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds;
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants;
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations; and
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act or any regulation issued thereunder.

Overall habitat richness, based on a number of vertebrate species, has been evaluated by New Mexico State University, as a part of the Southwest Regional Gap Analysis Project (SWReGAP). The analysis was recently refined by NMSU for Santa Fe County (Boykin, et.al.)<sup>2</sup>. The New Mexico Game and Fish Department has identified the conceptual locations of corridors needed to connect major habitat patches (outlined in Figure 4).

The Biota Information System of New Mexico (BISON-M) was developed for biologists by The New Mexico Department of Game & Fish, and The Fish & Wildlife Information Exchange. BISON-M is a compilation of biological information for both vertebrate and invertebrate species which occur in New Mexico and includes all threatened, endangered, and sensitive species. BISON-M database lists 622 species in Santa Fe County; amphibians, reptiles, birds and mammals (those taxa categories specified in SWReGAP, Table 4) are selected that met one or more of the following criteria:

- NM Endangered or Threatened
- NM Species of Greatest Conservation Need

---

<sup>2</sup> Boykin, K.G. R. Guy, and M. Calkins. 2009. *Santa Fe County Wildlife Habitat GIS Modeling Workshop*. New Mexico Cooperative Fish and Wildlife Research Unit. Technical Assistance Report. 55 pages.



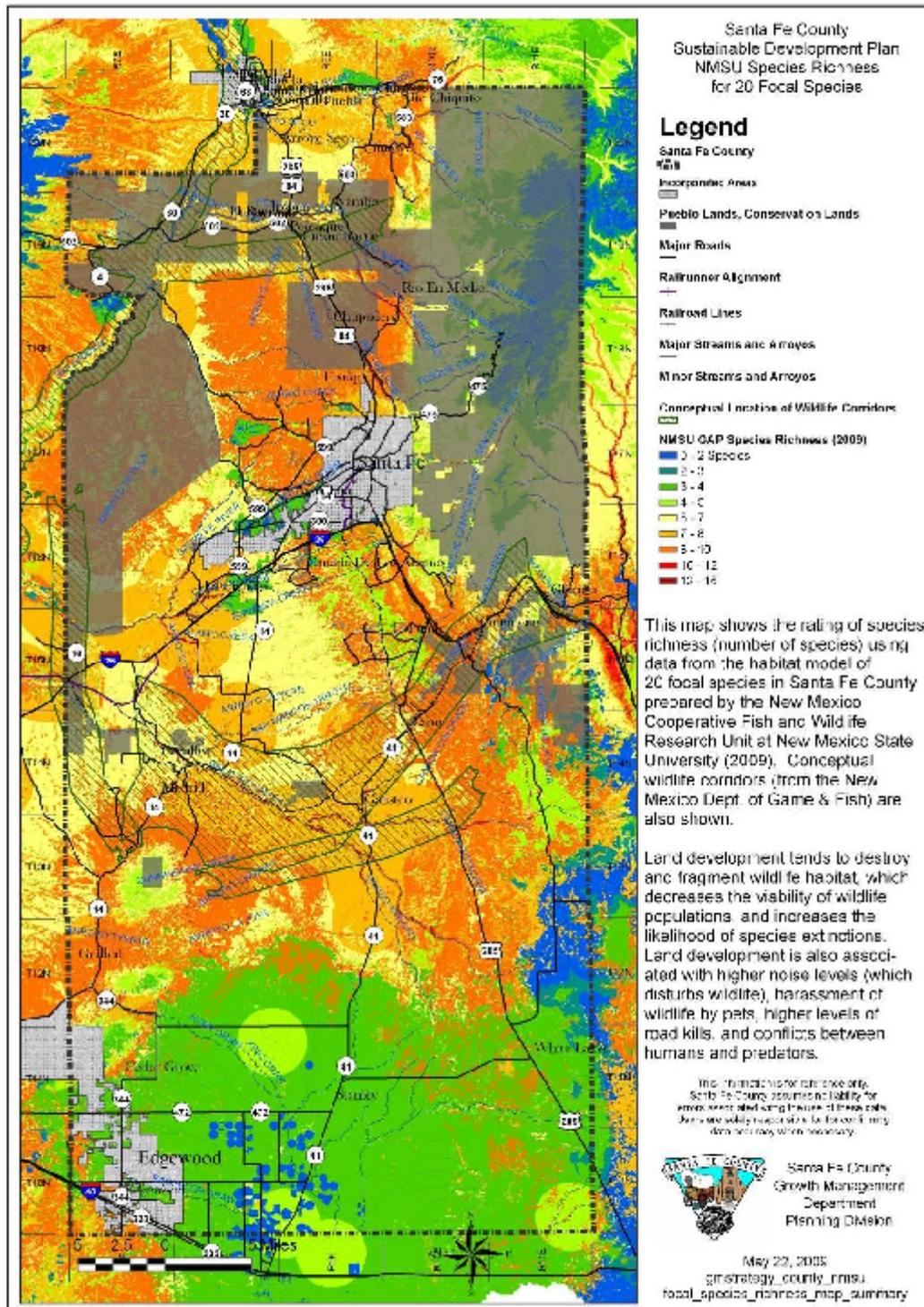


Figure 4: Species Diversity from SWReGap Analysis



### 2.6.1 Threatened and Endangered Fauna

There are a number of federal or/and state protected species that are known in Santa Fe County. Among them are: the grey vireo, bald eagle, whooping crane, baird’s sparrow, southwestern willow flycatcher, spotted bat, and the meadow jumping mouse. Suitable habitat for these species is dwindling due to developments for human habitation. Table 4 below, lists the 63 species designated as “Demonstrably Secure” (endangered, threatened, and greatest in need of conservation) developed by SWReGAP .<sup>3</sup>

LIST OF ENDANGERED AND THREATENED SPECIES		
Frog, Leopard	Northern Hummingbird, Violet-crowned	Tern, Least
Snake, Garter, New Mexico	White-faced Ibis,	Thrasher, Bendire's
Snake, Milk	Nighthawk, Common	Thrasher, Sage
Turtle, Box, Ornate	Nuthatch, Red-breasted	Titmouse, Juniper
Crane, Sandhill	Oriole, Bullock's	Vireo, Gray
Duck, Pintail	Northern Oriole	Baltimore Warbler,
Grace's Duck,	Teal, Blue-winged	Osprey,
Warbler, Gray, Black-throat	Duck, Teal, Green-winged	Owl, Barn
Warbler, Yellow	Duck, Wood	Owl, Boreal
Woodpecker, Downy	Eagle, Bald	Owl, Burrowing
Woodpecker, Hairy	Falcon, Peregrine	Owl, Spotted, Mexican
Woodpecker, Lewis's	Falcon, Peregrine, Arctic	Pigeon, Band-tailed
Bear, Black	Flycatcher, Olive-sided	Plover, Mountain
Beaver, American	Flycatcher, Willow,	SW. Plover, Snowy,
Western Bobcat	Goldfinch, American	Ptarmigan, White-tailed
Prairie Dog Gunnison's	Goldfinch, Lesser	Sparrow, Baird's
Lion, Mountain	Goshawk, Northern	Sparrow, Grasshopper
Marten, American	Grebe, Eared	Sparrow, Sage
Pronghorn	Grouse, Blue	Swallow, Rough-winged, N.
Raccoon, Common	Harrier, Northern	Swallow, Tree
Sheep, Bighorn, Rocky Mtn.	Hawk, Ferruginous	Swift, Black
Squirrel, Albert's		

Table 4: List of Threatened and Endangered Species in Santa Fe County

### 2.6.2 Threatened and Endangered Species Flora

Vegetation types in Santa Fe County are controlled by elevation, available water and are interdependent on temperature and precipitation. Landscape varies from ponderosa pine forests at elevations of 7500 feet;



pinon/juniper woodlands in mesas and hillsides; plains/grassland; and riparian wetlands along rivers and streams. Other native vegetation include: Alkali sacaton, blue grama, fourwing saltbush, galleta, gambel oak, Arizona fescue, muttongrass, mountain muhly, and sedge, which cover the broad, mountainous to semiarid landscape in the county.

Native plants and existing groundcover provide important natural habitat, prevent erosion and provide natural storm water runoff filtration and management. Additionally, Native American Pueblos in Santa Fe County harvest native plants for ceremonial and practical use. Desert plants are very sensitive and take years to establish once planted. Disturbance of a site can permanently destroy native vegetation, reducing habitat and biodiversity. Road construction and other development activity threaten native plants. For instance, roads built in previously undeveloped areas not only destroy native plants, but can also lead to the spread of exotic invasive plants; traffic spreads the seeds of these noxious weeds.

Table 5 lists some of the plants in the Santa Fe County area, designated by the New Mexico Rare Plant Technical Council<sup>6</sup> as “rare or endangered species”.

RARE PLANTS	
Latin Name:	Common Name:
<i>Abronia bigelovii</i>	Tufted Sand Verbena
<i>Astragalus cyaneus</i>	Cyanic Milkvetch
<i>Astragalus feensis</i>	Santa Fe Milkvetch
<i>Astragalus siliceous</i>	Mountains Milkvetch
<i>Cuscuta fasciculate</i>	Santa Fe Dodder
<i>Delphinium sapellonis</i>	Sapello Canyon Larkspur
<i>Hackelia hirsute</i>	New Mexico Stickseed
<i>Mentzelia springeri</i>	Mentzelia springeri
<i>Mentzelia todiltoensis</i>	Todilto Stickleaf
<i>Muhlenbergia arsenei</i>	Navajo Muhly/Tough Muhly
<i>Opuntia viridiflora</i>	Santa Fe Cholla
<i>Rubus aliceeae</i>	Santa Fe Raspberry

Table 5: Rare and Endangered Plants in Santa Fe County

## 2.7 Historic and Cultural Content of Santa Fe County

Santa Fe County is diverse in settlement patterns spanning from historical to contemporary. The character of the communities is best defined by a variety of criteria such as geographic setting, land use, culture, economy, community services and proximity to transportation corridors.

The existing settlements are a contrast between urban and rural areas either located within or adjacent to the

<sup>6</sup> New Mexico Native Plants Protection Advisory Committee. 1984. A Handbook of Rare and Endemic Plants of New Mexico. University of New Mexico Press, Albuquerque



county. Dispersed amongst these communities are large expanses of public lands such as Forest Service, BLM and State lands. Additionally, large holdings of tribal lands from San Ildefonso, Santa Clara, Pojoaque, Nambe and Tesuque Pueblos are located within Santa Fe County. Santo Domingo and Cochiti Pueblos also have portions of land at the western border of the County line. The natural resource base is sparse, limiting economic activities, coupled with finite water supplies. Traditionally, the resource base supported small, stable agricultural settlements. With the advent of increased urbanization there are environmental impacts and depletion of agricultural land and water resources that have occurred.

### **2.7.1 Tribal Culture**

Four Native American Pueblos are situated within County limits, providing genuine experiences of New Mexico's indigenous culture. North of the City of Santa Fe are the Pueblos of Tesuque, Nambe, and Pojoaque; to the west lies San Ildefonso.

The U.S. Supreme Court gave tribes the primary water rights and water resources necessary for its economic and cultural future. That means tribes and farmers who began using the water first have senior rights; next in line are towns and other newcomers. But until recently, 19 tribes in the West had not exercised those rights. This year, tribes in Montana, New Mexico, Idaho, Nevada and California are on the verge of securing their claims. New Mexico currently has 12 ongoing adjudications, including ones in the Pojoaque Valley, Taos, the San Juan River and the Lower Rio Grande. Less than a fourth of the water rights in the state have been adjudicated, but when they are, it could result in less water, or higher water prices, for non-Indian agricultural producers and communities downstream.

NATIVE AMERICAN PUEBLOS/TRIBAL LANDS				
Pueblo/Tribal Lands	Watershed	Population[1]	Total Area (square Mi)	Tribal Contact Number
Cochiti	Santa Fe	1,502	82.09	(505) 465-2244
*Nambe	Pojoaque	1,764	32.07	(505) 455-2036
*Pojoaque	Pojoaque	2,712	21.16	(505) 455-3334
Santa Clara	Cundiyo	10,658	77.11	(505)7537330/7326
Santo Domingo	Galisteo	3,166	106.6	(505) 465-2214
*San Ildefonso	Pojoaque	1,524	43.98	(505) 455-2273
*Tesuque	Pojoaque	806	26.52	(505) 955-7732

Table 6: Tribal Lands Located within Santa Fe County

\*Pueblos situated within Santa Fe County boundary

### 2.7.2 Historical Irrigation Practices: Acequias in Santa Fe County

The community-based acequias in Santa Fe County are one of the oldest water management institutions in the United States. New Mexico’s water is managed based on priority, with those using water first being first in line. These earthen ditches, native engineering works used for irrigation, date back to indigenous times. When the first European settler arrived in northern New Mexico, during the late sixteenth century, with the first Juan de Oñate colony in 1598, they saw the efficiency of the water irrigation systems already in place. When Spanish *conquistadores* conducted the first *entradas* (entry) into the Río Grande they realized that the construction of irrigation works or acequias would be critical for the establishment of communities and agricultural production. Spanish colonization policies required that officials of the crown, and settlers from the central valley of Mexico (who accompanied them), must locate their communities in the vicinity of water resources essential to permanent occupation<sup>8</sup>. The irrigation technology employed by the settlers was gravity flow by way of earthen canals or acequias that closely followed the contours of the sloping land form. Thus the Spanish expanded the acequia system as more colonizing settlements began to occur.

<sup>7</sup> US Census Bureau: Census 2000 Summary File 1New Mexico -- American Indian Area GCT-PH1. Population, Housing Units, Area, and Density: 20

<sup>8</sup> Ackerly, Neal. A Review of Significance of and Management Recommendations for Preserving New Mexico’s Acequia System. Dos Rios Consultants.

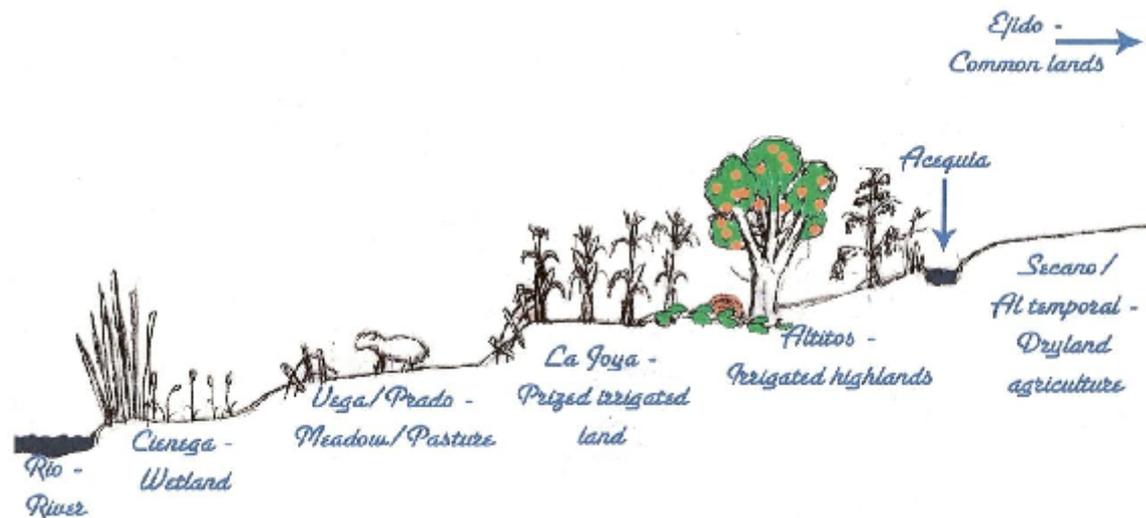


Figure 5: Acequia Landscape<sup>9</sup>

Acequia irrigation systems in the upper Rio Grande area have supported human subsistence for hundreds of years. These systems also supported the social, political, and ecological systems in traditional communities throughout Santa Fe County. As a social institution, they have preserved historic settlements and local cultures spanning from the Spanish colonial period, through the Mexican and Territorial periods, to present day.

The acequia irrigators known as parcientes formed their own water democracies operating outside of government in terms of their internal affairs; they elected their own officers, established rules, enforced them, and settled water disputes. The first water laws adopted by the Territorial Assembly of New Mexico in 1851-52 under United States jurisdiction were the Leyes de las Acequias, published in Spanish, guaranteeing the priority of water use for irrigation and the application of existing ditch rules. As in the past, acequia communities today are still in charge of their day-to-day governance, and collectively maintain their irrigation works and repair their diversion structures when necessary<sup>9</sup>.

In 1987, the four major basins or watersheds in Santa Fe County contained 70 acequias with approximately 7,595 acres of irrigated land<sup>9</sup>. There were 1,791 farmers with an average of 108.5 irrigated acres per *acequia*. Sixty-six (66) *acequias* had active associations, although only 19 had bylaws on file with the State Engineers Office.

The total amount of irrigated acreage (groundwater and acequias) in the County is over 18,000. Each acre is estimated to use approximately 2 ac-ft/yr of water for an estimated total amount of 36,000 ac-ft/yr. The primary areas of acequia-irrigated acreage are Agua Fria, La Cieniga, La Bajada, Santa Cruz, Nambe, Tesuque, Santa Fe, Pojoaque Valley, and Chimayo<sup>10</sup>. The southern areas of the County such as Stanley, Edgewood and Canoncito mainly use groundwater for irrigation purposes.

## **2.8 Water Resources**

A very brief description of the surface water and groundwater resources are described in this section with the intent of creating an awareness of the resource.

---

### **2.8.1 Surface Water**

Wetlands and streams are an essential component of the Santa Fe County Watersheds. They provide habitats for wildlife and fisheries, safeguard water quality, offer flood protection, stabilize slopes and stream flow, and recharge and discharge ground water. The surface water drainage systems also form a regional and local hub of water resources and water-related ecosystems of riparian zones and wetlands (Figure 6) in an otherwise arid landscape. Given the invaluable nature of these wetlands and streams, great care should be taken to protect them from environmental changes.

Eventually the drinking water for The City of Santa Fe and Santa Fe County will come from the newly constructed Buckman Direct Diversion (BDD) Project. The City of Santa Fe is responsible for the infrastructure and will deliver 1,000 acre feet per year of water to City and County Customers. The project is going to have long term impacts on water resources and water planning. Since the project is relatively new, the planning and water resources implications will be described in future updates to the water conservation plan.

### **2.8.2 Groundwater**

The groundwater hydrology in Santa Fe County is very complex. A general overview of the aquifer surrounding the City of Santa Fe is provided and details can be found in the draft 40 year water development plan. Most of the Santa Fe aquifer is characterized by the Santa Fe Group of Quaternary/Tertiary age. The Santa Fe Group consists of alluvial fans, river channel deposits and interbedded volcanic rocks preserved in a complex of depressed fault blocks within the Rio Grande depression. The west side of the watershed came under the influence of the Quaternary lava flows that originated in the Valles Caldera of the Jemez Mountains; these rocks outcrop in the Santa Fe Canyon and form the Caja del Rio grazing lands. Complex Tertiary to Cretaceous intrusive rocks occur in the La Cienega area. Patches of Quaternary alluvium are found along the Santa Fe River, especially at its confluence with the Rio Grande. Groundwater occurs to a greater or lesser extent in all of these geologic units.<sup>11</sup>

<sup>9</sup> Rivera, Jose. Martinez, Luis Pablo. "Acequia Culture: Historic Irrigated Landscapes of New Mexico". 2006

<sup>10</sup> Patrick Torres, County Extension Agent Santa Fe County, New Mexico State University. Personal Communication

<sup>11</sup> Jemez y Sangre Regional Plan. 2003, Vol. 2

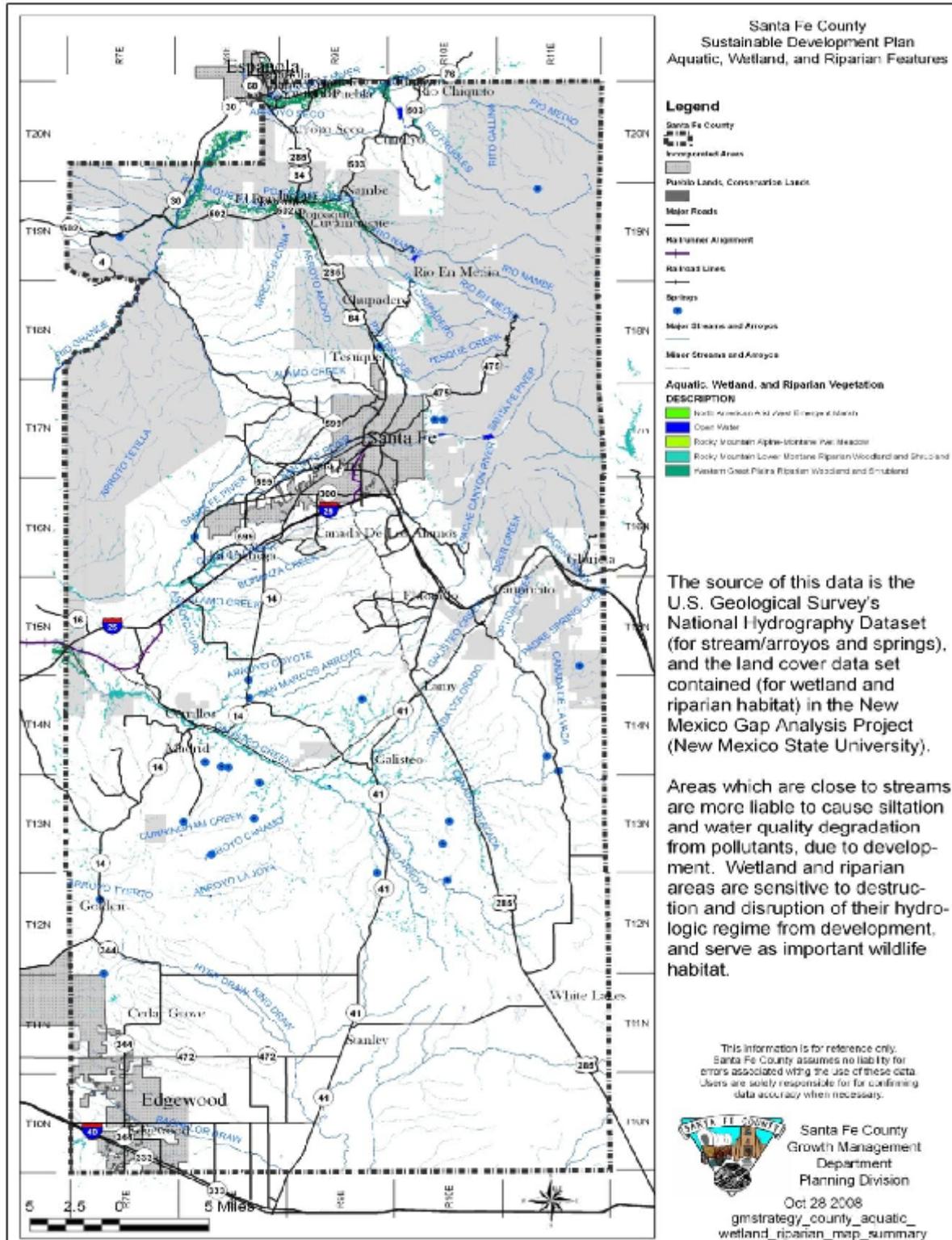


Figure 6: Aquatic, Wetland and Riparian Features

### 3 Santa Fe County Watersheds

There are six basins or watersheds in Santa Fe County. The northern most water shed is the Cundiyo Basin extending into Rio Arriba County. To the west is the Rio Grande Corridor which lies adjacent to the Pojoaque-Nambe-Tesuque Basins. For the purpose of this plan these sub-basins were combined to form a larger watershed. At the eastern county line, the Pecos Basin extends into Santa Fe County, although it drains easterly towards the Pecos River. The Galisteo Basin starts midway and extends south adjacent to the Estancia Basin<sup>8</sup>. All of the *acequias* in the county lie within the Cundiyo, Tesuque, Santa Fe, and Nambe Basins. Historically, *acequias* were used in Galisteo but they are no longer functional. Most of the irrigation in the Estancia Basin occurs via center pivot sprinklers.

The Rio Grande Corridor and the Upper Pecos Watersheds were not included in this plan as these watersheds go beyond the Santa Fe County lines. Future coordination with these watersheds may occur.

SANTA FE COUNTY WATERSHEDS <sup>12</sup>			
Watershed	Area in Square Miles and Acreage	Streams/Rivers	Number of Acequias
Cundiyo Basin	191 sq mi/122,359 acres	5	20
Pojoaque-Nambe Basin	204 sq mi/130,902 acres	4	17
Tesuque Basin	114 sq mi/72,948 acres	4	22
Santa Fe Basin	279 sq mi/178,755 acres	5	11
Galisteo Basin	730-sq mi/467,200 acres	3	0
Estancia Basin	2,260 sq mi/1,446,400	0	0
		Total Acequias:	70

**Table 7: Santa Fe County Watersheds**

<sup>12</sup>Saavedra, Paul *Surface Water Irrigation Organizations in New Mexico*, March 1987, TDDC-87-



Santa Fe County  
Water Conservation Program



Figure 7. Site Map for Santa Fe County Major Watersheds



Cundiyo-Santa Cruz River Watershed encompasses an area of 191 square miles in the northern most portion of Santa Fe County. The City of Espanola borders to the north and the Tesuque-Pojoaque-Nambe Sub-Basin to the south. Cundiyo, an irrigated valley, is a small, predominantly Hispanic agricultural based village, located on the Santo Domingo de Cundiyo Land Grant.<sup>13</sup> The village was established on the Cundiyo Grant which consisted of approximately 1,580 acres of land for livestock grazing and farming.<sup>14</sup> Historically four main irrigation ditches were developed: Acequia de la Placita, Acequia de Molino, Acequia de los Cuarteles, and Acequia de los Barriales. Currently, twenty acequias actively irrigate agricultural lands throughout this watershed. Irrigated lands are cultivated for commercial crops including alfalfa, corn, oats, chili, garden vegetables, and some orchard fruit.

The Rio Medio flows through the northern section of Cundiyo while the Rio Frijoles flows through the southern portion. The rivers converge midway between both sections flowing northwest west draining at the Santa Cruz Lake.

<b>CUNDIYO-SANTA CRUZ RIVER WATERSHED <sup>11</sup></b>	
Area in Square Miles	191 sq mi/122,359 acres
Elevation mean sea level (msl)	6,100 to 8,500 ft.
Average Annual Precipitation	The annual average precipitation is 18.93 Inches. Rainfall is fairly evenly distributed throughout the year. The wettest month of the year is August with an average rainfall of 3.32 inches.
Climate	The average temperature is 47.5 with summer temperatures in the 80's and temperatures in the 30's depending on elevation.
Streams/Rivers	Five
Number of Acequias	Twenty
Tributaries	Rio Frijoles, Rito Gallina, Rio Medio
Reservoir	Santa Cruz Lake
Native American Pueblo Land	Santa Clara
Other Lands	US Forest, municipalities
Vegetation	Ponderosa pine, Gambel oak, Arizona fescue, muttongrass, juniper, mountain muhly, sedge, twoneedle pinon
Water Resources	Santa Cruz River, Rio Quemado, Rio Medio, Santa Cruz Reservoir, and groundwater.

Table 8: Cundiyo -Santa Cruz Watershed Information

<sup>13</sup> Julyan, Robert: The Place Names of New Mexico . University of New Mexico, University of New Mexico Press (Paperback, 1996).

<sup>14</sup> U.S. Army Corp of Engineers. Draft Environmental Assessment of the Acequia de Los Ranchos Rehabilitation Project. Santa Fe County, New Mexico. October 2009.

### 3.2 Pojoaque-Nambe-Tesuque Watersheds

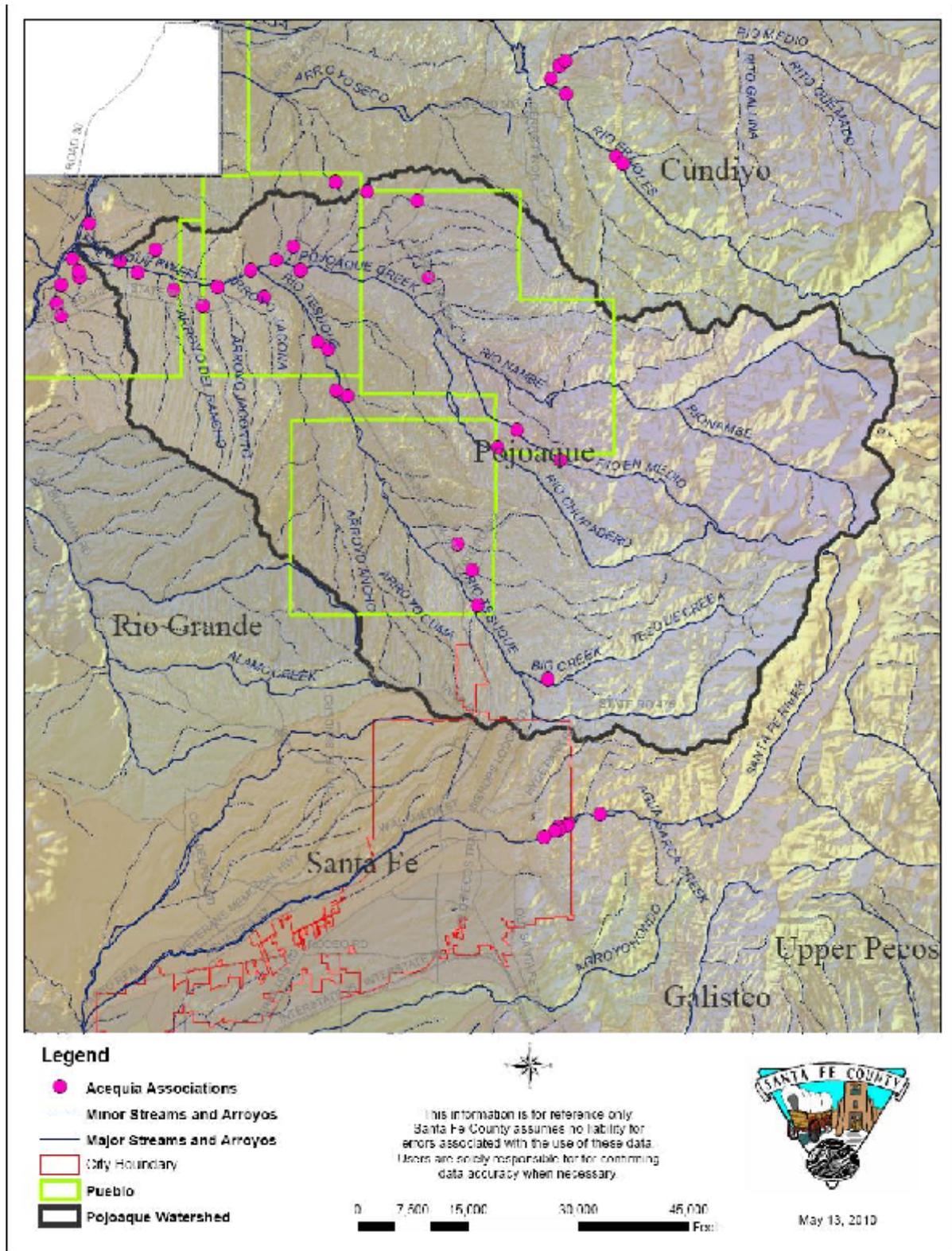


Figure 9: Site Map for Pojoaque - Nambe - Tesuque Watershed(s)

The Pojoaque-Nambe-Tesuque watershed(s) encompasses an area of 318 square miles in the northern portion of Santa Fe County. The elevation ranges from 12,621 ft. mean sea level (msl) at the peaks of the Sangre de Cristo Range to 5,494 ft msl at the Rio Grande, for a total relief of over 7,000 feet. The Nambe, Pojoaque, Tesuque, and San Ildefonso Pueblos are located within the sub-basin boundaries, and occupy most of its land area, while the Santa Fe National Forest covers its eastern area (BBER, 2000). This watershed has the most surface water of all the watersheds; with twenty-two acequias diverted from eight creeks, streams, and rivers.

<b>TESUQUE-POJOAQUE-NAMBE WATERSHED</b>	
Area in Square Miles	318 sq mi/ 203.850 acres
Elevation mean sea level	Ranges from 12,621 ft (peak of Sangre de Cristo Range) to 5,494 ft (base of Rio Grande River).
Average Annual Precipitation	The annual average precipitation is 14.22 to 18.93 Inches depending on the elevation. Rainfall in is fairly evenly distributed throughout the year. The wettest month of the year is August with an average rainfall of 3.32 inches.
Climate	The average relative humidity is 30 percent. The sun shines 82 percent of the time in summer and 70 percent in winter.
Streams/Rivers	There are four; the Nambe and Pojoaque Rivers are the principal sources of surface water.
Number of Acequias	Twenty-two
Tributaries	Nambe River, Rio en Medio, Chupadero, and Tesuque streams combine to form the Pojoaque River. Tesuque and Little Tesuque Creeks flow generally west from the Sangre de Cristo Range, converging to form the north-northwest flowing Rio Tesuque. The Rio Tesuque eventually joins Pojoaque Creek to form the Pojoaque River, which in turn flows west to the Rio Grande.
Reservoir and storage capacity	Nambé Dam and Lake's normal reservoir storage capacity is 2,023 acre-feet.
Native American Pueblo Land	Tesuque, Nambe, Pojoaque, and San Ildefonso
Other Lands	US Forest
Water Resources	The main rivers are: Pojoaque and Nambe; groundwater
Water Conservation Goals	Tesuque Landscape Ordinance (Appendix7. 1)

Table 9: Pojoaque -Nambe - Tesuque Watershed Information



AVERAGE TEMPERATURE AND PRECIPITATION (Tesuque*)													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max °F	43	49	56	64	73	83	85	83	77	66	52	44	64.7
Mean °F	29	35	41	48	57	66	70	68	61	51	38	30	49.4
Min °F	15	21	26	32	40	49	54	53	46	35	38	30	34.2
Precipitation (inches)	.60	.50	.84	.72	1.3	1.2	2.3	2.1	1.7	1.3	1.1	.65	14.22

Table 10: Weather Data for Tesuque Area

\*SANTA FE 2 Weather station, 10.16 miles from Tesuque

### 3.3 Santa Fe River Watershed

The Santa Fe River Sub-Basin encompasses the southern region of the Sangre de Cristo Mountain Range and covers a total area of 284 square miles. The Santa Fe River Watershed contains the largest municipality within the region, the City of Santa Fe, as well as smaller communities, including the traditional villages of Agua Fria and La Cienega. The Santa Fe River is the most significant surface water resource within the sub-basin. The Santa Fe River Watershed was identified as one of the state’s watersheds in most urgent need of restoration.<sup>15</sup> Major tributaries to the Santa Fe River include Arroyo Hondo, Arroyo Calabasas, Cienega Creek, and Alamo Creek. The Santa Fe River is perennial from Santa Fe Lake at 11,700 ft to Nichols Reservoir and from the City wastewater treatment plant (southwest of Santa Fe) to La Bajada. The natural outlet for the Santa Fe River is at the Rio Grande about 2 miles south of Cochiti Lake, but the river’s discharges are diverted northward to the lake about 3 miles upstream of the natural outlet.

<sup>15</sup> Santa Fe River Watershed Restoration Action Strategy. Santa Fe Watershed Association. 2002.

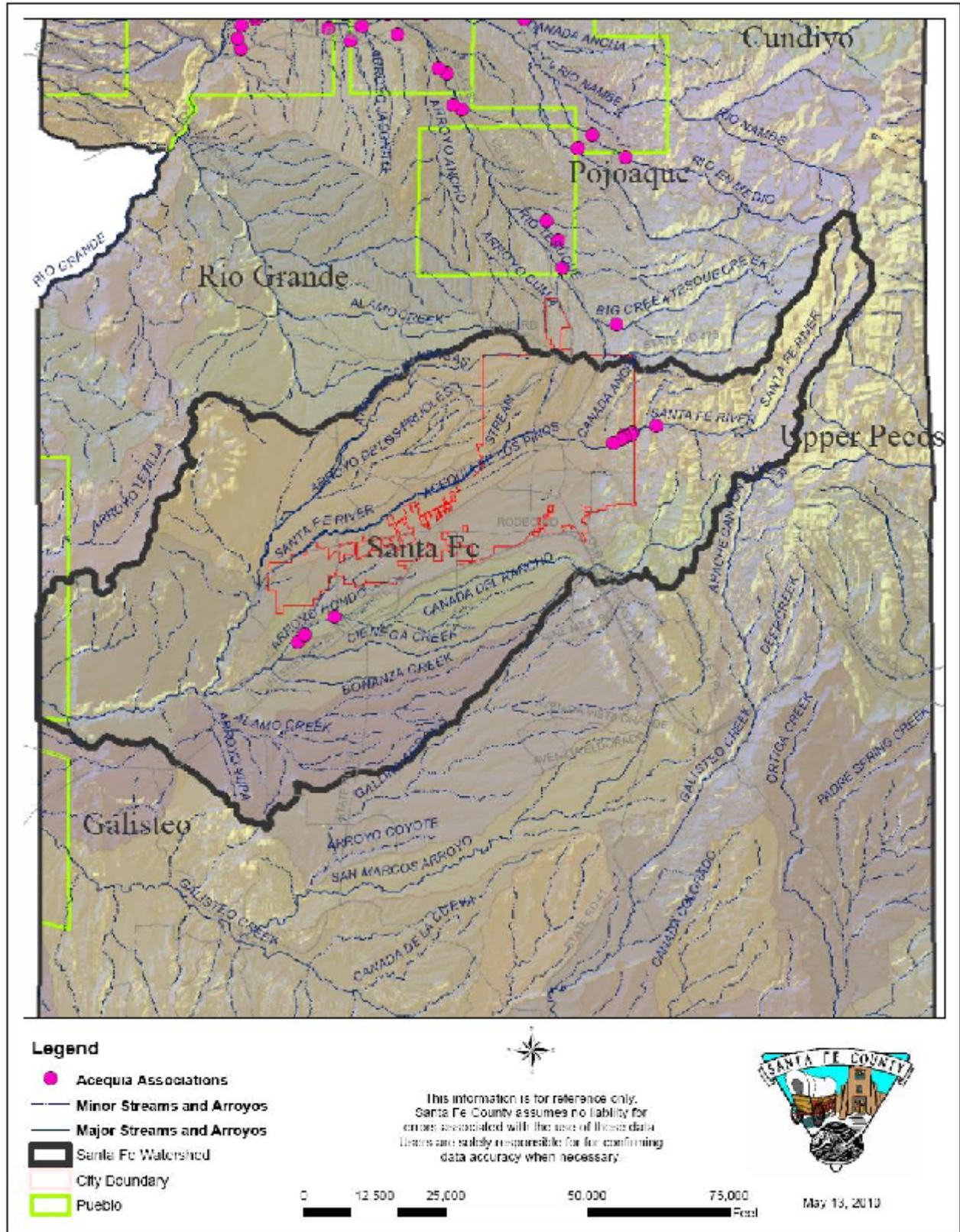


Figure 10: Site Map for the Santa Fe River Watershed



## SANTA FE RIVER WATERSHED<sup>16</sup>

Area in Square Miles	279 sq mi/178,755 acres
Elevation mean sea level	6,900 ft, extending from 12,150 ft msl down to 5,250 ft msl at the Rio Grande.
Average Annual Precipitation	Average annual precipitation in the Santa Fe River Sub-Basin is 12.4 inches, with a minimum recorded precipitation of 5.03 inches, and a maximum of 21.75 inches during the period 1868-1996.
Climate	The average relative humidity is 30 percent. The sun shines approx. 80 percent of the time in summer and 70 percent in winter.
Number of Streams/Rivers	5
Number of Acequias	11
Tributaries	Major tributaries to the Santa Fe River include Arroyo Hondo, Arroyo Calabasas, Cienega Creek, and Alamo Creek.
Reservoir	McClure and Nichols Reservoirs
Native American Pueblo Land	Cochiti and Santo Domingo
Other Lands	National Forest
Soils	Haplargids, Torriorthents, Calciorthids (high lime content), Ustorthents (forming soils), Cryoborolls (deep, dark, well-drained forest soils), Torrifluvents- Calciorthids (formed in water-deposited sediments on floodplains) Cryochrepts (light brown well-drained), and Boralfs (see Appendix 2 for a detailed description and location).
Vegetation	Invasive species such as; Tamarisk (salt cedar), Russian olive, Siberian elm, and numerous others.
Ecoregions	The central area of the County consists of north-central New Mexico valleys and mesas with sedimentary mid-elevation forests, crystalline subalpine and mid-elevation forests and foothills shrublands.
Water Conservation Goals	City of Santa Fe Water Conservation Ordinances (Chapter 6)

Table 11: Santa Fe River Watershed Information

<sup>16</sup> City of Santa Fe Water Division. Water Conservation Plan for the City of Santa Fe. December 2001.



### 3.4 Galisteo Watershed

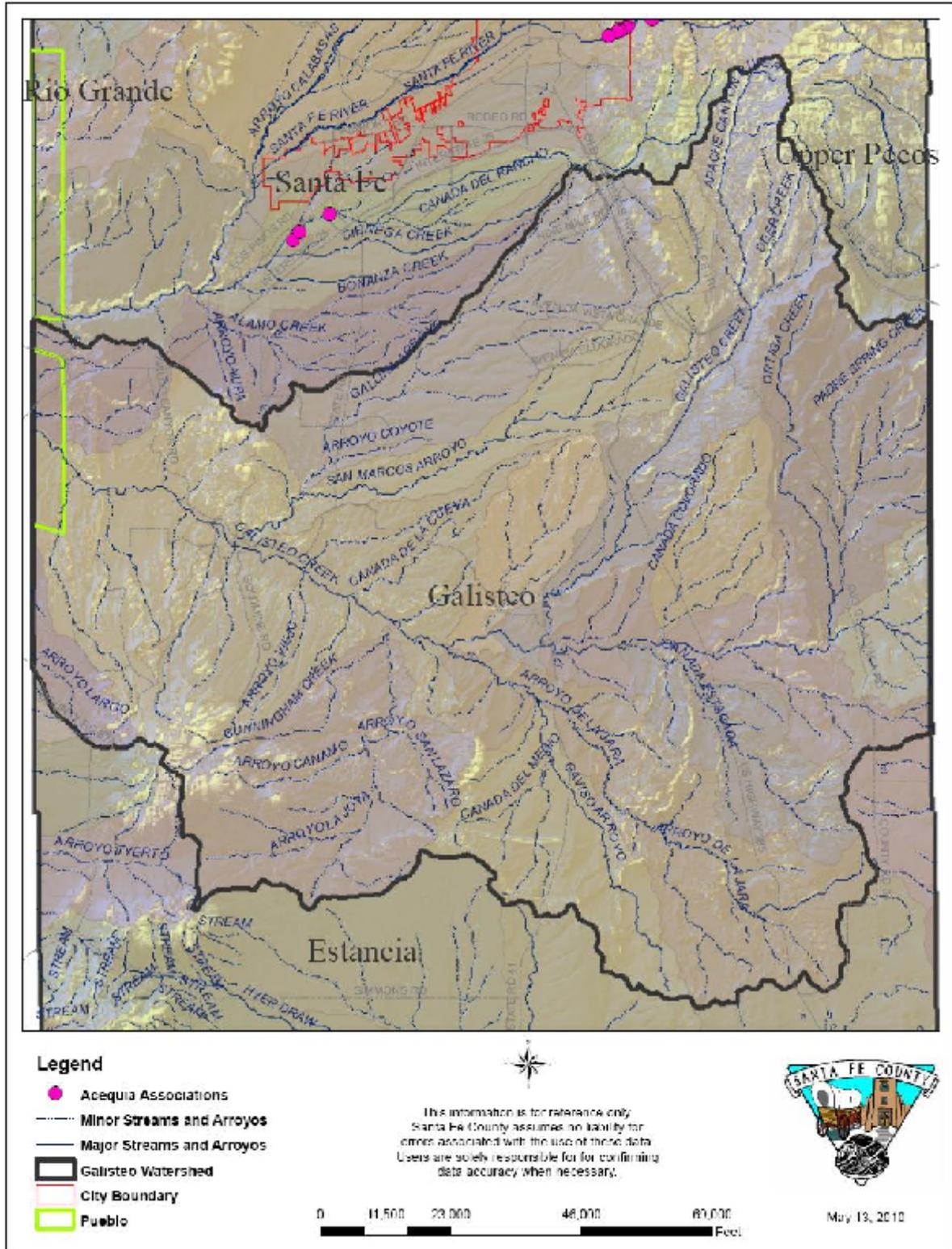


Figure 11: Site Map for the Galisteo Watershed



The Galisteo watershed incorporates over 620 square miles and 430,000 acres. The watershed originates in the Sangre de Cristo Mountains and flows in a southwesternly direction. It flows for approximately 730 square miles or 467,200 acres until it meets the Rio Grande<sup>17</sup>. The main tributary is Galisteo Creek which flows through the towns of Galisteo and Cerrillos. The watershed contains an upper and lower portion. The upper is characterized by perennial mountain streams fed by snow melt while the lower reach forms an intermittent meandering stream with a high sediment load. About 10% of the stream length is perennial. In many places, the stream is incised in the landscape, leading to perched grasslands which have dried out, are dissected by gullies, and are very susceptible to erosion.

<b>Galisteo Basin Watershed<sup>13</sup></b>	
Area in Square Miles	620 sq mi/430,000 Acres
Elevation mean sea level	5,700 to 6,700 feet
Average Annual Precipitation	The average annual precipitation is 10 to 13 inches. In winter the average temperature is 30 degrees; summer average temperature is 70 degrees; and the average seasonal snowfall is 10 inches.
Climate	The average relative humidity is 30 percent. The sun shines 70 percent of the time in summer and 62 percent in winter.
Streams/Rivers	The San Cristobal Creek and the Galisteo Creek, downstream from the confluence with the San Cristobal Arroyo (south of Galisteo) are predominantly ephemeral streams fed by rain storms.
Number of Acequias	None
Tributaries	San Marcos Arroyo
Reservoir and storage capacity	Construction of Galisteo Flood Control Structure (completed in 1970)
Native American Pueblo Land	Santo Domingo Pueblo
Other Lands	USDA Forest Service (Pecos-Las Vegas Ranger District of the Santa Fe National Forest), BLM, State Land Office Lands, The U.S. Army Corps of Engineers (USACE) manages an area of approximately 4.5 square miles around the Galisteo Reservoir for sediment and flood control; the U.S. National Park Service (NPS) Pecos National Monument manages about 50 acres of land as part of the historic Glorieta Battle Field in Lower Canonicito south of I-25; and the Towns of Galisteo, Lamy, Cerrillos, Madrid and community of Eldorado.
Soil & Rock types	“Las Lucas-Pojoaque” and “Panky-Pojoaque Harvey” associations are characterized by level to hilly topography with dissected and eroded terraces. The third soil association is called the “Travessilla-Rock outcrop-Bernal” and is found in higher elevations and characterized by steeper slopes and rockier terrain.
Wildlife	Southwest willow flycatcher habitat
Vegetation	Ponderosa pine forest in the upper watershed; in lower regions: pinon/juniper woodlands, shrub/grassland, and riparian wetlands. Other native vegetation: Alkali sacaton, blue grama, fourwing saltbush, galleta

<sup>17</sup> Watershed Restoration Action Strategy for the Galisteo Creek Watershed. Earthworks Institute. 2006



**Water Resources**

Springs and wetlands in the San Marcos Arroyo on either side of Highway 14;  
Wetlands and springs in the reaches of the San Marcos Arroyo and Gallinas Arroyo just north of Cerrillos.

**Table 12: Galisteo Basin Watershed Information**

**3.5 Estancia Basin**

The Estancia Basin is located east of the Manzano Mountains, the easternmost portion of Bernalillo County, to the south is Chupadera Mesa; the southern portion of Santa Fe County, and to the east gently rolling uplands. Only a third of the Estancia Basin is within Santa Fe County. The Estancia Basin is a topographically closed basin in which no surface water enters the basin from outside of the topographic boundary nor does any surface water leave the basin. The basin contains significant but limited underground water. Along with agriculture, the population in portions of the Estancia Basin is experiencing the most rapid growth in the State of New Mexico<sup>14</sup>. As a result, an increased number of people residing both within and immediately outside the Estancia Basin have become dependent on Estancia Basin water resources. This trend is putting increasing demand on the finite water resources of the Estancia Basin.

**TEMPERATURE AND PRECIPITATION (Edgewood)\***

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max °F	52	58	66	73	81	88	93	93	87	77	64	55	74
Mean °F	41	47	54	62	70	78	82	82	75	65	53	44	63
Min °F	31	35	43	50	59	67	70	70	63	53	42	34	52
Precipitation (inches)	3.1	3.2	3.7	3.7	4.7	4.5	2.2	3.3	3.4	4.8	4.2	3.9	43.68

**Table 13: Edgewood Climate Data**

\*WILLS POINT Weather station, 7.85 miles from Edgewood

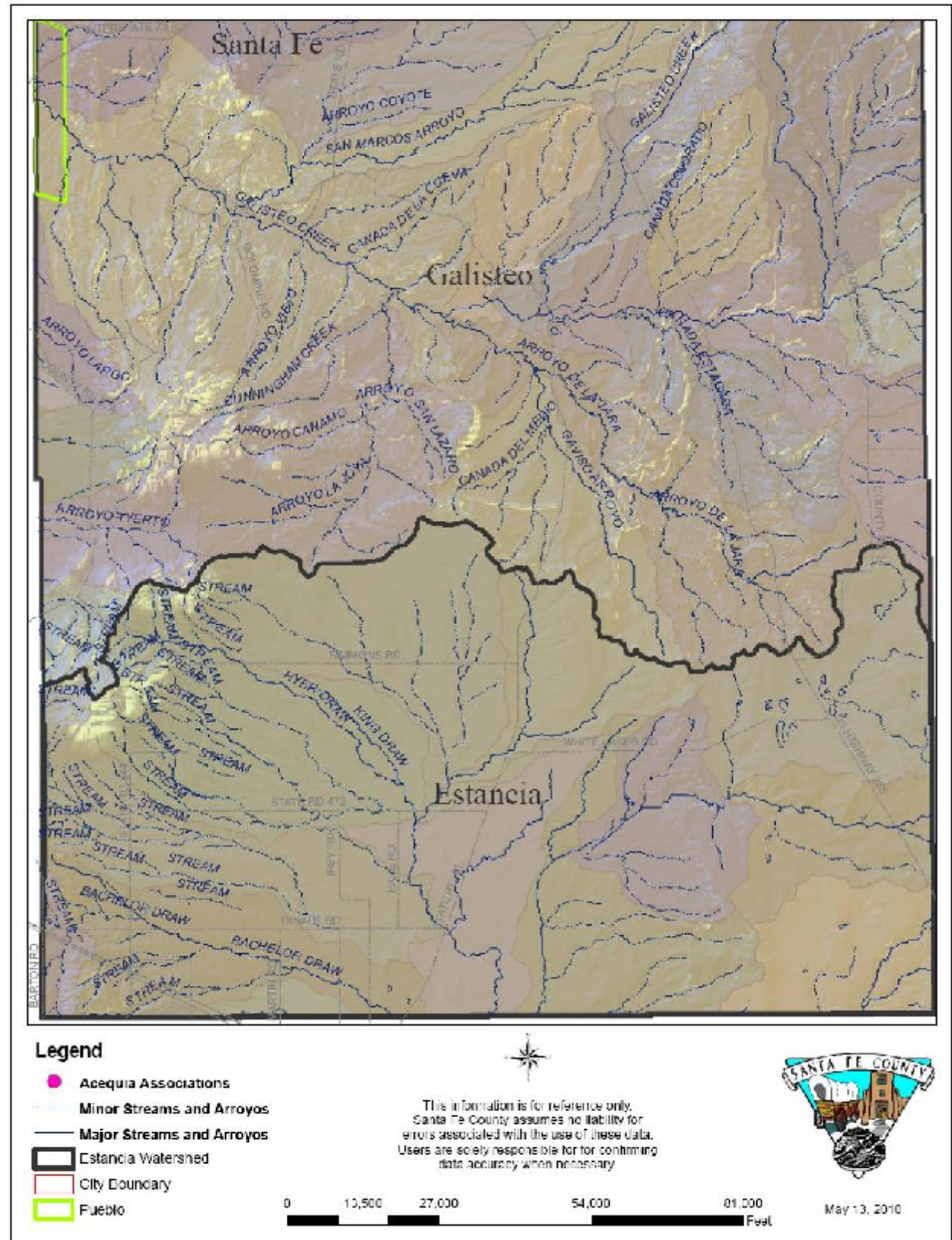


Figure 12: Site Map for the Estancia Basin Watershed



## ESTANCIA BASIN WATERSHED

Area in Square Miles	2,260 sq mi/1,446,400 acres
Elevation mean sea level	6,000 to 7,200 feet
Average Annual Precipitation	The average annual precipitation is 13.8 inches. In winter the average temperature in degrees; summer average temperature is 68.1 degrees; and the average seasonal snowfall is 20.7 inches.
Climate	The average relative humidity is 59 percent. The sun shines 74 percent of the time in summer and 65 percent in winter.
Streams/Rivers	Closed Basin
Number of Acequias	None
Tributaries	There are no significant perennial streams within the Basin, though short reaches of spring-fed drainages exist mainly on the east slopes of the Manzano Mountains.
Reservoir and storage capacity	Two small freshwater lakes: Manzano and Sherwood Forest Lakes. Laguna del Perro is a salt water (playa) lake in the central Estancia Basin (Torrence County)
Native American Pueblo Land	None
Other Lands	National Forest. Includes parts of 4 other counties: Torrance, Bernalillo, San Miguel, Lincoln.
Vegetation	Western wheatgrass, galleta, blue grama, fourwing saltbush, Ponderosa Pine, and pinon/juniper.
Water Resources	Valley Fill Aquifer and Permian
Water Conservation Goals	The Estancia Basin Recommended Regional Water Plan was developed to provide a roadmap that, if followed, would have decreased depletions in the Valley Fill aquifer from approximately 50,000 acre-feet per year to approximately 20,000 acre-feet per year by the year 2040. Since 1999, the planning effort has led to 11,000 acre-feet per year in water savings – approximately 7,600 acre-feet in increased irrigation efficiency efforts, and possibly as much as 3,400 acre-feet through forest thinning projects. <sup>18</sup>

Table 14: Estancia Basin Information

<sup>18</sup> Estancia Basin Recommended Regional Water Plan. Year 2010 Update. Final Draft



## 4 Santa Fe County Water Utility

This Section outlines the purpose of the Santa Fe County Utility (SFCU) Water-Wastewater Department and Santa Fe County Water storage facilities, service areas, and waste treatment plants. Wastewater treatment service areas and the corresponding treatment facilities are also summarized. The SFCU only serves a small portion of Santa Fe County and has limited extent beyond the City Limits. In addition, this section describes the agreements between Santa Fe County and the SFCWC, and between the City of Santa Fe and Santa Fe County, which lists the various water systems within the county, and includes future water allocations from the Buckman Direct Diversion (BDD). The allocation for the BDD is San Juan – Chama Water, through the Bureau of Reclamation (Appendix 7.2).

### 4.1 Water Supplier Profile

Water for the SFCWU is provided by the City of Santa Fe, under the 1996 Wheeling Agreement between the City of Santa Fe, Santa Fe County, and the Santa Fe County Water Company (privately owned); through which the Sangre de Cristo Water Division agreed to deliver up to 500 acre-feet per year (ac-ft/yr) of water<sup>19</sup> to the County. The City of Santa Fe is a 1982 Reclamation Reform Act (RRA) contractor with the Bureau of Reclamation.

The SFCWU currently receives water from the City of Santa Fe. The city of Santa Fe receives its water resources from<sup>13</sup>:

- Santa Fe River main stream and tributaries
- Eight ground water wells along the Santa Fe River
- The Buckman well field near the Rio Grande River; primarily withdraws from the San Juan-Chama contract.

The County water system is presently composed of four areas<sup>16</sup> in and around the City of Santa Fe. These areas are:

- 1) **The South County Area**, which uses the majority the present demand; about 90 percent. This area has approximately 1600 customers, and will continue to use the majority of the water.
- 2) **The Airport Development District** presently has only one service customer, the new County Public Works Building, but will probably have the largest growth potential in the future due to the Buckman Direct Diversion's plans to supply water to the area starting in 2011.
- 3) **The West Sector Area** presently has a small service demand, with the least number of customers (about 65), but has the potential for considerable growth, as the City of Santa Fe plans to annex areas inside the I-25/SR599 boundary. At that time, the City water service outside of this boundary will be turned over to the County to operate and maintain.
- 4) **The South Meadows Road/County Road 62 Area** presently has only three customers, but will have a large potential for growth in the future, when the South Meadows Road extension and the Buckman Direct Diversion's eastern segment pipeline are operational.

---

<sup>19</sup> Santa Fe County Legal and Water/Wastewater Operations Department(s), Santa Fe County Conjunctive Management Plan. January 2009.



#### 4.2 Santa Fe County Water Service Rates

<b>SANTA FE COUNTY WATER RESOURCES DEPARTMENT</b>			
<b>RATE SCHEDULE</b>			
<b>EFFECTIVE AUGUST 1, 2005</b>			
TYPE	Meter size	Residential	Non Residential
<b>WATER</b>			
Base Charge	5/8"	\$14.50	\$30.68
Base Charge	3/4"	15.68	43.59
Base Charge	1"	17.99	69.42
Base Charge	1 1/2"	38.99	133.99
Base Charge	2"	40.42	211.46
Base Charge	3"	61.08	407.77
Base Charge	4"		484.45
Base Charge	6"		964.05
Base Charge	8"		1,539.58
First 5,000 gallons/1,000		5.32	5.32
> 5,000, < 10,000 gallons/1,000		7.32	7.32
> 10,000, < 15,000 gallons/1,000		11.32	11.32
Above 15,000, Gallons/1,000		15.32	15.32
State Surcharge/1,000 gals.		0.03	0.03
<b>SEWER (Dec, Jan, Feb average usage)</b>			
Base Charge Per Month		\$6.54	\$6.54
All usage per 1,000 gallons		\$3.50	\$3.50
LATE PAYMENT PENALTY 1.5%			
Note: Drought Surcharge no longer exists			

Table 15: Santa Fe County Water Utility Water Rates (as it appears in bill inserts)

The SFCWU maintains records of water distribution and sales through a central billing system, which uses an inclining water rate structure to provide customers with a financial incentive to conserve. Water rates differ for residential and non-residential customers. Residential rates apply to all normal domestic use by individual dwellings, and non-residential rates apply to commercial, industrial, institutional, and all other non-residential types of service. Utility record keeping and other policies can be found in Appendix 7. 4: Santa Fe County Water/Wastewater Utility Operations Billing and Accounting Procedures.

### 4.3 Water Resources

The 40-year water development plan summarizes the current water system, water rights, historical and projected water demands. Water Rights are described in Section 5, page 59 of the 40-Year Water Development Plan.

#### 4.3.1 Water Demand and Production

Santa Fe County’s Water Utility has a 42 percent (Figure 14 below) increase during the summer, in comparison to the winter months. One possible reason for this difference is summer landscape irrigation practices. Another possibility for the increase in the summer water usage is due to the fact that Santa Fe is a popular tourist attraction. There are many cultural, historic and artistic events that also have the potential to increase the water use. Average water usage for a 5-year period (2005-2009) is detailed, month by month, in Appendix 7.9.

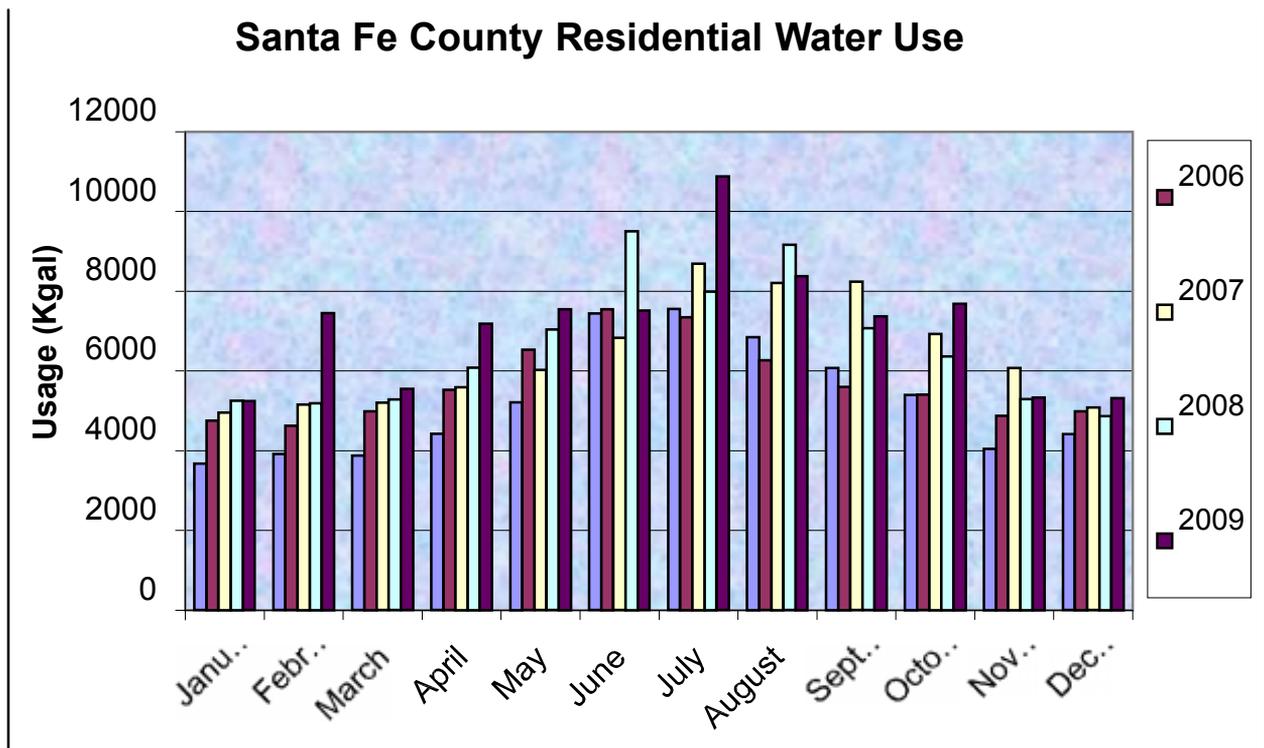


Figure 14: SFC Residential (comparative) 5-year Water Use History to Billed Customers

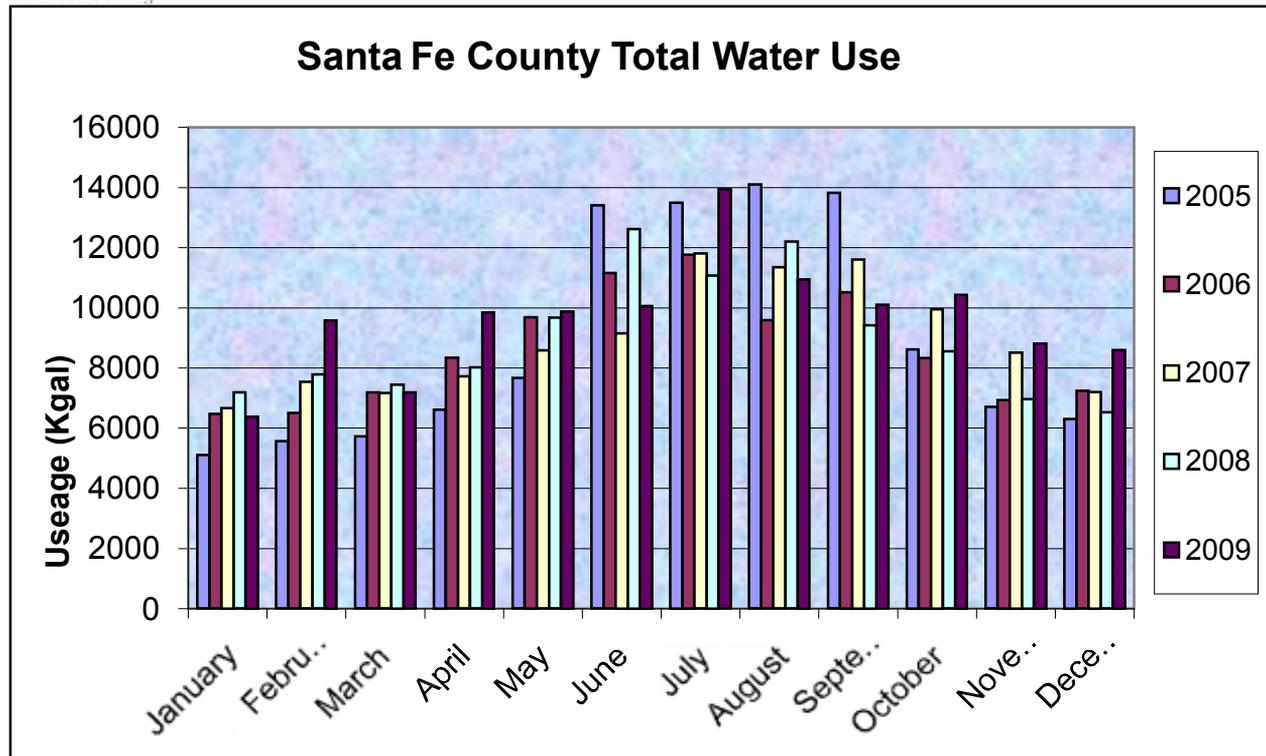


Figure 15: SFC Total Residential and Commercial (comparative) 5-year Water Use History to Billed Customers

#### 4.3.2 AWWA Audit

The American Water Works Association (AWWA) Water Balance is being utilized throughout the country as a standardized method of auditing water utilities, so all communities use the same means of obtaining their percentage of unaccounted-for-water. The software allows utilities to quickly compile a preliminary audit in a standardized method.

The AWWA describes the program as follows:

*The software includes ten worksheets in Microsoft Excel spreadsheet file. The worksheets prompt the user to enter standard water supply information such as supplied water volume, customer consumption, distribution system attributes and loss quantities. Once all the grading cells have been filled in, a composite grading score is calculated and displayed at the bottom of the worksheet. The grading is based upon a scale of 100, and this score can be used as a basic validation for the audit. Because many utilities don't typically tabulate all this data, the software allows the user to enter either known or estimated values, then calculates a variety of performance indicators useful for comparisons among utilities.*

The NM Office of the State Engineer requires that water utilities maintain losses of less than 10%. The AWWA's Water Audit estimates that Santa Fe County Utilities Department's non-revenue water is at 4.9%. The fact that the water system is fairly new accounts for the low water losses. The AWWA's Water Audit reporting worksheet can be found on Appendix 7.11.



### 4.3.3 Waste Water Facilities

Presently Santa Fe County collects and provides wastewater treatment to three service areas. These areas are:

- 1) The **Valle Vista Area** is located just southwest of the SR599 and SR14 intersection; has 308 homes and eight businesses. This wastewater collection system discharges the wastewater to an outdated extended aeration treatment plant, which is theoretically capable of handling about 70,000 gallons per day (gpd) of domestic wastewater. The plant was installed in the early 1970's and needs updating to continue serving. Plans are presently underway by the County to either replace the current facilities or provide infrastructure necessary to convey the areas wastewater to another facility. The new wastewater treatment plant is intended to meet all federal surface water as well as state ground water discharge requirements and will be available for reuse on parks, recreation fields, common areas, and for construction purposes in the area.
- 2) The **County Public Safety Complex and Detention Facility** area has a County operated wastewater collection system that collects all the wastewater generated by this area, as well as the planned development to the north. Presently this area discharges its wastewater to the State Penitentiary wastewater treatment plant located about one mile to the northwest. At the rate of about 50,000 gpd is planned to be pumped to the new wastewater facility at Valle Vista proposed for Fall of 2011.
- 3) The **State Penitentiary and National Guard Complex Wastewater Treatment Plant** is located just north of the present State Penitentiary Complex and about ½ mile south of Valle Vista. This aerated/facultative lagoon treatment system followed by discharge to irrigated acreage has a capacity of 200,000 gpd. The present plant is handling about 170,000 gpd of which 110,000 gpd comes from the Penitentiary Complex, 50,000 gpd from the County facilities to the east and about 10,000 gpd from the National Guard complex to the west. This treatment plant was constructed in the early 1990's and has considerable need to be upgraded. According to the State's wastewater consultant, the treatment plant needs at least two million dollars in upgrades and could really use about 3 million dollars to provide a more workable and cost effective treatment facility for the area. The County has asked the State of New Mexico to consider a regional wastewater facility for the area at this location. At the present time, the State has made no meaningful indications that regionalization of the present facility, to meet area needs at fair and reasonable wastewater treatment charges for all entities disposing of their effluent, is considered feasible and effective. Therefore, the County is pursuing building a regional wastewater treatment facility at the Valle Vista location to handle their wastewater needs as well as those of other interested parties. In the future, if the State Penitentiary Complex considers the feasibility of sending wastewater disposal to the new Valle Vista Plant, the County will consider the availability of treatment plant capacity. At that time, the expenditure will probably come at a higher price than current anticipated treatment plant costs.<sup>20</sup>

---

<sup>20</sup> Santa Fe County, Draft Sustainable Land Development Plan, 10.1.09



#### 4.3.4 Future Water Management Strategies

**Buckman Direct Diversion<sup>21</sup>:** In order to shift to a more sustainable supply, surface water supplies from the Rio Grande will be added to the County supply through the BDD project, which will provide the County's contracted water from the San Juan-Chama Project (which brings water to the Rio Grande Basin from the San Juan stream system for storage at Heron Reservoir) and will also provide additional supply through native Rio Grande water rights. Santa Fe County will receive a maximum of 1,700 ac-ft/yr of water through the BDD project.

**Conjunctive Water Management Planning (CWMP):** Although water from the BDD will provide additional supplies from a historically reliable source (the Rio Grande) and will lessen the demand on local supplies, the CWMP recognizes that surface flows on the Rio Grande can be variable. Therefore, the County has identified potential facilities, mechanisms and sources of supply that may be used in conjunction with the County's primary source of supply from the BDD. CWMP is intended to cover the period from commencement of operations of the BDD until the County portion of the project reaches its maximum capacity of 1,700 afy which is expected in about 20 years.

---

<sup>21</sup> Buckman Direct Diversion Project. Another Source of Sustainable Reliable Drinking Source. <http://www.bddproject.org/index.htm>



## 5 Santa Fe County Water Conservation Program

Santa Fe County has already achieved a low per capita water use rate through aggressive conservation measures. In August 2007, the Santa Fe County Water Conservation Program (WCP) was created to implement and oversee the County's newest conservation proposals and requirements.

The WCP's mission statement is: *Santa Fe County is dedicated to the conservation, preservation and sustainability of water resources for the benefit of its residents.* The objectives of the WCP are as follows:

1. Use water conservation practices to sustain a quality water supply for our future.
2. Provide comprehensive education and outreach program for the communities within Santa Fe County.
3. Act as stewards of aquifer preservation by oversight of domestic wells.

The Santa Fe County water Utility has achieved a consumptive rate between 72 to 90 gallons per capita, per day, one of the lowest in the nation has been achieved. The majority of the utility customers reside in homes built within the last ten years where, water efficient plumbing fixtures and devices are already in place; and landscaping is xeriscaped with low water use vegetation are prevalent.

Current conservation actions taken by the County include:

- Requiring roof catchments on all new construction. Houses with over 2,500 square feet of heated area must include a centralized cistern; smaller houses may use rain barrels.
- Requiring hot water circulation pumps on all new construction.
- For those served by the County water utility, a rate structure with higher water rates for those using more water is in effect.
- Requiring metering of domestic wells in new developments, and reporting of individual meter readings (yearly)
- Water use restrictions in new subdivisions; built into the plat requirements.
- Careful analysis of water budgets for new development and working with the developer to promote the best available conservation technology.
- Public outreach and education activities.

### 5.1 Existing Water Conservation Ordinances and Regulations

Santa Fe County has several Ordinances concerning water use. The ordinances outlining water conservation are listed below. Ordinances regarding water use and allocation or water used by the SFCWU are explained in further detail Appendix 7.1.



**Santa Fe County Water Conservation Ordinances passed in recent years include:**

<b>SANTA FE COUNTY WATER CONSERVATION ORDINANCES:</b>	
<i>Water Conservation Ordinances are listed in reverse chronological order.</i>	
<i>Ordinance 2003-6 rainwater harvesting: amended by Ordinance 2008-4</i>	<p><b>Commercial:</b> Capture 1.5 gallons of rainwater per each square foot of roofed area. Cisterns be installed underground or partially underground.</p> <p><b>Residential over 2,500 sq ft:</b> Capture 1.15 gallons of rainwater per each heated square foot roofed area. Cisterns must be installed underground or partially underground.</p> <p><b>Residential under 2,500 sq ft:</b> Utilize a rainwater catchment device sufficient to retain enough water for landscaping purposes. Possibilities include: rain barrels, swales, raised planters, or other devices as approved by the Land Use Department.</p> <p><b>Recycled water:</b> Includes grey water or properly treated effluent; to be used instead of utilizing a cistern to catch rainwater.</p>
<i>Ordinance 2006-3 instant hot water devices: amended by Ordinance 2006-8</i>	<p><b>Instant hot water devices:</b> Requires instant hot water devices on all permanent structures hot water tap.</p> <p><b>Commercial water conservation:</b> Requires commercial businesses, restaurants and lodging facilities to place water conservation notices in restrooms.</p>
<i>Ordinance 2002-13, the "Water Conservation Ordinance" amended by Ordinance 2004-7</i>	<p>Restrictions for waste or fugitive water</p> <p><b>Commercial retrofits:</b> Requires commercial properties to retrofit their facility when they come in for a building or development permit. Toilets and urinals must be replaced with low-flush (1.6 gpf or better) models, faucets must be fitted with low-flow faucet aerators, Showerheads must be low-flow. The program does not include home-based businesses.</p> <p><b>Public outreach and education:</b> includes table tents (indicating "water served only upon request") in restaurants, water conservation signage in public restrooms</p> <p><b>The domestic well metering program:</b> Only applies to properties that have wells with water restrictions recorded on their Recorded County Plat.</p>
<i>Ordinance 2000-9, emergency water restrictions</i>	<p>An emergency ordinance requiring water restrictions throughout Santa Fe County to be equal to or more stringent than those concurrently proposed by the City. Water restrictions delineated in Stages 1, 2, and 3.</p>
<i>Ordinance 1996-10, The Land Development Code, Article V: Procedures and Submittals</i>	<p><b><u>Water Supply Plans and Water Permits: Article V, Section 5.3.2.x (page V-8)</u></b> Detailed information concerning water supply plans and water permits for Preliminary Plat Submittal can be found in Article VII, Section 6: Water Supply.</p> <p><b><u>Water Supply Plans and Water Permits: Article V, Section 7.1.2.y (page V-18)</u></b> Detailed information concerning water supply plans and water systems for Preliminary Development Plans can be found in Article VII, Section 6: Water Supply, and Table 5.1.</p>
<i>Ordinance 1996-10, The Land Development Code, Article VII, Section 6: Water Supply</i>	<p>Applicants shall submit a water supply plan to be reviewed by the Land Use Administrator and County Hydrologist. Water supply plans for proposed subdivisions of six lots or greater be submitted to the State Engineer's Office and the New Mexico Environment Department. Water supply plans concern: water permits, community water systems, water availability assessments, water quality, water conservation, and fire protection. 100-year water supply must be proven for non-residential development and residential subdivision.</p>

**Table 16: Santa Fe County Water Conservation Ordinances**

**5.2 Water Conservation Program Outline**

The following include ways to expand upon existing ordinances and proposed future Water Conservation Program initiatives: implementation activities, schedule, and funding sources. These actions have the potential for significant water savings.



## 1. **Ways to Expand Existing Program Activities:**

- A. *Rainwater Harvesting Ordinance and Program:*
  - a. Expand to include incentives for residents installing cistern or rain barrels.
  - b. Incorporate passive harvesting techniques for ideal infiltration.
  - c. Include a demonstration site of how rainwater harvesting systems work.
  - d. Develop training and technical guidelines for installation and operation and maintenance of rainwater harvesting systems.
- B. *Commercial Retrofits:*
  - a. Assess low flow fixtures in commercial properties.
  - b. Provide incentives for replacing high use fixtures.
- C. *Well Metering Program(Domestic Well Owners):*
  - a. Provide incentives for those domestic well owners with high water use.
  - b. Replace meters to well owners or assist with meter installation.
  - c. Offer water saving devices and materials.
- D. *Establish Metering Program for Leak Detection(Utility customers):*
  - a. Establish a meter testing program.
  - b. Follow testing procedures in AWWA WATER METERS–SELECTION, INSTALLATION AND MAINTENANCE manual; chapter 5, page 52, paragraph 1.
  - c. Set up testing schedule; testing large meters more often than small meters. Also test meters recording the highest usage more often than meters recording low usage.
  - d. Create an inspection program to ensure that all meters are installed in accordance with AWWA STANDARDS (WATER METERS–SELECTION, INSTALLATION AND MAINTENANCE MANUAL OF WATER SUPPLY PRACTICES), as meters’ accuracy is greatly affected by installation procedures.
  - e. Establish base line on customers’ usage.
  - f. Flag customers when anomalies are detected.
  - g. Investigate reason(s) for anomaly.
  - h. Correct and/or repair as needed.
- E. *Establish comprehensive program to reuse the moisture and nutrients now called wastewater or treated effluent.*
  - a. Include a demonstration site to show how treated greywater and effluent systems work.
  - b. Develop training and technical guidelines for greywater and treated effluent systems.
- F. Establish a program to integrate water conservation and local food security through agriculture.
- G. Establish a program to coordinate water conservation programs as part of local economic development.

## 2. **Future Implementation Activities:**

### A. **Outreach**

#### 1) School Education

- a. *Education* (K-12)
- b. *Project WET*: Water Education for Teachers
- c. *River Xchange*: Watershed education for students, including student materials.



- d. *Children's Water Fiesta*: Host or co-host an (day long) event providing water conservation activities for children.
- e. *Curriculum Materials*: Provide teacher guides, student books and materials.
- f. *Field Trips*: Santa Fe Watershed, Botanical Gardens or future Buckman Direct Diversion.
- g. *School Garden Program*: School site-based demonstration desert gardens.
- h. *College-level Curricula*: Water conservation education at both the community college and university level.

## **2) Residential**

- a. *Homeowner irrigation classes*: Teach fundamentals of drip and sprinkler irrigation.
- b. *Homeowner landscape workshops*: Introduces Xeriscape and residential landscape design.
- c. *Public Events*: Community fairs and events; home and garden shows.
- d. *Literature distribution*: A variety of conservation topics and techniques.
- e. *Promotion of 1.6 gallon per flush (6-liter) toilets*.
- f. *Information on toilet damage* from household chemicals.
- g. *Efficient appliances*: Promotion of horizontal axis washing machines.
- h. *Evaporative Cooler*: New technology and efficiency information.
- i. *Rebate program*: Rainbarrels, low-flow fixtures, turf replacement, and toilet retrofits
- j. *Identify high water users and provide water conservation materials*.

## **3) Non-Residential**

- a. *Commercial Workshops* for facility managers.
- b. *Employee/Facility Management training*: Introduce the concept of water conservation; provide technical assistance, materials; provide assistance training to pollution prevention (P2) inspectors; and training on efficient watering practices for Open Space and Trails Department.

## **4) Professional/Paraprofessional**

- a. *Water and Energy Summit*: A joint event hosted with the City of Santa Fe for the purpose of identifying the correlations between water use and energy use.
- b. *Master Gardeners*: Teach Master Gardeners how to design, install, and maintain efficient irrigation and rainwater harvesting systems.
- c. *Xeriscape Training Workshops*
- d. *Landscape Water Management Classes*: Teach how to evaluate irrigation efficiency.
- e. *Market penetration targeting Homebuilders*: Water efficiency marketing strategy for area homebuilders.
- f. *Nurseries*: Marketing strategy of Xeriscape information distribution.
- g. *Rainwater Harvesting Certificate Program*:
  - i. Integrate water harvesting systems with other design considerations (soil conservation and remediation, energy conservation, aesthetic design, food production, wildlife habitat, etc).
  - ii. Create a water budget and match water harvesting systems with appropriate landscaping.

## **5) Natural Environment, Agriculture and Cultural**

- a. *Soil assessments*: Add mulch to plantings to retain moisture.
- b. *Watershed restoration*: Cultivation of beneficial Species in partner with soil building.
- c. *Create habitat for threatened and endangered species*
- d. *Acequia Awareness*: Partner with acequia organizations as acequias increase water levels in domestic wells and reinstate the cultural importance of Acequia systems



## **B. Technical Assistance**

### **1) Fixtures**

- a. *Plumbing Retrofit*: Program supplies low flow plumbing devices.
- b. *Multi-Family Program*: Technical help and materials to apartment managers.
- c. *Toilet Leak Detection*: Self-audit program on toilet leakage and repair.

### **2) Industry/Business/Government technical assistance**

- a. *Audits*: County staff and consulting agencies visit facilities and recommend actions to lower water use and retrofits if needed.
- b. *Commercial Landscapes*: Staff and consulting agencies helps create and monitor water budgets.
- c. *Conservation plans*: Staff assists in developing holistic conservation plans, including xeriscape and landscape design.
- d. *Cooling Towers*: Mandate efficiency standards.
- e. *Restaurant Review*: County staff and consulting agencies visit facilities and recommend actions to lower water use and retrofits if needed.

### **3) Technical Assistance within Other County Departments**

- a. *Open Space and Parks*: Assist in developing water budgets and watering schedules as necessary.
- b. *Community Services Department*: Supplies conservation technology to those most in need.
  - i. Maintenance staff uses water for their cleaning and daily activities.
  - ii. Educate staff to find and report leaks and on low water use fixtures.
- c. *Housing Department (Good Neighbor Program)*: Development of a landscape video, and provides conservation materials.
  - i. *New Resident Relations Program*: Provides copies of Water Conservation Guidelines, low flow faucet aerators, and spray nozzles for New Residents.
  - ii. *Maintenance Program*: Evaporative cooler preventative maintenance for low income citizens.

### **4) Technical Assistance with the Water / Wastewater Utilities Department**

- a. *Water Demand Analysis for Engineering*: Staff provides peak water demand estimates for large landscaped areas.
- b. *Customer audits (multifamily/commercial) for Customer Services*. Technical assistance to resolve high water bill complaints, water use and billing disputes.
- c. Determine policies and procedures for leak detection.
- d. Create procedures and policies for water conservation.

### **5) Development Review**

- a. *Xeriscape and Native Landscape design Review*: Provide technical support on native and xeric plant species.
- b. *Turf Limitation*: Non-residential turf limitation requirements.
- c. *Right-Of-Way*: Appropriate plants in rights-of-way.

## **A. Regulation**

### **1) Ordinance Development**

- a. *Passive water Harvesting*: Require stormwater management guidelines and update existing ordinances, and also require staff training and development.
- b. *Rainwater Harvesting*: Develop specific guidelines for residential and commercial installation.



- c. *Annual water allotments*: Based on the size and type of landscape with water use surcharges for overuse.
- d. *Blackwater and Greywater Ordinance*:
  - Residents will have the option of harvesting alternative water sources for new construction.
  - Require new construction to add a three-way valve stub-out in laundry rooms, to harvest grey water for landscaping needs.
  - Reuse blackwater as a source of landscape irrigation.
- e. *Permeable pavement*: Require permeable pavement on commercial developments .
- f. *Stormwater harvesting*:
  - Allow curb cuts to harvest stormwater and irrigate commercial landscaping.
  - Design curb-side, mediums, and other landscaping to water passively.

## **B. Planning & Research**

### **1) Conservation Plan**

*Water Conservation Plan*: Updated at intervals, every 5 years as needed.

### **2) Drought Plan**

*Drought Management Plan*: Updated as needed.

### **3) Residential**

- *Efficient appliance initiatives*: Staff evaluates initiatives to promote and market water efficient appliances.
- *Residential end-use study*: Nationwide three-year study of residential water use.

### **4) Non-Residential**

- *Car wash study*: Determine the amount of water loss through evaporation and other water losses.
- *Non-residential end-use study*: Nationwide research on water use and conservation potentials for commercial customers.

### **5) Water conservation research programs that impact social welfare**

- *Partnership programs*: Conservation assistance for the most economically in need of water.

### **6) Landscape and Commercial Development**

- *Drip irrigation*: Research to evaluate design, installation, and maintenance of as-built drip irrigation systems.

### **7) Water conservation research programs that impact Agriculture**

- *Partnership programs*: Erosion control education.
- *Organic material study*: Determine organic matter that will help retain water onsite in a Semi-Arid climate.
- *Study Results on Soil Amendments*: Make recommendations for different soil types based on the study.

### **8) Water conservation research programs that impact endangered species and other native animals**

- *Partnership program*: Education of endangered species in our watersheds.



### 5.3 Water Conservation Program Implementation Schedule

The implementation schedule is a key component of the Water Conservation Plan. The schedule will allow Santa Fe County to apply for funding and prioritize the water conservation needs of the county. The following three phases of the implementation plan and will be implemented as resources become available.

1. Phase I will consist of implementation activities that expand existing ordinances and activities and can be done in-house.
2. Phase II will involve resource development of rebates and other incentives.
3. Phase III includes assisting with community water systems or other stakeholders.

These Phases will require funding sources and may be implemented as money becomes available; therefore, the list of activities is not necessarily in chronological order. The implementation schedule may change due to the economic feasibility of a project, funding, drought conditions, and water conservation priorities. Three main groups will be targeted: County Utility customers, community water systems, and domestic well owners.

<b>Water Conservation Implementation Schedule</b>			
<b>Phase I</b>			
<b>Goal</b>	<b>Activity/ Monitoring / Results</b> <sup>13,22,23,24,25</sup>	<b>Specific Watershed</b>	<b>Staff/ Divisions Involved</b>
Collect Baseline Data on Existing Ordinances (1.A, 1.B, 1.C)	Collect baseline data for existing Ordinances: Determine the number of existing water conservation Measures that have been installed: Rainwater Catchment, Commercial retrofits, and Domestic Well Metering Awareness Program.	County-wide	Water Resource Specialist Information Technology/ SFCWU
Develop water conservation program budget (1.G)	Determine fiscal impacts of the water conservation program, along with cost benefit analysis of conserving water. Include future incentive, retrofit and rebate programs	County-wide	SFCWU/ Water Resource Specialist/ GMD- Planning
Create cost benefit Analysis	Demonstrate how the different water conservation implementation measures can save on operating and infrastructure costs.	Santa Fe Basin, Pojoaque- Nambe-Tesuqu	SFCWU/ Water Resource Specialist/ Economic Development
Resource Development (2.A.iv, 2.B.ii)	Determine ways to integrate water conservation practices with green infrastructure such as passive stormwater management techniques or ways to increase infiltration. Monitored by existing Ordinances and creation of green building codes.	County-wide	Water Resource Specialist Economic Development
Educate County Staff (2.B.iii., 2.B.v.,2.B.vi.)	Creation of internal policies and practices can be monitored by supervisors and included in the training credits that are required for the County Staff evaluations. A minimum of 3 training classes are required for County staff annually.	County-wide	Human Resources/ Variou Departments
School Education	Target 4 <sup>th</sup> and 5 <sup>th</sup> grade classes within Santa Fe County,	Identify	Water Resource Specialist

<sup>22</sup> Bernalillo County Water Resources Program. Water Conservation Plan Bernalillo County, New Mexico. Weston Solutions. April 21, 2006

<sup>23</sup> Texas Water Development Board. Water Conservation Best Management Practices Guide. Water Conservation Task Force. November 2004.

<sup>24</sup> Vickers, Amy. Handbook of Water Use and Conservation. WaterPlow Press. May 2001.

<sup>25</sup> Austin Water Utility, Water Conservation Division. City of Austin Water Conservation Plan. May 2005.



(2.A.i.c)	through the RiverXchange Curriculum. WCP will strive to reach 20 classrooms within the county and track progress of those students.	schools within each watershed	
Publicize water conservation county- wide (2.A)	Develop a Public Information Plan with goals and objectives; approach State Water Conservation at OSE for involvement. The goal is to provide information to customers a minimum 4 times a year.	County-Wide	PIO / Water Resource Specialist / SFCWU
Ordinance Development (2.C.i)	Review Ordinances from other local municipalities to determine Water Conservation Ordinance changes. For instance enhance existing rainwater harvesting guidelines (1.A)	County-Wide	SFCWU/ Water Resource Specialist
Create Partnerships with other stakeholder groups (2.A.i., ii., iii., iv., v.)	Continue the partnership between the City of Santa Fe's WCP and the County's WCP; create new partnerships with other community stakeholders. Monitor these coordinated efforts in water conservation for the benefit of the entire Santa Fe Community.	County-Wide	Water Resource Specialist / SFCWU/ Economic Development
Enhance Well Metering Program (1.C)	Begin enforcement of mandatory reporting of consumption data for metered domestic wells.	County-Wide	SFCWU/ Water Resource Specialist
Existing programs (1.A, 1.B, 1.C)	Develop incentives for existing program activities (Outlined above 1.A, 1.B, 1.C). Once incentives developed then activities in Phase II can be implemented.	County-wide	Water Resource Specialist Economic Development
<b>Phase II</b>			
Water system Audit and water loss (2.B.iii)	Gather baseline data of the county water utility; determine leaks, or water losses. Determine if water losses are: real loss, apparent losses, infrastructure or economic leakage.	Santa Fe Basin	SFCWU
Cistern Incentive Program (1.A)	Develop an incentive program for those who install a cistern to an existing home. Determine if the incentives will be for SFCWU costumers only or possibly include unincorporated area residents.	County-Wide; Santa Fe Basin	SFCWU/ Water Resource Specialist
Audit and Retrofit County facilities (1.B)	Some county operated facilities were audited in 2009. Continue to perform water audits on County facilities, and retrofit audited facilities with water efficient fixtures and equipment, as money becomes available.	County-Wide	SFCWU/ Water Resource Specialist
Develop Professional Materials (2.A.ii,iii)	Target landscape and water conservation professionals by providing more information on cisterns and rainwater catchment systems. Track the number of materials given to professionals.	County-Wide	SFCWU/ Water Resource Specialist / Land Use Staff
Technical Assistance to Professionals (2.B.i,ii)	Partner with "stakeholder" groups (i.e., the City of Santa Fe and the County Extension Service) to host events for low water use landscaping. Provide a certificate for those attending events. Track number of events and participants.	County-wide	SFCWU/Water Resource Specialist/ Land Use Staff
Incentive Programs (2.A.ii., 2.A.iv.)	Develop other incentives for residents, i.e.: fixture giveaways, clothes washer rebates, toilet replacement program. Determine the resources for the incentives.	Santa Fe Basin	SFCWU/ Water Resource Specialist
Water Reuse and Recycling (1.E)	Develop water reuse or reclamation activities; determine the types and location of the activities.	Santa Fe Basin Then County-Wide	SFCWU
Planning and Research (2.D)	Determine links between water conservation and energy conservation	County-Wide	SFCWU/ Water Resource Specialist
Domestic Well Metering (1.C)	Explore sources for low cost loan or rebate programs that involve residents that currently do not have a meter but	County-Wide	SFCWU/ Water Resource Specialist



	should comply with the meter reading conditions placed on their plat.		
<b>Phase III</b>			
Community water Systems (2.D.v)	Assist smaller community water systems with tracking water use spikes, anomalies, or finding other sources of water losses	County-wide	SFCWU/ Water Resource Specialist
Businesses (2.A.ii, 2.A.iv, 2.B.ii)	Establish a recognition program to acknowledge individuals/businesses who are low water users.	Santa Fe Basin Estancia Basin	SFCWU/ Water Resource Specialist
Utility meter maintenance and replacement (1.D)	Create policies for maintaining meters and determine when old meters need to be replaced. Create a meter maintenance checklist for staff to perform, on a monthly basis.	County-Wide	SFCWU/ Water Resource Specialist
Agricultural community (2.D.vii, 1.F, 2.A.V)	Assessment of water conservation practices for the county's agricultural community. Monitor agricultural Best Management Practices with other agencies such as NMSU County Extension Service.	County-Wide	SFCWU/ Water Resource Specialist
Resource Development (2.A.iv, 2.B.ii)	Increase staff to allow the WCP to better implement the activities listed within this document.	County-Wide	SFCWU/ Water Resource Specialist
Water Conservation Plan Update (2.D.i, 2.D.ii)	As the water conservation planning efforts are implemented, the planning activities and implementation schedule may need to be updated.	County-Wide	Water Resource Specialist

**Table 17: Water Conservation Phased Implementation Schedule**  
**GMD (Growth Management Department), SFCWU (Santa Fe County Water Utility), PIO (Public Information Officer)**

#### 5.4 Resource Development

Currently, there are two main sources of funding. These sources can be used to directly support County programs or to promote water conservation for utility companies. The main sources of funding are: 1) grant awards received from the U.S. Bureau of Reclamation; and 2) the County's General Fund/Utility Enterprise Fund. Other sources of funding and resource development may include:

- Grants through the US EPA, BOR or NRCS. BoR WaterSMART<sup>26</sup> and Field Services Water Conservation Program. These grants are competitive and the applications may not be funded.
- EPA administers, Section 319 grant (Clean Water Act), through the NMED for watershed protection; although, our water conservation program may not qualify, since funding is primarily allocated on the state level.
- The WCP could also potentially fund itself through water waste violations and through permit fees. Though, fines are unlikely to be a significant source of funding. However, reassessment of the current utility fee structure may be relevant for promoting water conservation efforts related to utility based customers.
- The WCP will coordinate with the County's Economic Development Office for assistance with 1) grant applications; 2) establishment of regional partnerships for cost sharing/revenue generation—including relations to energy generation and consumption for water production and delivery; 3) development of green infrastructure, such as better storm management and natural/passive terrain runoff and catchment;

<sup>26</sup> U.S. Bureau of Reclamation. WaterSMART program. <http://www.usbr.gov/WaterSMART/>



and 4) other potential funding sources to include, but not limited to: new development impact, use of assessment districts, access to County Utility Enterprise Funds (especially for conservation efforts related to utility customers), and resource development via County Capital Improvement Program. A comprehensive water conservation funding strategy will be necessary to ensure long term availability of resources.

Since there is no guarantee that grants will be awarded, the WCP cannot rely on grants in its long-range planning efforts. Ongoing resource development that leverages existing and future regional programs and efforts will enhance the effectiveness of the proposed WCP implementation activities. Addressing the economic and environmental impact and costs of water conservation will be critical for the regional sustainability equation as infrastructure costs have increased significantly over the recent years rendering improvements difficult and cost prohibitive.

Obtaining the Alliance for Water Efficiency<sup>27</sup> (AWE) water tracking tool will help provide the necessary cost benefit analysis to demonstrate how the different water conservation methods can save operating and infrastructure costs.

#### **5.4.1 Economic Value of Water Conservation**

Saving water among existing users through rates, retrofits, and new development guidelines has both environmental and economic benefits. Saving water stretches out our existing supply of water, so no infrastructure (pipelines, reservoirs, diversions, wells, treatment plants, etc.)<sup>28</sup> expansion is necessary to meet demands. In addition, there is now ample evidence that water conservation through improved watershed stewardship, improved land and soil management, and improved residential and commercial “water-smart” landscaping techniques, roof top rainfall collection, gray water use, and the use of reclaimed wastewater for irrigation and industrial uses provide tremendous economic benefits.

Furthermore, studies show that an incentive water pricing structure significantly affects water use decision-making, and can determine the effectiveness of conservation programs. Approximate water savings potential is 15 to 30 percent for indoor use and 40 to 50 percent for outdoor use, depending on current usage. According to the Jemez y Sangre Regional Water Plan (2003, JyS Water Plan, Vol. 2, White Paper #19), which includes the vast majority of Santa Fe County:

*“Incentive rate structures implemented by water utilities and mutual domestics should therefore be a key component of a successful water conservation program in the Jemez y Sangre region. Using the market system in this manner will make end users aware of their water use habits and give them concrete incentives to modify their own water use behaviors. Appropriate incentive rate structures can (1) stabilize agency revenue, (2) send conservation messages to customers, and (3) fund all aspects of conservation programs, such as promotion, education, and rebates for customer upgrades.*

- *To save water on a long-term and consistent basis, the local agencies need to:*

---

<sup>27</sup> Alliance for water Efficiency Tracking Tool. <http://allianceforwaterefficiency.org/Tracking-Tool.aspx>

<sup>28</sup> U.S. Environmental Protection Agency. WaterSense Program. 2010. [http://www.epa.gov/watersense/about\\_us/index.html](http://www.epa.gov/watersense/about_us/index.html)



- *Know their customers use habits (data);*
- *Make water conservation important (by establishing incentive rates) and credible (use science to create customer allocations);*
- *Provide on-going education and outreach to all customer groups on how to save water;*
- *Encourage the installation of conservation fixtures (efficient water use toilets, showerheads, sprinklers, evapotranspiration (ET) controllers, low-flow washing machines, etc.) through rebates or other incentive programs;*
- *Establish efficiency in new developments through regulations, and incorporate requirements for retrofitting existing development as a condition for building new development; and*
- *Monitor and support the customer's efforts to save water."*

Additionally, water conservation creates employment opportunities in a community by providing jobs related to improved water efficiency services in landscaping, plumbing, water-conservative appliance sales, individual wastewater treatment and reclaimed water re-use, water conservation education and water conservation monitoring, to name a few.

## **5.5 Drought Management**

Santa Fe County is susceptible to drought and climatic change. In the Santa Fe Basin, mountain front recharge from melting snow pack is the primary source of water for the aquifer and the City's reservoirs. These sources currently constitute the County's principal water supply. After the BDD becomes operational, the Rio Grande will become an important additional source of water. However, it too is susceptible to droughts or floods if climatic trends are negative<sup>29</sup>.

Evidence of climate change may already be evident in New Mexico with increased temperatures, changes in snowpack elevations; increasing precipitation in the form of rain rather than snow, smaller spring runoff volumes, milder winters and hotter summers are only a few indicators. Climate Change models confirm increasing temperatures. The models do not show overall changes in precipitation. Normal precipitation is driven levels are by decadal drought cycles. These cycles are driven by the temperature variations of the Atlantic and Pacific oceans. A warm Atlantic Ocean and cold Pacific Ocean result in drought in the Southwest USA. These cycles can last for several decades and bring long droughts<sup>30</sup>. The historical record of these cycles is recorded in tree rings. The result is higher temperatures, (especially in summer), greater evaporation and drier soils. Drier soils create lower plant density; as well, increasing bare soil, and dust. The resulting dust covering snow packs on mountains and causing them to melt earlier.

Water conservation becomes even more essential during times of drought, and is a first step in sustaining existing supplies. For new construction/development water conservation is built into the development review process, but for historic communities different strategies are necessary.

---

<sup>29</sup> D'Antonio, John, "The Impact on Climate Change on New Mexico's Water Supply and Ability to Manage Water Resources." NM Office of the State Engineer / Interstate Stream Commission. June 2006

<sup>30</sup> David S. Gutzler, "Climate Change" Presentation at the 14th Water Conservation/Xeriscape Conference and Expo . UNM Dept. of Earth & Planetary Sciences. February 2009.



*Santa Fe County Emergency Ordinance No. 2000-9*

Santa Fe County Ordinance 2000-9 is an emergency ordinance adopted on August 29, 2000 that declared drought conditions and adopted the City of Santa Fe's water restrictions and penalties for the County Utility. This ordinance gives Santa Fe County the authority to impose the same stage of water restrictions on its customers any time that the City of Santa Fe imposes restrictions, or any time it deems necessary. The ordinance adopted penalties, to be added to customer water bills, for violation of water restrictions that are consistent with the City of Santa Fe penalties: \$20 for the first, \$50 for the second, and \$100 for all subsequent violations (increasing to \$200 for fourth and subsequent violations when a Stage 3 emergency is declared).



## 6 Community Cohesion in Watersheds

As unincorporated communities throughout Santa Fe County have experienced growth over the past two decades, community members realized that planning would be a necessity to address the issues in a proactive, not reactive manner. Therefore, in 1996, the Board of County Commissioners requested that the Land Use Department and Planning Division begin work to help Traditional and Contemporary Communities develop local land use plans. Santa Fe County Ordinance 2002-3 (revised Ordinance 1998-5) is known as the Community Planning Ordinance and describes the process for conducting community plans and provides for County staff to assist communities in developing plans.

The Community Planning process has been used as a mechanism to design plans based on land planning conditions and needs. Some of the features considered for planning are:

- Historic development patterns and features in a village or community
- Soils and slopes
- Agriculture
- Acequias
- Water quality & quantity

### 6.1 Public Service Agencies within each Watershed

Many federal, state, local, tribal, non-profit and non-government agencies service Watershed areas. Some agencies serve several watersheds, while others deal only with one particular geographic area. Appendix 5 provides a list of the various agencies and the activities offered to SFC residents, as well as a list of activities from Open Space and Trails Division in Appendix 7. 6.

### 6.2 Governing Agencies

Regulatory requirements for water are housed in several different state agencies. In order to clarify the differences between water conservation measures, they are defined below:

#### Federal Agencies:

##### Department of Interior<sup>31</sup>:

- The **Bureau of Reclamation**, the largest wholesaler of water in the country, is working to stretch our nation's limited water resources, reduce conflict and facilitate solutions to complex water problems.
- The **U.S. Geological Survey** is helping our nation adjust its management of water by providing scientific publications, data, maps and application software on water resources.
- The **National Park Service** is managing the water resources and water-dependent environments that occur within our national parks to preserve their natural and cultural values.

---

<sup>31</sup> U.S. Department of Interior. Water Challenges. <http://www.doi.gov/whatwedo/water/>



- The **U.S. Fish and Wildlife Service** is engaged in water-resource planning, management and research that conserves, protects and enhances our nation's fish, wildlife and plants.
- The **Bureau of Land Management** is managing water resources and water-dependent environments on public lands to promote healthy, productive ecosystems that support its multiple-use mission.
- The **Bureau of Indian Affairs** is supporting the development, management and restoration of water and related natural resources on tribal lands.
- The **Minerals Management Service** is developing ocean science and technological information related to ocean stewardship to help our nation more safely explore and develop energy resources on the Federal Outer Continental Shelf.

### **Environmental Protection Agency<sup>32</sup>:**

**Office of Water:** The Office of Water ensures drinking water is safe, and restores and maintains oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

- **Office of Groundwater and Drinking water**, together with states, tribes, and our many partners, protects public health by ensuring safe drinking water and protecting ground water. We oversee implementation of the Safe Drinking Water Act.
- **Office of Science and Technology** is responsible for developing sound, scientifically defensible standards, criteria, advisories, guidelines and limitations under the Clean Water Act and the Safe Drinking Water Act. Works with partners and stakeholders to develop the scientific and technological foundations to achieve clean water. Producing regulations, guidelines, methods, standards, science-based criteria, and studies that are critical components of national programs that protect people and the aquatic environment.
- **Office of Water Management** supports the Federal Water Pollution Control Act and the Clean Water Act by promoting effective and responsible water use, treatment, disposal and management and by encouraging the protection and restoration of watersheds.
- **Office of Wetlands, Oceans and Watersheds** works to protect our marine and fresh water ecosystems, including watersheds, coastal ecosystems and wetlands. Regulate and monitor ocean dumping, manage dredged materials, and reduce marine debris. Protect water quality and habitats in 28 estuaries around the nation. Control polluted runoff and restore impaired waters.

### **State Agencies:**

**New Mexico Office of the State Engineer<sup>33</sup>** is charged with administering the state's water resources. The State Engineer has power over the supervision, measurement, appropriation, and distribution of all surface and groundwater in New Mexico, including streams and rivers that cross state boundaries. The State Engineer is also Secretary of the Interstate Stream Commission and oversees its staff.

---

<sup>32</sup> U.S. Environmental Protection Agency. Office of Water. <http://www.epa.gov/aboutepa/ow.html>

<sup>33</sup> New Mexico Office of the State Engineer. Mission Statement. <http://www.ose.state.nm.us/>



1. **Domestic Well Regulations Adopted in 2006:** The Office of State Engineer (OSE) adopted *Rules and Regulations for Governing the Use of Public Underground Waters for Domestic and Household Use (19.27.5 NMAC)* in 2006. These rules increase the fee for obtaining a domestic well permit to \$125 (from \$5) and reduce the allowable diversions from 3 ac-ft/yr to 1 ac-ft/yr. The rules and regulations also allow the State Engineer to establish Domestic Well Management Areas where stream-connected groundwater systems require special water resource protection. To-date, no Domestic Well Management Areas have been established in the Jemez y Sangre Regional Water Plan area, including Santa Fe County.
2. **Rainwater/Snowmelt Harvesting Policy:** The OSE supports the wise and efficient use of the state's water resources and, therefore, encourages the harvesting, collection and use of rainwater from residential and commercial roof surfaces for on-site landscape irrigation and other on-site domestic uses. The collection of water harvested in this manner should not reduce the amount of runoff that would have occurred from the site in its natural, pre-development state. Harvested rainwater may not be appropriated for any other uses. This policy is based on the concept of predevelopment hydrology. By demonstrating no change in runoff, the policy is consistent with interstate water compacts: i.e. Rio Grande, Pecos, and Colorado.
3. **Aamodt Settlement Agreement:** The Aamodt Settlement Agreement (New Mexico State Engineer v. Aamodt No. 66v06639 MV/LCS-ACE (D.N.M.)) was signed January 19, 2006 by the parties to one of the longest running federal cases in the United States (began in 1966). The settlement agreement is contingent on funding for a water diversion structure and water rights for the parties in the Pojoaque-Nambe and Tesuque drainages, including four Pueblos and Santa Fe County. The source of water will be San Juan Chama (SJC) Project water, native Rio Grande water and possibly water made available through recalculation of the Cochiti Reservoir Evaporative Pool. The existing uses listed in the Aamodt Settlement Agreement are based on uses in 2000 and do not include the golf courses on Pojoaque Pueblo.

**New Mexico Environment Department**<sup>34</sup> to provide the highest quality of life throughout the state by promoting a safe, clean and productive environment. NMED is committed to providing clear articulation of our goals, standards, and expectations in a professional manner so that the citizens of New Mexico can make informed decisions about the environment and their community.

1. **Greywater Policy:** Three state agencies regulate Grey water for safety and sanitation issues related to wastewater. "Wastewater" is liquid that exits a structure via its sewer system; therefore, Construction Industries Division (CID) regulates the licensing of individuals that handle wastewater or that install systems related to wastewater. This is important because this agency regulates who may legally do what with wastewater. This same agency controls the licensing of Irrigators. The New Mexico Environment Department (NMED) regulates properties or facilities that are legally classified as creating wastewater flows of less than 2000 gallons per day, specifically in the Environmental Health Division. The Groundwater Quality Bureau a division of NMED regulates discharges that are classified as being over 2000 gallons.

<sup>34</sup> New Mexico Environment Department. Mission Statement. <http://www.nmenv.state.nm.us/>



## **Local Government:**

### **City of Santa Fe**<sup>16</sup>

1. **Water Conservation Program:** The City of Santa Fe is continuing to implement its water conservation program, which includes mandatory offset of new growth with replacement of high flush toilets with low flush toilets, or more recently, water right purchases, rebates for washing machines, hot water recirculation requirements, rain barrels, cisterns, low flow toilets, and public education programs.
2. **Habitat Protection and Restoration Ordinance:** In April 2007, American Rivers listed the Santa Fe River as America's most endangered river of 2007. In response to community concerns, many groups have received funding to restore portions of the Santa Fe River, including treatment of 7,000 acres in the Santa Fe Watershed above McClure Reservoir by the U.S. Forest Service, and efforts to stabilize banks and habitat in reaches through town and downstream of the wastewater treatment plant.
3. There is a resolution by the City of Santa Fe directing City staff to research and prepare a report on a proposed voluntary program to enable residents to provide financial support for acquiring water rights used to support the ecological health of the Rio Grande and the Santa Fe River by checking a box on their city water bills. In response to this direction, an ordinance was developed creating Section 25-7 SFCC 1987, which established a water rights acquisition fund, and Section 25-8 SFCC 1987, which established a voluntary contribution fund to acquire water rights for the benefit of the Santa Fe River and the Rio Grande.

### **Town of Edgewood**

1. The Estancia Basin Regional Water Plan identifies water conservation measures that can be implemented within the Regional Planning Area which includes the Town of Edgewood.



## **7 Appendices**

**Appendix 7. 1: List of Santa Fe County Ordinances**

**Appendix 7. 2: San Juan – Chama Project**

**Appendix 7.3: List of Water Systems within Santa Fe County**

**Appendix 7.4: Santa Fe County Water/ Wastewater Utility Operations Billing and Accounting Procedures**

**Appendix 7.5: Santa Fe County Community, Education, and Public Service Agencies**

**Appendix 7.6: Santa Fe County Open Space and Trails Restoration Activities**

**Appendix 7.7: Existing Water Conservation Outreach Materials**

**Appendix 7.8: Historic Climate Data**

**Appendix 7.9: Santa Fe County Water Use History and Gallons Per Capita Per Day Calculations**

**Appendix 7.10: List of Acequias within Santa Fe County**

**Appendix 7.11: AWWA Audit and Reporting Worksheet Results for Santa Fe County Water Utility**

**Appendix 7.12: Santa Fe County Rainwater Harvesting Design Recommendations**

**Appendix 7.13: References**



## **Appendix 7. 1: List of Santa Fe County Ordinances**

### ***Santa Fe County Ordinance No. 2004-7 "The Water Conservation Ordinance"***

Santa Fe County Ordinance No. 2004-7 is an ordinance addressing water conservation for residential and commercial uses of water within Santa Fe County, adopted on November 9, 2004. This ordinance amends the water conservation ordinance that was previously in place (Ordinance No. 2002-13). The ordinance prohibits specific water wasting practices, while imposing a schedule for fines and enforcement. Additionally, it addresses outdoor and indoor conservation, distribution of conservation signage and literature, metering of domestic wells, water waste and fugitive water (see terms and definitions), and enforcement and penalties. Water use on land designated as farmland or ranchland is exempt from this ordinance.

#### Outdoor conservation requirements include:

- Outdoor irrigation is prohibited between 11:00 a.m. and 7:00 p.m. from May through September each year, although the ordinance includes several exemptions from this provision, for plants that are being irrigated for sale, all manual watering by landscape maintenance personnel, any water derived through rainwater catchment systems or permitted re-use systems, and any water being used from an acequia or other agricultural irrigation system.
- Outdoor irrigation systems may not be operated if there is a leak.
- Water system leaks from private water lines are required to be fixed within 15 days of the owner becoming aware of the leak.
- Planting of Kentucky bluegrass sod or seed is prohibited.
- Vehicle washing is only permitted if a shut-off hose nozzle is used.
- All swimming pools, hot tubs, and spas must be covered to prevent evaporation when not in use. Swimming pools may only be drained once per year.

#### Indoor conservation requirements include:

- Installation of new and replacement of existing plumbing fixtures must meet water conservation plumbing standards detailed in the ordinance. In addition, all other existing fixtures must be retrofitted to comply with these water conservation plumbing standards by July 1, 2005 (single and multi-family residential water users are exempted from this provision).
- All private and public eating establishments must provide water and other beverages only upon request, and customers must be advised of this policy either through table signage or posting of information in a location that is clearly visible. This provision also applies to catering and banquet operations.
- Lodging facilities must not change the linens and towels each day for guests staying multiple nights, unless specifically requested to do so.

#### Water conservation signage and literature distribution:

- All public, semi-public, and governmental restrooms and shower facilities are required to post at least one full-page water conservation sign in each restroom and shower, and lodging facilities are required to place a water conservation informational card or brochure in a visible location in each room.
- Retail plant nurseries are required to provide their customers with low-water-use landscape literature and water-efficient irrigation guidelines at the time of sale and are encouraged to tag or sign their low-



water-use plants, making it clear to customers which plants will require little or no supplemental watering after becoming established. In addition, literature indicating County planting restrictions is required to be provided along with any sale of turf, grass seed, or sod.

- Landscape contractors, maintenance companies, and architects are required to provide literature regarding low-water-use landscaping and guidelines for water-efficient irrigation to their clients, and landscape contractors are encouraged to provide customers instruction on how to operate their timed irrigation systems.
- Title companies and others closing real estate transactions are required to provide indoor and outdoor water conservation materials to their customers at the time of closing, and County departments are required to provide similar literature to anyone applying for a building permit or initiating a new water service.

#### Metering of Domestic Wells:

This ordinance applies only to Santa Fe County residents who voluntarily accepted water usage and water meter reporting requirements as a condition of plat approval. Water restrictions can be verified by reviewing a property's recorded survey plat. This program requires:

- Water meters to be installed.
- Landowners must report their water meter readings through County mailed postcards.
- The County will follow up with landowners who use more water than is allocated to them, providing water conservation literature or issuing fines.
- Installed water meters are also required to be tested for accuracy every ten years and replaced as necessary.

#### Water Waste:

Water waste and fugitive water is prohibited by this ordinance, although citations cannot be issued for unforeseeable or unpreventable plumbing or irrigation system failures until after the County issues a formal written notice. Incidental runoff from vehicle washing, periodic draining of swimming pools and spas, storm runoff, and other uses are exempt from the fugitive water restrictions.

#### Water Conservation Ordinance Enforcement:

The water conservation ordinance indicates that any and all County Water Conservation regulations may be enforced by the SFCWU, in addition to the County Code Enforcement Officers, Sheriff's Department, and Fire Department. Fines are issued for each conservation ordinance violation and increase should a particular type of offense occur on multiple days at the same address.

#### ***Santa Fe County Ordinance No. 2008-4 "The Rainwater Harvesting Ordinance"***

An ordinance adopted on May 13, 2008 (Santa Fe County Ordinance 2008-4) amends portions of Ordinance 2003-6 and the Santa Fe County Land Development Code to correct errors in and clarify the previous ordinance and land development code. The amended ordinance requires that drainage from 85 percent of a home's roofed area be captured, unless the approved development permit includes a plan for recycling water.



Homes that have a heated area of 2,500 square feet or greater are required to install underground, partially buried, or insulated cisterns that are connected to a pump and a drip irrigation system to serve all landscaped areas. Cisterns are to hold 1.15 gallons per square foot of heated area, although their size may be adjusted based on proposed landscaping (cistern capacity must be approved by the Land Use Administrator). Homes that have a heated area of less than 2,500 square feet are required to install rain barrels, cisterns, or other water catchment basins to capture drainage. The ordinance requires that a water harvesting plan be submitted, unless a development permit includes a plan for recycling water from each structure for landscaping or other approved uses.

### ***Santa Fe County Ordinance No. 2003-6***

Santa Fe County Ordinance 2003-6, which went into effect on November 15, 2003, sets rain water harvesting requirements for commercial and residential developments. This ordinance requires that commercial developments collect all roof drainage and that residential developments collect roof drainage from a minimum of 85 percent of the roof area, to be stored in cisterns and reused for landscape irrigation. Homes that have a heated area of 2,500 square feet or greater are required to install underground, partially buried, or insulated cisterns. Homes that have a heated area of less than 2,500 square feet are required to submit a rainwater catchment plan with their development permit application.

### ***Santa Fe County Land Development Code***

The Santa Fe County Land Development Code was adopted in 1980 with minor amendments in 1996. The Code reads as follows:

Article VII, Section 6 pertains to water supply plans, which must be submitted to the Code Administrator and County Hydrologist for review. The Code Administrator is then required to submit water supply plans for proposed subdivisions of six lots or greater to the New Mexico Office of the State Engineer and the New Mexico Environment Department for review. Water supply plan requirements are dependent on the type and scale of the development and may include sections on water permits, community water systems, water availability assessments, water quality, water conservation, and fire protection.

Article VII, Section 6.6 requires that a water conservation report be submitted with a subdivision preliminary plat application or, for other types of development, at the time of initial application. The report must include a water budget indicating the type and projected amount of water withdrawals and water consumption, as well as a list of any water conservation measures to be used to restrict water use. Only water conservation measures that have been adopted in a form that the County attorney considers legally binding will meet the requirements of the Code. Article VII, Section 6.6.2 indicates that a maximum of 1.0 ac-ft/yr will be allowed for total indoor and outdoor water use for each residential subdivision parcel.

Article III, Section 10.1 discusses the relationship of lot sizes to water policies and sets the policy that future population growth should be supported by adequate long-term water availability. Minimum lot sizes are listed in Article III, Section 10.2.1 and vary by lot location. Minimum lot size is dependent on water availability and can be calculated using the equation provided in Article III, Section 10.2. Standard values of water availability, adjustments for water conservation, and exemptions to minimum lot size requirements are discussed in Article III, Sections 10.2 and 10.3.



Article VII, Section 6.6.2 details those water conservation measures that apply to all developments, including the installation of water-saving fixtures, a requirement that evaporative coolers circulate their bleed-off water, restrictions on the amount of water that dishwashers and washing machines may use per load, a requirement for use of low-water-use landscaping techniques, a requirement that all community water system wells be metered (and meter readings reported), and a restriction on the installation of swimming and wading pools.

Appendix 3C of the Santa Fe County Land Development Code includes a discussion of xeriscape principles and planting guidelines, including a list of low-water-use plants that will do well in Santa Fe County.

### ***Santa Fe County Planning Update***

Santa Fe County is currently undertaking a coordinated and comprehensive update of the Growth Management Plan (adopted in 1999) and the Land Development Code (adopted in 1980 with minor amendments in 1996). The County's current planning update focus is on preparing a Sustainable Land Development Plan. These plans will identify County goals, establish decision-making policies, identify appropriate development types, and prioritize implementation strategies.

### ***Santa Fe County Landscaping Ordinances:***

#### **Tesuque Community Zoning District Ordinance # 2000-13**

- A. Native vegetation shall be preserved on development sites and local native plants used for landscape buffers and screening.
- B. Retention ponds are encouraged to be incorporated into landscaping for the site.
- C. Applications for development within 2 5' of an acequia shall be reviewed by the affected acequia association before any Development Permits are issued.
- D. Indigenous evergreen trees at least 5' tall and approximating the original density type existing on the site prior to disturb shall be used for screening and buffering of structures and cuts and fills, where required, in order to maintain year round screening.
- E. Cut slopes with a slope or retaining wall closer than 6' from the edge of a road or driveway, where the planting area for trees is limited, may be screened with a trellis supporting planted vegetation or some other similar means which creates a natural screened effect.
- F. Submittals must show landscaped areas.

#### **La Cienega and La Cieneguilla Ordinance # 2002-9**

- A. No permanent fences or walls that will impair or obstruct normal operations of an acequia shall be permitted within 6' of a community acequia assns. registered with the Office of the State Engineer (OSE).
- B. Acequia Association review of new development is required.
- C. Ridgetop protection – Article III, Section 2.3.10.b and c.
- D. Large outdoor recreation, landscaping areas (ball fields), or other large grass areas
  - a. must use treated effluent for landscaping and turf
- E. Native vegetation shall be preserved when possible.
- F. Local native plants shall be used for landscape buffers and screening.



- A. All trees and shrubs used for required landscaping buffers and screening must meet the following standards:
  - i. Trees shall have a caliper of **1.5"** and be **6'** or taller.
  - ii. Shrubs shall be in **5 gal.** pots or larger.
- B. Water Conservation Requirements for Landscaping
  - i) Water conservation and management shall not exceed **1%** of total construction costs.
  - ii) New development shall incorporate water conservation management practices.
  - iii) Collected water shall be used for landscaping irrigation and/or other domestic uses.
- C. Xeriscaping and/or native plants will be encouraged for landscaping all new landscaping.

### **Community College District Ordinance # 2000-12**

- A. Site Plan shall show existing and proposed landscaping.
- B. Master Plan in Fringe Zones shall include vegetation protection plans and standards.
- C. Submittals of plans or plats showing trails shall be accompanied by the following:
  - a) An improvement plan showing trail sections, building materials, and trailhead improvements;
  - b) A landscaping and irrigation plan; and
  - c) A maintenance plan.
- D. General landscaping requirements:
  - a) No more than **50%** of trees shall be evergreen.
  - b) Evergreens shall be a minimum of **8'** tall.
  - c) The other **50%** shall be low water use deciduous shade trees.
  - d) Deciduous trees shall be a minimum of **1 ½" caliper** and **6'** tall at time of planting.
  - e) Unpaved areas of parks and plazas shall be re-vegetated with native grasses or native wildflowers.
  - f) Turf grasses may be required for active recreation or high traffic areas only.
  - g) Unpaved areas of parks and plazas shall be planted with shrubs at an average of **1** shrub per **30** sq. ft. or a combination thereof.
  - h) Non-native plants in parks and plazas shall be irrigated by a permanent automated irrigation system.
  - i) Native plants shall be irrigated for **3** years or planted with perma-culture methods to minimize irrigation.
- E. Irrigation Systems
  - a) Parks, playfields, plazas, other developed open space areas and all commercial and industrial areas shall have installed effluent reuse lines for irrigation of community and commercial landscapes.
  - b) Subject to acquisition of applicable State and Federal permits, irrigation of such areas shall be converted to non-potable water when a reliable source is available from the District wastewater treatment facility that meets all applicable standards and requirements



### **US 285 South Highway Corridor Ordinance # 2005-8**

- A. Setbacks from highways shall be landscaped and may contain pedestrian paths and trails..
- B. Service areas, loading areas, outdoor storage areas, and trash receptacles for other than single-family houses shall be screened with buildings, walls, berms, vegetation, and/or existing terrain
- C. Screening for loading and outdoor storage areas shall have a minimum of **6'** in height and a maximum of **8'** in height. Disturbed areas shall be planted with native grass seed or with plants from the Landscape Plant list. Exhibit A of this Ordinance.
- D. Public or semi-public spaces such as plazas, parking lots and streets shall be landscaped with xeric trees and shrubs appropriate to the specific microclimate.
- E. Walkways and internal streets shall contain shade trees on at least one side, spaced a minimum of **40'** apart.
- F. Parking areas shall contain a minimum of **1** shade tree for each **10** parking spaces.
- G. Plazas and parks shall contain shade trees spaced a minimum of **50'** apart.
- H. A plan for maintenance of common areas shall be submitted for approval along with the Application.

### **San Pedro Contemporary Community Ordinance # 2002-2**

- A. Home businesses may be screened by landscaping.
- B. If natural landscaping is used, it must be trees and shrubs native to the area.
- C. 50% screening is required to screen parking areas and outdoor storage from all adjacent properties.

### **Tres Arroyos Del Poniente Ordinance # 2007-1 (TAP)**

- A. Non-residential setbacks from residential (except in areas developed as villages)
- B. Setback may be reduced from **50'** to **25'** if buffered by a landscaped berm ( minimum **3'**, **3:1** maximum side slopes) and wall or fence.
- C. Preserve native species in setback areas and other undeveloped areas on lots.
- D. Outside of protected courtyards plant only drought tolerant species.
- E. Do not introduce plants that might invade and replace native species.
- F. See list of appropriate and invasive species in the TAP Plan Appendix.
- G. General landscaping requirements:
  - a) No more than **50%** of trees shall be evergreen.
  - b) Evergreens shall be a minimum of **8'** tall.
  - c) The other **50%** shall be low water use deciduous shade trees.
  - d) Deciduous trees shall be a minimum of **1 ½"** caliper and **6'** tall at time of planting.
  - e) Unpaved areas of parks and plazas shall be re-vegetated with native grasses or native wildflowers.
  - f) Turf grasses may be required for active recreation or high traffic areas only.
  - g) Unpaved areas of parks and plazas shall be planted with shrubs at an average of **1** shrub per **30** sq. ft. or a combination thereof.
  - h) Non-native plants in parks and plazas shall be irrigated by a permanent automated irrigation system.



- i) Native plants shall be irrigated for **3** years or planted with perma-culture methods to minimize irrigation.

### **Santa Fe Metro Highway Corridor Ordinance # 2002-1**

#### **A. Scenic Corridor Subdistrict Residential and Non-residential**

- i. Not exempted from areas designated by the Highway Corridor Special Review
- ii. District as Urban Growth Areas.
- iii. Outside of protected courtyard, only drought tolerant species shall be planted.
- iv. To screen buildings from adjacent roadways – **50%** of new trees shall be:
  1. Evergreens a minimum of **6'** high at planting. Junipers and Pines.

#### **B. Commercial Gateway**

- i. Follow the above.



**Appendix 7.2: San Juan – Chama Project**

The San Juan-Chama Project was allocated a total of 96,200 acre-feet of project water<sup>35</sup> and is committed primarily by contract to the following entities (15) for the purpose of municipal, domestic, industrial, irrigation and recreation uses:

**Allocated Water: Location and Amount**

<b>Municipal, Domestic, and Industrial Purposes</b>	
<b>Location</b>	<b>Acre-feet</b>
Albuquerque Bernalillo County Water Ut Authority (Authority)	48,200
Jicarilla Apache Nation	6,500
City of Santa Fe	5,230
Ohkay Owingeh (formerly San Juan Pueb	2,000
County of Los Alamos	1,200
City of Espanola	1,000
City of Belen	500
Village of Los Alamos	400
Town of Taos	400
Town of Bernalillo	400
Santa Fe County	375
Town of Red River	60
Village of Taos Ski Valley	15
<b>Irrigation Purposes</b>	
Middle Rio Grande Conservancy District (	20,900
Pojoaque Valley Irrigation District (1972) (Offset storage in Nambe Falls)	1,030
<b>Recreation Purposes</b>	
COE-Cochiti Rec Pool (1964) Compensate evaporation losses at Cochiti Lake	Up to 5,000
<b>Uncontracted (allocated, but uncontracted, and identified rights settlements and or use)</b>	
future Indian water	2,990
<b>TOTAL ALLOCATION</b>	<b>96,200</b>

<sup>35</sup> U.S. Bureau of Reclamation. Allocation Schedule for San Juan Chama Water. 2009



### Appendix 7.3: List of Water Systems within Santa Fe County

The systems located within Santa Fe County are Public Water Systems as determined by the New Mexico Environment Department<sup>36</sup>. In the future the water Conservation Program will approach these systems that would like to incorporate water conservation implementation measures into their outreach activities.

NUMBER	WATER SYSTEM	CITY	SOURCE	POPULATION	PRODUCTION (gpd)	DEMAND (GP/D)	DEMAND (AF/Y)
NM3503926	AGUA FRIA WATER ASSOCIATION	SANTA FE	GW	650	64,800.00	33,000.00	88.72
NM3569826	ASI LA MAR TRAILER PARK	SANTA FE	GW	80	UNKNOWN	UNKNOWN	UNKNOWN
NM3504026	CANADA DE LOS ALAMOS MDWCA	SANTA FE	GW	70	4,000.00	3,000.00	8.07
NM3510026	CANONCITO AT APACHE CANYON		GW	250	31,680.00	17,000.00	45.70
NM3566026	CHUPADERO MDWCA		GW	160	57,600	21,000	56.46
NM3573126	CIELO LINDO		GW	26	51,840	3,000	8.07
NM3504226	CUNDIYO MDWCA	CUNDIYO	GW	65	11,520	3,000	8.07
NM3570426	EL RANCHO MOBILE HOME (MH) PARK (SANTA FE)	SANTA FE	GW	50	36,000	2,500	6.72
NM3504126	EL VADITO DE LOS CERRILLOS WATER ASSOC	CERRILLOS	GW	350	27,360	20,000	53.77
NM3537326	ELDORADO AREA WATER AND SANITATION DIST.	SANTA FE	GW	7500	UNKNOWN	600,000.00	1,613.01
NM3553321	ENCHANTED MESA MH PARK	ESPANOLA	GW	145			0.00
NM3524626	ENTRANOSA WATER AND WASTEWATER COOP	EDGEWOOD	GW	8500	2,600,000.00	2,000,000.00	5,376.69
NM3504426	GALISTEO MDWCA	GALISTEO	GW	150	57,600	27,590	74.17
NM3504326	GLORIETA EAST WATER SUPPLY	GLORIETA	GW	60	9792	4,500	12.10
NM3562626	GLORIETA ESTATES MDWCA	GLORIETA	GW	65	46640	6000	16.13
NM3504526	GLORIETA MDWCA	GLORIETA	GW	200	45,000.00	UNKNOWN	UNKNOWN
NM3544926	HYDE PARK ESTATES WATER USERS ASSOC	SANTA FE	SWP	183	14,400	8,354	22.46
NM3571026	JUNIPER HILLS MHP	SANTA FE	GW	60	72,000	2500	6.72
NM3574826	JUNIPER HILLS RANCH	SANTA FE	GW	54	23,040	UNKNOWN	UNKNOWN

<sup>36</sup> New Mexico Environment Department Drinking Water Bureau Sanitary Survey's 2004-2009



NM3571226	LA CIENEGA LAKESIDE MHP	LA CIENEGA	GW	60	UNKNOWN	3,000.00	8.07
NM3537526	LA CIENEGA MDWCA	SANTA FE	GW	525	115,200.00	25,000.00	67.21
NM3551026	LA VISTA HOMEOWNERS ASSOC	SANTA FE	GW	48	61,920	4,500	12.10
NM3533126	LAMY DOMESTIC WATER USER ASSOC	LAMY	GW	150	47,520	8,600	23.12
NM3500626	LAS CAMPANAS WATER SYSTEM	SANTA FE	GWP	400	UNKNOWN	50,000.00	134.42
NM3504626	LIFEWAY GLORIETA CONFERENCE CENTER	GLORIETA	GW	2500	161,330	50,000	134.42
NM3571426	LONE STAR TRAILER RANCH	SANTA FE	GW	95	UNKNOWN	5,000.00	13.44
NM3504826	MADRID VILLAGE WATER CO-OP		GW	300	38,000.00	14,000.00	37.64
NM3500326	NM AMERICAN WATER CO EDGEWOOD DISTRICT	EDGEWOOD	GW	5018	1,400,000	500,000.00	1,344.17
NM3532226	NM STATE PENITENTIARY	SANTA FE	GW	2200	67,320	VARIES	UNKNOWN
NM3572126	POJOAQUE TERRACES MHP	POJOAQUE	GW	200	2160	17,000	45.70
NM3500526	RANCHITOS DE GALISTEO WUA	GALISTEO	GW	70	79,200	10,000	26.88
NM3504926	RIO CHIQUITO MDWCA	CHIMAYO	GW	200	82,080	9,600	25.81
NM3533426	RIO EN MEDIO MDWCA	TESUQUE	GW	130	19,152	1,400	3.76
NM3572926	SANTA CRUZ MDWCA	SANTA CRUZ	GW	73	74,880	2,800	7.53
NM3500826	SANTA FE COUNTY SOUTH SECTOR	SANTA FE	SWP	3000	UNKNOWN	200,000	537.67
NM3538126	SANTA FE COUNTY UTILITIES@ VALLE VISTA	SANTA FE	SWP	1000	UNKNOWN	UNKNOWN	UNKNOWN
NM3500926	SANTA FE COUNTY WEST SECTOR	SANTA FE	SWP	250	UNKNOWN	12,750	34.28
NM3570726	SANTA FE MOBILE HOME HACIENDA	SANTA FE	GW	250	72,000	UNKNOWN	UNKNOWN
NM3505126	SANTA FE WATER SYSTEM (CITY OF)	SANTA FE	SW	80065	10,000,000.00	7,500,000.00	20,162.59
NM3572626	SANTA FE WEST MHP	SANTA FE	GW	200	57,600	UNKNOWN	UNKNOWN
NM3575026	SHALOM MOBILE HOME PARK	SANTA FE	GW	50	50	UNKNOWN	UNKNOWN
NM3511426	SOLACITO MDWCA	ESPANOLA	GW	44	3000	3000	8.07
NM3505226	SUNLIT HILLS WATER SYSTEM	SANTA FE	GW	990	288,000	116,000	311.85
NM3505326	TESUQUE MDWCA	TESUQUE	GW	370	UNKNOWN	UNKNOWN	UNKNOWN
NM3599126	THUNDER MOUNTAIN WATER SYSTEM	EDGEWOOD	GWP	1800	576,000	150,000.00	403.25

NM3572826	TRAILER RANCH MH PARK COMM	SANTA FE	GW	210	244,800	16,000	43.01
NM3569626	VILLAGE MHPARK	SANTA FE	GW	150	36,000	6,594	17.73
NM3536126	VISTA REDONDA MDWCA	TESUQUE	GW	75	UNKNOWN	8250	22.18
NM3580526	WILD AND WOOLEY TRAILER RANCH	SANTA FE	GW	93	UNKNOWN	5,000	13.44

## Appendix 7.4: Santa Fe County Water/ Wastewater Utility Operations Billing and Accounting Procedures

- Monthly water and wastewater bills are prepared from a utility billing software called CUBIC (Comprehensive Utility Billing & Control). Monthly charges are based on meter readings for water and wastewater usage customers. Stand-by fees are based on the number of acre-feet of water allocated to that particular customer. (The HTE software is not used for utility accounts receivable because it does not have the capability to calculate water & wastewater usage based on the meter readings.)
- Meters are read on a cycle billing basis. Bills are processed as soon as the meters are read utilizing a radio telemetry meter reading system.

### **Billing postings to customer history - "Customer Receivable/History"**

The Account Technician Senior issues invoices to customers on a monthly basis in the CUBIC Utility Software.

(Example: May usage charges are billed the last week in May)

(Each customer's usage is entered into an excel spreadsheet for the month of the usage)

- **Cash receipt posting** – Payments are entered daily in the CUBIC Utility Billing Software system through "Cash Receipts Posting".
  - The Account Technician Senior receives and posts all payments received
  - A detail and summary of the "Cash Receipts Journal" is printed through the utility billing software and a calculator tape is run to ensure cash receipts balance with posted payments. The Cash Receipts Journal includes the following information:
    - customer's name
    - address
    - payment type (i.e. check, cash, money order, etc.)
    - check number,
    - and the amount paid.
  - The Accountant Senior audits the deposit (or Accounting Tech, *if Accountant Senior is unavailable*)
  - The deposit is then taken to the Treasurer's Office.
  - Auditor signs Cash Receipts Journal Summary report; makes a copy for department's record; and the original is submitted to the Treasurer's office along with cash receipts.
  - Checks and cash are taken to the County Treasurer's office to be deposited and registered into the accounting system by the Accounting Tech.
  - The Treasurer's office processes a receipt of deposit, which matches the Department's Cash Receipts Journal Summary report.
  - The Treasurer's office receipt is then attached to the Department's backup.
  - A journal entry is done at the end of the month to record the current accounts receivable balance in the general ledger.
    - The journal entries are prepared after the customer history is updated with the new charges - usually by the 15<sup>th</sup> working day of the month.

Water/Wastewater Operations has several types of charges:

1. Water usage
2. Wastewater usage

3. Stand-by fees
4. Promissory notes
5. Miscellaneous charges (for fees or services out of the norm)
6. Fire service line (fire protection service charge)
7. Water rights
  - ◇ Under water & wastewater usage there are four types of customers: residential, commercial (including temporary for construction use), institution, and government. Each type is charged a different rate according to the appropriate rate schedule.
  - ◇ Stand-by fees are charged per acre-foot of water allocated each month. For developers who are installing meters for water usage, the stand-by fee is reduced each month for the numbers of meters added, according to each individual contract.
  - ◇ Promissory notes are given to customers who want water service in the future. These customers agree to pay \$6500 over the next 5 years at 6% interest. If they want water service immediately, they must pay \$300 up front and then agree to pay \$6500 over the next 5 years at 6% interest. For payments not received within 15 days of the due date, a 10% late fee is added. Interest is also charged at 0.5% per month until the payment is received.
  - ◇ Miscellaneous service charges are charges that are out of the ordinary. The charge is according to each individual contract.
  - ◇ Fire service line charges are for fire protection waterline services. The Utilities Department will furnish and install the waterlines and the customer will pay their share of the cost of installation. A contract is set up with customers. Payments are set up as a liability account.
  - ◇ Additional Water Rights are handled the same as promissory notes. A contract is set up with customers who want water service in the future. These customers agree to pay a specified amount over the next 5 years at 6% interest. They are required to pay 10% upon signing of contract.

**Appendix 7.5: Santa Fe County Community, Education, and Public Service Agencies**

This list was compiled in an effort to determine the many organizations that are connected to water conservation. Many other organizations may be present due to a lack of awareness within the Water Conservation Steering Committee.

<b>SFC Community, Education &amp; Public Service Agencies</b>							
<b>Agency Name</b>	<b>Activity</b>	<b>Watersheds</b>					
		<b>Santa Cruz</b>	<b>Pojoaque-Nambe</b>	<b>Tesuque</b>	<b>Santa Fe River</b>	<b>Galisteo</b>	<b>Estancia</b>
<b>Federal</b>							
USDA/NRCS	Soils information, Agricultural/surface water systems renovation and funding <a href="http://soildatamart.nrcs.usda.gov/manuscripts/NM687/0/SantaFe.pdf">http://soildatamart.nrcs.usda.gov/manuscripts/NM687/0/SantaFe.pdf</a>	X	X	X	X	X	X
Bureau of Reclamation	Upper Colorado Region Water Conservation Initiative <a href="http://www.usbr.gov/WaterSMART/">http://www.usbr.gov/WaterSMART/</a> (\$50k min - \$300 k max) <a href="http://www.usbr.gov/Waterconservation">http://www.usbr.gov/Waterconservation</a> (\$2k min - \$50 k max)	X	X	X	X	X	
<b>State</b>							
Office of the State Engineer	Water Rights Permitting Water Conservation Bureau <ul style="list-style-type: none"> <li>Public Outreach</li> <li>Technical Reports</li> </ul> <a href="http://www.ose.state.nm.us/index.html">http://www.ose.state.nm.us/index.html</a> Water Use and Conservation for Education – Early elementary through high school (“Aqua Action” to “Rio the Water Detective”) Regional Planning groups: Jemez y Sangre Regional Planning group Estancia Basin Regional Planning group	X	X	X	X	X	X
Department of Agriculture	Acequia and Community Ditch Fund Soil and Water Conservation Programs, Water and Natural Resources Policy, Galisteo Basin Fact Sheet	X	X	X	X	X	X
Public Education Department	Public Education Commission (advisory to Secretary of Education) – Carla Lopez, District 4 Santa Fe; recommendation on how to incorporate water conservation -related curriculum into public schools	X	X	X	X	X	X
Environment Department	Drinking Water Bureau, Groundwater Quality Bureau, Surfacewater Quality Bureau	X	X	X	X	X	X
Energy, Minerals and Natural Resources Division	Youth Conservation Corps, Land Conservation, Habitat Corridors, and Wildlife Adaptation	X	X	X	X	X	X
<b>County</b>							



Open Space and	Restoration Activities. Listed in Appendix 6				X	X	
Growth Management Department	Water Conservation Program <a href="http://Santafecounty.org/waterconservation">Santafecounty.org/waterconservation</a>	X	X	X	X	X	X
Water/ Waste Utility Department	Water Utility Customers Tiered rate structure to conserve water				X	X	
<b>City</b>							
Public Utilities Division	Water Conservation and Storm water Management Programs (Public awareness campaign & literature/public postings)				X		
<b>Tribal</b>							
Tesuque Pueblo	Tesuque Permaculture classes			X			
TNAFA	The Native American Farmers Assoc.	X	X	X			
<b>University</b>							
NMSU	Extension agencies: 4-H, FFA youth education and experience, Soil Health, Pest Management, alternative/creative growing techniques and funding growth of experimental/alternative/heirloom crops Water Resources: <a href="http://Watertaskforce.org">Watertaskforce.org</a> Master Gardener Association	X	X	X	X	X	X
Ecoversity	Hands-on workshops and how-to (compost, alternative building, solar, wind, cultivation)				X		
<b>National Laboratories</b>							
Los Alamos National Lab (LANL)	Environmental Communication & Public Involvement; Jemez y Sangre water plan & white papers	X	X	X	X		
Sandia National	Water and Energy Nexus <a href="http://www.sandia.gov/energy-water/">http://www.sandia.gov/energy-water/</a>	X	X	X	X	X	X
<b>Non-Profit/Private</b>							
Quivira Coalition	Events, workshops, publications				X	X	
Amigos Bravos	Events, publications	X	X				
Earth Day	Events and annual publication	X	X	X	X	X	X
Plants of the Southwest	Educational talks and workshops				X		
Santa Fe Green	Educational talks and workshops				X		
Santa Fe Watershed Association	Events, workshops, publications <a href="http://www.santafewatershed.org">www.santafewatershed.org</a>				X		



## **Appendix 7.6: Santa Fe County Open Space and Trails Restoration Activities**

Santa Fe County Open Space and Trails provides many restoration activities within the Santa Fe and Galisteo Watersheds. Below is a list of activities from Open Space and Trails Division:

### **Project Title: Tributary Arroyo of La Cienega Creek -El Penasco Blanco Open Space, "Los Carrizales"**

- *Location:* La Cienega, NM
- *Goal:* 2009 -Non-native tree removal: Russian Olive, Siberian Elm, Tamarisk
- *Description:* Felled trees, piled the slash in deep erosion cuts along the drainage, chipped some of the trees, and treated the cut stumps with "Habitat" an herbicide used for aquatic or riparian areas.
- *Lead Agency:* Santa Fe County Open Space and Trails Program
- *Partners:* Santa Fe/Pojoaque Soil and Water Conservation District

### **Project title: Santa Fe River - La Cieneguilla Open Space**

- *Location:* La Cieneguilla, NM
- *Goal:* Non-native tree removal: Russian Olive, Siberian Elm, Tamarisk
- *Description:* 2007-Extracted and mulched the trees using an excavator and grinder. In some areas smaller equipment was used to pull the trees and chip them. Seedlings and resprouts are pulled by hand with a Weed Wrench. No herbicide has been used. Removed levees/berms along the river channel that restricted access to the floodplain. Grass seed and a small number of cottonwood poles and willow whips were planted in disturbed areas.
- *Lead Agency:* Santa Fe County Open Space and Trails Program
- *Partners:* Santa Fe/Pojoaque Soil and Water Conservation District, Wild Earth Guardians (formerly Forest Guardians), New Mexico Environment Department, Bureau of Land Management, Center for Service Learning, Santa Fe Girls School.

### **Project title: Santa Fe River -El Camino Real Park**

- *Location:* Santa Fe, NM
- *Goal:* Induced meandering, bioengineering, channel reconstruction, non-native tree removal (Russian Olive, Siberian Elm, Tamarisk), planting of native vegetation.
- *Description:* Removed tons of trash and construction debris. Used heavy equipment to reshape the vertical, eroded river banks to a more stable 3 to 1 slope, installed large boulder vanes and planted stands of willows along the river channel to cause the river to meander (induced meandering), planted native cottonwood poles and seedlings and native shrubs and grasses.
- *Lead Agency:* State Land Office
- *Partners:* Environmental Protection Agency, New Mexico Environment Department, Santa Fe County, City of Santa Fe, Santa Fe Watershed Association, Camino Real River Connection, Trust for Public Land, iYouthWorks! youth conservation corps

### **Project title: Santa Fe River - San Isidro Park**



- *Location:* Santa Fe, NM
- *Goal:* Channel reconstruction, induced meandering, bioengineering, non-native tree removal (Russian Olive, Siberian Elm, Tamarisk) planting of native vegetation.
- *Description:* 2006 – present Removed tons of trash and construction debris. Used heavy equipment to reconstruct a meandering channel in order to begin to restore natural function to the river, constructed grade control structures, installed boulder and post vanes to cause the river to meander (induced meandering), planted thousands of willow whips along the outside bends of the meanders to stabilize the river channel, planted hundreds of native cottonwood poles, native shrubs, grasses, and forbs.
- *Lead Agency:* Santa Fe County Open Space and Trails Program
- *Partners:* Environmental Protection Agency, Santa Fe Watershed Association, Camino Real River Connection, Trust for Public Land, City of Santa Fe, ¡YouthWorks! Youth Conservation Corps

**Project title: Arroyo Hondo - Arroyo Hondo Open Space**

- *Location:* Santa Fe, NM
- *Goal:* Wetlands restoration
- *Description:* 2009- present. Removal of non-native trees, planting native trees, shrubs, grasses and forbs, installation of rock and wood post structures.
- *Lead Agency:* Santa Fe County Open Space and Trails Program
- *Partners:* Environmental Protection Agency, New Mexico Environment Department, Earthworks, Inc., University of New Mexico Community and Regional Planning Program



## Appendix 7.7: Existing Water Conservation Outreach Materials

### Domestic Well Metering Brochure:

#### Santa Fe County DOMESTIC WELL METERING PROGRAM



#### Information About the Well Metering Program:

##### PROGRAM PURPOSE—

To reduce overall groundwater withdrawals in Santa Fe County alleviating stress on the aquifer.

The combination of limited water resources as well as numerous droughts in Santa Fe County demonstrates the need for strict water conservation measures. Therefore, in December 2002, the Santa Fe County Board of County Commissioners adopted Ordinance 2002-13, entitled An Ordinance Addressing Water Conservation for All Residential and Commercial Uses of Water Within Santa Fe County.

A major goal of this ordinance is to implement a domestic well metering program within Santa Fe County. As stipulated by Ordinance 2002-13, the domestic well metering program applies to all Santa Fe County residents living or operating businesses on lots where restricted water usage and water meter reporting requirements were not initially accepted as part of plat approval. You can determine if you meet these requirements by checking your recorded survey plat for water restrictions. Water restrictions are usually limited to 0.25 acre foot per year or 81,463 gallons. This is the amount of water determined by the New Mexico Office of the State Engineer to sustain a household of four.

#### Information About Your Domestic Well:

##### SHARED WELLS—

Shared wells come with many benefits including the lower cost of drilling and maintenance. In order to obtain a shared well a group of people must apply for a permit through the Office of the State Engineer. It is also important that they understand and can comply with the regulations for a shared well. It is also recommended that the group using the well create a legally valid agreement to assure that each person knows their responsibilities, and there is no question of the construction or maintenance of the well. The legal agreement created by the current property owners should remain valid and binding for future property owners of the well.

##### WELL MAINTENANCE—

It is very common to forget about your well once it has been installed and you have running water. Yet, to keep your well functioning properly, early detection and regular inspection is necessary. Some of the most common problems that you can look for are wear on the parts of the pump, build up of deposits on the metal parts of the well, and corrosion on the well screen. If you have a higher than average water bill yet no increase in the delivery of your water you may be experiencing a pump performance problem. If the pump runs more frequently than it should check for possible leaks in places such as the pressure or the distribution system. Another aspect of your well that should be inspected regularly is whether there are any spaces in your water system where insects, plants, or other objects could enter, ultimately contaminating your water supply. If problems with your well worsen the best thing to do is to hire a professional to fix it.

## How to Read Your Water Meter:

### STEP 1



Observe that the water meter has one dial with a sweep hand and scale numbered from 1 to 10. Each revolution of the sweep hand represents 10 gallons of water through the meter.

### STEP 2



Refer to the horizontally displayed numbers in the mechanical odometer to read the total revolutions of the sweep hand and the total number of gallons through the meter.

### STEP 3



Read the mechanical odometer numbers from left to right. The meter shown in the image reads 369,200 gallons.

### STEP 4



Notice that the last number on the far right is fixed at zero. The actual value of this field is shown by the sweep hand, which measures individual gallons. In the meter shown in the photo, the sweep hand reads 0.8 gallons, making the exact number of gallons through the meter 369,200.8.

### USING WATER WISELY—

Water is a precious resource and should be used efficiently. When used efficiently a water user can save money. The average user uses 50 to 75 gallons of water daily. Water usage can be cut by 10 to 20% without affecting the users lifestyle.

### WAYS TO REDUCE WATER USE INSIDE AND OUTSIDE OF THE HOUSE—

- Change the toilets and shower heads to ultra low-flow ones
- Use front-loading washing machines and only do laundry when you have a full load.
- Don't leave water running while brushing teeth or washing dishes, and take shorter showers.
- Collect the cold water from your faucet while waiting for the hot water, and collect gray water—both can be used on vegetation
- Collect rainwater in barrels to use for irrigation
- Plant native and drought tolerant plants in your yard.
- Use a drip irrigation system instead of a regular sprinkler and only water in the evening or early morning.
- In all cases become aware of your water use.

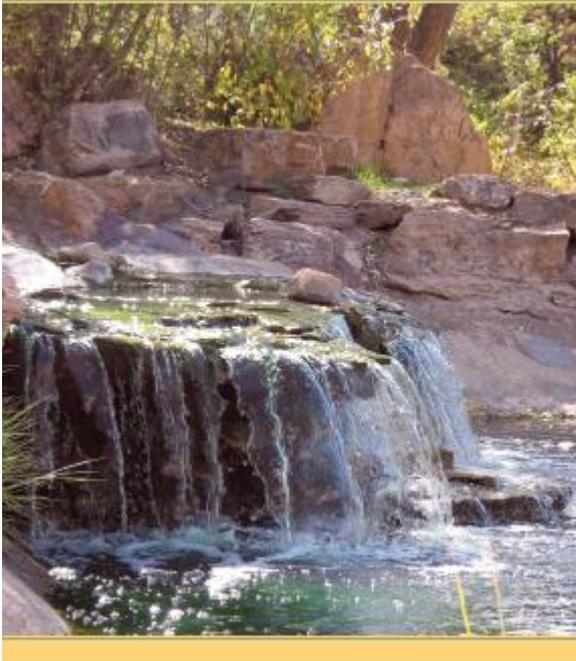
102 Grant Avenue, P.O. Box 276, Santa Fe, NM 87504-0276  
505.995.2718 or 505.986.6225  
[www.santafecounty.org/waterconservation](http://www.santafecounty.org/waterconservation)





## Santa Fe County Water Conservation Brochure:

### Santa Fe County Water Conservation Program



The Santa Fe County Water Conservation Program was put in place in August 2007 to implement and oversee the various conservation proposals and requirements put forth by the County over the last several years.

Water conservation actions include:

- Public education and outreach at local events
- Rainwater harvesting ordinances and consultations
- Stormwater Management
- Addressing climate change in our region
- Domestic well metering program
- Emergency declaration of water restrictions
- Requiring hot water circulation pumps on all new construction
- Developing Green Building Code requirements for future developments
- Collaboration with developers is essential in ensuring sustainable use of this limited natural resource

In December 2002, Santa Fe County adopted Ordinance 2002-13, addressing water conservation for all residential and commercial water uses in Santa Fe County.

Ordinance 2003-13 (Amended by 2004-7)  
Requirements:

- Domestic Well Metering
- Public Education
- Commercial toilet retrofits
- Drought management

Rainwater Harvesting:

Ordinance 2003-6 (amended by Ordinance 2008-4)

The capture and reuse of precipitation has come to be called rainwater catchment or rainwater harvesting. The Santa Fe County Board of County Commissioners adopted Ordinance 2003-6 on October 14, 2003, addressing water harvesting for all residential and commercial development within Santa Fe County.

Ordinance Requirements:

- All Commercial development is required to collect roof drainage from a minimum of 85% of roof area to be reused for landscape irrigation.
- Homes consisting of 2,500 square feet or greater of heated area must install underground, partially buried, or insulated cisterns

- Homes under 2,500 square feet must submit a rainwater catchment plan with their development permit application. These plans should include the locations of rain barrels and other passive water harvesting techniques.

Harvesting rainwater offers numerous benefits such as providing an additional source of water for landscape irrigation, reducing water demands on water systems that would otherwise provide potable water for these purposes. Harvested rainwater provides a supply of water that is accessible during most drought restrictions and may be used to reduce or replace ponding requirements for stormwater detention/retention.



### Benefits of Rainwater Harvesting:

- Increase water availability to on-site vegetation
- Reduce on-site flooding and erosion
- Reduce water bills and groundwater pumping
- Extend the life of landscaping

### Stormwater Management:

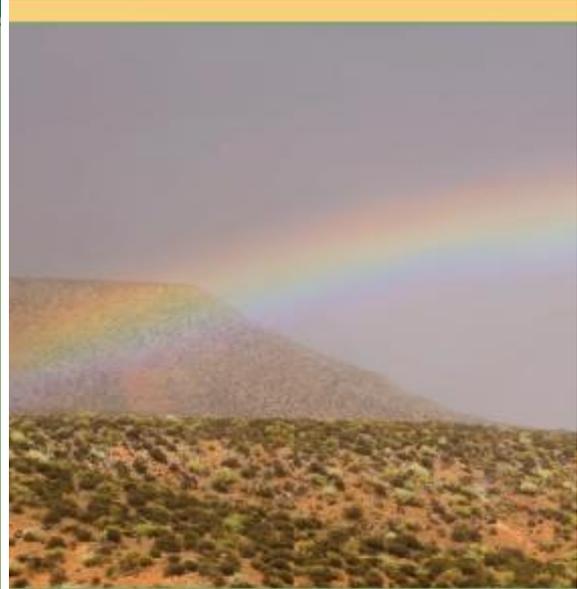
All development in Santa Fe County must adhere to the criterion set forth in Ordinance 2008-10 (stormwater and floodplain management) and Federal standards for construction site management.

A Construction General Permit is needed to comply with EPA standards for construction sites see: [www.epa.gov/npdes/stormwater/cgp](http://www.epa.gov/npdes/stormwater/cgp) for more information before you apply for a Development Permit.

For more information on preparing a Storm Water Pollution Prevention Plan (SWPPP) go to [www.nmenv.state.nm.us](http://www.nmenv.state.nm.us), a SWPPP is required as part of your Santa Fe County submittal package for development permit if you are disturbing more than one acre.

Thank you for your help in making Santa Fe County a water friendly community!

Conserve ~ Preserve ~ Sustain  
Santa Fe County



Santa Fe County



102 Grant Avenue  
P.O. Box 276  
Santa Fe, NM 87504-0276

For More Information Contact:  
505.995.2718 or 505.986.6225  
[www.santafecounty.org/waterconservation](http://www.santafecounty.org/waterconservation)

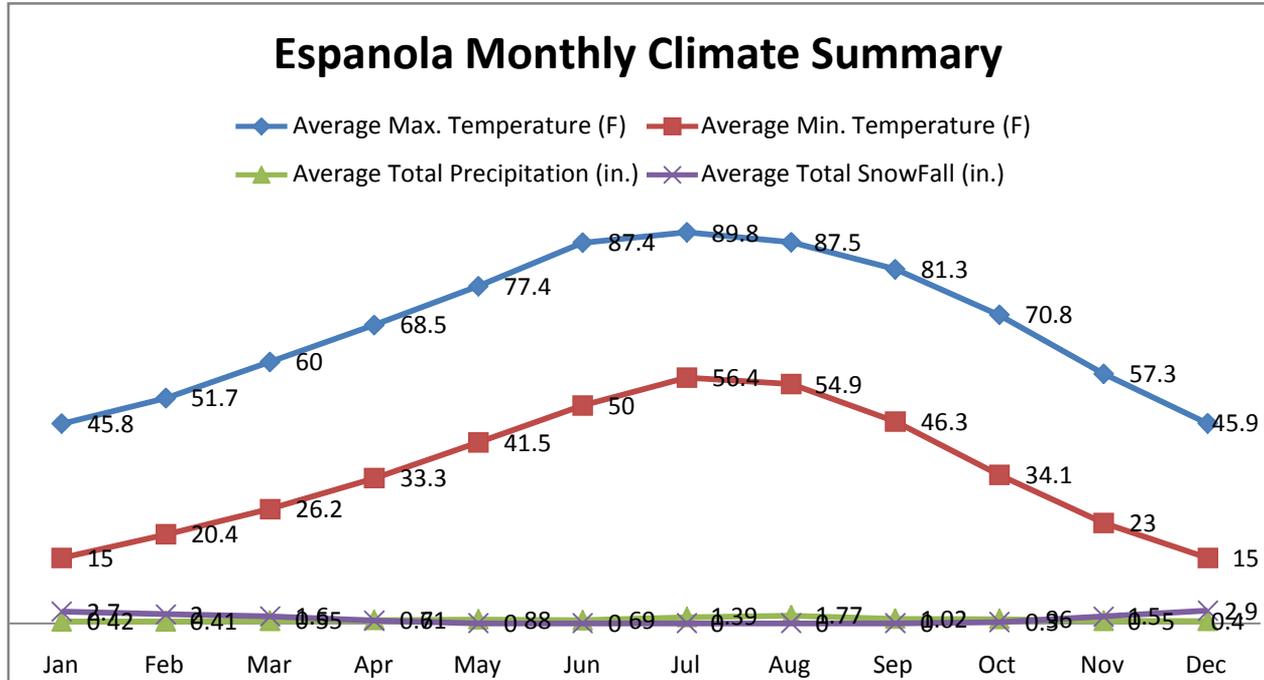


**Appendix 7.8: Historic Climate Data:**

**Cundiyo – Santa Cruz Watershed:**

**WEATHER STATION: ESPANOLA, NM (293031)**

**Monthly Climate Summary Period of Record 4/1/1895-12/31/2008**

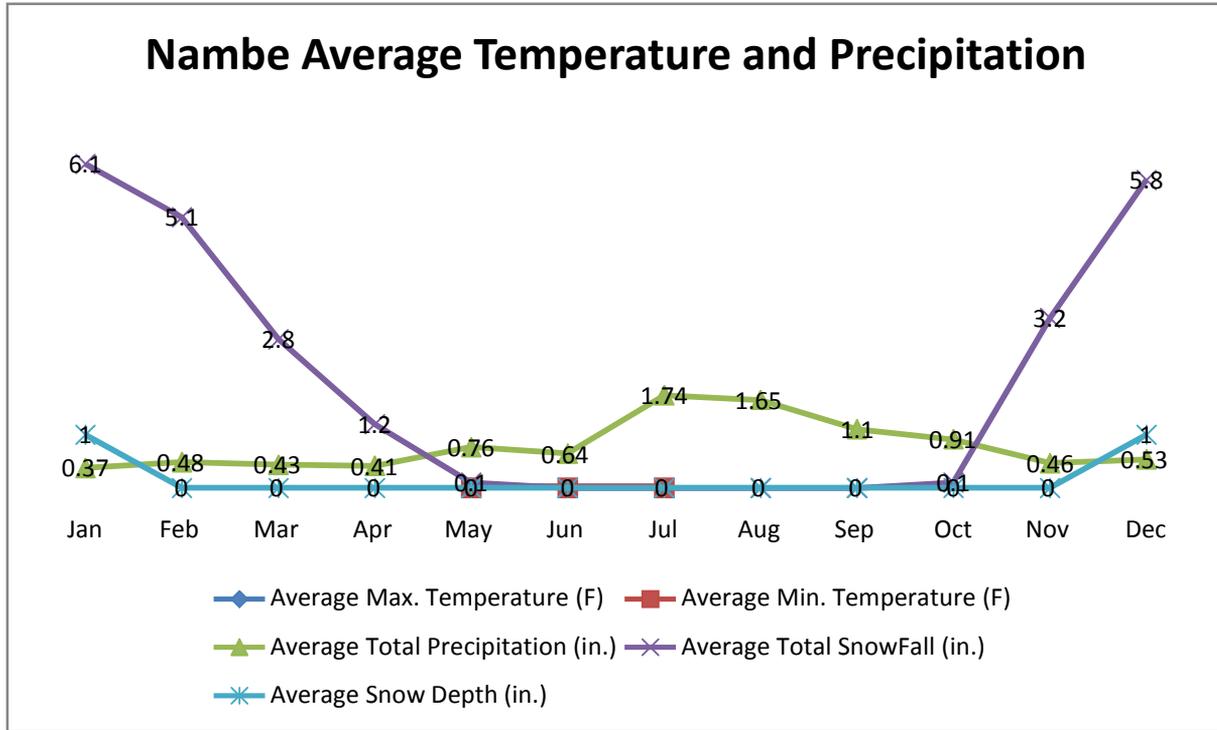




**Pojoaque – Nambe – Tesuque Watershed:**

**WEATHER STATION: NAMBE, NM (296028)**

**Monthly Climate Summary Period of Record: 1/30/1893 to 9/30/1974**

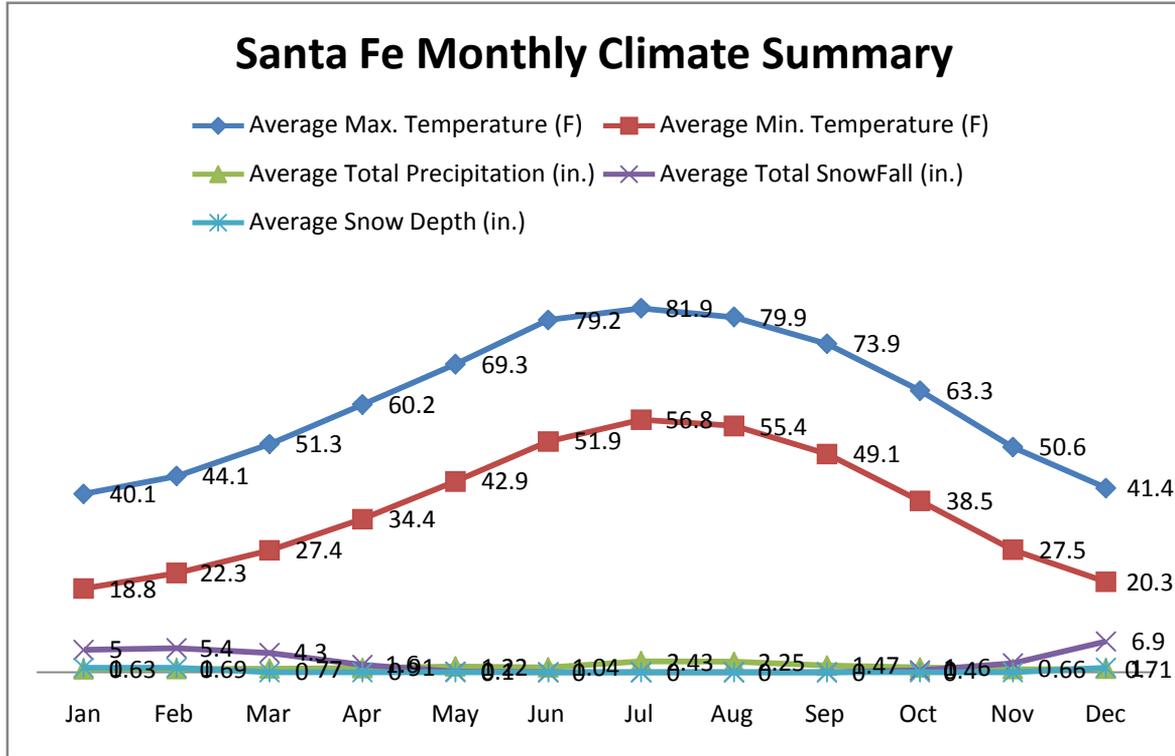




**Santa Fe Watershed:**

**WEATHER STATION: SANTA FE, NM (298072)**

**Monthly Climate Summary Period of Record: 1/1/1890 to 3/21/197**

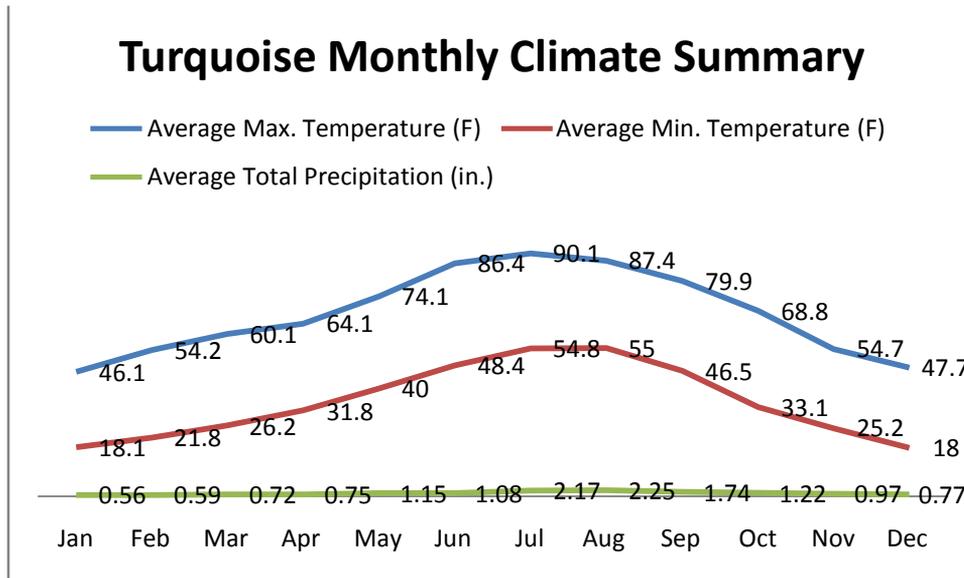




**Galisteo Watershed:**

**WEATHER STATION: Turquoise, NM (299193)**

**Monthly Climate Summary Period of Record: 1/1/1890 to 3/21/1972**

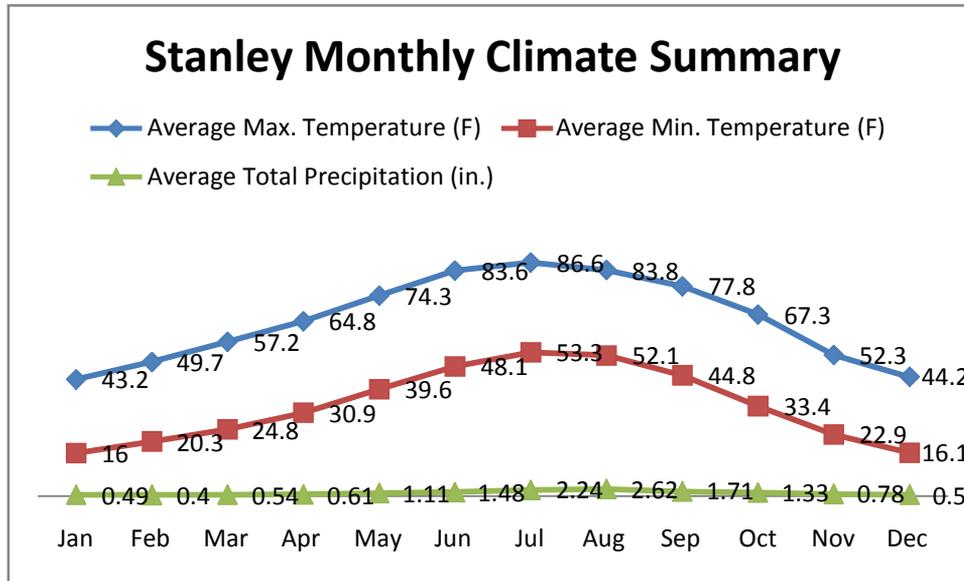




**Estancia Basin Watershed:**

**WEATHER STATION: STANLEY, NM (298518)**

**Monthly Climate Summary Period of Record 1971-2000**





**Appendix 7.9: Santa Fe County Water Use History (2005-2009) and Gallon Per Capita Per Day Calculations**

Santa Fe County Water Usage 2005						
Year & Month	Residential	Commercial	Government	Institution	Construction	Total
January-05	3,676,340	160,060	1,177,060	94,750	34,400	5,142,610
February-05	3,915,880	188,250	1,341,660	123,400	327,598	5,896,788
March-05	3,883,190	228,660	1,501,930	115,950	22,700	5,752,430
April-05	4,428,753	555,930	1,498,200	126,400	29,500	6,638,783
May-05	5,212,160	750,480	1,582,310	122,550	21,300	7,688,800
June-05	7,444,970	3,974,030	1,871,850	113,300	21,950	13,426,100
July-05	7,553,790	4,018,610	1,742,420	177,500	22,200	13,514,520
August-05	6,850,460	4,469,900	2,061,850	723,700	13,800	14,119,710
September-05	6,074,540	6,003,050	1,326,340	416,750	21,700	13,842,380
October-05	5,396,810	1,274,440	1,727,760	216,650	19,400	8,635,060
November-05	4,049,980	536,380	1,976,790	149,050	18,100	6,730,300
December-05	4,415,340	330,000	1,492,530	68,600	15,800	6,322,270
	<b>62,902,213</b>	<b>22,489,790</b>	<b>19,300,700</b>	<b>2,448,600</b>	<b>568,448</b>	<b>107,709,751</b>
Santa Fe County Water Usage 2006						
January-06	4,757,422	401,739	1,262,720	56,050	67,689	6,545,620
February-06	4,627,619	299,907	1,442,400	139,850	79,527	6,589,303
March-06	4,987,531	535,290	1,527,400	139,350	243,500	7,433,071
April-06	5,527,073	929,550	1,693,540	196,250	450,500	8,796,913
May-06	6,533,762	1,067,620	1,817,450	270,550	244,100	9,933,482
June-06	7,547,745	1,465,570	1,840,200	299,000	758,700	11,911,215
July-06	7,349,915	2,092,490	1,914,970	408,850	1,290,900	13,057,125
August-06	6,269,815	1,049,034	1,870,490	397,500	658,094	10,244,933
September-06	5,603,846	2,467,034	1,935,990	514,200	2,134,674	12,655,744
October-06	5,405,715	974,790	1,635,260	317,950	645,800	8,979,515
November-06	4,877,400	447,650	1,478,160	127,200	185,300	7,115,710
December-06	4,988,367	499,850	1,636,930	116,000	21,600	7,262,747
	<b>68,476,210</b>	<b>12,230,524</b>	<b>20,055,510</b>	<b>2,982,750</b>	<b>6,780,384</b>	<b>110,525,378</b>
Santa Fe County Water Usage 2007						
Year & Month	Residential	Commercial	Government	Institution	Construction	Total



January-07	4,959,570	288,450	1,373,840	50,000	104,233	6,776,093
February-07	5,159,540	209,580	1,996,730	174,050	4,000	7,543,900
March-07	5,210,720	282,940	1,439,000	239,350	779,200	7,951,210
April-07	5,595,170	353,850	1,607,320	167,500	4,175,870	11,899,710
May-07	6,029,280	505,810	1,461,300	588,300	1,493,400	10,078,090
June-07	6,833,430	757,840	1,544,310	19,350	1,194,600	10,349,530
July-07	8,694,548	849,740	1,716,760	548,150	50,200	11,859,398
August-07	8,208,277	774,080	1,898,180	466,000	2,323,300	13,669,837
September-07	8,245,243	1,149,380	1,510,800	703,600	2,528,300	14,137,323
October-07	6,927,611	731,800	1,933,570	360,800	988,300	10,942,081
November-07	6,074,868	592,660	1,646,210	194,300	1,816,300	10,324,338
December-07	5,085,336	410,850	1,504,320	202,050	1,585,570	8,788,126
	<b>77,023,593</b>	<b>6,906,980</b>	<b>19,632,340</b>	<b>3,713,450</b>	<b>17,043,273</b>	<b>124,319,636</b>

### Santa Fe County Water Usage 2008

January-08	5,254,629	542,960	1,296,150	97,100	194,700	7,385,539
February-08	5,190,659	651,040	1,394,000	552,850	1,205,590	8,994,139
March-08	5,287,352	641,300	1,513,810	3,300	409,500	7,855,262
April-08	6,085,061	492,970	1,435,410	6,350	2,178,500	10,198,291
May-08	7,044,606	842,270	1,489,740	293,500	1,681,300	11,351,416
June-08	9,507,931	1,079,980	1,750,890	275,750	2,888,700	15,503,251
July-08	7,994,576	1,036,210	1,484,770	554,650	3,019,500	14,089,706
August-08	9,170,766	1,214,920	1,498,780	323,450	2,292,800	14,500,716
September-08	7,073,434	695,510	1,336,300	310,400	2,626,300	12,041,944
October-08	6,362,418	540,270	1,199,680	452,350	1,526,000	10,080,718
November-08	5,293,565	393,880	1,105,450	175,850	1,150,490	8,119,235
December-08	4,870,823	257,340	1,271,210	128,700	226,810	6,754,883
	<b>79,135,820</b>	<b>8,388,650</b>	<b>16,776,190</b>	<b>3,174,250</b>	<b>19,400,190</b>	<b>126,875,100</b>

### Santa Fe County Water Usage 2009

Year & Month	Residential	Commercial	Government	Institution	Construction	Total
January-09	5,244,692	221,760	886,540	25,300	300,490	6,678,782
February-09	7,449,759	333,130	1,529,300	269,700	991,800	10,573,689
March-09	5,557,053	293,800	1,118,150	215,300	1,336,200	8,520,503
April-09	7,188,030	585,180	1,686,130	381,200	1,146,000	10,986,540
May-09	7,548,964	790,760	999,760	535,450	947,200	10,822,134
June-09	7,520,376	724,840	1,553,400	259,950	711,400	10,769,966



July-09	10,880,625	871,170	1,408,910	775,700	523,400	14,459,805
August-09	8,381,855	705,680	1,101,670	750,200	666,000	11,605,405
September-09	7,374,807	543,695	1,246,070	940,150	879,100	10,983,822
October-09	7,686,103	498,945	1,297,820	947,550	389,300	10,819,718
November-09	5,336,762	295,790	2,715,960	466,000	109,200	8,923,712
December-09	5,323,689	282,880	2,819,790	170,350	11,000	8,607,709
	<b>85,492,715</b>	<b>6,147,630</b>	<b>18,363,500</b>	<b>5,736,850</b>	<b>8,011,090</b>	<b>123,751,785</b>

**Gallons Per Capita Per Day (GPCPD)**

**Methodology:**

**Source of Data:** Metered water use from current customers on Santa Fe County Utility for the year 2009. The metered water use data was compiled for each subdivision, commercial and institutional sold on a monthly basis. Occasionally there is a meter malfunction or other issue which may require a credit or negative water use for a customer. Negative water use was not used in this study which may result in a slightly higher water use in some instances on a monthly basis.

**Number of Customers:** To estimate if a meter is active the excel formula COUNTIF was used to assess if the metered water use per month was more than 500 gallons. It is presumed if the water use is less than 500 gallons per month the home is unoccupied for most of the month.

**Estimate of Household Size:** 2000 Census data for tracts 103.04, 103.05, 103.07, 103.8 and 106 were used to represent the household population for the utility service area. Since the household size and number of homes varies from tract to tract a weighted average of these tracts was calculated. The results are as follows:

<b>2000 US Census Tract Number</b>	<b>103.04</b>	<b>103.05</b>	<b>103.07</b>	<b>103.08</b>	<b>106</b>	<b>Total</b>
<b>Total Population</b>	2453	884	1892	2297	6307	<b>13833</b>
<b>Average Household Size</b>	2.67	2.91	2.78	2.8	2.49	<b>13.65</b>
<b>Housing Units total</b>	975	42	751	890	2692	<b>5350</b>
<b>Housing Units Occupied</b>	919	34	680	821	2534	<b>4988</b>
<b>Housing Units Vacant</b>	56	8	71	69	158	<b>362</b>
<b>Percentage of Vacant Units</b>	5.74%	19.05%	9.45%	7.75%	5.87%	<b>6.77%</b>
<b>Weighted Average: Household Size =</b>	0.47	0.19	0.38	0.46	1.1	<b>2.6399</b>



<b>GALLONS PER CAPITA PER DAY (GPCPD)</b>													
<b>Subdivision Name</b>	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Average per Subdivision
<b>Rancho Viejo Unit 1</b>	39.28	54.57	43.03	51.77	71.20	64.48	97.51	72.76	63.07	57.59	44.05	38.71	58.17
<b>Rancho Viejo Tract G</b>	39.33	53.68	34.74	47.88	41.80	41.25	61.59	40.62	40.12	41.26	32.16	32.40	42.24
<b>Rancho Viejo La Entrada</b>	34.91	53.30	33.27	40.66	36.11	33.42	46.13	30.55	34.91	43.48	36.54	31.95	37.94
<b>Rancho Viejo Unit 2</b>	43.68	56.09	44.07	54.64	67.10	63.10	93.35	73.66	65.15	66.98	42.81	42.19	59.40
<b>Rancho Viejo Windmill Ridge Phase 1</b>	44.49	59.42	44.48	56.54	65.12	67.77	105.33	77.97	77.65	65.72	44.92	42.22	62.63
<b>Rancho Viejo Windmill Ridge Phase 2</b>	35.15	48.81	37.98	46.69	48.89	43.35	68.39	50.50	46.75	49.98	39.65	38.23	46.20
<b>Rancho Viejo Windmill Ridge Phase 3</b>	36.13	49.93	35.21	62.08	45.59	44.46	66.16	54.25	48.11	51.26	37.77	36.36	47.27
<b>Rancho Viejo College Heights</b>	43.13	62.13	38.59	58.34	79.53	83.90	122.27	91.74	77.69	79.57	45.12	45.52	68.96
<b>Rancho Viejo Windmill Ridge Phase 4</b>	35.11	47.91	32.20	44.05	41.59	44.01	60.50	46.02	41.86	46.01	35.31	35.18	42.48
<b>La Pradera</b>	31.25	46.99	34.91	46.59	37.35	35.84	44.38	34.70	35.50	38.97	32.80	34.05	37.78
<b>Las Lagunitas</b>	52.04	75.83	58.95	79.64	82.30	84.23	104.78	87.76	74.07	81.39	55.99	55.01	74.33
<b>Paseo C de Baca</b>	55.38	68.53	47.25	55.51	44.43	50.04	66.99	48.12	48.44	59.77	46.79	46.91	53.18
<b>West Sector</b>	44.75	62.22	51.60	62.01	114.06	117.03	161.67	132.83	114.78	103.89	40.21	40.24	87.11
<b>Valle Vista Housing</b>	45.06	67.35	56.77	59.95	50.34	48.81	64.30	52.23	49.28	54.12	45.34	43.97	53.13
<b>Pueblo Garcia</b>	59.54	90.22	63.41	79.10	71.05	66.02	92.96	77.07	64.46	76.25	63.49	66.50	72.51
<b>Valle Serena</b>	37.78	69.40	50.93	66.39	84.96	80.01	126.10	158.91	99.32	96.00	53.16	37.86	80.07
<b>Verde Estates</b>	73.92	104.47	78.41	93.07	83.50	80.24	123.24	104.01	79.49	88.50	73.72	80.44	88.58
<b>Valle Vista Housing</b>	58.08	86.06	60.55	72.36	66.34	67.60	97.63	72.58	65.56	72.31	60.58	59.69	69.94
<b>Oshara Village</b>	26.82	38.35	34.47	37.13	40.88	43.03	44.81	37.71	37.09	40.27	35.89	35.05	37.63



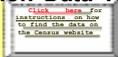
<b>Average GPCPD per Month</b>	43.99	62.91	46.36	58.65	61.69	60.98	86.74	70.74	61.23	63.86	45.60	44.34	
<b>2009 GPCPD</b>	58.92												

**Assumptions:**

1. Household Size = 2.6 persons per household based on the weighted average of 2000 Census Tracts 12.03 and 106
2. Less than 500 gallons per month equals unoccupied
3. Negative or credited meter usage was not used in calculated



### Census Information Data Table 2.1



OR

	TO	
2009	TO	2003

Use the most recent census data

#### DATA

US Census Table	Description	CENSUS YEAR	INPUT
		2000	
P37	Group Quarters Population	Total	1,527
H3	Occupancy Status	Total	3,575
from H3		Occupied	3,382
from H3		Vacant	0
H12	Ave. Household Size of Occupied Housing Units	Total	2.64

Formula: Household Size = Total Population / Total Number of Housing Units

Vacancy Rate %	0.0%
----------------	------

#### COMMENTS:



Santa Fe County  
Water Conservation Program

**DATA INPUT SHEET**

**3. SINGLE-FAMILY RESIDENTIAL (SFR)**

Santa Fe County

Instructions

**MONTHLY DATA**

**TABLE 3.1**

SFR BILLED WATER CONSUMPTION (Gallons (US))

2009 TO 2003

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	5,192,654	7,379,581	5,513,488	7,113,893	7,582,546	7,486,475	10,776,375	8,339,755	7,325,647	7,767,253	5,292,512	5,271,119
2008												
2007												
2006												
2005												
2004												
2003												

**TABLE 3.2**

Active Connections Only

You have chosen to enter Active Connections Only, enter the monthly values below, or enter annual values in table 3.8 Check message above Table 3.3 to see if additional data is required.

NUMBER OF SFR CONNECTIONS

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	1,496	1,518	1,522	1,540	1,545	1,548	1,580	1,586	1,594	1,610	1,565	1,561
2008												
2007												
2006												
2005												
2004												
2003												

**TABLE 3.3**

You have entered Active Connections Only in Table 3.2; leave the cells below blank

INACTIVE (ZERO USE) SFR CONNECTIONS (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009												
2008												
2007												
2006												
2005												
2004												
2003												

**TABLE 3.4**

Formula = (No. of Connections - No. of Zero Use Accounts) \* Ave. Household Size

SFR POPULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	3,949	4,008	4,018	4,066	4,079	4,087	4,171	4,187	4,208	4,250	4,132	4,121
2008	No Data											
2007	No Data											
2006	No Data											
2005	No Data											
2004	No Data											
2003	No Data											

**TABLE 3.5**

Formula = Billed Water Consumption (SFR only) / Calculated Population (SFR only)

SFR GPCD CALCULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	42.41	65.77	44.26	58.33	59.97	61.06	83.34	64.25	58.03	58.95	42.70	41.26
2008	No Data											
2007	No Data											
2006	No Data											
2005	No Data											
2004	No Data											
2003	No Data											

**ANNUAL DATA**

**TABLE 3.6**

ANNUAL CONSUMPTION


**TABLE 3.7**

ANNUAL CALCULATION

85,041,298
N/A

**TABLE 3.8**

AVG. ANNUAL CONNECTIONS


**TABLE 3.9**

AVG CONN. CALCULATION

1,555
N/A

**TABLE 3.10**

CALCULATED GROWTH RATE

N/A

**TABLE 3.11**

No. VACANT SFR


Are you sure growth is zero?

**TABLE 3.12**

SIZE OF HOUSEHOLD

2.64
2.64
2.64
2.64
2.64
2.64
2.64

**TABLE 3.13**

SFR POPULATION

4,106
N/A

**TABLE 3.14**

ANNUAL SFR GPCD

56.74
N/A



Santa Fe County  
Water Conservation Program

**DATA INPUT SHEET**

**5. INDUSTRIAL, COMMERCIAL & INSTITUTIONAL (ICI) AND OTHER METERED**

Santa Fe County

Instructions

**MONTHLY DATA**

2009 TO 2003

**TABLE 5.1**

ICI WATER CONSUMPTION (Gallons (US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	1,450,540	315,380	2,993,450	3,831,260	3,298,070	3,315,890	3,674,030	3,263,850	3,643,515	3,184,815	3,617,650	3,314,620
2008												
2007												
2006												
2005												
2004												
2003												

**TABLE 5.2**

OTHER METERED (Gallons (US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009												
2008												
2007												
2006												
2005												
2004												
2003												

COMMENTS:

**ANNUAL DATA**

**TABLE 5.3**

ICI ANNUAL CONSUMPTION

**TABLE 5.4**

ICI GPCD
17.46
N/A

**TABLE 5.6**

OTHER ANNUAL CONSUMPTION

**TABLE 5.7**

OTHER METERED GPCD
N/A



Santa Fe County  
Water Conservation Program

DATA INPUT SHEET

7. TOTAL WATER DIVERTED AND SUPPLIED

Santa Fe County

MONTHLY DATA

TABLE 7.1

TOTAL WATER DIVERTED (Monthly)(Gallons (US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	7,544,400	8,266,300	9,330,000	10,563,900	13,161,400	12,936,100	13,635,800	11,252,100	13,141,900	11,397,700	9,149,000	10,487,000
2008												
2007												
2006												
2005												
2004												
2003												

TABLE 7.2

IMPORTED WATER (Monthly)(Gallons(US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009												
2008												
2007												
2006												
2005												
2004												
2003												

TABLE 7.3

EXPORTED WATER (Monthly)(Gallons (US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009												
2008												
2007												
2006												
2005												
2004												
2003												

TABLE 7.4

Formula = Total Water Diverted + Imported water - Exported Water

TOTAL WATER SUPPLY (Monthly)(Gallons (US))												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	7,544,400	8,266,300	9,330,000	10,563,900	13,161,400	12,936,100	13,635,800	11,252,100	13,141,900	11,397,700	9,149,000	10,487,000
2008	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0

Table 7.5

SYSTEM TOTAL GPCD(Monthly)												
Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	43	52	63	63	75	77	78	64	78	65	54	60
2008	No Data											
2007	No Data											
2006	No Data											
2005	No Data											
2004	No Data											

ANNUAL DATA

TABLE 7.6

ANNUAL TOTAL DIVERTED
130,865,600
N/A

TABLE 7.7

ANNUAL TOTAL DIVERTED CALC
130,865,600
N/A

TABLE 7.8

ANNUAL TOTAL IMPORTED
N/A

TABLE 7.9

ANNUAL TOTAL IMPORT CALC
N/A

TABLE 7.10

ANNUAL TOTAL EXPORTED
N/A

TABLE 7.11

ANNUAL TOTAL EXPORT CALC
N/A

TABLE 7.12

ANNUAL TOTAL WATER SUPPLY
130,865,600
0
0
0
0
0
0

TABLE 7.13

TOTAL POP. EST.
5,633
N/A

TABLE 7.14

Year	SYSTEM TOTAL GPCD
2009	63.65
2008	NA
2007	NA
2006	NA
2005	NA
2004	NA



Selima Terengganu  
Water Conservation Program

2008	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0

0	N/A

**Table 7.5**

**SYSTEM TOTAL GPCD(Monthly)**

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2009	43	52	53	63	75	77	78	64	78	65	54	60
2008	No Data											
2007	No Data											
2006	No Data											
2005	No Data											
2004	No Data											
2003	No Data											

COMMENTS:

**TABLE 7.14**

Year	SYSTEM TOTAL GPCD
2009	<b>63.65</b>
2008	NA
2007	NA
2006	NA
2005	NA
2004	NA
2003	NA



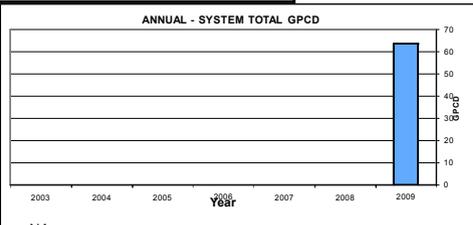
Santa Fe County  
Water Conservation Program

## 8. GPCD REPORTED DATA

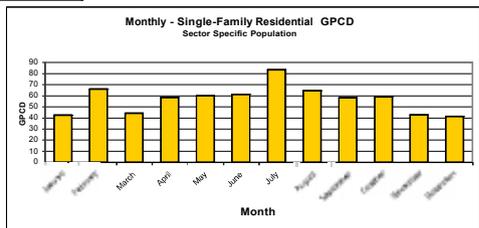
SECTION 10  
CALCULATIONS

Santa Fe County	
2009	To: 2003

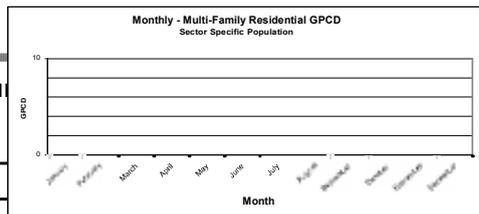
ANNUAL



Year	GPCD
2009	65.77
2008	NA
2007	NA
2006	NA
2005	NA
2004	NA
2003	NA



MONTHLY



Month	GPCD
January	41.26
February	65.77
March	44.26
April	58.33
May	59.97
June	61.06
July	83.34
August	64.25
September	58.03
October	58.95
November	42.70
December	41.26

Year	2009
------	------

Peak/Ave	1.47
----------	------

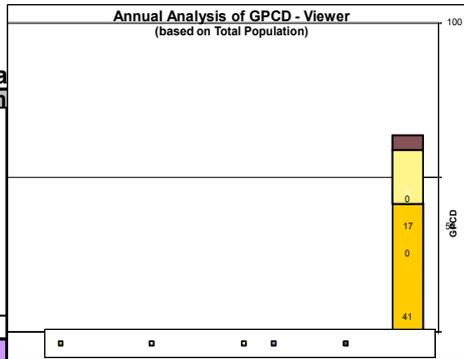
YEAR 2009



Santa Fe County  
Water Conservation Program

**Annual Reporting Perform**

Report to: 15  
Date: 1/2/2010



**Overall Annual GPCD (based on Total Population)**

Year	SFR - System	MFR - System	IC	Other Metered	Reuse	Non-Revenue Water
2009	41	N/A	17	N/A	Not Graphed	5
2008	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!
2007	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!
2006	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!
2005	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!
2004	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!
2003	N/A	N/A	N/A	N/A	Not Graphed	#VALUE!

Santa Fe County	
2009	to 2003



10. Monthly Reporting

Return to Introduction

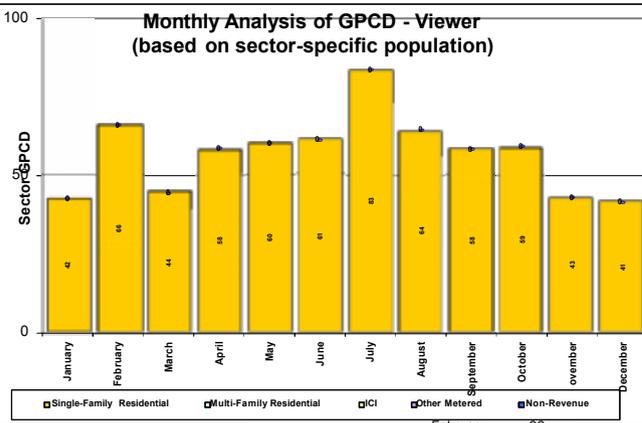
Choose Year for Monthly An

Choose Sector

Singl

Monthly GPCD

Month	Single-Family Residential		Multi-Family Residential	
	GPCD	GPCD	GPCD	GPCD
JAN	42.41	No Data	8.31	0.00
FEB	65.77	No Data	2.00	0.00
MAR	44.26	No Data	17.14	0.00
APR	58.33	No Data	22.67	0.00
MAY	59.97	No Data	18.89	0.00
JUN	61.06	No Data	19.62	0.00
JUL	83.34	No Data	21.04	0.00
AUG	64.25	No Data	18.69	0.00
SEP	58.03	No Data	21.56	0.00
OCT	58.95	No Data	18.24	0.00
NOV	42.70	No Data	21.41	0.00
DEC	41.26	No Data	18.98	0.00



February	66
March	44
April	58
May	60
June	61
July	83
August	64
September	58
October	59
November	43
December	41

Santa Fe County  
2009 to 2003

ICI  
Other Metered  
#REF!  
Non-Revenue  
Single-Fam 2009  
Multi-Famil 2008  
ICI 2007  
Other Mete 2006  
Reuse 2005  
Non-Reven 2004  
2003  
Yes  
No



## **New Mexico Office of the State Engineer Gallons Per Capita Per Day Calculator**

Office of the State Engineer staff designed a gallons per capita per day (NMOSE GPCD) calculator to implement the methodology. It uses a Microsoft Excel™ structure to record the data and to develop the results. The NMOSE GPCD Instruction Module provides the details on how the Calculator works, to include the data to input and how to interpret the results.

## **Santa Fe County Water Utility Results**

Santa Fe County entered data for 2009 Single Family Residential, and Industrial-Commercial-Institutional (ICI) based on 2000 Census data provided. The amount of total water diverted and supplied was also included in the spreadsheets. The GPCD reported data resulted in an annual system total GPCD of 63.65. The Monthly Reporting Performance for Santa Fe County Water Utility indicated that July has the highest GPCD at 83 and December had the lowest GPCD at 41.



## Appendix 7.10: List of Acequias within Santa Fe County

Name	City	Bylaws	Number of Irrigators	Total Irrigated Acreage	Large Farm Unit	Small Farm Unit
Cienega Creek						
<b>La Capilla Ditch</b>		no	7	16.2	10.9	0.2
<b>Acequia de La Cienega</b>	Santa Fe	no	38	6.8	11.5	0.1
Cuicu Creek						
<b>El Guicu Ditch</b>	Santa Fe	yes	21	71.5	10.9	0.2
Nambe River						
<b>Garduno Ditch</b>	Nambe	no	17	19	4	0.2
<b>Old Bernardino Ditch</b>		no	3	1.7	1.4	0.1
<b>Ortiz Ditch</b>	Santa Fe	no	53	139.8	21.8	0.1
<b>Community Ditch (Acequia de la Comunidad)</b>	Santa Fe	yes	48	230.5	64.6	0.2
<b>Acequia del Llano</b>	Santa Fe	no	26	155.4	78.1	0.1
<b>Acequia la Nueva</b>	Santa Fe	no	24	227.1	61.8	0.1
<b>Acequia del Alamo</b>		no	5	24.52	9.04	1.95
<b>Acequia del Medio</b>		no	7	12.35	3.3	0.13
<b>Acequia Barranco Alto</b>	Santa Fe	no	25	88.3	16.7	0.3
<b>Ancon Ditch</b>	Santa Fe	no	4	16.7	9.7	2.3
<b>Acequia de Las Joyas</b>	Santa Fe	yes	44	156.3	16.5	0.1
<b>Rincon Ditch</b>	Santa Fe	yes	37	70.3	21.8	0.2
<b>Cano Ditch</b>	Santa Fe	yes	39	179.7	42	0.2
<b>Jose G. Ortiz Ditch</b>		no	14	17	3.2	0.04
<b>Juan Sena Ditch</b>		no	3	5.5	4.3	0.5
<b>Acequia de Llano Frio</b>	Santa Fe	no	unknown	300		
<b>Acequia de los Trujillos</b>	Santa Fe	yes	22	69.6	11.9	0.2
Pojoaque River						
<b>Acequia de Los Indios</b>	Santa Fe	no	43	119.5	36.1	0.1
<b>El Rancho Ditch</b>	Santa Fe	no	32	65.4	8.7	0.5
<b>Acequia Otra Vanda</b>	Espanola	no	52	154.2	9	0.2
<b>Acequia Barranco de Jacona</b>	Santa Fe	no	44	69.9	9.3	0.1
<b>Acequia Ancon de Jacona</b>	Santa Fe	no	8	26.2	8.7	0.5
<b>Acequia Larga de Jacona</b>	Santa Fe	yes	54	106.7	10.3	0.2
<b>Acequia Del Rio</b>	Santa Fe	no	8	7.36	3.27	0.15
Rio Chupadero						
<b>Acequias de los de Chupadero</b>	Tesuque	yes	19	45.6	20.6	0.2
Rio en Medio						
<b>Acequia De Los Barriales</b>	Chimayo	yes	6	18.1	6	1.2
<b>Acequia del Molino</b>	Cundiyo	no	unknown			
Rio Frijoles						
<b>Acequia de la Placita</b>	Santa Fe	yes	unknown			
<b>La Cienega Ditch</b>	Cundiyo	no	unknown			
Rio Medio						



Santa Fe County  
Water Conservation Program

<b>Acequia del Alto</b>	Tesuque	no	9	10.6	2.5	0.04
<b>Acequia del Molino</b>	Tesuque	no	unknown			
<b>Acequia del Medio</b>	Tesuque	no	unknown			
Rio Quemado						
<b>Acequia De Los Ortigas</b>	Chimayo	no	unknown			
Santa Cruz River						
<b>Santa Cruz Irrigation District (SCID)</b>	Santa Cruz	no	unknown	3300		
<b>Herrera Ditch (SCID)</b>	Espanola	yes	130	174.2	14.3	0.06
<b>Sombrillo Ditch (SCID)</b>	Espanola	yes	134	171	18.4	0.1
<b>Fresquez Ditch (SCID)</b>	Santa Cruz	no	40	104	8.9	0.1
<b>Los Maestas Ditch (SCID)</b>	Espanola	no	21	56.7	10.8	0.3
<b>Martinez Abajo Ditch (SCID)</b>	Santa Cruz	no	10	38.4	5.2	0.4
<b>La Puebla Ditch (SCID)</b>	Espanola	yes	123	364.1	20.8	0.2
<b>Acequia De Los Mansanitas (SCID)</b>	Chimayo	no	4	9.2	3.5	1.6
<b>Espinosa Ditch (SCID)</b>	Chimayo	yes	167	216.8	9	0.09
<b>Reservoir Ditch (SCID)</b>	Chimayo	no	50	78.8	4.8	0.1
<b>Acequia de los Cuarteles</b>	Santa Cruz	yes	unknown			
<b>Martinez Arriba Ditch</b>	Chimayo	no	68	133		
<b>Acequia de los Ranchos</b>	Chimayo	no	unknown	85		
Santa Fe River						
<b>Acequia de Deposito</b>	Chimayo	no	unknown			
<b>La Bajada Community Ditch</b>	Santa Fe	no	14	49.7	23.2	0.5
<b>Acequia Cerro Gordo</b>	Santa Fe	no	8	1.37	0.37	0.04
<b>Acequia Del Llano</b>		no	18	13.2	2.7	0.03
<b>Acequia De Muralla</b>	Santa Fe	no	15	5.6	0.8	0.07
<b>Acequia Madre</b>	Santa Fe	no	17	33.1	22.2	0.02
<b>Los Tanques Ditch</b>	Santa Fe	no	unknown	24.6		
<b>Acequia Molino</b>	Santa Fe	no	unknown			
Tesuque River						
<b>Acequia Barranco Blanco</b>	Santa Fe	yes	20	63.2	9.3	0.1
<b>Acequia de Los Romeros</b>	Santa Fe	no	12	22.8	7.2	0.3
<b>Acequia del Rio de Chama</b>		no	15	26.8	5.3	0.2
<b>Acequia de Los Ojitos</b>	Santa Fe	yes	12	21.7	4.6	0.2
<b>Acequia de Los Ortizes</b>	Tesuque	yes	17	34.6	4.7	0.1
<b>Acequia del Medio</b>	Santa Fe	no	18	27.6	4.5	0.1
<b>Acequia Madre de Tesuque</b>	Santa Fe	no	47	33.9	4.8	0.02
<b>Acequia Chiquita</b>	Santa Fe	no	22	4.1	0.9	0.01
<b>Cy More Ditch</b>	Santa Fe	yes	14	7.8	2.8	0.6
<b>Acequia del Cajon Grande</b>		no	8	11.4	2.8	0.1
<b>Acequia del La Placita</b>		no	unknown	28		



# Appendix 7.11: AWWA Water Audit Reporting Worksheet and Results for Santa Fe County Water Utility

**AWWA WLCC Free Water Audit Software: Reporting Worksheet**
Back to Instructions

Copyright © 2014 American Water Works Association. All Rights Reserved. WWS4.0

Water Audit Report for: **Santa Fe County Utility Department**

Reporting Year: **2009** - **1/2009 - 12/2009**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Move the mouse over the cell to obtain a descriptor of the grade.

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

---

**WATER SUPPLIED**

or Enter grading in column 'F'

Volume from own sources:	<input type="text" value="0.000"/>	Million gallons (MG)/yr (MG/yr)
Master meter error adjustment (enter positive value):	<input type="text" value="0.500"/>	Unmetered/associated MG/yr
Water imported:	<input type="text" value="121.300"/>	MG/yr
Water exported:	<input type="text" value="0.300"/>	MG/yr
<b>WATER SUPPLIED:</b>	<b><input type="text" value="121.500"/></b>	<b>MG/yr</b>

---

**AUTHORIZED CONSUMPTION**

Billed metered:	<input type="text" value="125.500"/>	MG/yr
Billed unmetered:	<input type="text" value="0.000"/>	MG/yr
Unbilled metered:	<input type="text" value="0.000"/>	MG/yr
Unbilled unmetered:	<input type="text" value="1.844"/>	MG/yr
<b>AUTHORIZED CONSUMPTION:</b>	<b><input type="text" value="126.544"/></b>	<b>MG/yr</b>

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Click here:  for help using option buttons below  
 Use buttons to select percentage of water supplied OR value  
 Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

---

**WATER LOSSES (Water Supplied - Authorized Consumption)**

MG/yr

**Apparent Losses**

Unauthorized consumption:	<input type="text" value="0.329"/>	MG/yr
Customer metering inaccuracies:	<input type="text" value="0.063"/>	MG/yr
Systematic data handling errors:	<input type="text" value="0.720"/>	MG/yr
<b>Apparent Losses:</b>	<b><input type="text" value="1.143"/></b>	

**Real Losses**

Real Losses = Water Losses - Apparent Losses:  MG/yr

**WATER LOSSES:**  MG/yr

---

**NON-REVENUE WATER**

NON-REVENUE WATER:  MG/yr

= Total Water Loss + Billed Metered + unbilled unmetered

---

**SYSTEM DATA**

Length of main:	<input type="text" value="55.0"/>	miles
Number of active AND inactive service connections:	<input type="text" value="1,770"/>	
Connection density:	<input type="text" value="32"/>	connections/mile main
Average length of customer service line:	<input type="text" value="30.0"/>	ft. (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	<input type="text" value="75.0"/>	psi

---

**COST DATA**

Total annual cost of operating water system:	<input type="text" value="\$1,142,360"/>	\$/year
Customer retail unit cost (applied to Apparent Losses):	<input type="text" value="\$1.50"/>	\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	<input type="text" value="550.73"/>	\$/million gallons

---

**PERFORMANCE INDICATORS**

**Financial Indicators**

Non-revenue water as percent by volume of Water Supplied:	<input type="text" value="4.98"/>
Non-revenue water as percent by cost of operating system:	<input type="text" value="0.48"/>
Annual cost of Apparent Losses:	<input type="text" value="\$5,156"/>
Annual cost of Real Losses:	<input type="text" value="\$337"/>

**Operational Efficiency Indicators**

Apparent losses per service connection per day:	<input type="text" value="1.77"/>	gallons/connection/day
Real Losses per service connection per day*:	<input type="text" value="5.75"/>	gallons/connection/day
Real Losses per length of main per day*:	<input type="text" value="N/A"/>	
Real Losses per service connection per day per psi pressure:	<input type="text" value="0.03"/>	gallons/connection/day/psi
Unavoidable Annual Real Losses (UARL):	<input type="text" value="17.43"/>	million gallons/year
Infrastructure Leakage Index (ILI) (Real Losses/UARL):	<input type="text" value="0.21"/>	

\* only the most applicable of these two indicators will be calculated

---

\*\*\* YOUR SCORE IS: 82 out of 100 \*\*\*

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

**PRIORITY NEEDS FOR ATTENTION:**

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer retail unit cost (applied to Apparent Losses)

2: Master meter error adjustment

3: Customer metering inaccuracies

For more information, click here to see the Grading Matrix worksheet

99



## Appendix 7.12 Santa Fe County Rainwater Harvesting Design Recommendations

### **INTRODUCTION**

The permitting guidelines are based on current best practices and common sense. There are three types of listings.

The first is items that are required when a system is permitted and then inspected for compliance. The second listing references those items that are prohibited in all or certain situations. The third listing includes suggested items based on current state of the art.

### **DISCLAIMER**

This guideline is for the design and installation of rainwater harvesting systems. It is based on current best practices.

The design guidelines are for information purposes only and practitioners assume full responsibility for their use. The permitting checklist includes items that are either prescribed (required) or proscribed (prohibited). The listing is provided as a guideline for municipal inspectors to judge the critical aspects of a design as it relates to health and safety of the community, the installers, and the owners. The municipality assumes no liability for the actual installation. Note that because a technique is not listed, does not mean that it is either permitted or prohibited. Designers, installers, and owners bear full responsibility for adequate designs, good construction practices, and responsible operation and maintenance. The long-term viability of a design is the responsibility of these private parties.

### **CERTIFICATION OF COMPONENTS**

1. Permitted systems shall list of certifications for the plumbing and electrical components including tanks.
2. All plumbing and electrical components of the system are automatically approved if they have a reference number from UL, APA, IAPMO, or ASTM.
3. An acceptable alternative to national certification shall be an engineer's stamp. Examples include: concrete tanks formed and poured on site, tanks using membranes or bladders, and any other innovative technology that is too new or different to have national certification.

### **COMPONENT GUIDELINES**

#### **A. COLLECTION SURFACE**

The roof or other harvesting surface is a continuous, raised and relatively clean surface where precipitation is caught. Divide surfaces for passive and active harvesting. Note that roofwater harvesting is permitted by the NM State Engineer<sup>1</sup>.

##### **A1. Required elements for Roof Tops**

The following calculations and drawings should be done for any roof. They are required for any roof over 3000 square feet.

1. Determine runoff coefficient and amount of peak runoff based on a declared storm. (note a potential system is the 100 yr/ 1/2 hour peak event at ) A second method of calculation is the 5 minute cloudburst with an equivalent flow of 4.5 inches per hour for a 10 year storm and 6.4 inches per hour for a 100 year storm.
2. Show pipe runs on the site plan with pipe material, pipe size, and slopes. Show pipe inverts at all relevant points. Show flow arrows on or adjacent to pipe lines.

#### **B. CONVEYANCE**

Conveyance is defined as the mechanical system that moves captured precipitation to the storage system.

##### **B1. Required elements for Conveyance**

1. All roof to ground conveyance shall have an unobstructed flow to daylight, or a secondary



drainage system.

Example 1. Roof drain with secondary drain system

Example 2. Scupper and downspout with overflow at scupper

Example 3. Roof drain with secondary drain system

2. All conveyance systems shall be designed and constructed to prevent the intrusion of sediment and/or debris into the system.

3. Rain gutter specific rules

- 3a. If a gutter run exceeds 60 feet, include an expansion joint.

- 3b. Keep the front of the gutter ½ inch lower than the rear.

- 3c. Provide a minimum gutter slope of 1/16 inch per foot of run.

- 3d. Provide gutter hangers or support per 3 feet of run.

- 3e. Gutters to be minimum 26 gauge steel, 0.025 aluminum, or approved material such as copper, zinc, plastic, etc.

- 3f. Downspouts shall provide 1 minimum square inch for every 100 square feet of roof area.

- 3g. Maximum run of gutter for one downspout shall be 50 feet.

4. Catchment sump rules

- 4a. Sumps are the structures that collect and convey rainwater that has been spilled from a canale.

- 4b. The inlet of in-ground sumps should be a minimum of 4" below grade, and be covered by 1" to 6" gravel. The recommended rock on top of the grate is

- 4c. Plastic liners used as funnels for in-ground scuppers must not be exposed to direct sunlight and should be of a minimum thickness of 10 mm. The liner shall ensure runoff is directed into the center drain. The lowest edge of the outer perimeter of the funnel shall be a minimum of 2 inches above finish grade to prevent the inflow of sheetflow and sediment.

- 4d. In ground sumps shall have a removable lid for cleaning and removal of sediment. The cleaning schedule should be part of the O&M documentation provided to the owner.

5. All buried conveyance pipes shall at minimum have cleanouts at every 90-degree bend or at the end of each continuous run. Conveyance shall use drainage pipe fittings such as SDR with no straight 90 degree els.

6. All conveyance pipes shall have a minimum continuous slope of 1%.

## **B2. Prohibited elements for Conveyance**

1. Any appurtenance that blocks the free drainage from a roof. For example, completely blocking a canal is prohibited even when a downspout is provided.
2. Any vertical pipe on the North or Northeast sides of buildings that does not completely drain after each precipitation event.

## **B3. Recommended elements for Conveyance**

1. Rain Gutters: should be inspected as part of the roofing system.
2. Properly designed conveyance lines will not have large obstructions. The potential problems will come



from accumulated sediment and pea gravel from ballasted roofs. For this reason a sediment collection structure is recommended ahead of any buried tank.

### **C. INLET FILTRATION And/Or FLUSHING**

Most systems will fail without some type of flushing or filtration. There are a number of practices with no consensus in the industry as to best practice. See examples in appendices.

#### **C1. Required elements for Filters and Flushes**

1. All filters or flushes shall be marked on the site plan.
2. All filters or flushes shall be readily accessible for cleaning
3. All filters and flushes shall be adequately sized for the flows that pass through them. Where a plan is required, filter and flush capacities shall be matched to design peak flows.

### **D. STORAGE**

#### **D1. Required elements for all tanks and cisterns**

1. All tanks shall have a permanent marking as to purpose and volume. Note that tank capacity is frequently molded on poly tanks. A useful location for such information is at the point of exit from the tank, e.g. pump box, hydrant, etc.

Example "Rainwater harvesting tank, no potable makeup, capacity 1500 gallons"

2. All tanks shall have an overflow and spillway with capacity to handle a 100 year 1/2 hour storm. The overflow and spillway shall drain to a location in compliance with current municipal drainage codes. The spillway shall have cobble, gravel, or other linings to prevent erosion and silting.
3. All tanks shall have a service way for cleaning or repair. The opening shall be large enough for removal of equipment and cleaning the tank at minimum. Preferred is an opening large enough for service person to enter. Note that installers shall bear responsibility for compliance with OSHA confined spaces regulations.
4. All Tanks openings larger than 12" in diameter shall have locking lids or entryways. A lock and hasp or a minimum of 3 screws is required.
5. All tanks shall have a vent system of equal diameter to the inlet piping. All vents, overflows, observation ports or any other openings to the atmosphere shall have permanently affixed screens with a minimum mesh size of 1/8"
6. Freeze protection of outlets and valves. All water holding pipes shall be set below frost line of 24 inches unless they are designed to be winterized.
7. Any load bearing tank shall be presented in a plan with a licensed engineer's stamp.
8. A licensed contractor shall do tank placement and replacement.
9. Any tank system with more than 15,000 gallons total storage capacity shall have at least two tanks. The system shall be plumbed so that all functions are available from either or both tanks. This will allow the system to remain operational when a tank is cleaned or repaired.

#### **D2. Prohibited elements for all tanks:**

1. No greywater or effluent shall be introduced into a rainwater harvesting tank.
2. No rainwater tank shall have a gravity overflow into a greywater or effluent tank. A level controlled addition of rainwater to a greywater or treated effluent (secondary or higher per NMED regulations) shall be permitted as long as the addition is demand controlled (see definitions) for a



specific irrigation cycle.

### **D3. Required elements for buried tanks:**

A buried tank or cistern is defined as a structure that is completely covered with earth. It does not refer to above ground tanks that are partially bermed into the earth.

1. All buried tanks shall be indicated on a to-scale site plan to be provided with permit application. An updated as-built shall reflect any changes to the original plan and shall be provided at time of final inspection to county and to the owners of the system.
2. All buried tank applications shall provide a schedule of materials, indication of expected service life, and manufacturer's recommendations for minimum and maximum burial depths.
3. All non traffic rated cisterns or tank shall be permanently marked and protected from traffic access.
4. All excavations shall meet OSHA requirements.
5. Bedding of tanks shall meet manufacturers requirements or shall be approved by county staff.
6. Tank placement can be done by the owner or contractor if the tank or sections can be moved with a backhoe. A licensed crane operator shall install all systems too large for a backhoe.
7. Backfill shall be done according to manufacturer's specs or as agreed to by county staff.
8. Permit shall indicate if a buried tank is to be in a traffic bearing area and shall then provide evidence that the design and installation are adequate for this purpose. Compaction tests may be required.
9. Serviceways for buried tanks shall be installed above grade.
10. All steel tanks shall have a coating, cathodic protection or another anticorrosion system.

### **D4. Required elements for above ground tanks**

1. Above ground tanks shall be deigned and manufactured for that purpose. No tank intended solely for underground use will be used above grade without a variance. A variance will be granted upon documentation from the manufacturer that the use of the tank in question is warranted by that manufacturer. This means, for example, that the above ground use of septic tanks is prohibited.
2. Plastic tanks shall be made from UV stabilized material.
3. Plastic tanks shall be of an opaque material that prevents the entry of sunlight.
4. Screening of all openings to prevent direct sunlight from entering the tank is required.
5. Use of above ground tanks is subject to district prohibitions or requirements for screening.
6. A tank will be considered bermed rather than buried when less than 50% of the height is covered and there is no deflection of the sidewalls.

## **E. BACKUP SYSTEMS**

Backup systems add water from a municipal system or a well when the system is low. Other common terms used for these systems are "makeup water" or "auxiliary water". These terms are used interchangeably in this document.

### **E1. Prohibited elements for makeup water equipment**

1. No makeup water system shall use a toilet type float valve. These are made for the top of vessels and like toilets, have no safety to prevent constant running when they fail. This type of system cannot fill a rainwater tank to a low or mid level. A rainwater tank that is filled to the



top has no capacity for rainwater capture.

2. No makeup water shall be connected to a system without an approved backflow preventer or an accepted air gap. All connections to municipal water and all backflow devices are subject to approval before installation.

## **E2. Required elements for makeup water equipment**

1. All connections to potable water connections shall have a manual isolation valve, and a line drain.
2. All connections to the tank shall be drainable so that the pipes are completely drainable during freezing weather OR all said connections shall be below frostline in the area where installed. This will include any flooded outlet –pipe from the tank.
3. All automatic makeup water shall have redundant valves in series that actuate simultaneously.

## **F. DISTRIBUTION**

### **F1. Prohibited elements for distribution equipment**

1. Any line that is pressurized by a pump, that connects to any potable line without approved backflow protection.

### **F2. Required elements for distribution equipment**

1. Any system that uses a constantly pressurized mainline with shall have a pump protection device such as a pump down float switch or low pressure cutoff.
2. All wiring shall, conform to current electric code.
3. For any system requiring a permit and using a pump
  - A. A manufacturer's data sheet shall be included with permit checklist
  - B. Line length, wire type, depth of bury, and maximum voltage drop shall be included with application.
    4. All pumps, pressure tanks, and line level electrical equipment shall be in a lockable enclosure.
    5. All power circuits shall be installed by a licensed electrician or by a homeowner with a valid homeowners permit from NM Construction Industries Division.
    6. A rainwater harvest system terminates at an irrigation valve box or pressurized service line.

### **F3. Recommended elements for distribution equipment**

1. Outlet filtration per usage.
  - a. 100 micron filtration for drip irrigation.
  - b. 30 and 5 micron in series for toilet flushing
2. Gravity distribution systems need no regulations
3. For purpose of permitting and regulation, a rainwater harvest system terminates at an irrigation valve box or pressurized service line (e.g. for toilet flushing). After this point the components are considered part of an irrigation or plumbing system.

## **G. CONTROLS**

### **G1. Prohibited elements for control systems**

1. Exterior sight glasses are prohibited unless protected from freezing.

### **G2. Required elements for control systems**



1. Where control wiring outside of cisterns has mixed voltages (e.g. Pump Start relays) the wiring shall be labeled as to voltage.
2. Where line level (110 VAC or greater) is used in control wiring, all lines shall meet burial depths of outdoor line level wiring codes.
3. A junction box shall be used at the point of connection for control wiring. The control voltage shall be permanently marked on the outside and inside of the junction box.
4. A control schematic shall be left inside of the most appropriate control box.

### **G3. Recommended elements for control systems**

1. All tanks should have a level indicator.
2. Any system that does not need a pressure driven system (used for yard hydrants) should use demand actuated controls.
3. Control voltages should not be mixed in a cistern. That is, all control wiring in a tank should use:
  - A. Low voltage 32 VAC or 32 VDC, or less
  - B. Line level voltage 110 VAC or greater, 48 VDC or greater.
  - C. Where the components of a control system require low and line level voltages, there should be two separate and permanently labeled electric junction boxes; one for each voltage level.

## **H. REQUIREMENTS SPECIFIC TO TOILET FLUSHING**

### **H1. Prohibited elements for toilet flushing**

1. No supply line from a cistern may be connected to any fixture other than a toilet without a written variance

### **H2. Required elements for toilet flushing**

1. A plumbing flow schematic shall be filed with every permit that uses rainwater for toilet flushing.
2. A separate and independent water line shall supply toilets when rainwater is to be used.
3. All supply lines from rainwater systems to toilets shall be permanently marked with purple pipe where allowed. Where purple pipe (generally PVC) is prohibited, purple sleeves, or purple paint shall be used for all toilet supply lines. The final marker or sleeve shall be at the connection to the local toilet valve or fixture.
4. A connection to a municipal source is required. The connection shall have an approved backflow device. The connection shall have a normally closed supply valve between the backflow and the toilet supply. The valve shall have a permanent label to indicate its function.
5. The supply line to the toilets will have a normally open service valve. The valve will be permanently labeled as to function.
6. A sign will be installed in each individual toilet space indicating that the water for toilets is from rainwater.

### **H3. Recommended elements for toilet flushing**

1. Signs are recommended at the entrances to all toilet facilities as a means of awareness and education.
2. Toilet water should be filtered to an acceptable aesthetic level.
3. Where large volumes of water are stored for longer than 60 days, an aeration or tank recirculation system will eliminate potential smells.

## **I. OPERATION AND MAINTENANCE**



### **Required elements for O&M**

1. All permitted systems shall have a written operation and maintenance plan that will be available before final staff sign off. The plan shall include, the name and address of the owner, name and address of installer (and designer where applicable), cut sheets from all major components, a written description of the system is to operated, a calendar of maintenance dates and activities, all warranties, and the name and number of the responsible party(s)



## Appendix 7.13: References

1. 2008 U.S. Census Bureau: State and County QuickFacts. Data derived from Population Estimates, Census of Population and Housing, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report
2. Soil Survey of Santa Fe County Area, New Mexico; Charles D. Hibner, Natural Sources Conservation Services <http://soildatamart.nrcs.usda.gov/manuscripts/NM687/0/SantaFe.pdf>
3. U.S. Dept. of Agriculture, Natural Resources Conservation Service Soils GIS Data (SFC Growth Management Dept.)
4. U.S. Fish and Wildlife Service. Endangered Species Act 1973 as Amended by the 108<sup>th</sup> Congress., U.S. Department of Interior
5. Boykin, K.G. R. Guy, and M. Calkins. 2009. *Santa Fe County Wildlife Habitat GIS Modeling Workshop*. New Mexico Cooperative Fish and Wildlife Research Unit. Technical Assistance Report. 55 pages.
6. New Mexico Native Plants Protection Advisory Committee. 1984. *A Handbook of Rare and Endemic Plants of New Mexico*. University of New Mexico Press, Albuquerque
7. US Census Bureau: Census 2000 Summary File 1New Mexico -- American Indian Area GCT-PH1. Population, Housing Units, Area, and Density: 2000
8. Ackerly, Neal. "A Review of Significance of and Management Recommendations for Preserving New Mexico's Acequia System". Dos Rios Consultants. Silver City, NM. 1996
9. Rivera, Jose. A., and Martinez, Luis Pablo. "Acequia Culture: Historic Irrigated Landscapes of New Mexico". 2006 [http://www.cultura oasis.com/data/ponencias/Rivera\\_Jose\\_Acequia\\_Culture.pdf](http://www.cultura oasis.com/data/ponencias/Rivera_Jose_Acequia_Culture.pdf)
10. Patrick Torres, County Extension Agent Santa Fe County, New Mexico State University. Personal Communication.
11. Jemez y Sangre Regional Plan. 2003, Vol. 2
12. Saavedra, Paul *Surface Water Irrigation Organizations in New Mexico*, March 1987, TDDC-87-2
13. Julyan, Robert: *The Place Names of New Mexico*. University of New Mexico, University of New Mexico Press (Paperback, 1996).
14. U.S. Army Corp of Engineers. Draft Environmental Assessment of the Acequia de Los Ranchos Rehabilitation Project. Santa Fe County, New Mexico. October 2009.
15. Santa Fe River Watershed Restoration Action Strategy. Santa Fe Watershed Association. 2002.
16. City of Santa Fe Water Division. Water Conservation Plan for the City of Santa Fe. December 2001.
17. Watershed Restoration Action Strategy for the Galisteo Creek Watershed. Earthworks Institute. 2006
18. Estancia Basin Recommended Regional Water Plan. Year 2010 Update. Final Draft
19. Santa Fe County Legal and Water/Wastewater Operations Department(s), Santa Fe County Conjunctive Management Plan. January 2009.
20. Santa Fe County, Draft Sustainable Land Development Plan, 10.1.09
21. Buckman Direct Diversion Project. Another Source of Sustainable Reliable Drinking Source. <http://www.bddproject.org/index.htm>
22. Bernalillo County Water Resources Program. Water Conservation Plan Bernalillo County, New Mexico. Weston Solutions. April 21, 2006
23. Texas Water Development Board. Water Conservation Best Management Practices Guide. Water Conservation Task Force. November 2004.
24. Vickers, Amy. *Handbook of Water Use and Conservation*. WaterPlow Press. May 2001.
25. Austin Water Utility, Water Conservation Division. City of Austin Water Conservation Plan. May 2005.
26. U.S. Bureau of Reclamation. WaterSMART program. <http://www.usbr.gov/WaterSMART/>
27. Alliance for water Efficiency Tracking Tool. <http://allianceforwaterefficiency.org/Tracking-Tool.aspx>



School of Civil and Environmental Engineering  
Water Conservation Program

28. U.S. Environmental Protection Agency. WaterSense Program. 2010.  
[http://www.epa.gov/watersense/about\\_us/index.html](http://www.epa.gov/watersense/about_us/index.html)
29. D'Antonio, John, "The Impact on Climate Change on New Mexico's Water Supply and Ability to Manage Water Resources." NM Office of the State Engineer / Interstate Stream Commission. June 2006
30. David S. Gutzler, "Climate Change" Presentation at the 14th Water Conservation/Xeriscape Conference and Expo . UNM Dept. of Earth & Planetary Sciences. February 2009.
31. U.S. Department of Interior. Water Challenges. <http://www.doi.gov/whatwedo/water/>
32. U.S. Environmental Protection Agency. Office of Water. <http://www.epa.gov/aboutepa/ow.html>
33. New Mexico Office of the State Engineer. Mission Statement. <http://www.ose.state.nm.us/>
34. New Mexico Environment Department. Mission Statement. <http://www.nmenv.state.nm.us/>
35. U.S. Bureau of Reclamation. Allocation Schedule for San Juan Chama Water. 2009
36. New Mexico Environment Department Drinking Water Bureau Sanitary Survey's 2004-2009



Santa Fe County  
Watershed Council Program