

# City of Santa Fe 2018 Annual Water Report



CITY OF  
**Santa Fe**

## City of Santa Fe, New Mexico

Alan Webber, Mayor  
Erik Litzenberg, City Manager

### City Councilors

Signe Lindell, Mayor Pro Tem, District 1  
Renee Villarreal, District 1  
Peter Ives, District 2  
Carol Romero-Wirth, District 2  
Chris Rivera, District 3  
Roman Abeyta, District 3  
JoAnne Vigil Coppler, District 4  
Mike Harris, District 4

### Contributing Departments, Divisions, and Sections

City Attorney's Office  
ITT Department  
Land Use Department  
Utility Building & Customer Service Division  
Wastewater Division  
Water Budget Office  
Water Conservation Office

### Compiled, written, and edited by the

Water Conservation Staff  
City of Santa Fe Water Division  
801 W. San Mateo Road  
Santa Fe, NM 87504

### Acknowledgements

Rick Carpenter  
Christine Chavez  
Amanda Encinias  
Andrew Erdmann  
Arianna Espinoza  
Lee Gagnon

Kathleen Garcia  
Caryn Grosse  
Alan Hook  
Shannon Jones  
Marcos Martinez  
Maya Martinez

Michael Moya  
Alex Puglisi  
Christine Chavez  
Patricio Pacheco  
Mario Torres  
Bill Schneider

For more information visit [www.santafenm.gov/water\\_division](http://www.santafenm.gov/water_division)  
Cover Photo: BDD Booster Solar Array



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Figure 1 - Students on a field trip to the Santa Fe Municipal Watershed

## Executive Summary

2018 was a very dry year in Santa Fe. The year began with a warm winter which gave way to an early, dry, and windy spring – National Resource Conservation Service projections for available water in the Santa Fe watershed were below 17% of normal. Starting in mid-July, monsoon rains came to the City leading to a significant flooding event on July 23<sup>rd</sup> and which built into significant accumulated precipitation over the winter of 2018-2019.

In response to low projections, the City Water Division projected high demand and a high need for groundwater to compensate for increased demand and reduced surface water availability. Projections were used to provide a roadmap for operations during 2018 and, thanks to a combination of effective foresight, little impact from wildfire, and the diligent water conservation efforts of Santa Fe Water customers, total water demand was lower than projected and groundwater use was substantially lower than projected.

The Water Division supplied 8,953 acre-feet (af) of water to its water utility customers in 2018 and the gallons per capita per day (gpcd) usage increased from 90 in 2017 to 95. The Water Division also provided 1,700 af of Santa Fe River target flows for the ‘Living River’ Initiative which measures from April 2018-April 2019 and so includes 1400 af of 2019 spring runoff, while meeting its acequia irrigation deliveries for the 2018 irrigation year.

## Introduction

The mission of the Santa Fe Water Division is to provide reliable, safe, and sustainable water to meet the needs of our customers and community.

Submitted pursuant to City Code Section 25-9.5 SFCC 1987, the purpose of this report is to provide information about the state of the City of Santa Fe's Water Division and summarize information about the City of Santa Fe's Water Division including water supply, water rights, production water demand, types of water use, drought and precipitation, and water utility management.

The City's surface water comes from the Santa Fe River and San Juan-Chama Project (SJCP) water via the Rio Grande, which are treated through conventional and advanced treatment processes.



*Figure 2 - Water Conservation Ambassadors learn about the water cycle at the Children's Water Fiesta*

The City Well Field is mostly located in close proximity to the Santa Fe River and consists of seven active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe.

The Water Division supplied 8,953 acre-feet (af) of water to its water utility customers in 2018. The Water Division also provided 1,700 af of Santa Fe River target flows for the 'Living River' Initiative which measures from April 2018-April 2019 and so includes 1400 af of 2019 spring runoff, while meeting its acequia irrigation deliveries for the 2018 irrigation year.

The City of Santa Fe experienced a very dry winter in early 2018 which contributed to an increase in Gallons per Capita per Day (GPCD) from 90 in 2017 to 95 in 2018. The end of 2018, however, was wetter than normal – beginning with a series of storms in late July that led to substantial flooding in town and on the Santa Fe River.

## 2018 Water Demand and Supply Picture

2018 was predicted to be hot and dry and the production projections prepared by Water Division staff were designed to strategize for a year of high demand and low surface water availability. The 2017 annual report included the graph below (figure 1) which shows the demand and production projections for 2018, which included an anticipated total demand of 10,000 acre-feet.

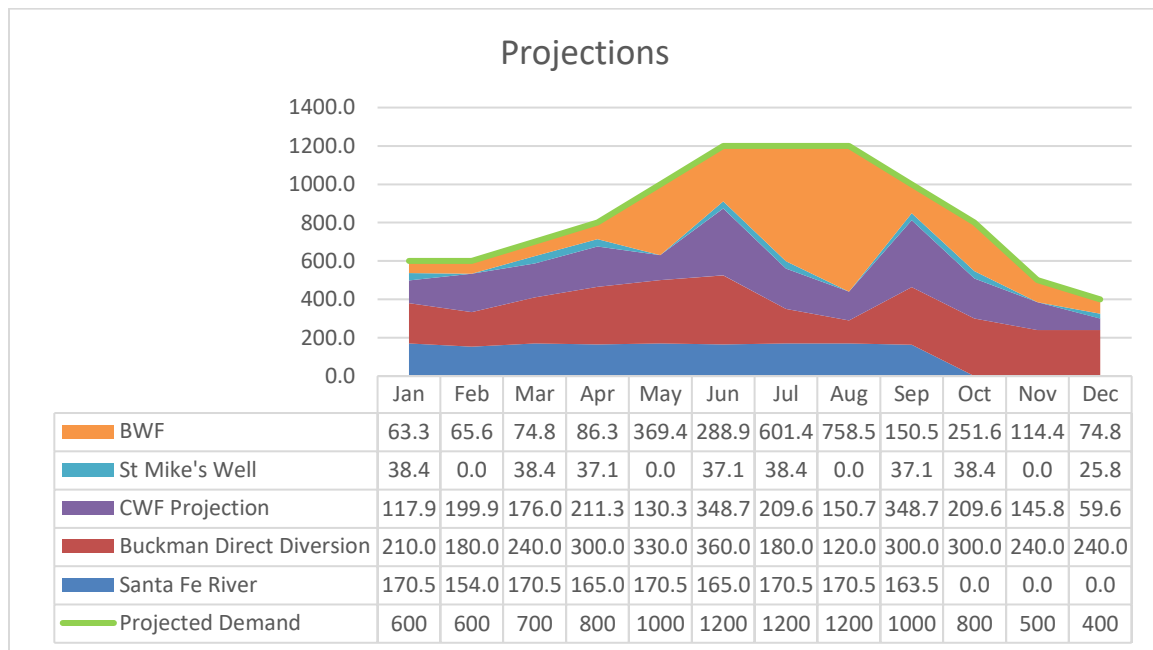


Figure 3 - Projected Water Demand by Source for 2018

The predicted production schedule, above, projected significant groundwater use – particularly from the Buckman Well Field which was expected to produce nearly 3,000 af of water – and anticipated low- to no-production from surface water sources.

Looking back, 2018 was hot and dry, but the combination of Santa Fean's water conservation efforts, forward looking cooperative management of surface water resources, and good luck in terms of Rio Grande flows and the fire season resulted in lower overall demand and groundwater use than projected.

Total demand was 8,953 acre-feet, slightly up from 2017 but significantly below projected demand. The increase was primarily due to a short, warm, and dry winter which led to an early start to irrigation season in April instead of in May. Peak demands were roughly the same, but the high demand season began a month earlier than the average.



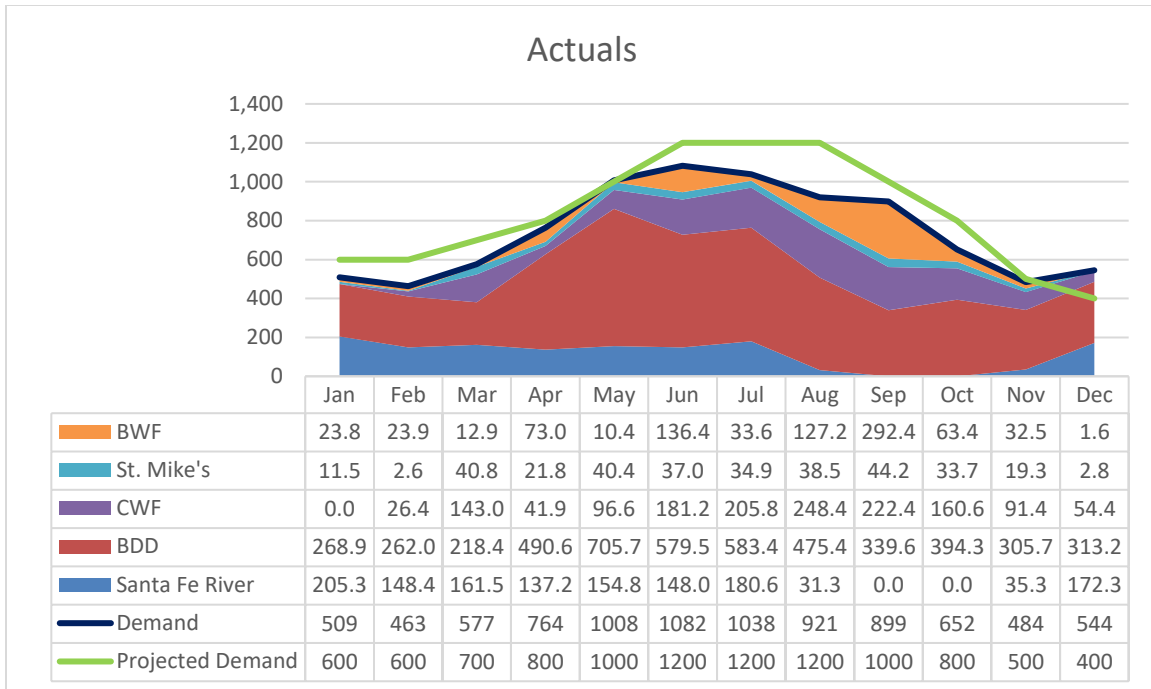


Figure 4 - Actual Demand by Source for 2018

The Santa Fe River is the historic source of water for the City of Santa Fe and originates in the mountains above Canyon Road. The City is permitted for 5,040 af per year of water from the Santa Fe River including storage rights in the Nichols and McClure reservoirs. In 2018 there was very little precipitation in the Santa Fe Watershed. Staff projected a total annual supply of 1500 af from the Santa Fe River which very nearly matched the actual production of 1374 af with a shut-down starting in August and start up in late November. City Water Division staff also worked with local acequias, initiating regular meetings to strategize on how best to efficiently deliver and utilize water given the hot dry conditions and low available flows which allowed for a cooperative relationship between the city and irrigators through a scarce water year.



Figure 5 - Public Utility Division Director Shannon Jones leads students on a tour of the Wastewater Treatment Plant.

The BDD facility, co-owned by the City and County, diverts the City's San Juan Chama Project (SJCP) water from the Rio Grande. The City has 5,230 af of SJCP water delivered from the upper Colorado River Basin into the Chama River by the Bureau of Reclamation (BoR) via tunnels beneath the Continental Divide. BDD operations are vulnerable to low flows in the Rio Grande due to permit restrictions, potentially high silt content, and increased transmission losses (infiltration & evaporation) of SJCP water and because of these vulnerabilities, projected production of SJCP water was 3,000 af. Through regular coordination with SJCP partners including the BoR, efficient facility maintenance and project management, and departmental coordination, the BDD was able to produce close to 5,000 af and to remain operable during the installation of new delivery pipelines, metering equipment, and valves.

## Water Supply

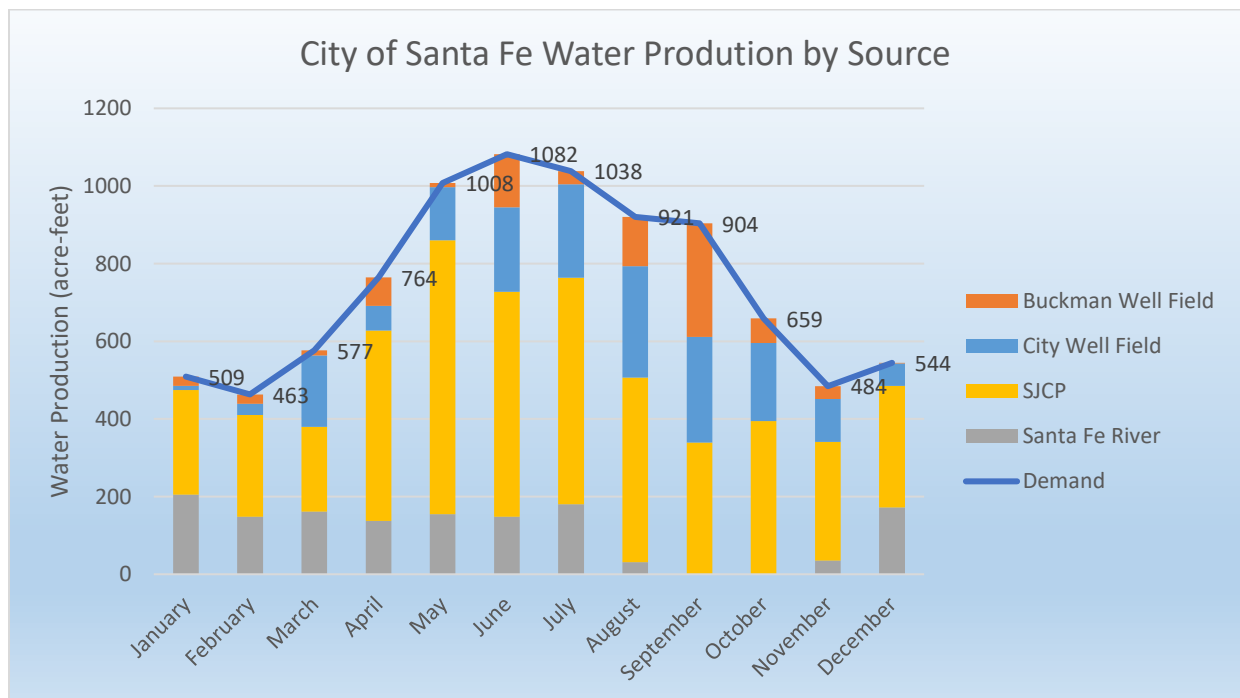


Figure 6 - Total Production by Source by Month for 2018

## Production by Supply Source

As usage pattern shown in the Production by Supply Source figure above (figure 3), shows the early irrigation season – in April and May instead of May and June – resulting from a dry and warm winter. Low reservoir levels throughout the year led to low reservoir levels and poor water quality in the Santa Fe river resulting in the shut down of the plant from mid-August to mid-November. Groundwater use was higher than it has been in recent years though much lower than projected. Groundwater is the only source of water available in times of drought and water managers strive to preserve and protect groundwater reserves to be prepared for future shortage.



## Santa Fe County Water Deliveries

The Santa Fe County Water Utility is a ½ owner of the BDD facility which provides up to 5,230 acre-feet of water to the City each year in addition to being the source of all of Santa Fe County Water Utility water. The City Water utility also provides up to 1,350 acre-feet per year of backup water to the County Utility and an agreement between the City and County on the terms of that arrangement was signed at the end of 2016.

Las Campanas receives drinking water service from the County Water Utility and also diverts untreated water via the BDD Diversion to be used for turf irrigation.

The Santa Fe County Water Utility typically is delivered potable water from the City of Santa Fe when the BDD facility is not producing drinking water due to poor water quality or low flow conditions in the Rio Grande. Thanks to coordinated efforts among water users along the Rio Grande, and good fortune in regard to late summer weather and fires, the BDD remained operational throughout 2018 and Santa Fe County did not utilize any backup water.

## Water Demand

### Per Capita Consumption

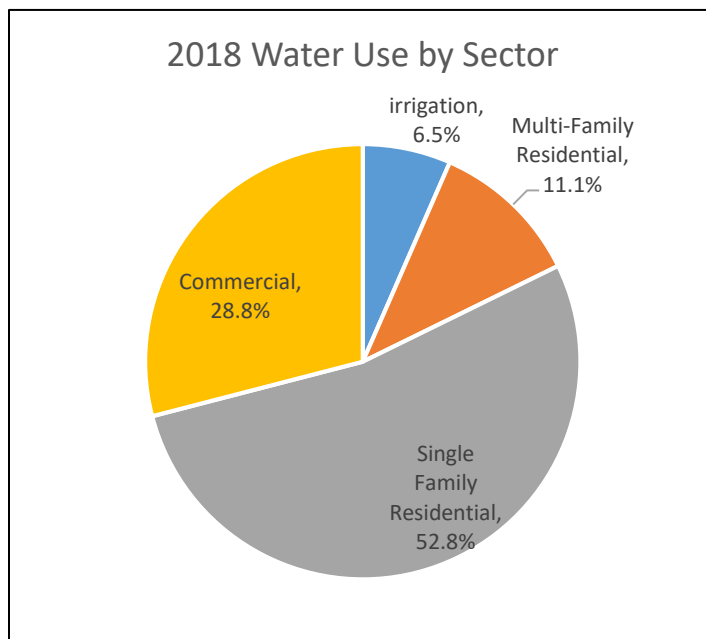


Figure 7 -2018 Total Water Demand by Sector

To better regulate municipal water use, the NMOSE began to condition municipal water- rights permits with the GPCD measurement and began a program to standardize the GPCD methodology. On March 16, 2009, the NMOSE released the standardized GPCD methodology using the GPCD calculator. The City has calculated GPCD using this tool since 2010.

The 2018 GPCD was 95. The previous year, the GPCD was calculated at 90. This increase is the result of increased annual

water use for outdoor watering resulting in a dry, warm, and short winter.

For the second year in a row, the Water Conservation Office has used PEPANARES data rather than census projections to estimate population. The result of this is that the

population is slightly lower, resulting in a slightly higher GPCD that is likely more representative of the actual level of use in Santa Fe.

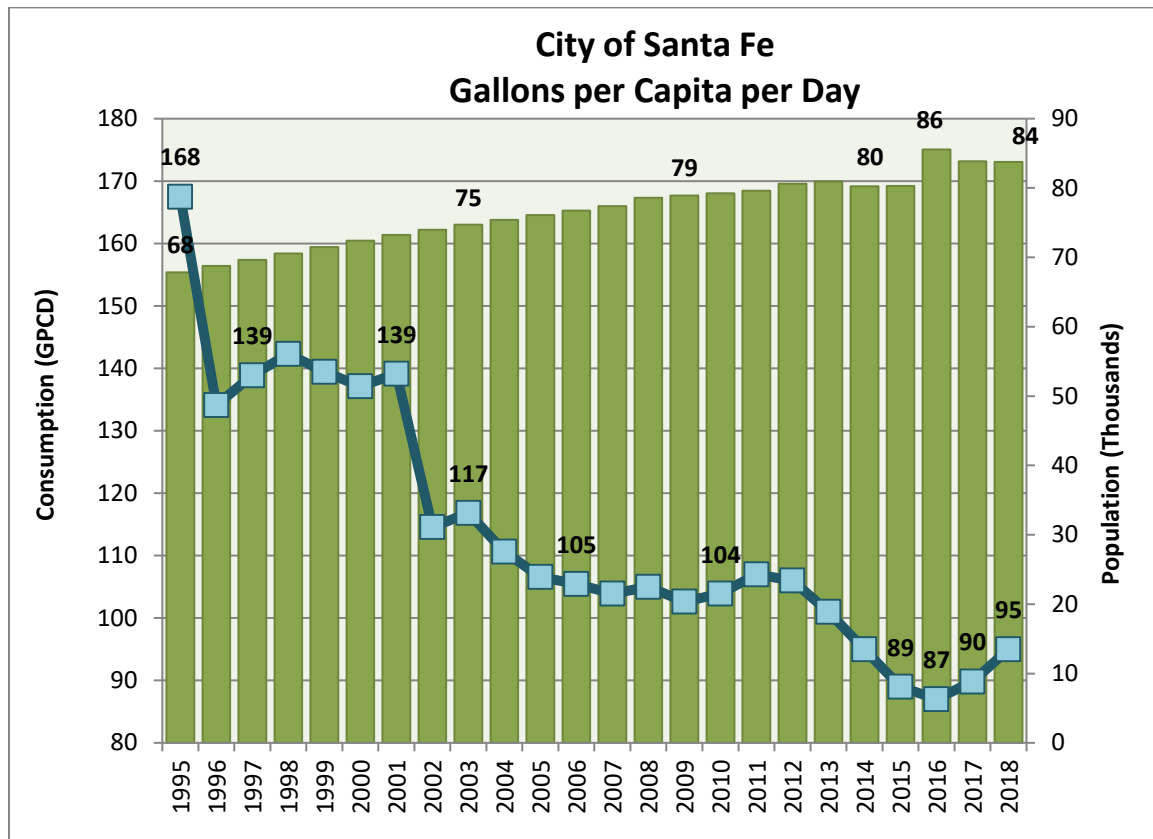


Figure 8 - GPCD & Total Consumption 1995-2018

### Other Water Demands

Water demands in Santa Fe are not met entirely with treated drinking water and the water utility also delivers raw water to acequias for irrigation and to the Santa Fe River channel through town to comply with the Living River Ordinance, and – working with the Wastewater Division of the Public Utilities Department – also provides reclaimed wastewater for irrigation.

### Santa Fe's Living River

The purposes Santa Fe's Living River Program are to help support the river's green corridor of trees, grasses, and other plants; to support healthy wildlife habitat; and to add to the beauty of free-flowing water to the parklands along the Santa Fe River. Benefits of maintaining a vegetated, green river corridor include shading and cooling of the urban environment; supporting plants that convert carbon dioxide into oxygen; helping to clean stormwater runoff; and controlling erosion. The target flow hydrograph establishes a schedule for the release of Living River water from April to April in proportion to anticipated water availability.

In 2018, the Natural Resources Conservation Service (NRCS) forecast for the upper Santa Fe River was equal to or less than 17% of the thirty-year average streamflow yield;

therefore, the Living River target flows represented a critical-dry hydrograph of 300 acre-feet for the 2018-19 target flow year. The 300 af target was reached gradually with releases beginning in April 2018 and continuing through early spring of 2019. In February of 2019, in response to significant snowfall, reservoir emergency management operations released an additional 1,400 af of Santa Fe River water to maintain adequate space in the reservoirs for anticipated 2019 runoff. Emergency management releases of water in March of 2019 brought total releases for the 2018-2019 Living River water year to 1,700 af.

A number of considerations determined the nature of the Santa Fe River Target Flow Hydrograph (for both the timing and volume of the flows) that had been developed for the 2018-19 target flow year. Due to the fact that it was a critical-dry year, and by recommendation of the River Commission, the most notable changes were the following:

- 1) As called out in the administrative procedures the Annual Childrens' Fishing Derby was suspended;
- 2) the two-pulses (Spring and Summer) were combined into one Spring pulse.

The combined pulse allowed for more saturation to occur in the newly planted reach of the Santa Fe River below Frenchy's Field, a project completed by Santa Fe County, and one in which the city will be taking over the maintenance of these reaches upon completion of construction. City and County staff were collaborating on alternative measures to provide additional irrigation to the newly planted reach when flooding damaged the site in July 2018.

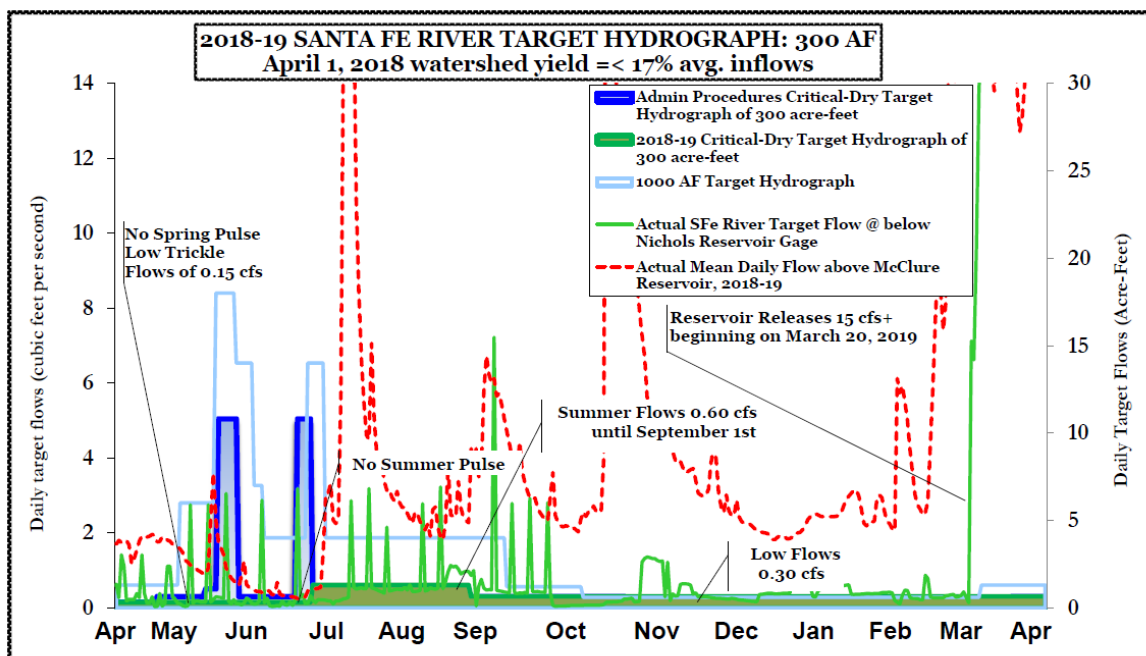


Figure 9 - 2018-2019 Santa Fe Living River Hydrograph

## Treated Effluent Water Deliveries

Treated effluent from the City's treatment plant is sold directly to contractors via an onsite standpipe. The total production of treated effluent was 6,085 acre-feet in 2017, or 68% of the City's total production of 8,935 acre-feet. 49% of the treated wastewater was reused and the remaining 51% flowed into the lower Santa Fe River.

The City of Santa Fe's reclaimed wastewater (treated effluent) has many uses including:

- irrigation to recreational fields;
- irrigation at local golf courses;
- dust control at the regional landfill and for other construction projects;
- watering for livestock and wildlife on the Caja del Rio mesa;
- contribution to the on-site, wildlife, education pond at the NM Game & Fish facility;
- and supporting the lower Santa Fe River downstream of the City's wastewater treatment plant.

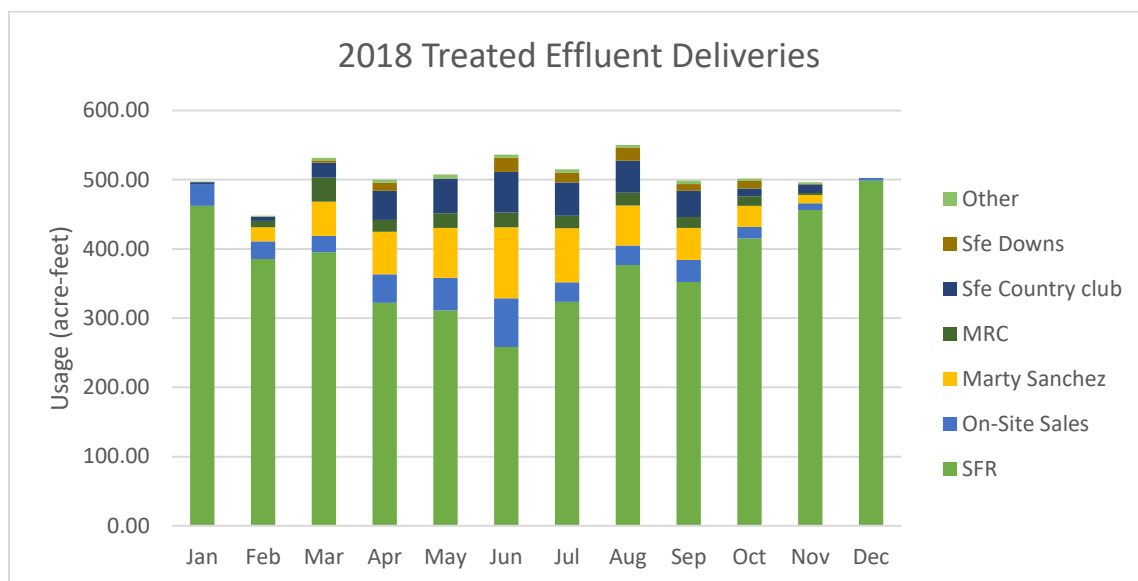


Figure 10 - 2018 Reclaimed Wastewater Deliveries

In 2015, the City Water Division completed the Santa Fe Basin Study: Adaptations to Projected Changes in Water Supply and Demand. The purpose of this report was to evaluate the impacts of population growth and climate change on the Water Division's ability to meet future potable water demand. The report identified a potential shortfall of several thousand acre-feet by the year 2055 due to a combination of population growth and climate change reducing surface water availability in the Santa Fe River and Colorado River Basins. The report also identified Reclaimed Wastewater as the most viable alternative for augmenting future water supplies.

In 2016, another report was completed – the Santa Fe Water Reuse Feasibility Study – which evaluated how to best utilize reclaimed wastewater to address the future water



shortages predicted in the 2015 Basin Study. Seven potential options were evaluated and the alternative, which scored the highest, largely due to providing the greatest benefit in terms of acre-feet of water available and doing so at the lowest cost per acre-foot provided, was to pursue return flow credits on the Rio Grande. This alternative would involve construction of a pipeline to convey the portion of the City's treated effluent that is derived from imported SJCP water to a discharge location on the Rio Grande. Returning unconsumed water to the Rio Grande from which it was delivered would enable the City to divert additional water from the Rio Grande until the entire SJCP portion of the City's water rights – 5,230 acre-feet – is fully consumed. The City only consumes about 35% of the water that runs through the system this could be a benefit of several thousand acre-feet per year.



*Figure 11 - The Santa Fe River below Guadalupe St.*

## Water Supply Sources

The City of Santa Fe has four sources for drinking water:

- The Santa Fe River
- San Juan-Chama Project water via the Rio Grande
- The City Well Field
- The Buckman Well field

A fifth water supply source is the utilization of reclaimed water from the Paseo Real Wastewater Treatment Plant. Reclaimed water reduces the demand on the total supply of potable water.

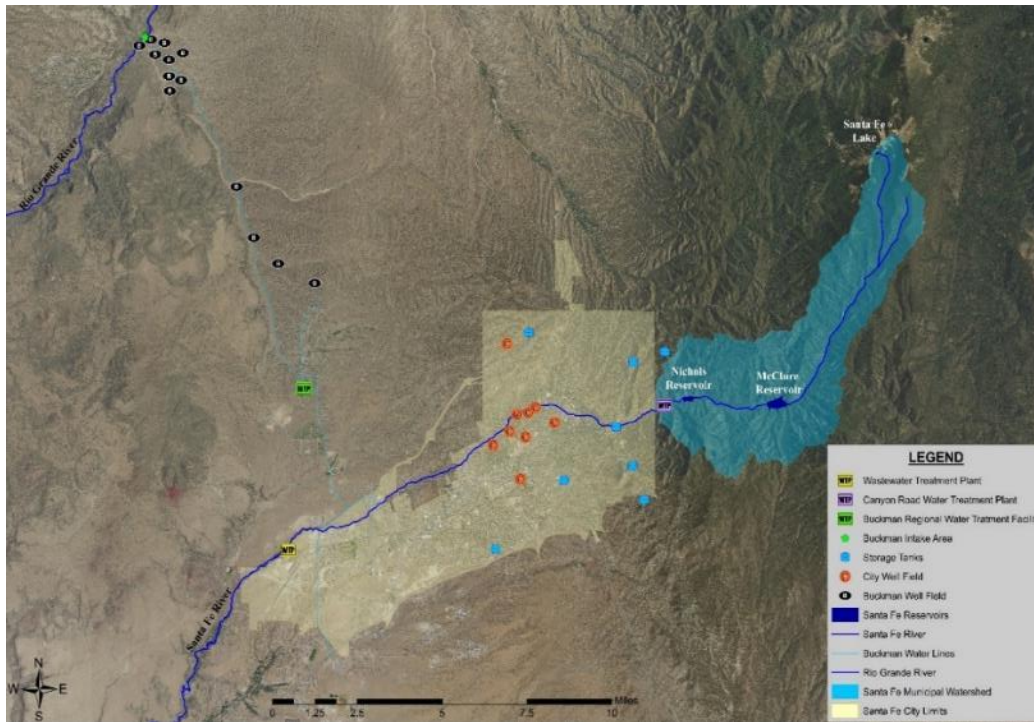


Figure 13 - Map of the Santa Fe Water System

## Surface Water

The Buckman Regional Water Treatment Plant (BRWTP) treats San Juan-Chama Project water imported from the Colorado River Basin and delivered via the Rio Grande through tunnels constructed by the BoR. As a contractor of the SJCP, the City of Santa Fe can divert up to 5,230 acre-feet per year of drinking water. A joint City of Santa Fe and Santa Fe County board governs the BRWTP and the Buckman Direct Diversion (BDD) Project facilities.

| Source                          | Water Rights (acre feet) | Available Water (acre feet)                                  |
|---------------------------------|--------------------------|--|
| <b>Santa Fe River</b>           | 5,040                    | 4,040 assuming 1,000 bypassed to the river                   |
| <b>City Wells</b>               | 3,507/4,865              | sustainable use when needed                                  |
| <b>Buckman Wells</b>            | 10,000                   | sustainable use when needed                                  |
| <b>Buckman Direct Diversion</b> | 5,230                    | Imported San Juan-Chama water per the Colorado River Compact |

Figure 14 - Table of Available Production Water Rights

The City of Santa Fe has a license to store up to 3,985 acre-feet (combined) of Santa Fe River water in McClure and Nichols Reservoirs located in the closed Santa Fe River Municipal Watershed as shown in Figure 1. The Santa Fe River is the historic source of drinking water for Santa Fe and the City has a water right to produce up to 5,040 af per year from this source.



The management responsibility for the Santa Fe River includes source water protection and watershed management under the City of Santa Fe's Municipal Watershed Program. In 2018 with exceptional drought conditions, the USFS closed the Santa Fe National Forest on June 1<sup>st</sup>, including the Santa Fe Municipal Watershed, until July 9<sup>th</sup>. With improving soil moisture and weather conditions, the Santa Fe National Forest conducted a prescribed burn in the beginning of October, 2018 on approximately 545 acres within the municipal watershed, just south of McClure Reservoir. Since 2015, the City of Santa Fe's Water Division customers, as the beneficiaries of a healthy watershed, have paid for over 5,500 acres of fuel treatments for vegetation management by the Santa Fe National Forest to protect the City's municipal reservoirs from wildfire and improve forest resiliency (see Figure 20).

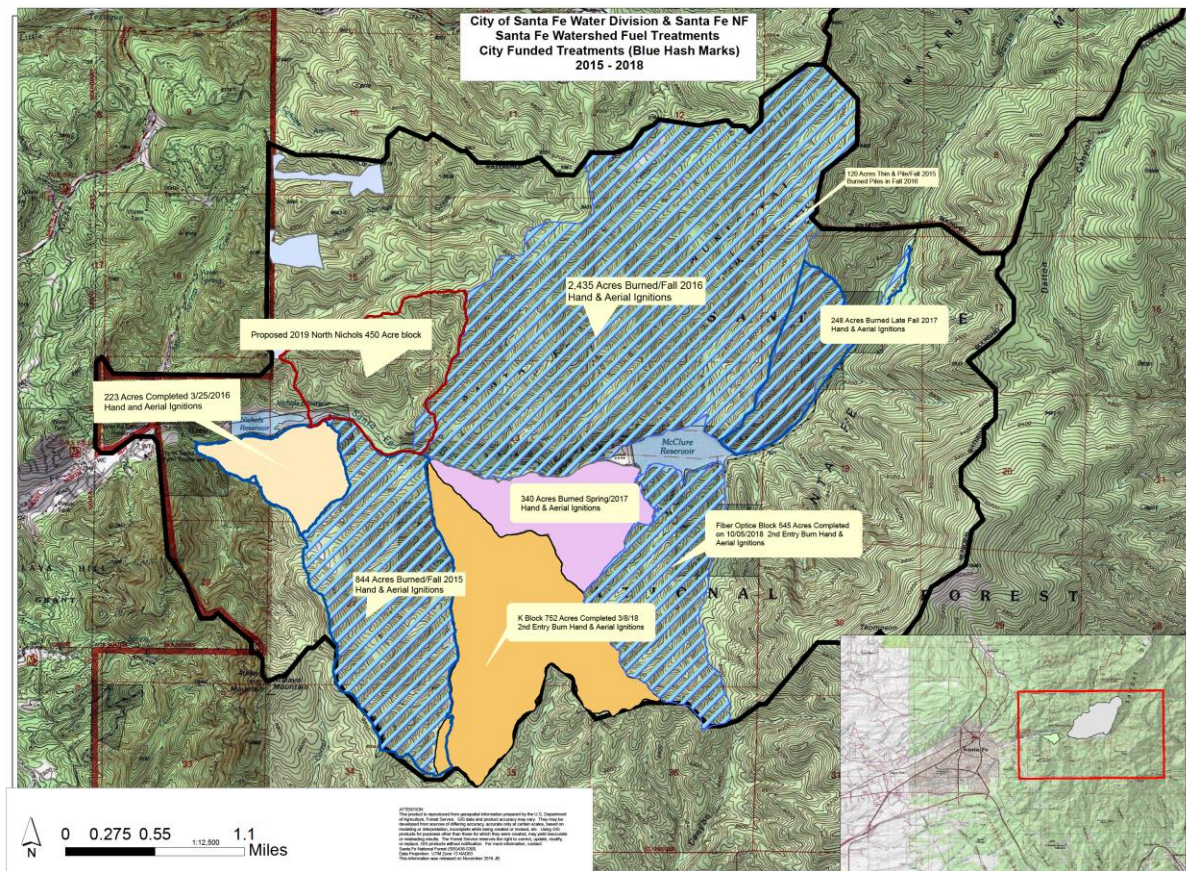


Figure 15 - Map showing prescribed burn treatments in the Santa Fe Municipal Watershed 2015-2018

## Ground Water

The City of Santa Fe has seven active groundwater wells in the City Well Field, most of which are focused near the Santa Fe River (see figure 1). Combined, the wells are permitted to produce up to 4,865 acre-feet per year of drinking water supply for Santa Fe and not more than 35,070 acre-feet per 10 year period.

The Buckman well field is located near the Rio Grande, approximately 15 miles northwest of Santa Fe (see figure). The Buckman Well permit allows the City a maximum pumping rate of 10,000 acre-feet per year for drinking water supply provided significant groundwater pumping offset rights are in place in five groundwater basins: the Rio Grande above Otowi Gage, the Rio Grande below Otowi Gage, the Nambe, Pojoaque and Tesuque basins, and on the lower Santa Fe River in La Cienega.



*Figure 16 - Student Ambassadors learning from a groundwater model at the Children's Water Fiesta*

### Surface Water Rights Used for Offsets

In addition to water rights directly diverted for water supply, Santa Fe maintains a portfolio of 'offset' surface water rights that are associated with the Buckman well field and the Northwest Well.

The purpose of offset water rights is to allow the city to comply with the conditions of approval attached to the Buckman Well Field and Northwest well permits issued by the NM Office State of the Engineer (OSE). When wells are pumped surface water is likely to be absorbed into the aquifer at a greater rate in order to fill the void created by pumping the well. The OSE uses a computer model to estimate these impacts and then requires that the City offset reduced surface water availability by acquiring water rights in each impacted basin and reducing the demand for surface water. City water planners are working on strategies to minimize groundwater pumping and to meet offset obligations in different ways.



The City of Santa Fe has acquired sufficient water rights to satisfy its current obligation on the Rio Grande, Rio Tesuque, and Rio Nambé/Rio Pojoaque through acquired surface water rights.

| Stream system                   | Water rights (af) |
|---------------------------------|-------------------|
| <b>Rio Tesuque</b>              | 57.25             |
| <b>Rio Pojoaque / Rio Nambé</b> | 101.87            |
| <b>Rio Grande</b>               | 1,066.12          |
| <b>La Cienega</b>               | 0                 |

Figure 17 - Offset Water Rights by Stream System

## Drought & Precipitation

Drought is a normal recurrent feature in the arid southwest. Santa Fe has a very dry, high desert climate with intense sunlight. The highest temperatures in July and August are 80-90 °F with only 3-6 days per year with highs over 90°F. Santa Fe began 2018 in the midst of a warm, dry winter that ended early. By the middle of 2018, Santa Fe and Northern New Mexico was in an exceptional drought.

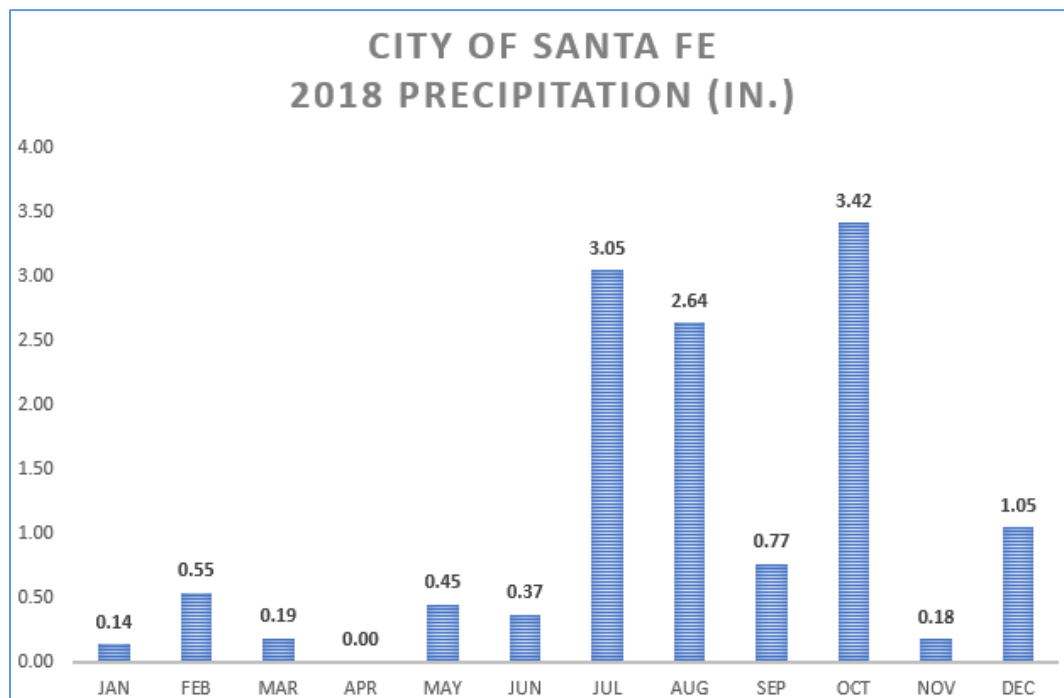
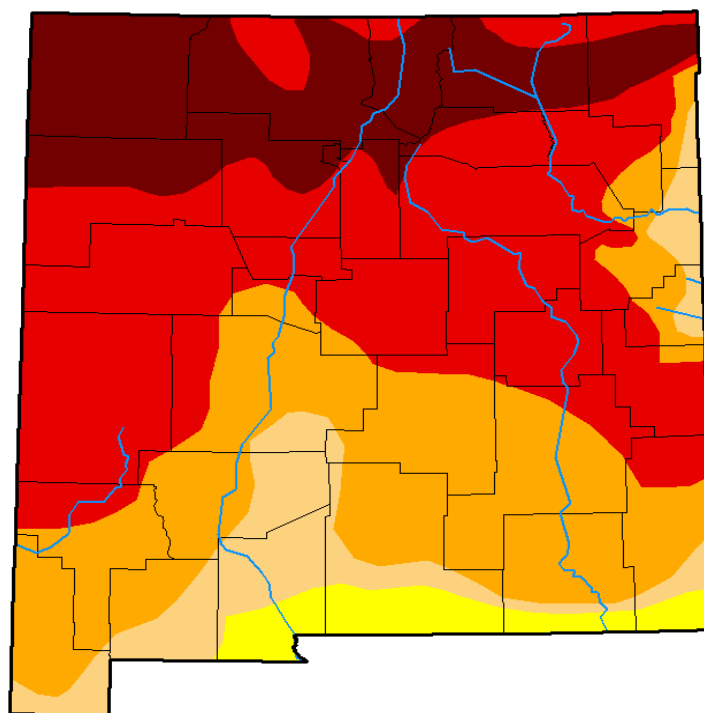


Figure 18 - Precipitation by month in Santa Fe 2018

| Description         | Possible Impacts   |
|---------------------|--|
| Abnormally Dry      | Going into drought: short-term dryness slows growth of crops/pastures. Coming out of drought: some lingering water deficits; crops/pastures not fully recovered.   |
| Moderate Drought    | Some damage to crops/pastures; streams, reservoirs, or wells are low with some water shortages developing or imminent; voluntary water-use restrictions requested. |
| Severe Drought      | Crop/pasture losses are likely; water shortages are common and water restrictions are imposed.   |
| Extreme Drought     | Major crop/pasture losses; widespread water shortages or restrictions.   |
| Exceptional Drought | Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.                                   |

**July 3, 2018**



*Figure 19 - NOAA Drought Status for New Mexico 2018*

In 2018, precipitation in New Mexico was well below the average rainfall. Spring 2018 snowmelt and subsequent runoff started early and was well below normal due to strong La Niña conditions throughout the Southwest. 2018 had well above normal temperatures in early spring with dry and windy conditions quickly reducing the snowpack runoff in both the Rio Grande and Santa Fe River basin. The monsoons arrived late and produced heavy rains, see Figure 11, including the July 23<sup>rd</sup> exceptional rain event causing downstream flooding and property damage.

According to the Western Regional Climate Center, the Santa Fe Watershed weather station, at an elevation of 7,674 ft., receives on average 13.84 inches annually of precipitation. In 2018, the Santa Fe Watershed station recorded 17.41 inches of precipitation. Higher in elevation within the municipal watershed are two National Resource Conservation Service (NRCS) ‘SNOTEL’ weather stations that measure accumulated precipitation (see Figure 14).

| SNOTEL Station   | Elevation (Feet) | Accumulated Precipitation (inches) |
|------------------|------------------|------------------------------------|
| SNOTEL Station   | Elevation (Feet) | Accumulated Precipitation (inches) |
| <b>Santa Fe</b>  | 11,445           | 32.2                               |
| <b>Elk Cabin</b> | 8,210            | 25.6                               |

*Figure 20 - Precipitation levels in upper Santa Fe watershed 2018*

In 2018, despite decent precipitation at high elevation, lower elevation areas – including the irrigated areas throughout the city – received very little precipitation with cumulative precipitation reduced by nearly half between 11,445’ and 7,674’.



*Figure 21 - Installation of underground fiber optic cables in the upper Santa Fe watershed*