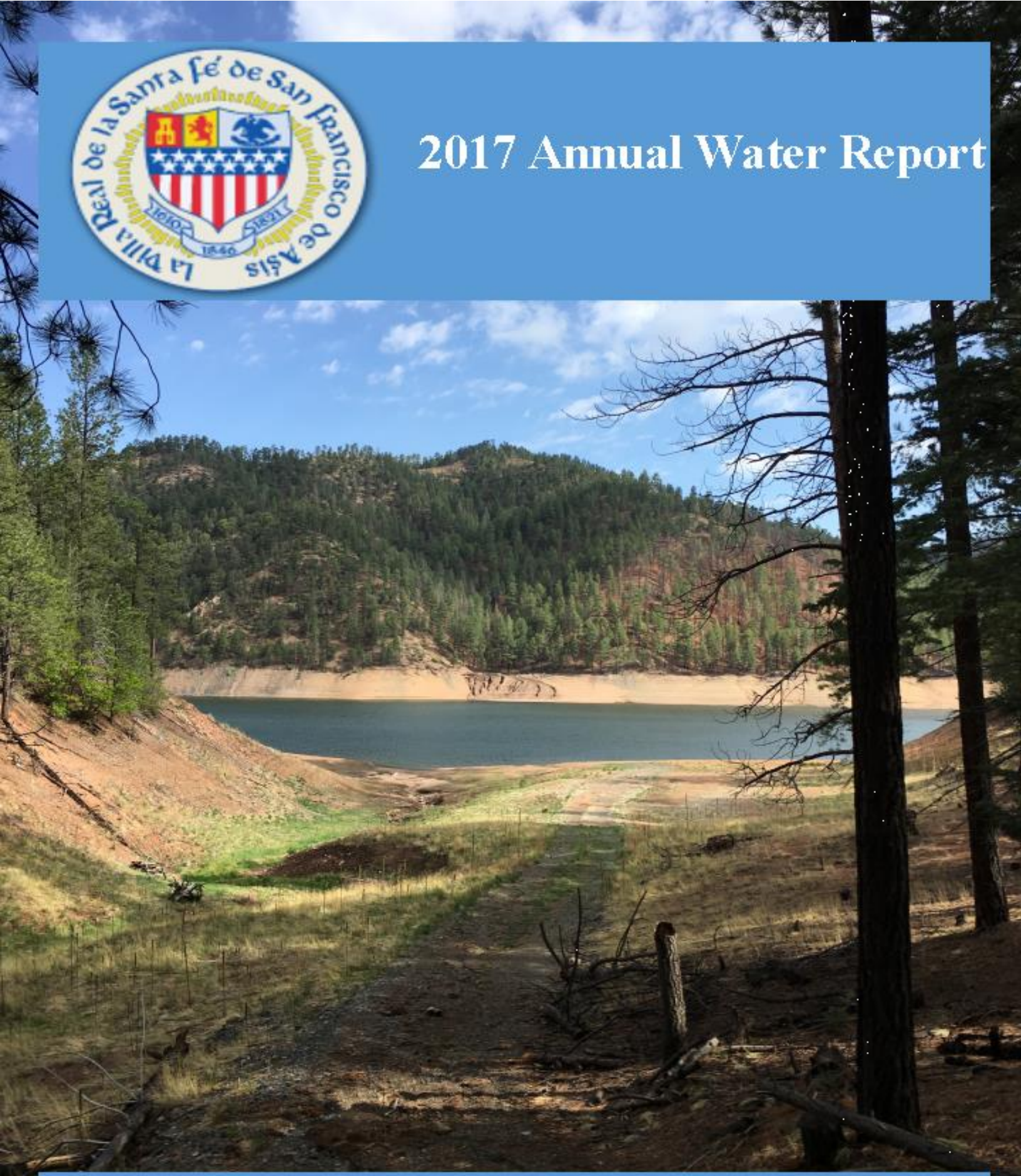
2017 Annual Water Report



City of Santa Fe Water Division

City of Santa Fe, New Mexico

Javier Gonzales, Mayor
Brian Snyder, City Manager

City Councilors

Signe Lindell, Mayor Pro Tem, District 1
Renee Villarreal, District 1
Peter Ives, District 2
Joseph Maestas, District 2
Carmichael Dominguez, District 3
Chris Rivera, District 3
Ronald Trujillo, District 4
Mike Harris, District 4

Compiled, written, and edited by the

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

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

Acknowledgements

Victor Archuleta
David Barsanti
Chuck Bear
Diana Catanach
Rick Carpenter
Christine Chavez
Amanda Encinias
Andrew Erdmann
Arianna Espinoza
Lee Gagnon
Kathleen Garcia
Caryn Grosse
Alan Hook
Shannon Jones
Amy Lewis
Marcos Martinez
Maya Martinez
Michael Moya
Lisa Noriega
Alex Puglisi
Nick Schiavo
Bill Schneider

For more information visit www.santafenm.gov/water_division

Cover Photo: Santa Fe River

Table of Contents

List of Figures

List of Tables

Executive Summary

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

The purpose of this report is to provide information about the state of the City of Santa Fe's Water Division and the water supplies we depend upon and to describe the 2017 operations of the system to citizens and customers.

This report is submitted pursuant to City Code Section 25-9.5 SFCC 1987 and summarizes 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, both of which are treated through conventional and advanced treatment processes to meet current permit regulations.

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 8,627 acre-feet (af) of water to its water utility customers in 2017. Also, the Water Division met its acequia irrigation deliveries and provided "Living River" bypass flows to the Santa Fe River.

The City of Santa Fe continued its water conservation efforts that, in part, contributed to a service-area gallon per capita per day (GPCD) demand of 90.

2018 Water Demand and Supply Picture

2018 is predicted to be hotter and drier resulting in increased demand and reduced surface water availability. These projections are based on a total system demand of 10,000 af distributed through the year based on patterns of average monthly use.

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. The river is also used to meet other water demands including the Living River and acequia deliveries. The National Resource Conservation Service is projecting that, for 2018, the total amount of water available from the Santa Fe River will be less than 20% of the historic average. For these projections a value of 1500 acre-feet is being used the Santa Fe River production.

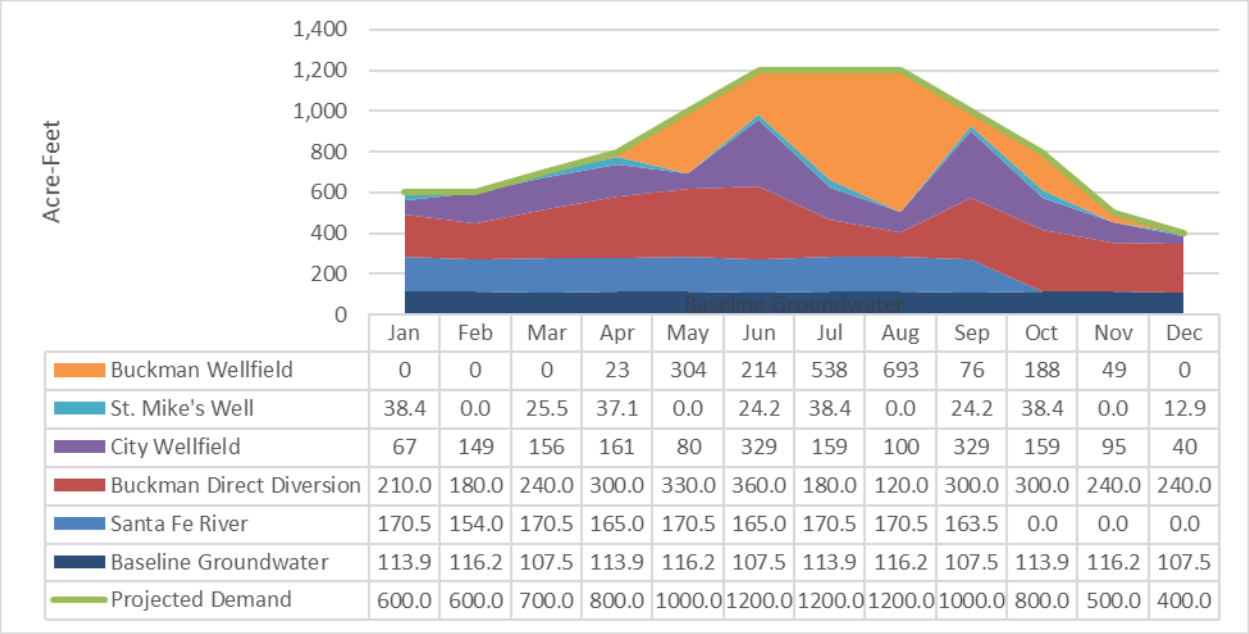
The BDD facility, co-owned by the City and County, diverts the City's San Juan Chama Project (SJCP) water from the Rio Grande. The City has 5,230 af of SJCP water delivered from the upper Colorado River Basin into the Chama River by the Bureau of Reclamation via tunnels beneath the Continental Divide. The City holds over 14,000 af of SJCP water in storage in reservoirs in the northern part of the state and is expecting a full allocation of SJCP water in 2018. One of the operational complexities associated with the use of SJCP water is that the contractors of those flows, including the City of Santa Fe, are responsible for losses to infiltration and these losses increase when native water levels are low. In this instance, the Albuquerque – Bernalillo County Water Utility Authority (ABCWUA) is likely to suspend its use of SJCP water leaving Santa Fe in a position where the losses incurred to deliver water from storage reservoirs to the BDD intake are unacceptably high. This could result in a reduction or pause of BDD operations. Due to the possibility of reduced production from the BDD, these projections use a value of 3,000 af of SJCP water. The scenario used in the projections assumes BDD remains operational year round.

Groundwater is the only source of water the City can use to meet demand that exceeds surface water availability. Total demand is projected at 10,000 af with 1500 af of Santa Fe River Water and another 3000 af of SJCP Water, leaving 5,500 af of demand to be met with groundwater. Groundwater, in these projections, is divided into four categories: City wellfield production, Buckman wellfield production, St. Mike's production, and baseline production. The differences between these categories are:

- City wellfield production = water produced from the City wellfield above the minimum required for sampling and operational exercise.
- Buckman wellfield production = water produced from the Buckman wellfield above the minimum required for sampling and operational exercise.
- St. Mike's production = water produced from the St. Mike's above the minimum required for sampling and operational exercise. The St. Mike's well is permitted as a Supplemental Point of Diversion for the Santa Fe River license and is tracked separately for this reason.

- Baseline production = water produced from all of the wells – City, Buckman, and St. Mike's –to meet City and LANL sampling requirements and to provide adequate operational exercise. Baseline production is intended to ensure regular operation of more wells than have been used in recent years and to ensure that wells are predictable and that reliable backup is always available.

Production capacities and constraints for each individual well were considered in determining an appropriate distribution of groundwater pumping and aggregated based on the categories listed above to develop these projections. They are intended to measure and plan for system capacity under high-demand and low-surface water availability. The projection assumes that BDD is operating all summer without having to shut down while production levels remain at 5500 af for groundwater.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Buckman Wellfield	0	0	0	23	304	214	538	693	76	188	49	0
St. Mike's Well	38.4	0.0	25.5	37.1	0.0	24.2	38.4	0.0	24.2	38.4	0.0	12.9
City Wellfield	67	149	156	161	80	329	159	100	329	159	95	40
Buckman Direct Diversion	210.0	180.0	240.0	300.0	330.0	360.0	180.0	120.0	300.0	300.0	240.0	240.0
Santa Fe River	170.5	154.0	170.5	165.0	170.5	165.0	170.5	170.5	163.5	0.0	0.0	0.0
Baseline Groundwater	113.9	116.2	107.5	113.9	116.2	107.5	113.9	116.2	107.5	113.9	116.2	107.5
Projected Demand	600.0	600.0	700.0	800.0	1000.0	1200.0	1200.0	1200.0	1000.0	800.0	500.0	400.0

Figure 1: 2018 Water Demand and Supply Picture

Water Supply Sources

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

- Santa Fe River
- San Juan-Chama surface water via the Rio Grande
- City well Field
- 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.

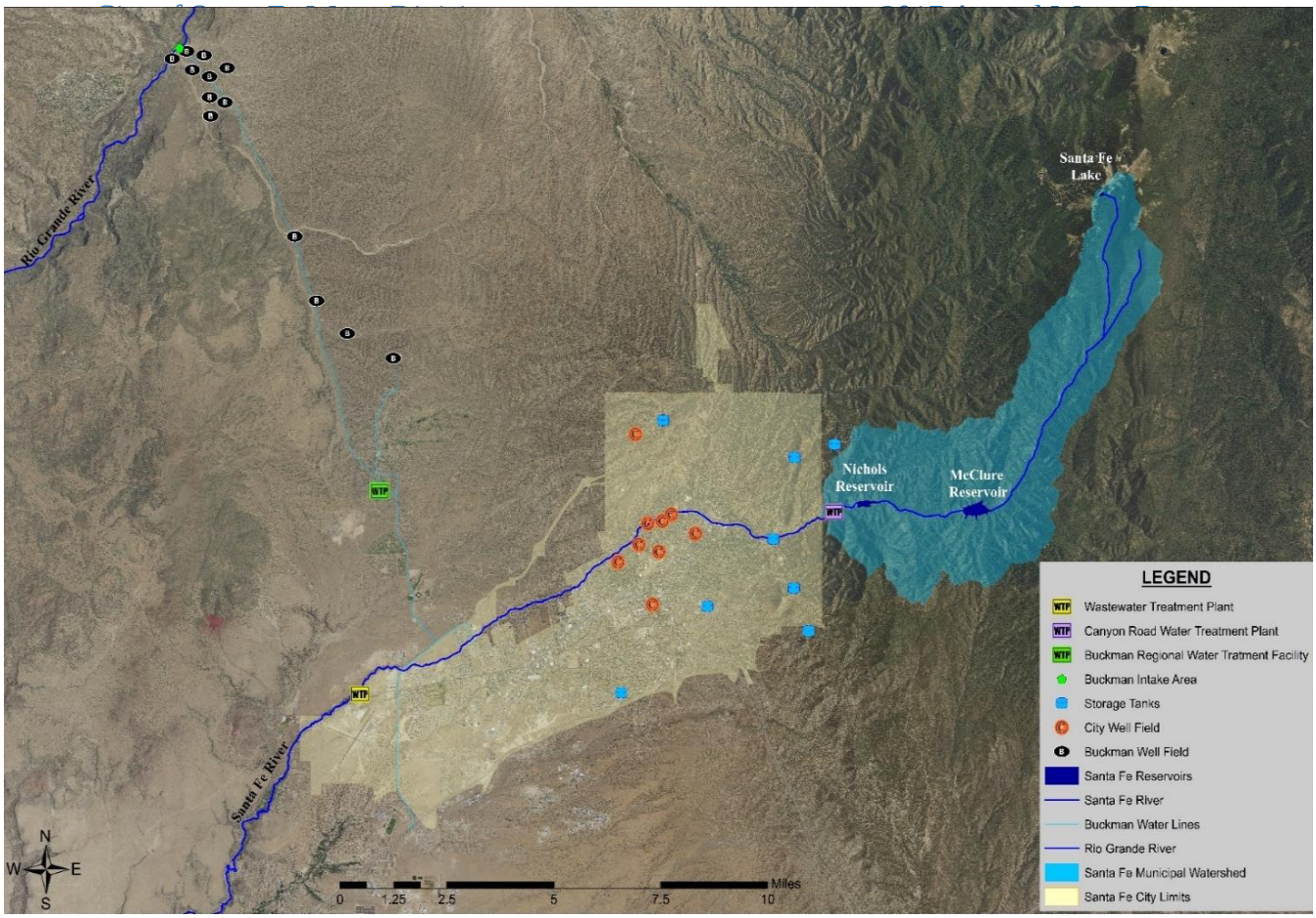


Figure 2: Map of City of Santa Fe Water Supply Sources

Water Rights

Surface Water

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. Both municipal drinking water supply reservoirs are located east of the City within the Santa Municipal Watershed as shown in Figure 1. In 2015, a new intake tower was installed at McClure Reservoir.

Table 1: City of Santa Fe Diversion Water Rights and Supply Portfolio

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

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. As a contractor of the San Juan-Chama Project, the City of Santa Fe can consume 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.

Ground Water

The City of Santa Fe has seven active groundwater wells within the City limits, 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.

In addition to the City well field, there are also thirteen groundwater wells in the Buckman well field, which is located near the Rio Grande, approximately 15 miles northwest of Santa Fe (see figure). The Buckman Wells are operated under one permit that allows the City of Santa Fe a maximum pumping rate of 10,000 acre-feet per year for drinking water supply and which requires groundwater pumping offsets in the Rio Grande, Nambe-Pojoaque-Tesuque, and La Cienega Basins. High rates of construction and the availability of SJCP water from BDD have allowed the city to minimize pumping from the Buckman Wells in recent years. The newest Buckman Wells are about 2,000 feet deep and began production in 2003. The older Buckman Wells began production in the 1970s.

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 permit 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 requires that the city offset reduced surface water availability due to increased infiltration to groundwater from Buckman Wellfield pumping 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 Nambe/Rio Pojoaque through acquired surface water rights.

Table 2: City's Surface Water Offsets

Stream system	Water rights (af)	Offsets needed in 2017 (af)
Rio Tesuque	49	34
Rio Pojoaque	88	58
Rio Grande	1,438	1,011
La Cienega	1	2.6

Relinquishment Credits

New Mexico water storage rights holders received relinquishment credits when the quantity of Rio Grande water provided to Texas is above that required by the Rio Grande Compact. Relinquishment water allows the City to store relinquishment 'credit' water in the municipal reservoirs during times when the Rio Grande Compact would otherwise limit the City's right to store water. Based on times when the city "over delivered" stored water in the past.

The OSE administers relinquishment credits to the City. As an alternative to using relinquishment credits, the City often releases its San Juan-Chama Project water into the Rio Grande in exchange for the right to store Santa Fe River water, at times when it would otherwise be prohibited by the Rio Grande Compact. The City has a current balance of 6,452 acre-feet in relinquishment credits.

Water Production

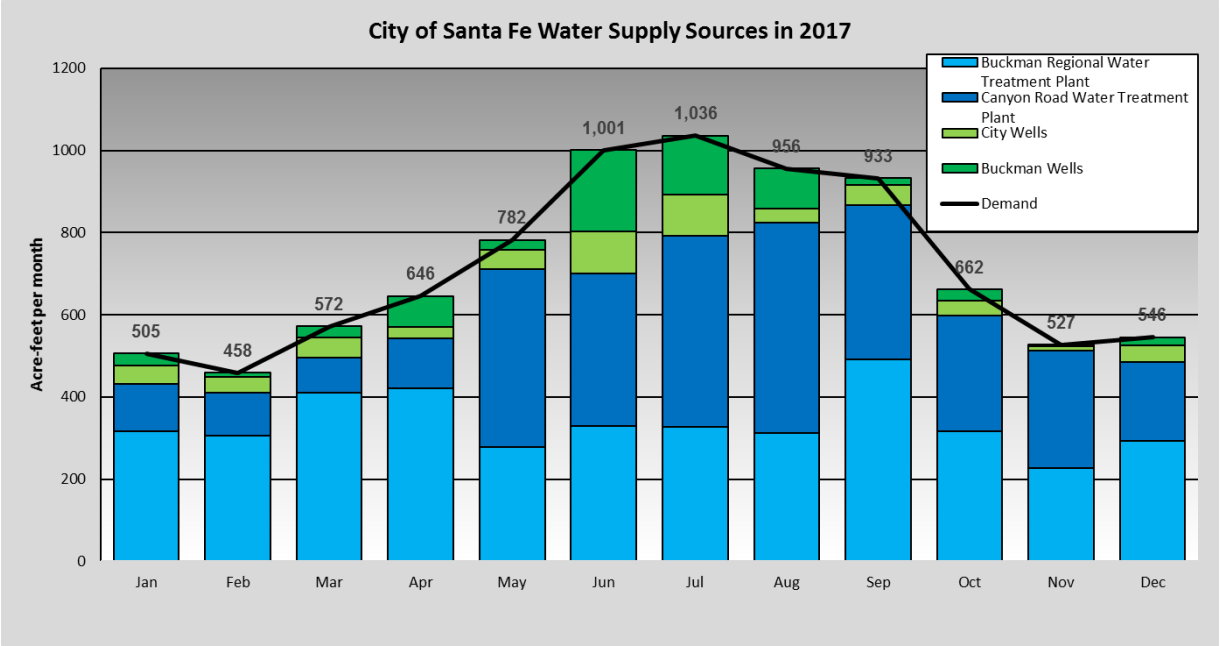


Figure 3: 2017 Monthly Production by Supply Source with the Annual Total in acre-feet

Production by Supply Source

As shown in the Production by Supply Source above (figure 2), the City has continued to take advantage of increased availability of surface water from the Buckman Regional Water Treatment Plant to decrease use of the City and Buckman well fields, allowing the wells to recover for use in drier years when surface water is not as readily available. In 2017, the total production for the City of Santa Fe's utility customers was 8,625 acre-feet.

Wholesale Water Deliveries

The Santa Fe County Water Utility is a ½ owner of the BDD facility and the majority of the water supplied to the County Water customers comes from the facility. The City Water utility also provides up to 1,350 acre-feet per year of wholesale 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 conditions in the Rio Grande. Under the Water Resources Agreement with the City of Santa Fe, Santa Fe County Water Utility took delivery of 131 acre-feet of water in 2016 and 0 acre-feet in 2017.

Treated Effluent Water Deliveries

The City of Santa Fe's reclaimed wastewater (treated effluent) has many uses including: irrigation to recreational fields and 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 which supports the riparian ecosystem and local agriculture in the La Cienega and La Bajada areas.

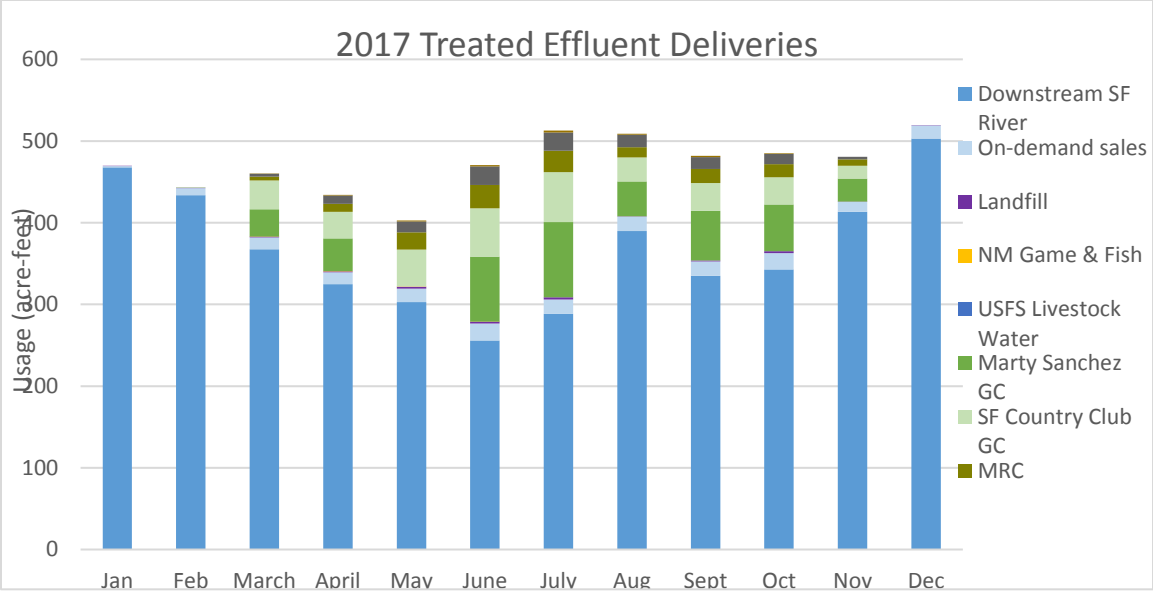


Figure 4: 2017 Treated Effluent Deliveries by Contractor

Treated effluent from the City's treatment plant is sold directly to contractors via an onsite standpipe. The total production of treated effluent was 5,591 acre-feet in 2017, or 65% of the City's total production of 8,625 acre-feet. 22% of the treated wastewater was reused and the remaining 78% flowed into the lower Santa Fe River.

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 5: Secondary Clarifier Weirs and Clarivacs

Drought & Precipitation

Drought is a normal recurrent feature in the arid southwest. Santa Fe has a very dry, high desert climate with intense sunlight. On average, the city experiences more than 300 sunny days per year. The highest temperatures in July and August are 80-90 ^{o}F with only 3-6 days per year with 90+ ^{o}F highs.

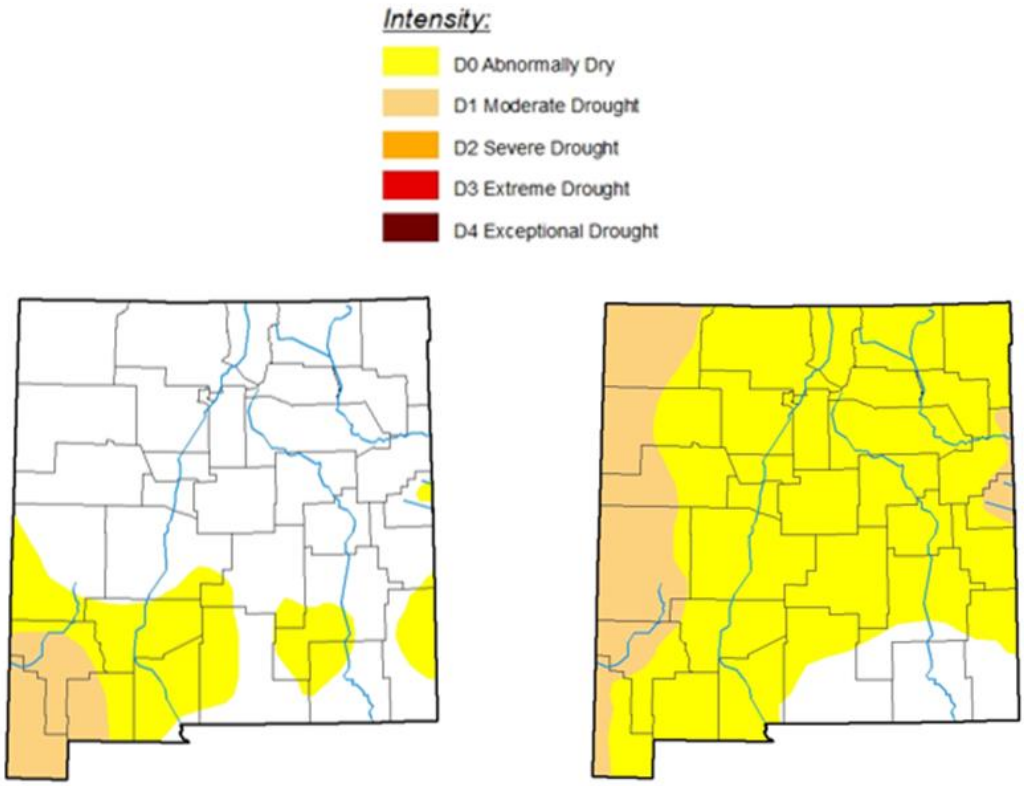


Figure 6: Drought comparison for July 2017 (top) and December 2017 (bottom) courtesy of the Drought Monitor, which focuses on broad-scale conditions. Data is mapped weekly by National Oceanic and Atmospheric Administration (NOAA), the U.S Department of Agriculture (USDA), and the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln.

Overall, Santa Fe began 2017 with normal precipitation, but the winter experienced dry conditions with little precipitation. Among other factors (water demand section), the precipitation likely contributed to an increased need for outdoor watering, which accounts for approximately 40 percent of Santa Fe's total water use. Additionally, there are no returns from water used for outdoor watering, so water used for this purpose is not available for lower Santa Fe River (SFR) flow or reuse.

In 2017, precipitation in New Mexico was near the average rainfall. Spring 2017 snowmelt and subsequent runoff started early and was well below normal for the seventh year in a row, which follows climate change predictions. 2017 was well above normal temperatures in early spring and the dry and windy spring quickly reduced the snowpack. The monsoons arrived late and produced heavy rains, which broke the meteorological drought that had been occurring.

Table 3: NRCS SNOTEL Data for 2017 Calendar Year, Santa Fe Watershed

SNOTEL Station	Elevation (Feet)	Accumulated Precipitation (inches)
SNOTEL Station	Elevation (Feet)	Accumulated Precipitation (inches)
Santa Fe	11,445	33
Elk Cabin	8,210	22.3

According to the Western Regional Climate Center, Santa Fe receives on average 13.84 inches annually of precipitation. National Resource Conservation Service (NRCS) 'SNOTEL' weather stations measure accumulated precipitation. There are two SNOTEL weather stations in the upper Santa Fe River municipal watershed (see Table 3).

With the geographic spread in Santa Fe, it is hard to generalize rain precipitation. The data from these two stations shows how different precipitation can be from one location to the next within Santa Fe.

Water Demand

Per Capita Consumption

A common metric for comparing annual water use and water conservation effectiveness is gallons per capita per day (gpcd). Essentially, it is derived by dividing the amount of water supplied to the City of Santa Fe by the population of utility customers served. In 2017, the City's water customers average daily water use went from 87 gpcd in 2016 to 90 gpcd in 2017.

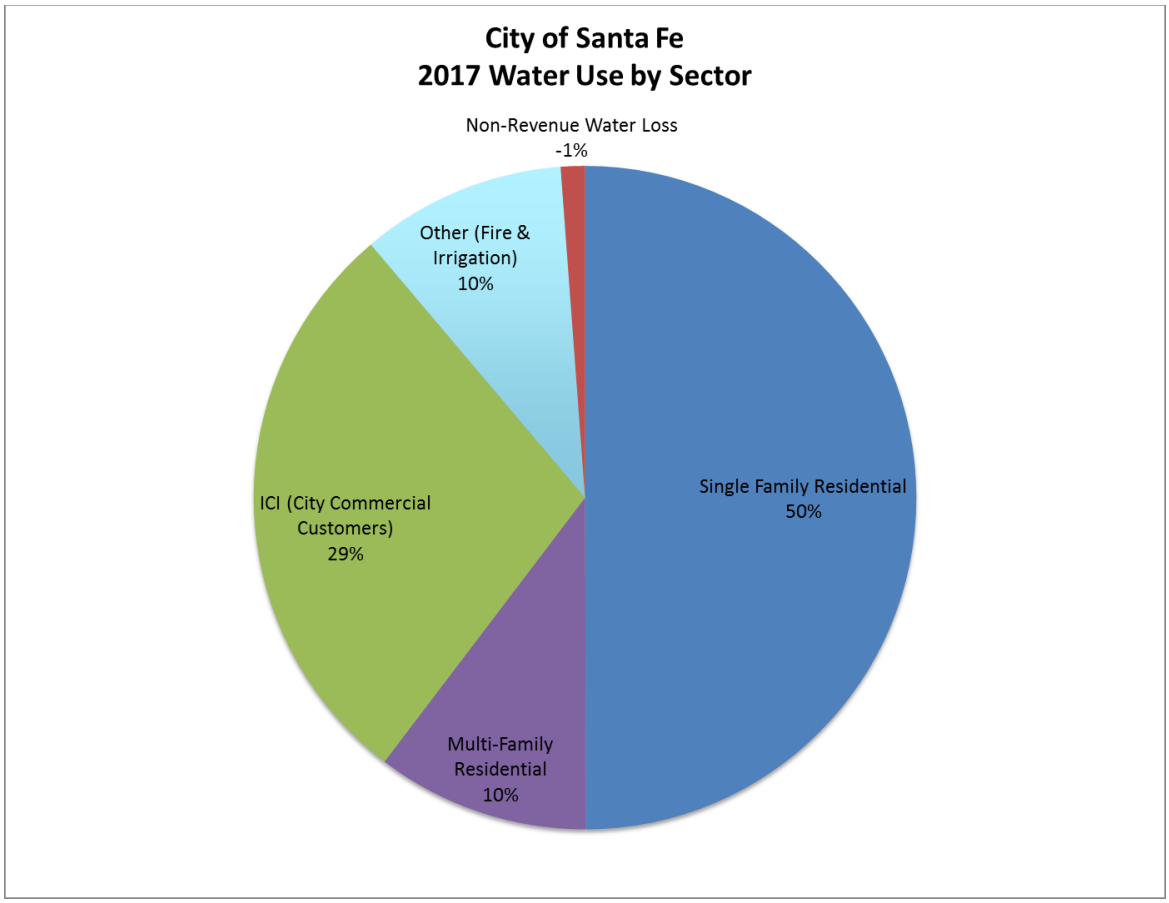


Figure 7: 2017 Water Use by Sector

To better regulate municipal water use, the NMOSE began to condition municipal water-rights permits with the GPCD measurement and began a program to standardized the GPCD methodology, On March 16, 2009, the NMOSE released the standardized GPCD methodology using the GPCD calculator, 2.04 Beta Version. The City was required to use the tool for the first time in 2010.

The 2017 GPCD was 90. The previous year, the GPCD was calculated at 87. The GPCD did not really go up for 2017, in fact it stayed constant, but the office chose to apply an adjustment to the population that is calculated as part of the spreadsheet. The Santa Fe Water Conservation Committee worked on a population adjustment based on PEPANNRES (Annual Estimated of Residential Population). This adjustment was made because population was being overestimated resulting in a lower GPCD number. For example, in 2017, the population was 87.474 without the adjustment and with the adjustment it was 83,878 which was more accurate. This gives the City a more accurate picture of the GPCD and helps establish true targets for conservation relative to the customer sector it focuses on.

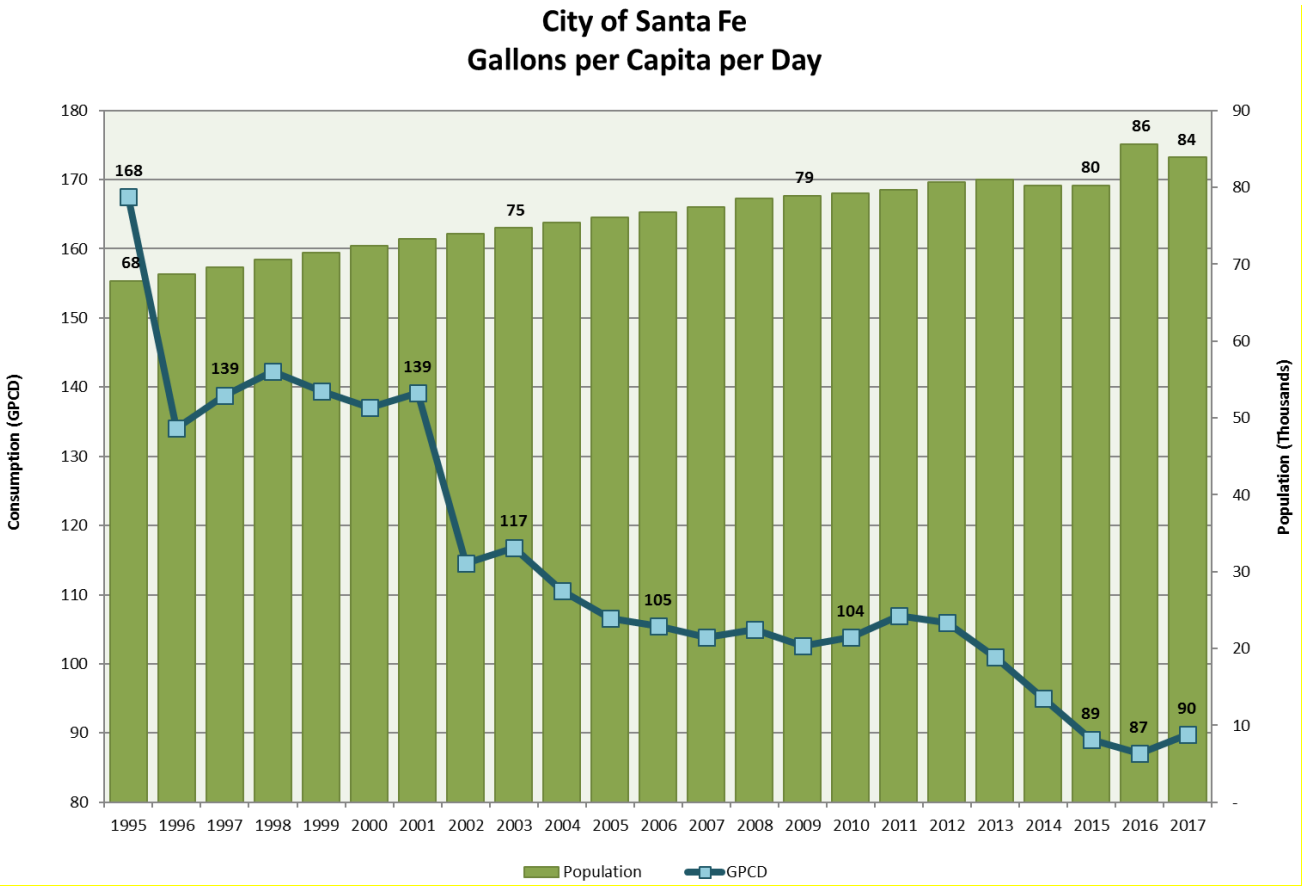


Figure 8: Gallons per capita per Day (GPCD) from 1995-2017

Although water conservation outreach and education programs contribute to the overall decrease in water consumption, there are several other factors to take into account. The city experienced a net loss in water customers after annexation to the county in which the typically high water use communities of La Tierra and La Campanas were transferred to Santa Fe County.

Contractual and Other Water Demands

Santa Fe River

The Santa Fe River bypass flows are administered under the terms of the City of Santa Fe's Administrative Procedures For Santa Fe River Target Flows, Resolution 2012-28. The Living River Initiative, Ordinance 2012-10, provides that up to 1,000 acre-feet of water be provided for bypass flows to the Santa Fe River downstream of Nichols Reservoir. In years when the forecast for the runoff from mountain snows fall below 75% of the annual average, Santa Fe River target flows are scaled downward. This past target year, the April 1st forecast was 76% of the thirty-year average streamflow yield for the Santa Fe River; therefore, the Santa Fe River target flows were projected to be 760 acre-feet with an annual river allocation up to 1,000 acre-feet (see Figure 9, page 14).

It is important to note that the other determinant of Santa Fe River bypass flows administered through the Santa Fe River target flow program is the concept of the bypass constraint. The administrative procedures for the program define the bypass constraint as follows, "*Bypass constraint*": *an operation principle that requires the rate at which water is passed through the outlet works of Nichols Reservoir dam is always equal or less than the stream inflow at the 'above McClure' gage.* In other words, at any given time, the volume of Nichols Reservoir outflow administered for the Santa Fe River target flows (target flows) is not allowed to exceed the volume of inflow at the City's upper reservoir, McClure Reservoir.

The purposes of the target flows are to help support the Santa Fe 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. Other 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 has also been administered to provide flows that support community events, scheduled along the Santa Fe River as provided for in the Santa Fe River Target Flow Ordinance. This past year, city staff was able to administer the planned target flow releases and accommodate both Spring and Summer pulses, the Children's Fishing Derby, and other community events.

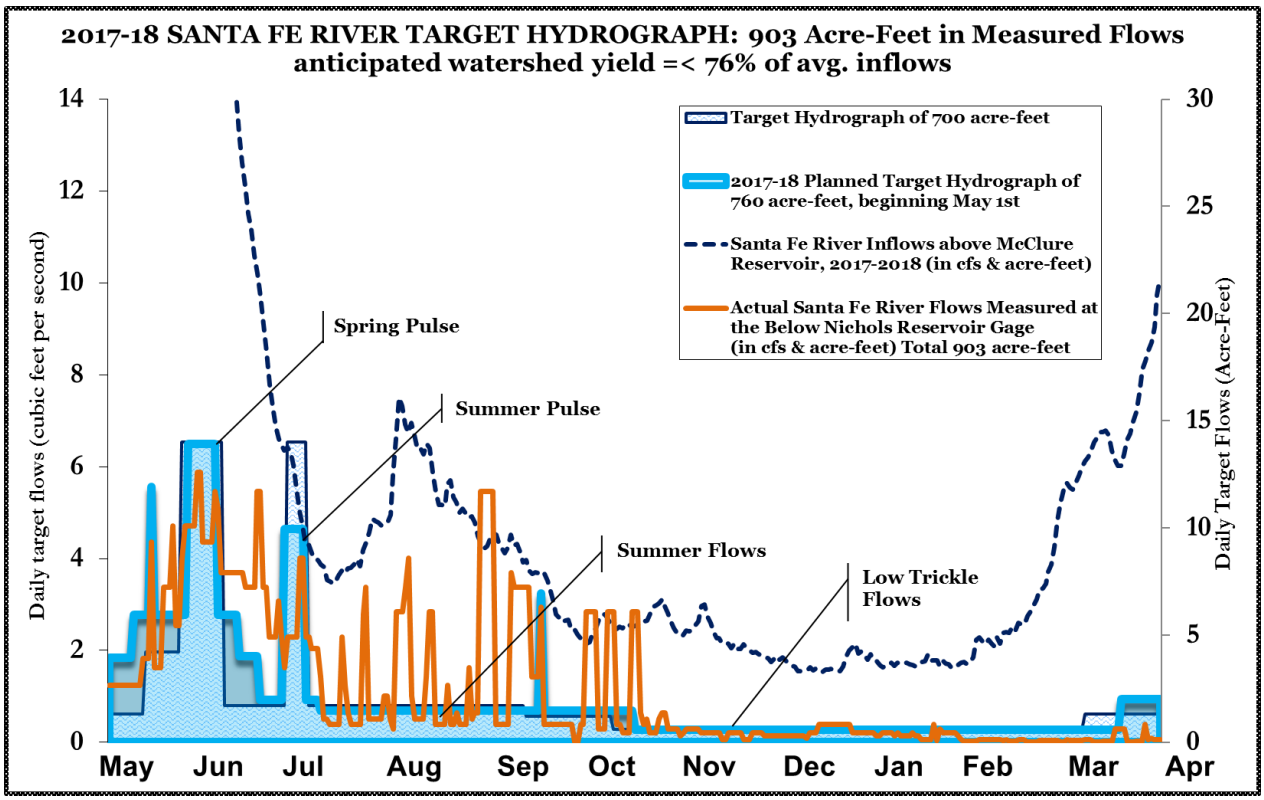


Figure 9: 2017-2018 Santa Fe River Target Flow Hydrograph

Water Bank

New water demand on the City water system requires a water credit from the Water Bank in an equal amount, with the goal being to maintain sufficient rights to meet increasing water obligations. The City requires that any new construction project which will results in a net increase in demand on City water account for that increase either through purchasing water credits from the City's Water Bank, or by transferring Water Rights to the City Water Division. When water credits are purchased from the City, the source of these credits is conserved water realized through conservation rebate programs or water rights which have been purchased by the City. When water rights are transferred to the City water bank, these water rights are used as offset rights (see Water Rights Used for Offsets).

In 2015, the City of Santa Fe began a buyback program for privately owned toilet retrofit credits and has purchased 95.025 acre-feet to date.

		2009	2010	2011	2012	2013	2014	2015	2016	2017
End Of Year Balances	Public Banked Water Totals	9.62	81.72	90.76	99	104.8	165.2858	240.9538	281.7535	296.5767
	Dedicated Banked Water	0	6.19	16.06	32.6	49.11	62.736	77.276	90.596	118.881
	UnDedicated Banked Water	9.62	75.53	74.7	66.4	55.69	102.5498	163.6778	191.1575	177.6957
	Private Banked Water Totals	485.4831	512.6431	547.0281	527.2681	518.0181	597.1221	667.059	647.5405	618.4505
	Privately Owned Water Rights	455.89	483.5	518.21	498.9	489.95	578.654	656.549	637.848	613.208
	Privately Owned Toilet Retrofit Credits	1183.725	1165.725	1152.725	1134.725	1122.725	738.725	420.4	387.7	209.7
	Affordable Housing	56.87	50.66	46.16	42.11	38.36	33.36	31.56	29.52	26.72
Acquisitions	Public Water Rights Acquired	9.62	39.64	0	1.09	0	54.1632	18.417	0	0
	Private Water Rights Acquired	62.74	33.32	41.75	0	31.05	94.91	114.695	6.513	0
	Affordable Housing Credits Acquired	59.32	0	0	0	0	0	0	0	0
	Conservation Credits Acquired	0	32.46	9.04	7.15	5.8	6.3226	2.926	8.0997	6.8232
	Total Acquisitions	131.68	105.42	50.79	8.24	36.85	155.3958	136.038	14.6127	6.8232
Dedications	Public Banked Water Dedicated	0	6.19	9.87	16.54	16.51	13.626	14.54	13.32	28.285
	Affordable Housing Dedications	2.45	6.21	4.5	4.05	3.75	5	1.8	2.04	2.8
	Privately Owned Toilet Retrofit Credits Dedicated	39	18	13	18	12	384	318.325	32.7	178
	Private Water Rights Dedicated	10.13	5.71	7.04	19.31	40	6.206	36.8	25.214	24.64
	Total Dedications									

Figure 10: Water Bank Balances

*The City's water bank tracks the inflows (credits), allocations (debits), ownership, and designated use. For detailed information, please refer to the following ordinances and city code: 2005 Water Transfer Ordinance, 2009-38 Water Budget Requirements (effective January 1, 2010), and Water Conservation provisions in City Code Chapter 25.

Water Resources Planning

The overall goal of water resources planning is to ensure that the City's water resources are managed efficiently in a manner reflecting the values of the community. City water planning staff work to find innovative solutions to improve system resiliency and to ensure water will be available to meet future demands without damaging the cultural or physical landscape of the region.

Management responsibility includes source water protection and watershed management under the City of Santa Fe's Municipal Watershed Management Program, protecting the source of 40% of the City's drinking water supply. Water resources planning and

management efforts cover a broad range of duties, including being a good steward of the precious and finite resource: water.

Fiscal Responsibility

The Water Division is committed to fiscally responsible management of the water utility. This is achieved by an annual review of the finance plan. The review provides projections for both revenue and expenditures including the capital improvement plan (CIP). The goal is to be fiscally responsible while maintaining a high level of service and increasing effectiveness and efficiency. The last rate increase went into effect July 1, 2013 and the Water Division does not project another increase until 2019.

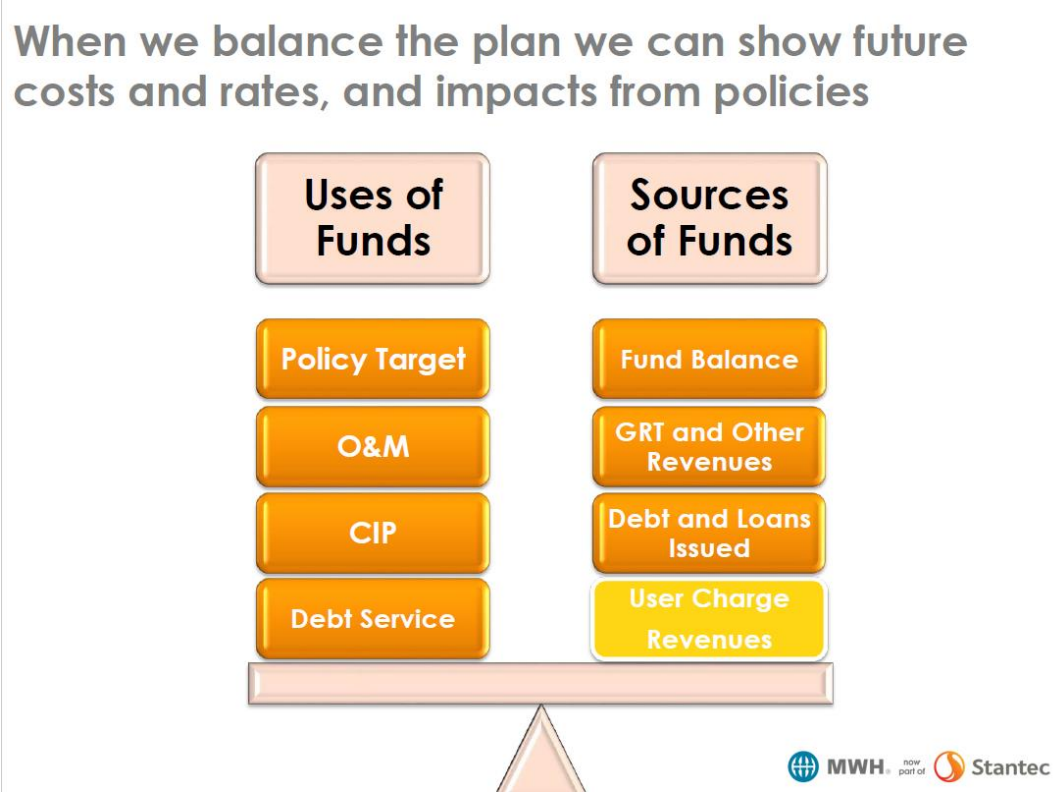


Figure 11: How the water division must balance its budget