

CITY OF SANTA FE

**ADMINISTRATIVE PROCEDURES FOR
SANTA FE RIVER TARGET FLOWS**

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Article I: Introduction

These administrative procedures describe how City staff will implement Section 25-13 SFCC 1987 to provide 1,000 AFY in target flows to the Santa Fe River.

As the City of Santa Fe has worked in recent years to further diversify its water supply portfolio, it has also worked on a range of initiatives to make substantial improvements along the Santa Fe River and within the river's broader watershed. These improvements have included forest management practices in the upper watershed; riparian rehabilitation projects along the entire river corridor; a variety of erosion control and storm water management projects; construction of significant new reaches of the Santa Fe River Trail; and enhancements within the City's parklands along the river's banks. Consistent with these efforts to protect the City's water supply, improve the drainage and hydrologic functions of the river system, support greenery, shade and wildlife habitat, and to beautify the corridor with aesthetic enhancements, the City also seeks to increase water flows in the river below the City's reservoirs.

A commitment to manage water resources in ways that allow for a programmatic approach to provide for water flows in the Santa Fe River is consistent with the City's Long Range Water Supply Plan (LRWSP). The LRWSP states that, "The City will provide water to maintain a living Santa Fe River, except under drought or emergency conditions." Further, the Plan states, "After the BDD (the Buckman Direct Diversion facility) is online in 2011 and barring legal restrictions, the City will, in accordance with public input, initially release approximately 1,000 AFY [acre feet per year] of water from the Santa Fe River canyon reservoirs to the Santa Fe River, except under drought or emergency conditions."

Following successful river flow programs that were implemented during 2009, 2010 and 2011, the City now seeks to formalize its commitment to provide for river flows in the Santa Fe River in future years. These Administrative Procedures, along with enabling legislation (City ordinance and resolution), establish an approach to codify and give guidance for the City's river flow commitment.

Prior year flows administered for the Santa Fe River yielded valuable information regarding the management of flow regimes; resulted in positive impacts within the riparian corridor; and were extremely popular with people who visited the river, experienced water flowing through the City, and sat or played along the river's banks. These Administrative Procedures address issues such as ideal and contingent flow scenarios; flow volume accounting procedures; adjustments to flow scenarios due to water surpluses or shortages; and other operational details.

Article II: Title, Authority, Applicability, Purpose & Interpretation

- 2.1 **Title.** Administrative Procedures for Target Flows in the Santa Fe River shall be cited and referred to herein as the "Administrative Procedures."
- 2.2 **Authority.** Administrative Procedures for Target Flows in the Santa Fe River are adopted pursuant to the Santa Fe River Target Flow Ordinance, Article 25-13 SFCC 1987 and Resolution No. 2012-_____.
- 2.3 **Applicability.** Pursuant to the Santa Fe River Target Flow Ordinance, these Administrative Procedures apply to target flows on or after February 29, 2012, the date of adoption of the Santa Fe River Target Flow Ordinance.

2.4 **Purpose.**

Ord. No. 2012-10 directs the City of Santa Fe to bypass flow to the Santa Fe River downstream of Nichols Reservoir. These administrative procedures describe the means and methods by which the flows will be administered, monitored, measured, adapted to variable conditions and reported in order to ensure that the objectives for the flows are met to the greatest extent possible.

2.5 **Interpretation.**

These Administrative Procedures shall be liberally interpreted to accomplish the purposes set forth in Article 25-13. To the extent of ambiguity, omission or clear error in these Administrative Procedures, City staff and the flow manager shall have authority to interpret and clarify any such matter during implementation of these regulations and procedure so as to effectuate the intent of Article 25-13.

Article III - Definitions of Terms and Phrases

Defined Terms and Phrases. The following defined terms and phrases shall apply to the Administrative Procedures.

1. **"above McClure gage"**: the stream gaging station 08315480 (or 08315479 for low flows) located above McClure Reservoir; this is the measuring point for flows entering McClure Reservoir.
2. **"acre-foot (af)"**: a quantity or unit of water that is equal to the amount of water required to fill an area of 1 acre with 12 inches (i.e., 1 foot) of water; one acre-foot is equal to 325,851 gallons.
3. **"actual daily flow"**: the daily rate of stream flow at the below Nichols gage as recorded by the flow operator.
4. **"annual target"**: the quantity of water in af to be bypassed to the river based upon anticipated watershed yield, within the target year.
5. **"anticipated watershed yield"**: the expected annual yield of water to the Santa Fe River and the municipal reservoirs within the Santa Fe River upper watershed, expressed as the percentage of the historical average; the anticipated watershed yield is estimated as of April 15th using the best available information including the amount of snow, both as depth (in inches) and snow-to water equivalent (in inches) at the weather stations in the upper watershed (Santa Fe and Elk Cabin); the Santa Fe Basin forecast predictions from Natural Resource Conservation Service (NRCS); weather forecast from the National Weather Service and NOAA; and any other pertinent appropriate weather-related information.
6. **"below Nichols gage"**: the stream gaging station 08316505 located below Nichols Reservoir, or at a comparable location of measurement at or below the outlet from Nichols Dam; this is the measuring point for target flows administration under these Administrative Procedures.
7. **"Buckman Direct Diversion Project (BDD)"**: a water supply project that provides water supply to the region using the San Juan Chama Project water and Rio Grande surface waters; the project began producing water in January of 2011 and is expected to be fully operational by July of 2011.
8. **"bypass constraint"**: an operating 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.
9. **"bypass flows"**: generally, water that flows past a diversion or storage facility. In these Administrative Procedures, it refers to water that the City chooses not to store in the municipal reservoirs and thus allows to flow to the Santa Fe River below Nichols Reservoir

provided that the rate at which the bypass flow is passed through the outlet works of Nichols Reservoir dam is always equal to or less than the stream inflow at the ‘above McClure’ gage.

10. **“critical-dry year”**: a year in which the anticipated watershed yield is less than 30% of the historical average watershed yield.
11. **“critical-dry year hydrograph”**: the graphical representation of the desired target flows in critically dry years in which the annual discharge is 300 afy.
12. **“cubic feet per second (cfs)”**: a *rate* of water flow; one cubic feet per second equals two acre-feet per day and 0.65 million gallons per day
13. **“daily target flow”**: the desired daily stream flow at the below Nichols gage.
14. **“dry year”**: a year in which the anticipated watershed yield is between 30% and 75% of the historical average watershed yield.
15. **“dry year hydrograph”**: the graphical representation of the desired target flows in dry years in which annual discharge is scaled down from 1000afy (to between 300 and 700 afy) based on decreased, anticipated watershed yield.
16. **“flow manager”**: a member of City of Santa Fe staff responsible for managing releases of water to the River, record-keeping, reporting, and determining changes to daily target flows as prudent under adaptive management; the flow manager is the River and Watershed Coordinator, unless otherwise designated by the City Manager.
17. **“flow operator”**: a water Division staff member responsible for making water utility system adjustments to meet the daily target flow and for measuring and recording the actual stream flow.
18. **“historical average watershed yield”**: the average of annual yield of stream flow in the Santa Fe River within the Santa Fe River upper watershed as determined by stream flow measurements at USGS gage 08316000 (Santa Fe near Santa Fe) and USGS gage 08315479 and 08315480 (18-inch and 8-foot above McClure Reservoir, respectively); between 1914 to 2007 the average annual yield measured at Santa Fe near Santa Fe gage was 4,909 af.
19. **“hydrograph”**: a graphic representation of the variation in stream discharge, in cubic feet per second, plotted against time.
20. **“municipal reservoirs”**: the reservoirs on the Santa Fe River in the upper watershed - Nichols and McClure with 684 and 3,256 acre-feet of capacity, respectively.
21. **“natural hydrograph”**: the graphical representation of stream flow as it varies over time in response to climatic (snow melt, precipitation) and man-made (storage, urban storm flow runoff) conditions. The natural hydrograph herein refers to the condition prior to the addition of the target flows governed by these Administrative Procedures, as measured on the Santa Fe River at the existing stream gage locations.
22. **“public process”**: the public engagement and community outreach process through which the objectives for river flows were developed. From December 2010 through February 2011 input was gathered through conversations with over thirty stakeholders (including many River Commissioners) and two community meetings with over ninety, culturally and generationally diverse participants.
23. **“river”**: The Santa Fe River reach that begins below Nichols Reservoir
24. **“release flows”**: the flows from the outlet works of Nichols Reservoir that are discharged from Nichols dam in order to manage flood or potential flood flows.
25. **“spills”**: flows from Nichols Reservoir that are discharged over the Nichols dam spillway when the reservoir is full.
26. **“target flows”**: the daily, seasonal or annual amount of water (as a volume or a rate) desired in the river as measured at the below Nichols stream gage. The quantity is variably identified in various sections of the Administrative Procedures depending upon the anticipated watershed yield.
27. **“target hydrograph”**: means the graphical representation of the daily target flow

necessary to provide up to 1,000 acre-feet of water in the Santa Fe River as measured at the below Nichols gage. The quantity of water is variably identified in several sections of the Administrative Procedures for Target Flows in the Santa Fe River depending upon anticipated watershed yield.

28. **“target year”**: the period beginning April 15th and continuing through April 14th the following year; this definition allows the flow manager to adjust the target flows as necessary according to anticipated watershed yield from the mountain snow pack.
29. **“upper river”**: the reach in the river for which target flows are maintained year-round to support all aspects of a healthy riverine and riparian ecosystem; at a minimum as far as Two-Mile Pond, and ideally, as far as the head gate for the Acequia Madre.
30. **“water service”**: water provided to a customer through the municipal water utility system.
31. **“water service emergency”**: a situation that would cause an interruption in the Water Division’s ability to provide water service or that threatens public health and safety.
32. **“water system”**: the water utility system owned and operated by the City, and includes without limitation all the physical plant, wells, pumps, transmission and distribution facilities, water treatment facilities, storage facilities and all water rights and rights to water owned by the City for use in its water utility.

Article IV – Administrative Procedures

4.1 Objectives

4.1.1 Target Flow Objectives

- a) Create an ecologically healthy vegetative corridor
- b) Benefit the entire community with flows (e.g., equity)
- c) Nurture a beautiful, natural urban greenspace with water in an arid environment
- d) Provide an educational resource for schools and steward the resource for the community

4.1.2 Adaptive Management to Address Objectives and Purpose

The hydrographs presented in these Administrative Procedures provide guidance, or examples, for the administration of flows in a manner that meets the objectives and purpose of the target flows. Actual flows may be adjusted in response to watershed yield forecasts, evolving seasonal conditions and/or feedback from monitoring. When changes to daily target flows are necessary or merited (i.e., adaptive management), the flow manager and/or flow operator shall take into consideration the objectives identified above and the purpose identified for the various components of the hydrographs.

4.2 Target Hydrograph and Target Flow Seasons

4.2.1 Target Hydrograph and Target Flows

The target hydrograph (Figure 1) contains stream flow targets in cfs and af and a schedule for increasing and decreasing flows. The total volume of the target hydrograph is 1,000 afy. The target hydrograph will be adjusted in dry and critical-dry years to conform with the dry year hydrographs and critical-dry year hydrograph as described in Section 3. The schedule is approximate and subject to modification under the guidelines in the Article 4.11: Adaptive Management.

The target hydrograph includes the following aspirational goals:

- **Low Flows for the Upper River.** Flows are 0.3 cfs during the colder season from mid-

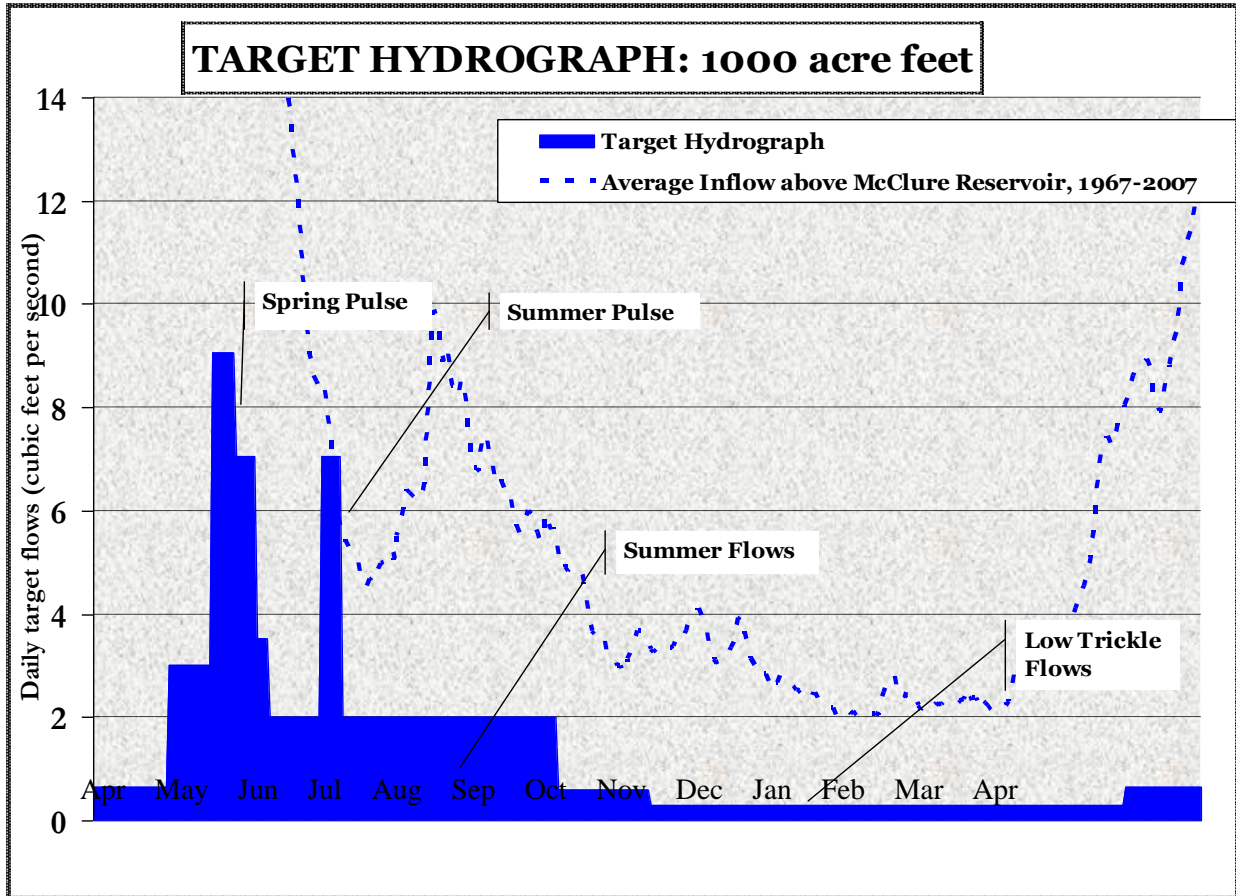
October to mid-March when vegetation is dormant. Flows increase to 0.6 cfs from mid-March to early May and from mid-September to mid-October. The purpose of the mid-September to early May flows is to provide for flows in the upper river to:

- support plant life with irrigation and maximize riverine and riparian ecological health;
 - recharge ground water, subsurface flows and bank storage during periods of plant dormancy to increase availability of water in the warmer months;
 - maintain a wet environment to support the life cycles of macroinvertebrates;
 - recharge local groundwater and sub-surface flows;
 - ensure a wetted river bed so that spring and summer flows will travel farther and more efficiently along the river course.
- **Spring Pulse.** Flows are 3 cfs for two weeks beginning in early May, then increase to 9 cfs for a week following, and then drop to 7 cfs for a week in early June. The purpose of the spring pulse is to provide as much water to the river reach (including San Ysidro crossing and the intersection with Route 599) as feasible. The timing and magnitude of the spring pulse is designed to provide necessary flows through downtown for the Fishing Derby and River Festival and for the blessing of the river in the village of Agua Fria around the day of San Ysidro, patron of the crops. The purpose of the spring pulse is to:
 - mimic natural spring runoff that is provided by the melting of accumulated winter snows;
 - irrigate the trees and other vegetation along the river corridor to support the typical spring time activities within tree/plant (and faunal) annual life cycles as plants are beginning to draw water, beginning to produce buds and leaves;
 - extend surface water flows as far as possible with the objective of reaching beyond the San Ysidro crossing down to the City's Waste Water Treatment Plant;
 - recharge local groundwater and sub-surface flows;
 - continue the process of ground water recharge that will benefit plant life into the summer months.
 - **Summer Flows.** Flows are an average of 2 cfs from mid-June to mid-September. The flow manager may increase or decrease the flow rates to meet flow objectives, with particular regard for major events in Santa Fe, provided that the average is maintained and flows are not reduced below .3 cfs.

The purpose of the summer flows is to:

- provide flows through downtown, and the Santa Fe River Park, for aesthetic and social benefit;
 - supply irrigation to enhance the river's function as an appealing urban greenbelt;
 - recharge local groundwater and sub-surface flows;
 - maintain the wetted river bed so that flows from rainfall events will travel downstream farther and more efficiently.
- **Summer Pulse.** Flows are 7 cfs for one week in early July. The purpose of the summer pulse is to:
 - push flows once again downstream to San Ysidro Crossing and the river's intersection with Route 599 during the hot and dry periods in advance of the summer monsoon rains;
 - sustain vegetation during the hottest time of year, with moisture for new/germinating seedlings, and ultimately enhancing the river corridor as an appealing urban greenbelt;
 - provide flows for river bank irrigation and wetting of the river bed in the period between spring runoff and the likely arrival of monsoon rainfall.

Figure 1



4.3 Dry and Critical-Dry Year Target Flow Reductions

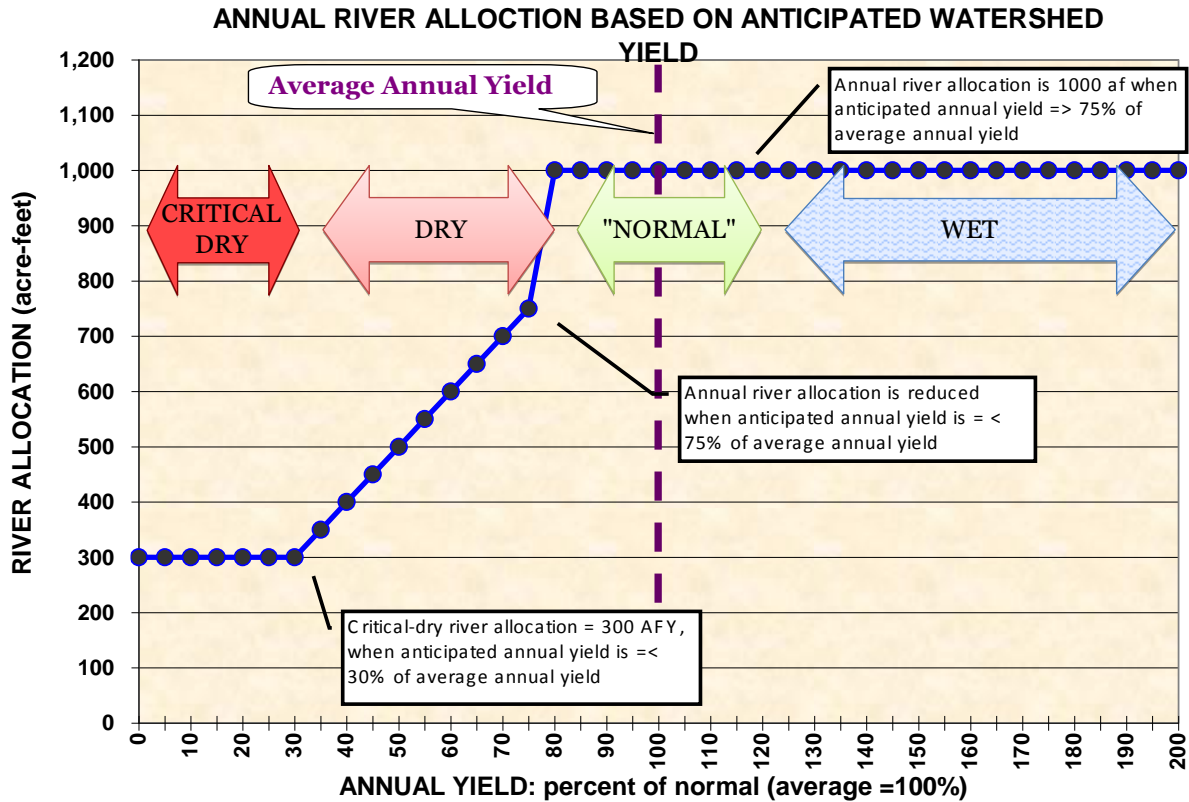
4.3.1 Reduction of Target Flows in Dry and Critically Dry Years

A dry year is defined as a year in which the anticipated watershed yield is equal to or less than 75% but greater than 30% of historical average. A critical-dry year is a year in which the anticipated watershed yield is equal or less than 30% of the historical average. In dry and critical-dry years, the total volume of the target hydrograph (1,000 af) will be reduced, by multiplying 1,000 by the percentage of the anticipated watershed yield:

$$\text{TargetHydrograph} \times \text{AnticipatedWatershedYield}_{\text{yearX}} = \text{target flows}_{\text{yearX}}$$

For example, in a year where the anticipated watershed yield is 65% of average, the target flow for the target year is calculated by $1,000 \text{ af} \times 65\% = 650 \text{ af}$. The reduction calculation is depicted graphically in Figure 2.

Figure 2



4.3.2 Dry Year Hydrographs

In dry years, the flow manager will allot the timing and magnitude of the daily target flows in a manner consistent with the following guidelines:

- (a) reduction in summer flows,
- (b) scaling-down – but not eliminating – the spring pulse and,
- (c) reduction in low flows from 0.30 cfs to 0.15 cfs.

The timing and magnitude of dry year target flows for 700 af, 600, afy, 500 afy, and 400 afy are described in the Dry Year Hydrographs in Appendix A.

While scaling back the quantity of the annual target flow in dry years, the priority is to provide for spring and summer pulses to fulfill the purposes of the pulses as outlined for the 1000 afy target flow in section 4.2.1 above.

4.3.3 Critical-Dry Year Hydrograph

In critical-dry years, in which the total target flows equal 300 af per target year, the daily target flows will be managed in a manner consistent with the following guidelines and as illustrated by Figure 3:

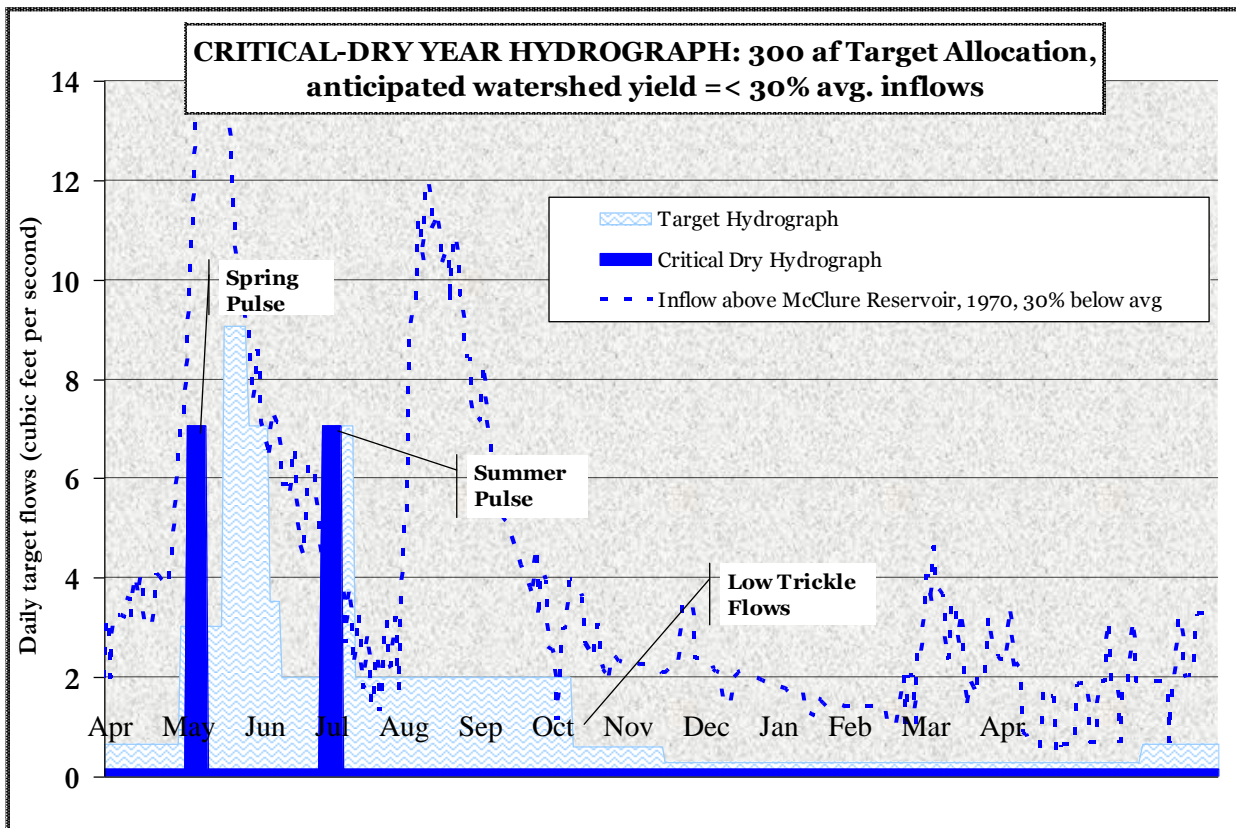
- a) sustained low flows of 0.15 cfs,
- (b) one spring and one summer pulse, each of approximately 100 afy.

The schedule of the pulses shall generally follow the timing of the pulses in the target

hydrograph. The magnitude of the pulses shall be approximately 7 cfs, provided that the daily target flows are within the bypass constraint. The river shall retain flows of at least 300 afy barring an emergency or unforeseen infrastructure constraint (e.g., failure of Nichols’s Reservoir outfall structure). The purpose of the critically dry year hydrograph is to maintain a wet corridor in the upper river for riverine and riparian ecological benefit while providing two downstream pulses for the purposes of the pulses as outlined for the 1000 afy target flow in section 4.2.1 above.

In critical-dry years, since the daily target flows for the Fishing Derby cannot be reliably met, the Fishing Derby will be suspended.

Figure 3



4.4 Wet Year Flows

During wet years, defined as when the anticipated watershed yield is greater than the historical average, the river will be allocated water according to the target hydrograph (e.g., 1,000 afy) in the target year. In wet years, the actual daily flows will likely be greater because of flow contributions from reservoir flood management, and because of greater flows within the urban watershed. These greater daily flows will meet many of the objectives described in Article 4.1. Furthermore, the irrigation needs of the river corridor will be supplemented by the above-average spring precipitation. By not increasing the target hydrograph in a wet year, in wet years the City may be able to put the full amount of the City’s Santa Fe River water rights under License 1677 to beneficial use and thus rest the City’s well fields and use of local groundwater resources.

4.5 Management and Accounting of Releases and Spills

4.5.1 Management of Municipal Reservoir Flood Flows

The City manages the municipal reservoirs in part, in a way that protects the river and the urban watershed from floods. Flood management includes both the capture of peak inflows from the upper watershed and the management of release flows and spills from Nichols and McClure Reservoirs.

Pursuant to Article 25-13 SFCC 1987, the flow manager and flow operator are directed to manage, as much as possible, the release of flows and spills in a manner consistent with the target hydrograph and the objectives herein. This includes:

- a) matching the timing and magnitude of the flows,
- b) scaling the additional release flows in a manner which increases the magnitude of the spring pulse
- c) discharging the release flows in a manner to augment the magnitude of the low flow.

4.5.2 Accounting of Releases and Spills vis-à-vis the Target Hydrograph

Water that is released and/or spilled for flood management will count toward the daily target flows and target hydrograph, when the flows are within the daily target flows of the target hydrograph. If water greater than the daily target flows is released or spilled into the river, the quantity of water that exceeds the daily target flow will not be counted toward the 1,000 afy of the target year. For example, if the total planned target flow for a period of May 20 to June 3 is 300 af, but necessary reservoir management results in actual flow of 1,000 af, then 300 af shall be counted toward the planned commitment and 700 af shall not be counted, provided that the 300 af met the daily flow targets desired under the target hydrograph.

The purpose of allowing water spilled or released to count toward the 1,000 af target hydrograph is so that the municipal water utility can store excess water in wet years for water supply to compensate for the additional use of groundwater required in critically dry years. The water released or spilled in excess of the target hydrograph and daily target flows cannot be stored and released for the river later in the season because of the water right and storage limitation discussed in the next section.

- 4.5.3 Except as described above in section 4.5.2, the 1000 acre-feet volume of water shall not include water released for any other purpose at the time of release.

4.6 Water Rights

4.6.1 Use of the City's Santa Fe River Water and Storage Rights

The City is not using any of the water rights under License 1677 and Declaration No. 01278 to comply with Article 25-13 SFCC 1987. The City will continue to periodically put all the water rights under License 1677 and Declaration No. 01278 to beneficial use.

4.6.2 Bypass Constraint

In order to assure that the administration of Ord. No. xxxx does not adversely interfere with the storage, diversion and use of water under License 1677 and Declaration No. 01278, the flow manager and flow operator will manage the daily target flows in a manner such that the target flows will not come out of water stored under License 1677 and Declaration No. 01278 in the municipal reservoirs. This means that the City will not discharge water to the river that it has stored. To accommodate this constraint, the flow operator will regulate the daily target flow in a

manner such that discharges from Nichols Reservoir to the river shall not be greater than the daily inflow into McClure Reservoir; hence the flow operator will only bypass water for daily target flows.

4.6.3 Recognition of Other Surface Water Right Users

The City recognizes that there are other surface water right holders of Santa Fe River surface water, including those with partially adjudicated rights. Nothing in these Administrative Procedures should be construed to define, manage or be in conflict with the valid rights of other surface water right holders.

4.7 Management and Operational Procedures

Management and administration of daily target flows to the river require participation by the flow manager, flow operator, the Water Division director, other Water Division staff, and the River Commission Chair to ensure that flows are released in a timely manner according to the target hydrograph, dry year hydrographs, or the critically dry year hydrograph.

4.7.1 Flow Management

The flow manager, in consultation with the Water Division staff, shall be responsible for determining the quantity of water allocated to the target year based on the anticipated watershed yield. The flow manager will also determine the daily target flows of the target hydrograph, or deviations therefrom based on the anticipated watershed yield, by fitting the annual target and associated hydrographs to the upcoming target year. The flow manager will annually present the hydrograph for the upcoming target year to the River Commission at its April meeting for review. The flow manager will provide a copy of the target year hydrograph to the Water Division Director, the Water Division source of supply manager and the Level Four operators at the Canyon Road Water Treatment Plant for implementation.

When necessary, the flow manager may alter the daily flow targets in a manner consistent with the adaptive management objectives described in Section 11. These alterations may incorporate consultation with the River Commission Chair or designee, the flow operator, and the Water Division director. The flow manager will be the city's river and watershed coordinator or another member of city staff designated by the city manager. All adjustments to the daily target flow shall be made via email to the Water Division Director, the Source of Supply Manager, the Canyon Road Water Treatment Plant Level 4 Operators. The River Commission Chair shall be copied (cc:) on all communications directing the adjustment of daily target flows.

4.7.2 Flow Operations

The flow operator shall be the Water Division Source of Supply staff person on duty and responsible for controlling the daily release rates. The flow operator will adjust the discharge water from Nichols Reservoir in accordance to the daily target flow, and record the actual daily flow at the below Nichols gage. The flow operator may reduce the daily flow target to match daily inflow at the McClure reservoir, should the daily flow target exceed the daily inflow.

4.7.3 Flow Adjustment Infrastructure

The flow operator adjusts the daily target flows for the river by regulating the “splitter box” valve at the Canyon Road Water Treatment Plant control panel, and then sending a system operator to the below Nichols gage to see what effect the adjustment had on the actual instantaneous flow. Because of the cumbersome nature of this procedure, the daily flow targets in these Administrative Procedures are adjusted no more than weekly. Should, in the future, the outlet works be reengineered to be more nimble, and the below Nichols gage provide real time data, the daily target flows may be managed and adjusted more frequently, in particular in response to

climatic conditions.

4.8 Emergencies and Flow Adjustment

To help prevent an interruption in water service and to protect public health and safety, target flows to the river may be adjusted during a water emergency. Upon implementation of a Water Emergency Management Plan, target flows to the Santa Fe River will be adjusted pursuant to Chapter 25-5.6 and Exhibits C (Water Warning Orange) and D (Water Emergency – Red) SFCC 1987.

4.8.1 Water Emergency Implementation Stages

If the operational water system supply as determined by the water division director's sole discretion, equals between eighty percent (80%) and ninety-nine percent (99%) of operational water system demand, the city manager may declare a "Water Warning - Orange" water emergency implementation stage. If the operational water system supply as determined by the water division director's sole discretion, is less than eighty percent (80%) of operational water system demand, the city manager may declare a "Water Emergency - Red" water emergency implementation stage.

Chapter 25-5, Exhibit C (Amended: November 30, 2011 by Ord. No. 2011-38) states that under "Water Warning – Orange" water emergency implementation stage, target flows to the Santa Fe River may be suspended.

Chapter 25-5, Exhibit D (Amended: November 30, 2011 by Ord. No. 2011-38) states that under "Water Emergency – Red" water emergency implementation stage, target flows to the Santa Fe River shall be suspended.

4.9 Monitoring

The City shall monitor the impacts of providing daily target flows to the river, to determine whether the objectives identified in Section 4.1 are being met. Monitoring will provide the feedback necessary for the flow manager to institute adaptive management as identified in Article 4.11; and/or to amend these Administrative Procedures to ensure that the objectives and purposes of the target flows are being met to the fullest extent possible. City staff will coordinate and collaborate with community volunteers, local non-governmental organizations and other agencies to implement a monitoring program.

4.9.1 Stream flow

The City will continue to monitor stream flow (in cfs) at 15 minute increments at the below Nichols gage and the above St. Francis gage. Each of these gages will be calibrated periodically to assure high quality data.

4.9.2 Wetted Distance

The City, in conjunction with community volunteers and cooperating agencies, shall develop a methodology by which the distance the daily target flows have traveled can be measured.

4.9.3 Future Monitoring

The City shall consider additional river monitoring that will assist in adaptive management and in determining appropriate daily target flows in the future. Potential parameters include:

Soil moisture: to understand the water available for riparian vegetation under varying daily target flows, hydrographs, and climatic conditions;

Ecological health indicators: the presence, location, and characteristic of flora and fauna in the river corridor;

Storm flow peak: to understand if or the how the target flows have altered the timing and magnitude of urban storm runoff;

Water quality: to understand if or the how the target flows have altered the water quality in the river;

Surface water infiltration: to understand the temporal and spatial distribution of stream flow loss;

Surface/ groundwater interaction: to understand the fate of stream flow infiltration, and the contribution, if any, of groundwater to surface water.

4.10 Accounting and Reporting

4.10.1 Flow Accounting

The flow manager, with data provided by the Water Division and flow operator, shall account quarterly for the volume of water released per target year at the below Nichols gage using the assumption that all water passing the gage has either been discharged pursuant to Article 25-13 SFCC 1987, spilled or released. The flow manager shall make adjustments as necessary to manage the target year water allocation. The basis of the volumetric accounting will be the official below Nichols gage record, and shall identify the periods of time during which flow estimates were estimated (missing stream flow data results from frozen equipment, battery failure, equipment vandalism, etc). Interim estimates can be made using the actual daily flow as recorded by the flow operator and reported on the daily water report. Released or spilled water shall be accounted as described in Section 5.

4.10.2 Reporting

The City shall endeavor to keep elected officials, the River Commission, the city manager, the Water Division director and the public informed regarding the activities associated with Article 25-13 SFCC 1987. The reports outlined below identify specific reporting recommendations.

Report on Annual Target and Hydrograph for Upcoming Year

After April 15th, the flow manager will report by email to the River Commission, the Water Division director, Public Utilities Committee and the city manager the target year hydrograph based on the anticipated watershed yield. The report shall include the relevant information on which the anticipated watershed yield was based (e.g., NRCS basin forecasts, snow-to-water equivalent from SNOTEL sites in the upper watershed, climate predictions for the National Weather Service and NOAA). The target year hydrograph will be posted on the City's website.

Annual report

At the end of each year, the flow manager shall prepare reports which describe the previous year's activity relevant to Article 25-13 SFCC 1987. For the previous target year the report shall include the daily actual stream flow data (daily mean and cumulative), the annual volume released, and annual flow, a summary of routine or special activities along the river (e.g., Fishing Derby, River Festival) a description and explanation of deviations from the target hydrograph, observations or recommendations related to adaptive management, and an estimate of the amount of groundwater pumped to accommodate the daily target flows. For the current target year, the

report shall include the annual target quantity and the target hydrograph. The flow manager will submit the report to the River Commission, the Public Utilities Committee, the City Council, and post the report to the City's website.

Periodic Actual Stream Flow Report

The flow operator and Water Division staff will record and track actual daily flow at the below Nichols gage in an Excel-compatible spreadsheet. The flow operator shall send the electronic spreadsheet to the flow manager approximately monthly.

Daily Water Report

The flow operator and Water Division staff will report actual daily flow at the below Nichols gage on the Daily Water Report, which is emailed to any interested party and posted on the City's website.

4.11 Adaptive Management

4.11.1 Adaptive Management Goals

The goal of Article 25-13 SFCC 1987 is to provide for flows in the river, while providing the City with flexibility in managing both the water supply system and river flows. The target hydrograph, dry year hydrographs and critically dry year hydrograph are designed to match Article 25-13. \, and these Administrative Procedures, that the flows to the river be managed in a manner to optimize the benefits of the flows to meet the objectives. Hence, these procedures allow for and encourage adaptive management, provided that the annual target is not impacted.

4.11.2 Adaptive Management Conditions and Considerations

The following conditions and considerations may influence or provide cause for adaptive management:

- a. High flows or flood risk
- b. Timing, intensity and/or scale of monsoon events
- c. Periods of exceptionally dry weather
- d. Scheduled community events
- e. Maintenance/improvement work within the river channel or on water supply infrastructure
- f. Maintaining daily target flows equal or below inflow into McClure Reservoir
- g. Feedback from monitoring data
- h. Change in snowpack or watershed yield conditions (e.g., late snowfall) after the beginning of the flow year

5. Annual Fishing Derby

The City of Santa Fe's Annual Fishing Derby takes place each year on the first Saturday in June. The Fishing Derby provides opportunities for children and families to join with neighbors to experience a fun and engaging day by the river, to learn about the Santa Fe River and riparian ecology, and to learn fishing skills.

In dry years when the anticipated watershed yield is less than 50%, or, if for other climatic or hydrologic reasons daily target flows adequate for the Fishing Derby cannot be met, the date of the Fishing Derby may be changed or the Fishing Derby will be suspended.

(Resolution No. 2012-52)

6. Miscellaneous Provisions

- 6.1 **Amendments.** These Administrative Procedures may only be amended pursuant to a duly adopted resolution of the Governing Body.
- 6.2 **Severability.** In the event that a court of competent jurisdiction shall determine that any provision these Procedures are invalid, unlawful or unenforceable, the remainder of these Administrative Procedures shall remain in full force and effect.

Appendix A
Dry Year Hydrographs

