

WaterSMART Basin Study Proposal: City of Santa Fe and Santa Fe County, New Mexico

Introduction

To increase the sustainability of their water supply, the City of Santa Fe (City) and Santa Fe County (County) water utilities have developed new surface water sources. The Santa Fe river, like many surface waters in the arid Southwest, is vulnerable to climate-change-induced impacts (Figure 1¹). In this proposed Basin Study, the City and County are seeking the assistance of the Bureau of Reclamation to better understand the future effects on and associated risks from surface water use in three sub-basins: the Santa Fe River watershed, the upper Rio Grande watershed (upstream from Otowi stream gage) and the San Juan River watershed, as the source water for the San Juan-Chama Project water.

The City and County water utilities have a diverse water supply portfolio, providing water to their customers with surface water from the three previously identified sub-basins and groundwater from two well fields.

Additionally, thousands of domestic wells provide water to users outside the utility service area, but within the Santa Fe sub-basin. Groundwater overuse over the past four decades has led to significant declines in aquifer water levels and growing depletions of water from nearby streams, rivers, and springs to which the aquifers are connected.

The City and County have addressed the water imbalance in multiple ways. Aggressive water conservation programs have reduced utility customer demand by 42% since 1995, which has brought the current demand down to less than 110 gallons per capita per day. Additionally, the City and County have reduce their reliance on groundwater mining by recently constructing a surface water diversion and treatment facility, the Buckman Direct Diversion (BDD), through which the utilities' customers receive water from the Bureau of Reclamation's San Juan-Chama Project and native Rio Grande surface water. Both water utilities have also embarked on long-range planning efforts to identify future water supply deficiencies and to identify strategies for meeting those shortfalls.

With this proposed Basin Study, the City and County intend to build on previous water planning efforts to incorporate the predicted impacts of climate change into 40-year water availability estimates and water demand projections. The City and County will then use these projections to develop adaptation and mitigation strategies to maintain a continuing supply to customers under the projected conditions. This study proposes to use the City's water supply system multi-criteria decision support model (WaterMAPS=Water Management and Planning Simulation) to evaluate the ability of various alternatives, or groups of alternatives, to best meet future demand vis-à-vis desired criteria (cost, implementability, environmental impact, etc).

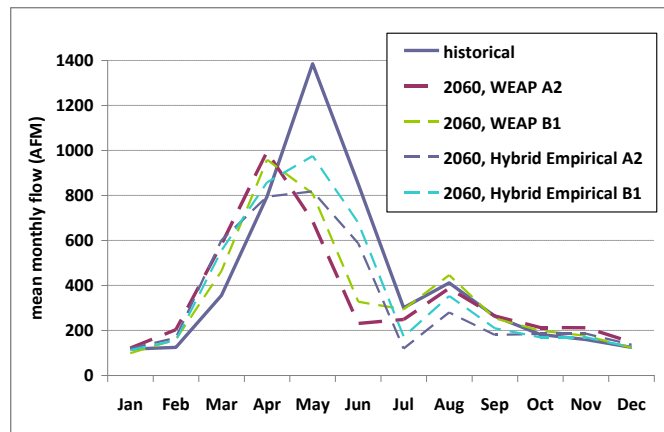


Figure 1. Projected reduction in monthly stream flow to the Santa Fe River in 2060¹.

¹ Cox, T.J., Lopez Calva, E, and Navato, A.P., Quantifying Climate Change in Water Supply Planning for a Snowpack-Driven Watershed, AWRA 2011 Spring Specialty Conference, 2011

Basin Study Information

Sub-basins

The sub-basins of interest for this proposed Basin Study are threefold: Santa Fe river watershed, Upper Rio Grande sub-basin (upstream of Otowi Gage), and San Juan River sub-basin (source of San Juan-Chama Project water, Figure 2). Each of these sub-basins is a source of surface-water supply for the City and County. The first two sub-basins are within the Rio Grande basin; the third lies within the Upper Colorado River basin.

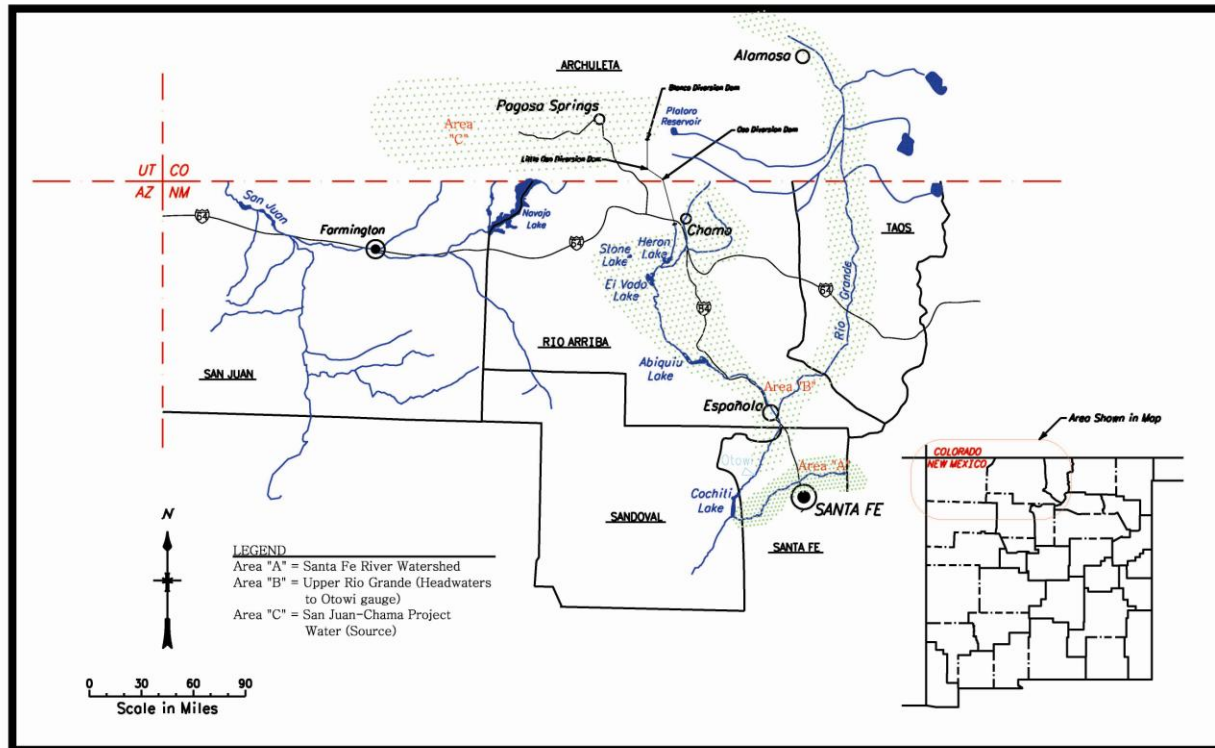


Figure 2. The Santa Fe watershed (shaded green) receives water supply from the Santa Fe sub-basin, the upper Rio Grande sub-basin (green stipple) and the San Juan Chama River sub-basin (green stipple).

Study Area

As can be seen in Figure 2, the study area for this Basin Study includes significant portions of northern New Mexico and southern Colorado. The Santa Fe watershed (Area A, Figure 2) constitutes the primary water supply for the City. The City and County also divert water from the Rio Grande (Areas B, Figure 2) and San Juan-Chama Project water (Areas B, Figure 2) as parts of their supplies, so the origins of these surface water supplies are important to the availability and sustainability of the Santa Fe's water supply, and are therefore important components of this study.

Project Costs

The proposed project is expected to cost \$421,256, with 53% contributed by the Project Partners and the remainder by Reclamation. Forty-five percent of the costs are in-kind contributions by City, County, and Reclamation staff, with the remainder earmarked for specialized services from consultants and cooperators. Total costs, as well as the break down of cost by task and by City, County, and Reclamation contributions, is presented in the Cost Table below.

Costs for City of Santa Fe and Santa Fe County Basin Study Proposal	City of Santa Fe:		Santa Fe County:		City of Santa Fe: Contracts		Stakeholders (JyS, EBRIF, SJC Contractors)		Reclamation:		Reclamation: Agreements/IDIC/Cooperators	
	Labor Hours	Value	Labor Hours	Value	Value	Contractor					Value	Contractor
Task 1a: Study preparation - compile supporting information	12	\$864	10	\$700			15	\$750	10	\$809		
Task 1b: Study preparation-Preliminary Assessment Report	160	\$11,520	16	\$1,120	-				40	\$3,237	-	
Task 2a: Prepare data sets-develop climate change - impacted		\$0		\$0					30	\$2,428	\$30,000	Sandia National Labs
Task 2b: SJC firm yield analysis		\$0		\$0			20	\$1,000	610	\$50,000		
Task 3: Update and enhance WaterMAPS	200	\$14,400	40	\$2,800	\$55,000	CDM			20	\$1,618		
Task 4a: Assess climate change impacts on City and County water supplies	100	\$7,200	10	\$700	\$25,000	CDM	15	\$750	30	\$2,428		
Task 4b: Assess climate change impacts on Santa Fe watershed	80	\$5,760	8	\$560			40	\$2,000	60	\$4,855		SFWA, Earthworks, TNC, etc
Task 5a: Develop and analyze mitigation and adaptation options	400	\$28,800	80	\$5,600	\$40,000	CDM			80	\$6,474	\$80,000	CDM/ Sandia National Labs
Task 5b: Prepare Santa Fe basin Water Supply Plan	200	\$14,400	40	\$2,800			30	\$1,500	200	\$16,184		
Sub Total	1152	\$82,944	204	\$14,280	\$120,000			\$6,000	1079.76	\$88,032	\$110,000	
Non-Federal/Reclamation								\$223,224				\$198,032
Non-Federal/Reclamation								53%				47%
BASIN STUDY TOTAL												\$421,256

Cost-share Partners

City of Santa Fe Water Division
Claudia Borchert
801 W. San Mateo, Santa Fe, NM 87505
(505) 955-4203; ciborchert@santafenm.gov

Santa Fe County Water Utility
Karen Torres
424 NM 599, Santa Fe, NM 87504
(505) 992-9871; ktorres@santa.co.us

Basin Study Partners

Bureau of Reclamation Albuquerque Area Office, Upper Colorado Division
Dagmar Llewellyn, Water Management Division
555 Broadway, NE, Suite 100
Albuquerque, NM 87102
(505) 462-3594; dllewellyn@usbr.gov

Reclamation Regional Contact

Jonne Hower
Upper Colorado Regional Office
UC 416,
125 S. State St., Rm 6107
Salt Lake City, UT 84148
(801) 524-3634; jhower@usbr.gov

Supporting Stakeholders

Fifteen supporting stakeholders are listed in #5 under the Proposal Evaluation Criteria on page 10, and four supporting letters are attached.

Study Abstract

The surface water supplies of the City of Santa Fe and Santa Fe County are predicted to be significantly impacted by future climate change. The objective of this Basin Study is to quantify the potential impact of climate change on the potentially available water supply from each of the three sub-basins that supply surface water to Santa Fe. This process will be based on the Upper Rio Grande basin-scale climate risk assessment, which is currently underway through the Albuquerque Area Office of Reclamation. This climate risk assessment will identify the potential impacts of the predicted temperature and precipitation patterns on stream flow, reservoir evaporation, soil-moisture content and, to a lesser degree, groundwater recharge. The Basin Study will also assess the vulnerability and possible shortcomings of the current long-

range water supply strategies, and evaluate and adopt new mitigation and adaptation strategies into the resulting sub-basin water supply plan, as necessary. The study will consider adaptation and mitigation options such as aquifer storage, surface-water storage, water conservation, storm water management and use, and treated effluent use. Another objective of this Basin Study is to assess the impacts of climate change on the Santa Fe watershed agriculture and local food production, land use, ecosystem, and water demand (potable, agriculture, riparian, upland, etc).

Study Outline

To accomplish the Basin Study proposed herein the City and County, in consultation with our technical advisor from Reclamation, have identified the following five tasks. The partners involved with each task or subtask are identified in the parenthetical italics following. Details on the value of in-kind labor hours or contracts are detailed in the Cost Table. Deliverables and stakeholder involvement opportunities are identified where appropriate.

1. Study preparation

- a. Compile supporting information, including information from the Upper Rio Grande Climate Risk Assessment, Upper Colorado River Climate Risk Assessment, recent population data for the City and County, County water rights, water supply and future demand (*City, County, and Reclamation*);

- b. Prepare preliminary assessment report of qualitative climate change impacts on water supply sources, as per of Santa Fe Resolution 2011-017 Directing Staff to Prepare An Assessment of Potential Climate Change Impacts to the City's Water Supplies and to Revise the City's Long Range Water Supply Plan as Necessary (*City, County, and Reclamation*);

Deliverable: Preliminary Assessment Report: Climate Change Impacts on the Santa Fe Watershed and Mitigation and Adaptation Alternatives

Stakeholder Involvement: 1 public meeting and website blog to gather adaptation and mitigation alternatives from in-basin stakeholders; presentation of Preliminary Assessment Report to City and County governing bodies

2. Prepare datasets

- a. Process and format results from the URGSiM model that was used for the Upper Rio Grande Climate Risk Assessment as needed for input into Santa Fe water management model (Water MAPS)(*Reclamation*);

- b. Analyze San Juan-Chama firm yield, including the impact of increased evaporation loss and long-term carry-over storage at Heron Reservoir (*Reclamation*);

Deliverable: Technical Memorandum identifying the data, method and results of Reclamation's calculation of the potential San Juan-Chama Project Water firm yields under multiple future projected climate change conditions

Stakeholder Involvement: Presentation of results to San Juan-Chama Contractors Association, and sharing of data with stakeholders

3. Update and enhance Stella WaterMAPS model

- a. Incorporate range of hydrologic variability from paleoclimate streamflow record (tree-ring analysis performed in Santa Fe upper watershed) (*City and CDM*);
- b. Incorporate snowpack/runoff relationship¹(*CDM*);
- c. Incorporate County water rights, water supply (primarily native Rio Grande), and demand projections (*County, City and CDM*);

- d. Develop simulations using climate-change-impacted hydrologic projections developed in Task 2 (*Reclamation*);
- e. Develop City and County demand projections under future climate change conditions by linking current demand to appropriate independent variables such as season, weather condition, and socioeconomics (*CDM*);
- f. Incorporate changes in magnitude and timing of available supply from the San Juan-Chama project (*City and CDM*);
- g. Establish future reservoir evaporation rates by developing a regression model as a function of mean monthly temperature (*City and CDM*);

Deliverable: Technical Memorandum documenting the new input data for WaterMAPS with a description of the source and analysis of the data where appropriate (*CDM*)

4. Assess adequacy of current water supply plan strategies and watershed health under future climate-change-induced conditions

- a. Use updated WaterMAPS model to evaluate impacts on timing and magnitude on supply imbalance, need and frequency of mandatory demand restrictions, reliance on groundwater beyond “sustainable” levels, and the 1,000 acre-feet for Santa Fe ‘Living’ River Initiative (*City, County, Reclamation, CDM*);

Deliverable: Technical Memorandum documenting quantitatively how the Santa Fe watershed may be impacted under various projected climate change scenarios. (*City, County, Reclamation, CDM*)

Stakeholder Involvement: update to Jemez y Sangre Regional Water Council and Espanola Basin Regional Issues Forum

- b. Assess impacts of climate-change induced changes on ecosystem and watershed health, land use, local food production, and landscape resiliency (*City, County, Reclamation*);

Stakeholder Involvement: ½ day workshop with technical experts and interested stakeholders to identify and assess climate induced impacts on the Santa Fe watershed

5. Use updated WaterMAPS model to evaluate adaptation and mitigation options

- a. Develop and analyze options, program options in WaterMAPS; revisit objective weighting of criteria by which options will be evaluated; evaluate options or option portfolios with WaterMAPS. Options may include change in operating rules, change of agreements, aquifer storage and recovery using storm flows, excess BDD capacity, and/or unused County water rights, increasing above-ground storage, increased conservation, and demand management (*City, County, Reclamation, CDM*);
- b. Prepare final report: Santa Fe Basin Water Supply Plan (*City, County, Reclamation, CDM*);

Deliverable: Santa Fe Basin Water Supply Plan that incorporates potential climate-change impacts.

Stakeholder Involvement: 1 public meeting to share results with public; meeting with adoption of Regional water supply plan by City and County governing bodies; update to Jemez y Sangre Regional Water Council, Espanola Basin Regional Issues Forum, and San Juan-Chama Contractors Association

Study Schedule

The City, County, and Reclamation anticipate this completing this proposed Basin Study within 22 months of initiation. A schedule of the individual tasks is included on the subsequent page.

Schedule for City of Santa Fe and Santa Fe County Basin Study Proposal	Months after Study Start																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Task 1a: Study preparation -compile supporting information																						
Task 1b: Study preparation- Preliminary Assessment Report																						
Task 2a: Prepare data sets -develop climate change impacted hydrology for each basin																						
Task 2b: SJC firm yield analysis																						
Task 3: Update and enhance WaterMAPS																						
Task 4a: Assess climate change impacts on City and County water supplies																						
Task 4b: Assess climate change impacts on Santa Fe watershed																						
Task 5a: Develop and analyze mitigation and adaptation options																						
Task 5b: Prepare Santa Fe basin Water Supply Plan																						
City of Santa Fe/Santa Fe County Reclamation																						

Proposal Evaluation Criteria

1. The extent and consequences of anticipated imbalances in water supply and demand

Multiple analyses have concluded that a significant imbalance between water supply and demand is likely in the future for the Santa Fe sub-basin. The Jemez y Sangre Regional Water Plan, 2007 Update shows a 2060 demand for the Santa Fe sub-basin of approximately 27,000 acre-feet in 2060. The current available supplies are approximately 19,000 acre-feet, leaving a gap of 8,000 acre-feet or 30% of projected year-2060 demand (Figure 2). By 2045, the City of Santa Fe's 2008 Long Range Water Supply Plan shows the difference between available supplies and anticipated demand of 2,700 acre-feet of the total projected need of 18,100 acre-feet (15%). The water shortages may begin to appear as early as 2020s, should any dry years occur in the decade. Santa Fe County's 40-year Water Supply Plan shows adequate surface water for its planning horizon, has identified the need for groundwater "back-up" supplies, which the County will rely upon during low flows in the Rio Grande (drought) or if the surface water facility is offline. Additionally, while Figure 3

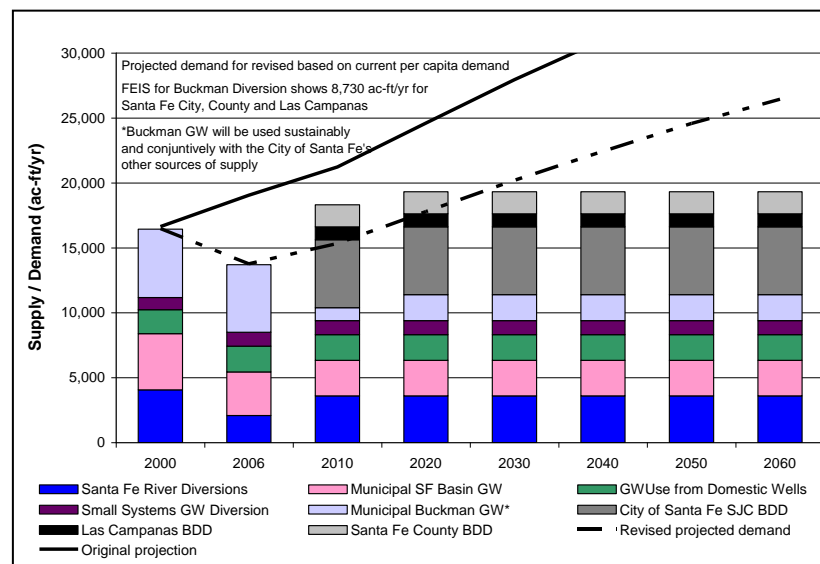


Figure 3. Water supply imbalance in the Santa Fe sub-basin from Jemez v Sangre Water Supply Plan Update 2007.

accounts for water needed for human needs, it does not factor in the water needed to sustain the Santa Fe River ecosystem, local agriculture, recreation, and other watershed needs.

Santa Fe has an arid climate and a limited water supply; therefore, comprehensive planning is necessary to assure that critical water uses are not inadvertently left out of the planning process. For example, one of Santa Fe's anticipated future water supply sources is the transfer of agricultural water rights from the Middle Rio Grande valley. Turning entirely to this source of supply may have undesirable outcomes. A significant transfer of water rights from this area upstream may result in the production of less agriculture locally, add to the 'urban island heat' effect, decrease the quality of life provided by the green space and, of national importance, threaten the long-term viability of two endangered species: the Rio Grande silvery minnow and the southwestern willow flycatcher. The need to care for these endangered species increases the risk to all Rio Grande surface water users, as providing adequate water and habitat may reduce available surface water for all other users in the basin. Additionally, the San Juan-Chama Project water, because it is under federal control, may be used to provide water for the endangered species thereby shortening deliveries to the Contractors. Climate-change-induced impacts will exacerbate the situation, forcing communities without comprehensive, long-range plans to resort to increased unsustainable groundwater use, the impacts of which might include decreased surface-water supply (since river water will leak from the rivers to fill in the depleted groundwater system), declining water quality, increased production and treatment costs, and land subsidence,.

Santa Fe is grappling with the same issues as the rest of the West: how to secure sustainable and reliable water supplies for a growing population, while preserving the watershed and riparian environment, maintaining the core values associated with quality of life (like the historic role of the Santa Fe River, and local food production). This proposed project can provide an example of how a sub-basin can develop a long-range plan in keeping with the many values that water provides within a watershed.

2. Federal involvement is needed due to the nature and complexity of the issues.

Santa Fe's water supply is impacted by four Federal Projects: Reclamation's San Juan-Chama Project facilities, Abiquiu Reservoir and Cochiti Reservoir (Corps of Engineers), and Elephant Butte Reservoir (Reclamation). The San Juan Project Water Contractors represent three Native American tribes to whom the federal government has Trust responsibilities, as well as ten municipalities, two counties and two irrigation districts. At least nine federal agencies are involved in the management, administration, or planning of Santa Fe's water: US Forest Service, US Fish and Wildlife Service, Reclamation, Environmental Protection Agency, Department of Energy (Los Alamos National Laboratory), US Geological Survey (USGS), Bureau of Land Management, Bureau of Indian Affairs and Department of Justice (Trust responsibility for Native American water rights settlements). In addition, Santa Fe's water supplies are administered by three state agencies: The NM Office of the State Engineer (OSE), the Interstate Stream Commission and the New Mexico Environment Department. Storage of the water is governed by the Rio Grande Compact, which dictates water sharing between three states and Mexico, and specifies involvement of the federal government. Many other agencies, community groups, non-governmental organizations and private citizens are stakeholders to water-use decisions within Santa Fe watershed.

The multifaceted water supply issues include growing need for increasing municipal water supply and energy production, water for endangered species and the ecosystem, Native American water right settlements, and local food production. These growing demands will be

increasingly difficult to meet in light of predicted climate change impacts. For example, Reclamation's Climate Change and Water 2011 Report identifies a decrease of stream flow at Otowi gage on the Rio Grande of 14.4% in 2050. The issues are compounded by the delayed impacts on surface water from groundwater pumping, the lack of an adjudication of water rights in the Middle Rio Grande, and an absence of comprehensive regional aquifer management. All of these issues are complex, already involve the Federal government, and will benefit by continued engagement by Reclamation.

Additionally, Reclamation has technical experts uniquely suited to provide guidance on many aspects of this project. Reclamation, through the West-wide Climate Risk Assessment, has been leading the effort to quantify the impacts of climate change on stream flow and water resources. Reclamation operates the San Juan-Chama project, and is uniquely positioned to assess the projected impacts of climate change on the firm yield of the project and the feasibility of allowing long-term, "carry-over" storage in Heron Reservoir.

Given the extensive federal involvement in regional water management in general and Santa Fe's water supply in particular, as well as the myriad of involved entities, federal government involvement will be critical to the success of this water-planning effort. Also, the adaptation and mitigation measures considered may include optimizing the use of Federal facilities (e.g. allowing longer-term, storage of water in Heron Reservoir) intergovernmental agreements, or operational changes on the Rio Grande.

3. The existence and quality of data and models available and applicable to the proposed study

This proposed study will rely heavily on the abundant, existing data and models, which are identified below. Most of the needed data has been collected under previous water supply planning efforts, including the regional Jemez y Sangre Regional Water Supply Plan, the City's Long Range Water Supply Plan, the County's 40-Year Water Plan, and the West-wide Climate Risk Assessment.

High quality hydrologic, climate, water production, population, demand, and water quality data are readily available within the Santa Fe sub-basin. These datasets include:

- Santa Fe River historical stream flow records from six stream gages covering 1912-present collected by the USGS and Watershed West under contracts with the City;
- 500 and 700-year stream flow record reconstructed from tree ring data from Dr. Ellis Margolis with the University of Arizona Tree Ring Laboratory;
- two SNOTEL weather stations sites collecting snowpack, snow-to-water equivalent, temperature, and precipitation by the Natural Resource Conservation Service (NRCS),
- seven precipitation gages (1867- present) maintained by the National Weather Service, Amy Lewis, the City and others;
- McClure and Nichols Reservoir evaporation rates estimate by the City from pan evaporation data throughout northern New Mexico,
- McClure and Nichols Reservoir storage levels recorded by the USGS and the City;
- groundwater level data from over 50 monitoring and private wells (1962-present) from the USGS, the City and County water utility;
- surface and groundwater production by individual source from the City and County;
- acequia water delivery requirements and City treated effluent production and use
- water quality from NM Bureau of Geology and Mineral Resources, City, and County;
- current population from US Census data and City Land Use Department;

- Available models within the Santa Fe sub-basin:* The primary model that will be used in this study is the decision support model, Water Management and Planning Simulation (WaterMAPS), which was developed by the City during its long-range water supply planning efforts. WaterMAPS includes a 40-year planning horizon, a future-year probabilistic simulation based on the long-term hydrologic record (currently a 60 year period), a two-year operational mode simulating a variety of hydrologic conditions, adjustable per-capita demand-based groundwater impacts with a unit response function (based on the administrative groundwater model used by the OSE for water right administration), water rights, cost estimates, infrastructure capacity, water quality, reservoir accounting, and Rio Grande Compact rules (Fig. 4).

In addition to the system simulation model, CDM tested two models of downscaling global climate models (GCMs) results to the Santa Fe sub-basin hydrology. This study will compare the results of this methodology with the methods commonly used by Reclamation throughout the west.

- Stream flow records from over twenty gages including Otowi gage (1892-present) collected by the USGS;
- reservoir storage levels and pan evaporation rates from Heron, El Vado, Abiquiu, Cochiti and Elephant Butte Reservoirs collected by Reclamation and the Corps of Engineers-reported annually in the basin Water Accounting Report;
- over twenty NRCS ‘SNOTEL’ weather stations, which record snowpack, snow-to-water equivalent, temperature, and precipitation.

High-quality, hydrologic and climate data are available within the upper San Juan River sub-basin to support evaluation of the impacts of climate change on the San Juan-Chama project: Stream flow is recorded in the upper San Juan watershed to assist San Juan-Chama operators in recording the mean daily diversion and assure compliance with the bypass-flow requirements. Data from NRCS ‘SNOTEL’ weather stations, which record snowpack, snow-to-water equivalent, temperature, and precipitation, is also available.

Climate projections are being developed by Reclamation for all three sub-basins: As part of the Upper Rio Grande Climate Risk Assessment, Reclamation is currently developing climate

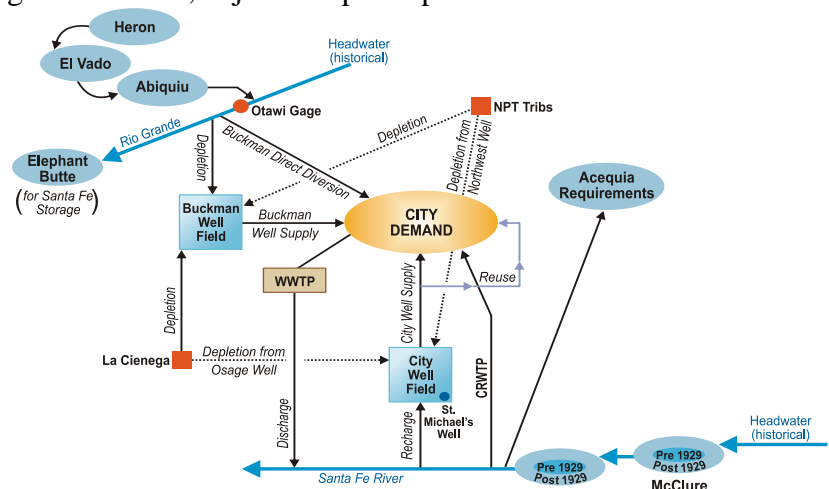


Figure 4. Schematic of WaterMAPS components.

projections for all three basins, for three projected greenhouse-gas emission scenarios, through 2099. These projections are based on the bias-corrected, spatially down-scaled results from general circulation model (GCMs). The results have been downscaled to 1/8th degree grid scale, and used in a Variable Infiltration Capacity (VIC) model to develop streamflow projections. The VIC results are being fed into the PowerSiM model URGSiM, for routing through the basins of interest. As part of this study, Reclamation will format the results from this climate risk assessment for ready use in Santa Fe's water planning model.

4. Nexus between the Basin Study and a Reclamation project or activity

The proposed study has a nexus with multiple Reclamation projects. First, Reclamation is the operator of the San Juan-Chama Project, the firm yield of which will be analyzed under this proposal. This makes use of the expertise within Reclamation and will benefit all of the San Juan-Chama Contractors, as well as the Native American water settlement that are incorporating San Juan-Chama project water into their agreements.

Second, Reclamation is taking the lead to plan for the water infrastructure needs of the Aamodt Water Rights settlement under the Claims Resolution Act 2010 signed December 8th. The Act and Settlement indicate that a 4,000 acre feet capacity, regional water system will be built with a Department of Interior (Reclamation) cost-share of \$169.3 million. San Juan Chama Project water constitutes some of the system's water supply source.

Third, Reclamation is collaborating with many water users via the Middle Rio Grande Collaborative Program to care take the endangered Rio Grande silvery minnow and southwestern willow flycatcher. One primary source of supplemental water for the minnow is San Juan-Chama Project water. By understanding the availability of this source of supply, as well as the availability of water in the upper Rio Grande basin, Reclamation will be able to better plan for the minnow's needs.

5. Stakeholders interest in and support for the Basin Study

Multiple stakeholders share expressed support the Santa Fe Basin Study; four stakeholder letters are attached. The region's water planning organization, Jemez y Sangre Water Planning Region Council, which encompasses part of the Rio Grande basin, has expressed support for and will participate in this project. The Planning Region includes three counties, two cities, and seven Native American pueblos. Similarly, the Espanola Basin Regional Issues Forum (EBRIF) has provided a letter of support, and wishes to participate and serve as a venue for the results of this work to be disseminated to its members, many of whom use or will use San Juan-Chama Project water. Los Alamos County water utility, which is active in the Water Council, EBRIF, and receives San Juan-Chama Project water, also wishes to participate as a stakeholder in this study. An additional letter of support was received from the Santa Fe River Commission. Additional supporting stakeholders include the NM Interstate Stream Commission, Middle Rio Grande Conservancy District (the second largest San Juan-Chama Project water contractor), Jicarilla Apache Nation (a San Juan-Chama Project water contractor), Santa Fe Watershed Association, Santa Fe Basin Water Users Association, The Nature Conservancy, Earthworks Institute, La Cienega Valley Association, , the US Forest Service, La Bajada Acequia Association, and Gallegos Ranch.

6. The non-Federal cost-share contribution exceeds the required 50 percent.

This basin study proposal suggests a 53 / 47 % cost share between non-Federal cost-share partners and the Federal Government. The 53% non-Federal cost-share includes in-kind contribution of supported stakeholders.

Santa Fe Basin Study Proposal

Attachments: Letters of Support (4)



Jemez y Sangre Regional Water Planning Council

Bureau of Reclamation Review Committee

May 12, 2011

Upper Colorado Basin Regional Office

125 South State Street, Room 6107

Salt Lake City, UT 84138-1102

Subject: City of Santa Fe and Santa Fe County Watershed Basin Study

Dear Bureau of Reclamation Review Committee:

The Jemez y Sangre Regional Water Planning Council (Jemez y Sangre) is pleased to support the proposal presented by the City of Santa Fe and Santa Fe County to study the impacts of climate change on the water supplies used in the Santa Fe basin and to evaluate potential adaptation and mitigation strategies. While our 2008 Selected Topics: Jemez y Sangre Regional Water Plan Phase 2 Update included a qualitative section on potential climate change impacts (Climate Change Impacts in Water Resources of the Jemez y Sangre Region), the section did not provide quantitative data necessary for water suppliers within our region evaluate how the previously-identified imbalance between anticipated demand and available supplies would be amplified under various climate change scenarios. We laud the efforts of the City of Santa Fe and Santa Fe County to seek a partnership with the technical experts within the Bureau of Reclamation to quantify these important issues within their proposed study and to make long range plans on how to address them.


The Jemez y Sangre region is one of sixteen water planning regions in New Mexico. As required by state statute, in 2003 Jemez y Sangre completed a Regional Water Plan that identified the available water supplies, projected future water demand, the magnitude and timing of the difference between available supply and projected demand, and alternatives that local water utilities and water users could implement to satisfy future water needs. All of New Mexico's regional water plans combined provide the foundation and context by which New Mexico develops state-wide water policies in its State Water Plan. Our Jemez y Sangre, Region 3 (north of Cochiti Reservoir and south of the Embudo stream gage) is located within the Rio Grande basin, which is generally considered over-appropriated by the New Mexico Office of the State Engineer. Like many water users and planners within the Rio Grande basin, Jemez y Sangre and our Regional Water Plan recognize that the 21st century will bring increasing water supply challenges, even without the likely decrease in water availability due to climate change, as identified in Reclamation's 2011 Climate Change and Water report.

The looming water resource challenges can best be met with adequate preparedness. The proposal we are endorsing herein provides the City and County of Santa Fe with the information, tools and options necessary for the local governments and their water utilities to plan wise water resource use. We are confident that the City of Santa Fe and Santa Fe County will continue to play leadership roles in sharing the knowledge gained and the technical framework with the other entities within our water planning region (City of Española, Los Alamos County, Rio Arriba County, etc), using the available organizational structure offered through Jemez y Sangre. Furthermore, many Jemez y Sangre members are current or future recipients of San Juan Chama Project water. We feel that for sustainable water supplies and the future of regional water planning, it is essential that each San Juan Chama project water user understand the reliability and vulnerability of the San Juan Chama Project water resource under future conditions, especially as the Native American water right settlements move toward implementation.

Should the included proposal be selected, Jemez y Sangre pledges our time, expertise, and collaboration network to work with the City and County of Santa Fe in developing appropriate adaptation and mitigation alternatives, choosing the best strategies, and disseminating gained knowledge throughout the Jemez y Sangre water planning region and with the other three water planning regions within the Rio Grande basin.

Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, reading "Charles Nylander".

Charles Nylander

Chair, Jemez y Sangre Regional Water Planning Council



May 12, 2011

Española Basin Regional Issues Forum
11 Abierto Way
Santa Fe, New Mexico 87506

Bureau of Reclamation Review Committee
Upper Colorado Basin Regional Office
125 South State Street, Rom 6107
Salt Lake City, Utah 84138-1102

Subject: City of Santa Fe and Santa Fe County Watershed Basin Study

Dear Bureau of Reclamation Review Committee:

The Española Basin Regional Issues Forum (EBRIF) is pleased to support the proposal presented by the City of Santa Fe and Santa Fe County to study the impacts of climate change on the water supplies used in the Santa Fe basin and to evaluate potential adaptation and mitigation strategies. We endorse the efforts of the City of Santa Fe and Santa Fe County to seek a partnership with the technical experts within the Bureau of Reclamation to collaborate so as to quantify the potential impacts of climate change on the availability of water resources in the Española Basin, developing information through their proposed study to develop improved long range water supply plans.

The Española Basin Regional Issues Forum (EBRIF) is an ad hoc, government-to-government forum representing fourteen (14) city, county, and tribal governmental jurisdictions in the Española Basin, located in North Central New Mexico. The governmental members include representatives from: Los Alamos County, Rio Arriba County, Santa Fe County, City of Española, City of Santa Fe, Pueblo of Cochiti, Pueblo of Nambe, Ohkay Owingeh, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of San Ildefonso, Pueblo of Santa Clara, Pueblo of Santo Domingo, and Pueblo of Tesuque. Over the past seven (7) years, EBRIF has met monthly to discuss important regional issues, with a primary focus on regional water supply and wastewater issues. EBRIF has a mission statement and charter that emphasizes regional partnerships and collaborations as a mechanism to solve cross-jurisdictional problems (see www.ebrif.org).

EBRIF has agreed to support this proposal by the City of Santa Fe and Santa Fe County. Over the past seven years, water sustainability for the Española Basin has been the significant focus topic for EBRIF representatives. EBRIF represents local and tribal governments that have a real need for future water availability information that can assist their implementation of water conservation programs, and other technical and regulatory efforts to narrow the increasing gap between available regional water supply and the growing demand for water. Also, the EBRIF city and county members are responsible for developing 40-year water use plans, and will greatly benefit from the products and deliverables produced by the City of Santa Fe and Santa Fe County study proposal.

Moreover, the tribal governments in the EBRIF area are increasingly involved in efforts to protect watersheds, implement conservation measures on their tribal lands, enhance tribal economic development, all the while continuing to protect their Native American claims to water resources. EBRIF support for this study proposal will further the water resource interests of its membership. EBRIF supports the development of refined information on the future impacts of climate change on water supplies. This basin study will better inform future city, county, and tribal governmental decisions, and promote cross-jurisdictional partnerships and collaborations.

Please feel free to contact me if you desire further discussion regarding this letter, and EBRIF's support for this study proposal. I can be reached at (505) 820-6318 or cdnylander@comcast.net.

Thank you on behalf of EBRIF.

A handwritten signature in cursive script that reads "Charles Nylander".

Charles Nylander
Facilitator and Chair

DEPT OF PUBLIC UTILITIES
LOS ALAMOS COUNTY • NEW MEXICO
Electricity, Water, Gas & Wastewater Services

May 13th, 2011

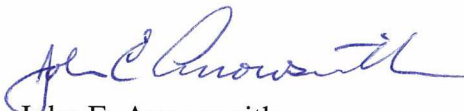
Ms Claudia Borchert
Hydrologist
City of Santa Fe Water Division
P.O. Box 909
801 West San Mateo
Santa Fe, NM 87505

RE: Supporting Stakeholder for Proposed Watershed Study

Ms. Borchert:

The Incorporated County of Los Alamos Department of Public Utilities would like to express our support for the referenced study and request to be included as a Supporting Stakeholder in your application to the Bureau of Reclamation. As you know, Los Alamos County has a contract with the Bureau of Reclamation for San Juan/Chama Project water. This water is projected in the County's 40-year water plan to be a vital component of our future water supply. Accordingly, we are presently conducting a study to determine the best way to develop this water in the near term. As a San Juan/Chama contractor, we have a significant interest in the projected effects of climate change on the reliability of our San Juan/Chama water supply and are interested in the outcome of your proposed study. Thank you for the opportunity to be of support to this effort.

Sincerely,



John E. Arrowsmith
Utilities Manager

From: [Jerry & Donna Jacobi](#)
To: [BORCHERT, CLAUDIA I.](#)
Subject: Re: FW: WaterSMART Climate Change impacts proposal
Date: Friday, May 13, 2011 4:14:53 PM

2314 Calle Colibri
Santa Fe, New Mexico 87505

13 May 2011

Claudia Borchert
Water Resources Coordinator
Sangre de Cristo Water Division
City of Santa Fe,
New Mexico 87504

Dear Claudia:

Yes, I am interested in participating in the study of the Santa Fe basin water supply and watershed health including the upper watershed condition, ecosystem health, and groundwater recharge. All of these are important in our effort to get some water into the middle section of the Santa Fe River during the climate change we are anticipating. One of the concerns that we often hear is that water running down the river is wasted water. We need to examine further the link between surface flows and groundwater, whether it exists between shallow or deep aquifers. I would be willing to assist in any way possible and would be willing to devote a portion of my time helping with project design and even field measurements since I did assist in the field while working with the NM Environment Department.

Sincerely,

Jerry

Gerald Z. Jacobi
Chairman, Santa Fe River Commission