Santa Fe Water 2100:

5-year Water Resource Planning Cycle

Updated 1/12/2021 to incorporate Process Recommendations from 2020 Public Outreach

City of Santa Fe Water & Santa Fe County Utilities

January 12, 2021

Executive Summary

City of Santa Fe Water (City), and Santa Fe County Utilities (County) have initiated a science based, community informed, five year planning cycle to develop long range water resource management plans. In the case of the City, a water resource plan extending out to 2100 will be developed, from which information on nearer horizons can be extracted as needed. For the County, this process will inform a 40-year water plan, longer range planning, and capital project spending prioritization. The City and County value participation and contribution from a diverse cross section of citizenry in this science based water planning process, and feel that this participation will lead to stronger plans that are more likely to be successfully implemented. The first cycle, which began in 2020 and is scheduled to be complete by the end of 2024, will be evaluated, refined, and repeated every 10 years or as necessary in future years.

Public feedback on this process was gathered in the fall of 2020, and has been incorporated here. This feedback was gathered from short-survey postcards, an online survey, two webinars, and three virtual breakout sessions. Process specific feedback from that outreach is summarized in a report titled "Santa Fe City & County 5-Year Planning Cycle Water Plan: Summary of Process Recommendations from Public Outreach, 2020" available at https://www.santafenm.gov/water_resources_planning.

Desired outcomes from the planning cycle include:

1. Planning Approach
2. Scenario Development
    a. Supply Scenarios
    b. Demand Scenarios
3. Preferred Projects and Initiatives
    a. Some of these projects will be evaluated more rigorously by the City and County and or incorporated into their respective Capital Improvement Plans as applicable.
4. Long Range Water Resource Plans

This document lays out the approach to achieving these outcomes for use by the City, County, and other interested parties as a living roadmap for the 2020 – 2024 long range water resources planning process.

The overall schedule is summarized in Table 1.

Table 1: Summary of planning cycle

Year	Objective	Spring	Summer	Fall	Winter
2020	**Define Process**		Draft 5-Year Planning Process	Public workshops to define process	Final 5 Year Planning Process (this document)
2021	**Supply & Demand Scenarios**	Public workshops on supply and demand	Draft Supply and Demand Scenarios	Public Comment	Final Supply and Demand scenarios
2022	**Evaluate Shortages**	Public workshop on shortages		Public workshop on multiple criteria ranking	
2023	**Evaluate Adaptation Strategies**	Public workshop on adaptation strategies	Draft Ranked Project List	Public Comment	Final Ranked Project List
2024	**Develop Plan**		Draft 80 Year Water Plan	Public Comment	Final 80 Year Water Plan

Color Key:	**Public Input**	**Public Engagement**	**Draft Deliverable**	**Final Deliverable**

Introduction:

The City of Santa Fe Water Division, and Santa Fe County Utilities share ownership of the critically important Buckman Direct Diversion Water Treatment Plant, and work together to manage water deliveries from this and other sources to customers in and around the City of Santa Fe through a connected transmission and distribution network. The City provides assurance of backup supply to the County, and the two entities have a successful history of working together to manage water deliveries to their customers, and for planning for the future together. In 2015, the City and County completed the Santa Fe Basin Study, a collaborative evaluation of the potential impact of climate change and population growth on Santa Fe's water future. In 2019, the City of Santa Fe passed resolution 2019-56 calling for development of 40 and 80 year Water Resource Management plans for the City. The City and County are working together on this regional water planning effort in order to assure a reliable and sustainable water supply to their water users. A shared planning process ensures a shared understanding of potential future supply and demand scenarios, potential resulting shortages, and potential adaptations to avoid those shortages. Both the City and the County believe that a transparent, science based, and community informed water planning process is the best way to create a representative and actionable water resources management future.

This document lays out a five year process for development of long range Water Resource Management plan for both the City and County. In the first year of the five year planning cycle, public input was solicited to develop and formalize this science based and community informed approach. In the second year of the five year planning cycle, supply and demand scenarios will be developed. These scenarios will likely be developed in parallel. In the third and fourth year of the planning cycle, the supply and demand scenarios would be combined in a computer model in order to quantitatively evaluate the magnitude of potential shortages and adaptation strategies. In the final year of the planning cycle, the process will be documented in the form of a water plan or plans, which in the case of the City will extend to at least 2100. These plans will be used by the City and County to inform more in depth studies of particular adaptation strategies if necessary, and to guide future new project capital planning. While this plan is currently centered on the City and County water utilities, regional entities such as the Pojoaque Basin Regional Water Authority or the Eldorado Area Water and Sanitation District, could join this effort for any or all planning years, to the extent that they are able. Scenarios involving connection of these or other regional entities to the City and or County water utilities may be considered as well.

2020: Outcomes

During 2020, the first year of the five year planning cycle, public input was solicited to develop and formalize a draft science based and community informed planning approach to deliver supply and demand scenarios, prioritized capital projects and initiatives, and long range water plans within a 5 year period. Substantial efforts were made to engage the full range of water users in the area through a variety of different mechanisms, including informational inserts and postage-paid short-survey postcards distributed inside monthly city utility bills, a widely distributed electronic survey, and a series of two informational webinars and three in-depth breakout sessions designed to focus on the proposed planning process. The City and County announced the planning process and opportunities for public engagement through ads placed in local newspapers, social media posts, and email outreach to partners and stakeholders in the region.

Despite limitations associated with the COVID-19 pandemic, there was an overall high level of engagement with the City and County's combined outreach efforts:

- 1,931 individuals completed and returned the short-survey postcard.
- 678 individuals completed and submitted the online survey.
- 42 individuals attended the introductory webinars.
- 18 individuals participated in the in-depth breakout sessions.

Planning Schedule and Deliverables

No recommendations for changes to the proposed schedule and deliverables (Table 1) were received during the 2020 public outreach.

Planning Approach

The 2020 public outreach was a good start in development of mechanisms for obtaining community input to the long range water planning process. Moving forward, in order to develop a planning process (as represented in this "living" document) that is clear, factual, science-based, and is informed by feedback from public values from a broad demographic of the area, the following principles should be followed:

- Maintain early, effective, and committed public engagement.
    - Utilize public meetings for information/updates/accomplishments/Q&A.
    - Additional surveys
    - Field trips
    - School outreach
    - To get the word out about these engagement opportunities, use a variety of communication tools and channels which all refer back to the information hubs of the City and County websites.
- Use partnerships to multiply outreach.
- Seek diverse and inclusive representation.
- Seek diverse community values.

This overview is from a report titled "Santa Fe City & County 5-Year Planning Cycle Water Plan: Summary of Process Recommendations from Public Outreach, 2020" available at https://www.santafenm.gov/water_resources_planning or

https://www.santafecountynm.gov/public_works/utilities/wrp This report summarizes *process specific* feedback only from the 2020 outreach. Values and non-process specific recommendations received from the postcard and online surveys is discussed below.

Community Values around Water

As mentioned above, 678 people responded to a detailed, online survey, and 1931 people responded to a briefer postcard survey included in the City of Santa Fe September utility bill. Demographic information from the online survey indicates that respondents to that survey were from people older and wealthier than the community average. No demographic information was collected on the postcard survey and zip code is not enough to infer representativeness of those respondents. While the sample is not representative, it does give clear indications of water related preferences and concerns of local residents. Overall, City of Santa Fe Water customers indicated that a resilient system and the cost of water, in that order are more important to them than groundwater levels, river flows, or customer service. Non-market environmental values of water were weighted above the market value of water by most online survey participants. For a more detailed summary of responses from these surveys, see the report titled "City of Santa Fe Water Survey: Summary Results" available at https://www.santafenm.gov/water_resources_planning.

Year 2 (2021): Develop Supply and Demand Scenarios

In the second year of the five year planning cycle, supply and demand scenarios will be developed. These scenarios will be developed independently of each other. A more integrated water supply and demand scenario development approach may be considered in future planning cycles. (For an example of a more in-depth scenario development process, see the Colorado River Basin Water Supply and Demand Study (CRBWSDS), Technical Report A – Scenario Development.)

Supply Scenario Development

During supply scenario development, a range of potential drivers of change to the City and County's water supply will be characterized by staff. These will likely include hydrological variability, climate change, and "what if" disruption scenarios related to catastrophic, supply impacting events. Hydrologic variability may include analysis of megadrought and or tree ring based sequences. On the climate change side, this development will include evaluation of climate scenarios and associated future flows on the Rio Grande, Santa Fe River, and San Juan – Chama project. The flows will be available from the U.S. Bureau of Reclamation (Reclamation) as part of a successful 2019 grant application to Reclamation by the City. Development of supply disruption scenarios might include loss of storage in Santa Fe reservoirs for some amount of time due to wildfire, loss of Buckman Direct Diversion for some amount of time due to water quality or diversion system failure, or reduction of San Juan Chama water due to shortage sharing or water calls on the Colorado River. The range of supply scenarios will be presented to the public and ideas for which scenarios to consider, or alternate scenarios may be developed during public outreach. The supply scenario development framework is shown in Figure 1.

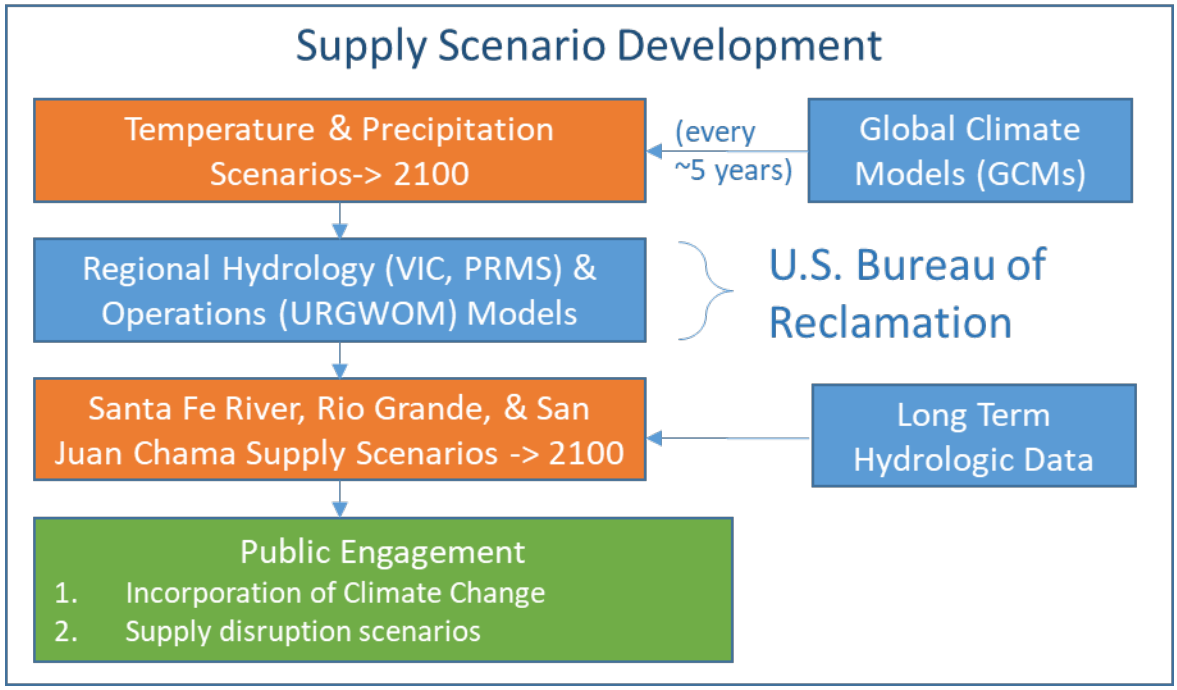

Figure 1: Schematic representation of potential supply scenario development approach

Demand Scenario Development

Demand scenario development will utilize census data and City and County Zoning information to develop population scenarios in the City and County out to 2100. These population scenarios will be spatially explicit (not just how many people, but where within the City and County the development occurs) for the first 20 years of the scenario, and lumped by City and County after that. These scenarios may be built from other planning efforts including but not limited to the City of Santa Fe Land Use and Urban Design Plan, the City Sustainability Plan, the County Utility Master Plan, the County Sustainable Land Use Development Code and the Pojoaque Basin Regional Water System design documents.

Per capita use scenarios might be developed by the City's Water Conservation Committee (WCC), and the County's Water Policy Advisory Committee (WPAC) with input from other public stakeholders. The Water Conservation group within the City of Santa Fe Water Division will lead the per capita use scenario development for the City. The demand scenario development framework is shown in Figure 2.

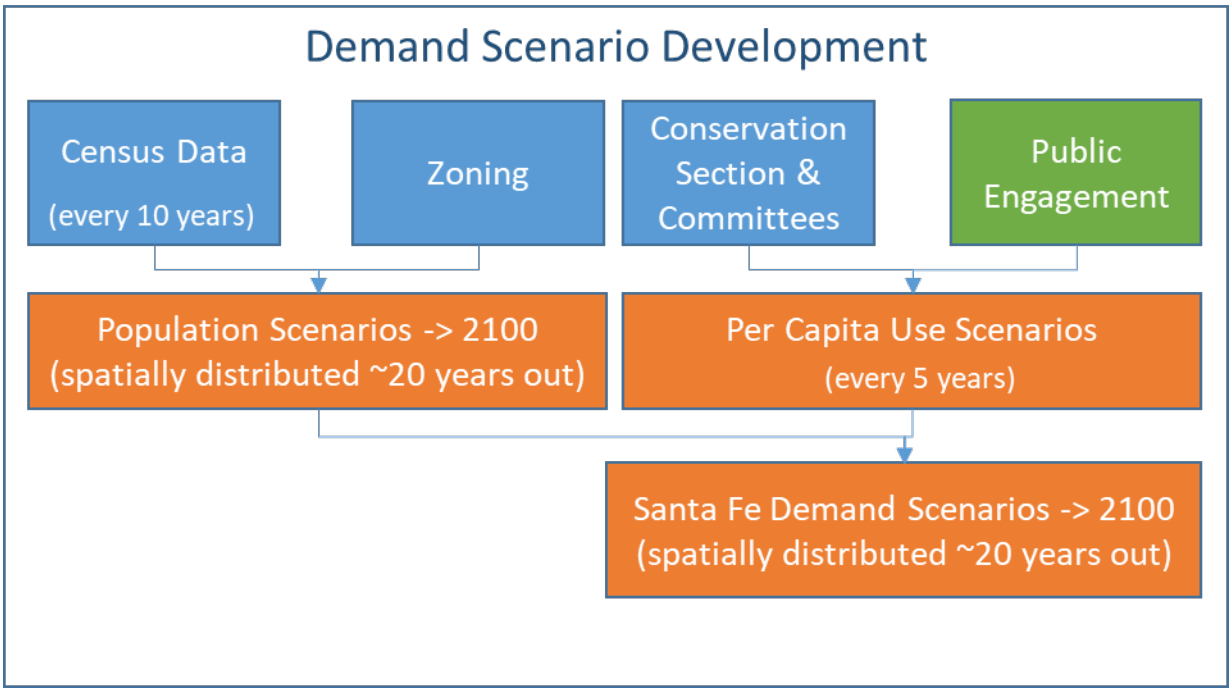

Figure 2: Schematic representation of potential demand scenario development approach

2021 Supply and Demand Scenarios Tentative Schedule[1]

- January & February 2021
    1. City and County, along with land use departments if possible combine zoning data and census projections to develop a range of spatially explicit population scenarios out 20 years, and lumped City and County population scenarios from 21 years out to at least 2100.

[1] The City is currently working to fill a vacancy to carry this work forward. This tentative schedule is contingent on that hire.

2. CC and WPAC collaborate to develop per capita use scenarios out to 2100. Distinguish indoor and outdoor use.

- April 2021: Public engagement
    1. Supply Scenario Development Workshop
        a. Large group presentation of available climate change scenarios and staff recommended method for incorporation into planning process.
        b. Breakout groups
            - Possible Exercise/Game on Uncertainty in Decision Making. Desired feedback on what level of risk of shortage people are willing to accept.
            - Brainstorm Supply Disruption Scenarios. Desired feedback on a list of potential threats to supply in addition to changes in hydrology associated with Climate Change.
                - Wildfire scenarios
                    - Santa Fe River
                    - Rio Grande
                    - San Juan tributary headwaters
                - Water Quality scenarios SW & GW
                - Colorado River politics scenarios
                - Others
    2. Demand Scenario Development Workshops
        a. Large group presentation by City of Santa Fe Basin Study Update results
            i. Demand Uncertainty > Climate Change Uncertainty
        b. Large group presentation by CC and WPAC of proposed per capita use scenarios
        c. Large group presentation by City and County of proposed population growth scenarios
        d. Large group presentation by City of drought index.
        e. Breakout groups
            - Discuss community values related to water supply and demand. Desired outcome would be a set of potential demand scenarios related to community values.
                - Santa Fe River flows below Nichols
                - Santa Fe River flows below Wastewater Treatment Plant
                - Irrigated parks and greenspace
            - Discuss drought index
                - What % change to indoor use desired as function of drought index level?
                - Ditto outdoor use.How low can we go inside?
                - How low can we go outside?
                - How do we achieve these goals?

- Summer 2021: City and County incorporate public input
    - Provide draft supply and demand scenarios to stakeholders by July 31, 2021

    - 61 day comment period August 1 – September 30, 2021

- November 30, 2021: City and County finalize supply and demand scenarios. Communicate these results to the public.

Specific Information Desired from Public Interaction in Year 2

- Relative value of different water uses
    - Outdoor water use
        - Parks vs golf courses vs public landscaping vs private landscaping vs public gardens vs private Gardens
    - Indoor water use
        - Commercial vs residential
- Sustainability of Water Supply (Perceived likelihood of supply disruption scenarios)
    - Santa Fe River Watershed vulnerability to fire
    - Santa Fe City Wells vulnerability to contamination
    - Buckman Wells vulnerability to contamination
    - Vulnerability of BDD diversions to low flows in the Rio Grande

Year 3 & 4 (2022-2023): Evaluate Shortages and Develop and Rank Adaptation Strategies

In the third and fourth year of the planning cycle, the supply and demand scenarios will be combined in a numerical computer model called the Santa Fe Integrated Water management System Model (IWSM). IWSM, which is currently under development, is a system level water operations model that will represent Santa Fe's water supply system from a physical and legal perspective. IWMS will enable stakeholders in the planning process to evaluate potential future shortages or opportunities resulting from different supply and demand scenarios, and examine potential adaptation strategies to address these shortages. The third year of planning (2022) will focus on identifying future shortages, communicating those shortages, and generating a list of potential adaptation strategies for evaluation with IWMS. The fourth year of the planning cycle (2023) will be used for iterative evaluation and refinement of adaptation strategies and generation of a ranked list for feasibility study and or capital project planning purposes. This aspect of the planning cycle is shown schematically in Figure 3.

2022-23 Shortage Evaluation and Ranking of Adaptation Strategies Tentative Schedule

- January through March 2022: Quantitative Shortage Evaluation
- April 2022: Public engagement/workshop
    - Large group presentation of shortages
    - Breakout groups
        - Brainstorm adaptation strategies
- May through October 2022: Evaluation of Adaptation Strategies with IWSM
- November 2022: Public workshop
    1. Large group presentation of multiple criteria ranking approach
    2. Breakout groups
        a. Discuss (revisit) values and resulting metrics to be used to evaluate alternatives. (Define and quantify criteria rankings for a multiple criteria ranking approach.)
        b. Develop weights

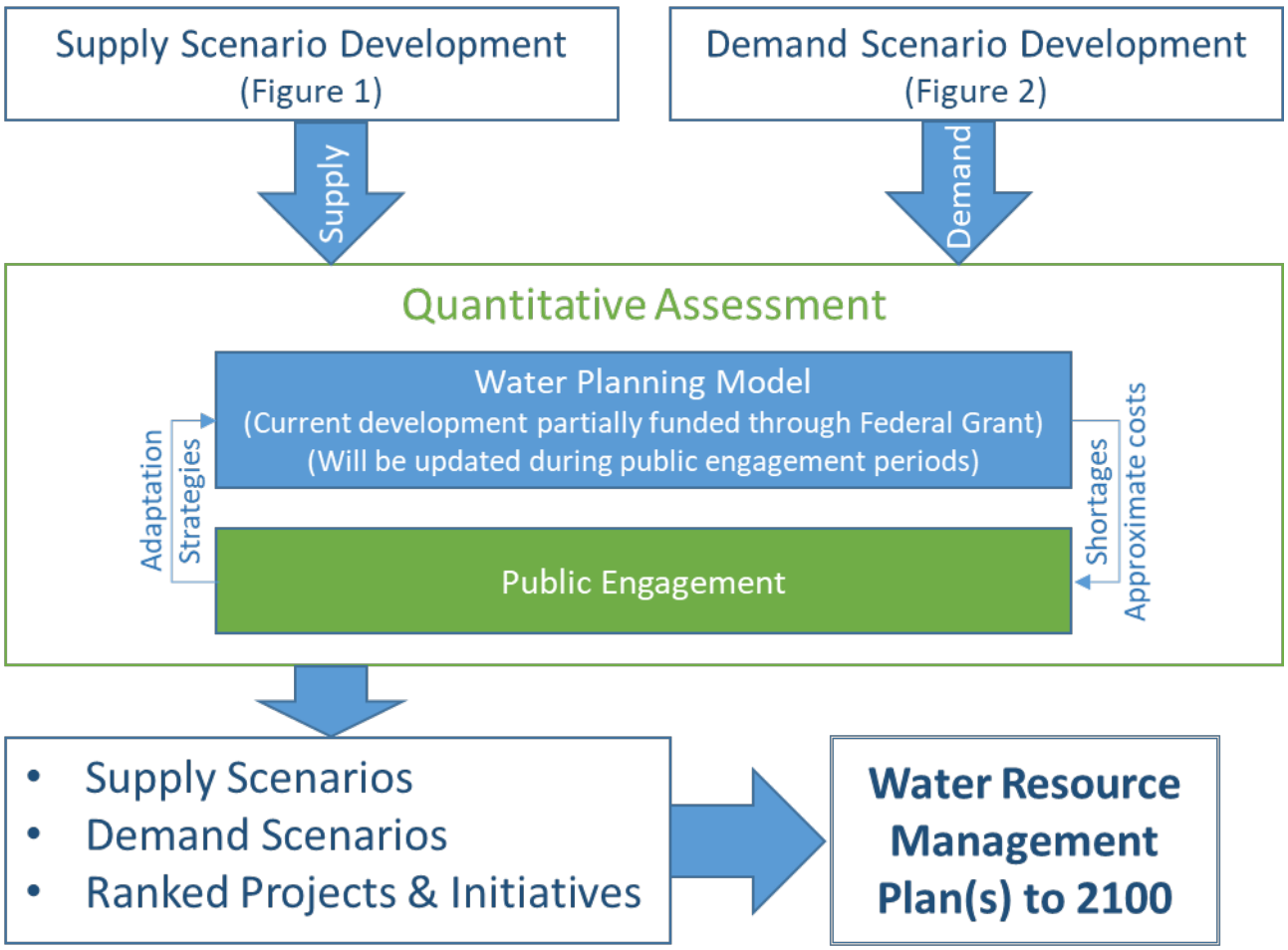

Figure 3: Schematic representation of shortage evaluation and adaptation strategy development

- December 2022 through March 2023: Ranking of Adaptation Strategies

- March 2023: Communication of this ranked list to public as part of advertising April 2023 Public Workshop and overall Communications Plan.

- April 2023: Public workshop
    - Large group presentation of adaptation strategies impact
        - Reduction of Shortages
        - Ranking of adaptation strategies with multiple criteria ranking
    - Breakout groups
        - Modify adaptation strategies

- July 2023 Draft Ranked List
    - Provide draft ranked project list to stakeholders by July 31, 2023
    - 61 day comment period August 1 – September 30, 2023

- November 2023: Final List of Feasible Projects Ranked by Multiple Criteria and $/AF
    - Top projects lacking key technical information will be considered for feasibility studies

- Top projects with sufficient information will be quantitatively evaluated for inclusion in the capital project planning for the City and County

- December 2023: Communicate these results to the public.

Specific Information Desired from Public Interaction in Years 3 and 4

- Relative importance of water bill, water in the upper Santa Fe River, water in the lower Santa Fe River, aquifer levels, energy use, customer service, water data availability.
- Non-market values of water in the community
    - Relative Weights for Triple Bottom Line Analysis
- Independent ranking of projects on ranked project list.

Year 5 (2024): Develop Long Range Water Supply Plans

In the final year of the planning cycle, the process should be documented in the form of a water plan extending to 2100. This plan might include portfolio development in which selected alternatives are bundled to meet given demand scenarios. This plan should be consistent with, and may reference higher level policy objectives identified by the City and County. A forty year water plan can be carved out of the longer plan as needed to meet specific administrative requirements.

The top projects with sufficient information will be quantitatively evaluated for inclusion in the capital project planning processes of the City and County.

2024 Plan Development Proposed Schedule

- Draft 80 Year Water Plan
    - Provide draft plans for public comment by July 31, 2024
    - 61 day comment period August 1 – September 30, 2024

- November 30, 2024: Finalize long range Water Resource Management plan which in the case of the City will extend out to at least 2100.

- December 2024: Communicate these results to the public.

Specific Information Desired from Public Input in Year 5

- Feedback on overall process and product.

Summary Development Figure

The planning process schedule is summarized in Table 1. The flow chart of information for the development of supply and demand scenarios, adaptation strategies, and long range water plans is seen in Figure 4, which is a combination of Figures 1, 2, and 3.

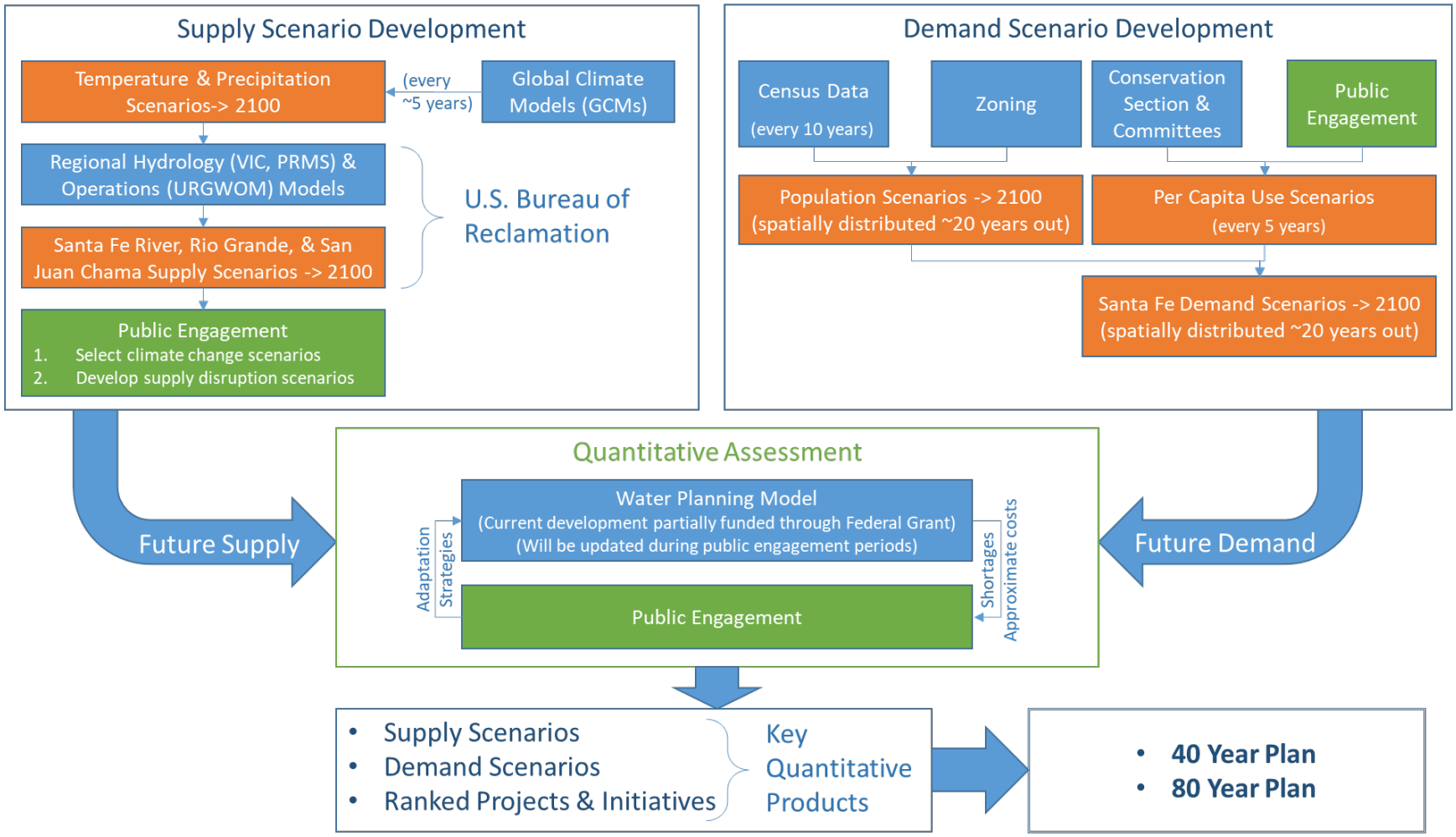

Figure 2: Schematic representation of five year planning process