

DRAFT Objectives for Adaptation Strategies

Lower Santa Cruz Basin Study

Demand Sub-team

Developed July 2019

Background *(Adapted from the Plan of Study)*

There is concern in the Lower Santa Cruz River Basin (LSCRB) region as key areas in the Basin are experiencing groundwater declines due to a combination of groundwater pumping, drought conditions and a lack of access to renewable supplies. In the future, impacts associated with climate change are expected to further influence water supply reliability in multiple sectors, including agricultural, industrial, environmental and municipal sectors.

The goal of the LSCRB Study is to identify where physical water resources are needed in order to mitigate supply-demand imbalances due to projected changes in climate and population growth in the LSCRB study area, which is identical to the Tucson Active Management Area. Following identification of areas of projected water imbalance, place-based adaptation strategies will be developed to improve water reliability for municipal, industrial, agricultural and environmental sectors in the Lower Santa Cruz River Basin.

The Basin Study will evaluate risks, under selected scenarios, to water users and the environment, by assessing:

- 1) the types and volumes of supplies used to satisfy water demand in the study area,
- 2) the associated risks to their reliability,
- 3) how losses of renewable supplies and changes in future groundwater levels could affect water imbalances

Demand Sub-team

As part of the Basin Study, a Demand Sub-Team (herein “Sub-team”) was formed to provide input on projected water demand for the municipal, agricultural and industrial sectors. Sub-team members provided valuable input on the assumptions used for translating the population and water use estimates developed by the Central Arizona Project: Service Area Model (CAP:SAM) into the ADWR’s Regional Groundwater Flow Model of the Tucson Active Management Area.

The Sub-team also seeks to identify adaptation objectives and develop criteria to evaluate adaptation strategies used to address physical water imbalances. The Sub-team developed a general framework to evaluate adaptation options. This framework can be used to guide trade-off analyses of adaptation strategies, as described below.

For this Sub-team, adaptation objectives are largely driven by the need to comply with Arizona’s Assured Water Supply Rules and achieve safe-yield within the Tucson Active Management Area. These objectives are detailed below.

Evaluation of Adaptation Strategies

Adaptation strategies will be assessed in a place-based manner. However, in order to allow for the comparison of adaptation strategies, it is helpful to define a common set of overarching priorities. The Sub-team acknowledges that the characteristics of adaptation strategies will vary in measurability, both qualitatively and quantitatively.

Priority considerations defined by the Sub-team include:

1. Satisfaction of 100-year Assured Water Supply

Factors that influence satisfaction or attainment of Assured Water Supply, including physical availability of a 100-year water supply, i.e., areas of groundwater decline over 4 feet per year. These are a priority consideration for the Sub-team. Adaptation measures will be considered in conjunction with aquifer storage, as percent remaining storage and/or as number of years of storage.

2. Minimizing impacts of over-pumping in sensitive aquifer regions

Areas of the aquifer sensitive to groundwater declines are of priority consideration for the Sub-Team. These are areas currently experiencing water levels declines, where groundwater pumping will exacerbate declining groundwater levels and/or where natural or artificial aquifer replenishment is lacking.

3. Minimizing impacts of pumping in areas prone to subsidence

Areas sensitive to subsidence are considered with regards to changes in groundwater pumping.

4. Optimization of current infrastructure and resources

Strategies that are complementary to existing infrastructure and physical water availability are prioritized, compared to projects with high capital expenses. The Demand Sub-team seeks to continue to optimize resources we have now that include secure, potable water supply, environmental benefits, and quality of life.

5. Avoid areas with water quality issues

Areas with water quality concerns, even if constituents are not yet regulated, are of priority consideration to ensure such areas are properly managed.

6. Minimize impacts of over-pumping in aquifer regions connected to riparian areas

Strategies that can be used for multiple benefits, such as preservation of floodplain function and riparian habitat.

These priority considerations should be qualitatively assessed for projects, where applicable. This analysis should be used in conjunction with an evaluation of the indicators listed below to develop an overall, holistic assessment of how the adaptation strategy of interest will impact water availability and reliability to satisfy regional water demand.

Indicators were defined by this Sub-team to characterize high-priority locations for adaptation efforts (“location indicators”) and to evaluate relative feasibility of adaptation options (“feasibility indicators”). The list of indicators is not meant to be exhaustive but should serve as a guide for high-level assessment of relative benefits of adaptation strategies. Location indicators are used to describe an area of interest for adaptation efforts, while feasibility indicators are used to assess the viability of an adaptation measure, considering effectiveness, implementability and cost.

Table 1. Summary of Location Indicators for Demand Sub Team

Location Indicators
Areas with groundwater decline rates over 4 feet per year
Areas with groundwater occurrence over 1,000 feet below ground surface
Sensitive area of aquifer with respect to water level decline
Sensitive area of aquifer with regard to subsidence
Existing complementary infrastructure
Potential availability of reclaimed water
Presence of water quality issues (regulated or unregulated)

Table 2. Summary of Feasibility Indicators for Demand Sub Team

Feasibility Indicators
Provider identification and source
Existing infrastructure
Capital cost of project
Availability of physical water sources
Availability of delivery mechanism
Potential to recover stored water
Community support