



Chapter 7 Projects and Management Actions

7.1 Introduction

This chapter of the Cuyama Basin Groundwater Sustainability Agency's (CBGSA's) 2025 *Groundwater Sustainability Plan* (GSP) includes the Projects, Management Actions and Adaptive Management information that satisfies Sections 354.42 and 354.44 of the Sustainable Groundwater Management Act (SGMA) regulations.¹ These projects and their benefits will help achieve sustainable management goals in the Cuyama Groundwater Basin (Basin).

7.2 Management Areas

The CBGSA has designated two areas in the Basin as management areas: the Central Basin Management Area and the Ventucopa Management Area, which are both defined as regions with modeled overdraft conditions greater than 2 feet per year that are projected by the Cuyama Basin Water Resources Model (CBWRM) to drop below minimum threshold levels before 2040 (see Figure 7-1). Management actions and projects within these management areas may be managed by the Cuyama Basin Water District pursuant to any agreement with the CBGSA. The two management areas are generally separated from one another by the Santa Barbara Canyon Fault. The remaining areas in the Basin are not included in a management area, and generally operate with balanced groundwater pumping and recharge, based on modeling of Basin water budgets. Future changes in management area boundaries will be considered based on updates to numerical modeling as additional information is collected.

As discussed below in Section 7.5.2, pumping allocations have been developed for the Central Management Area and farming units, but not in other portions of the Basin. However, the CBGSA will develop a management plan for the Ventucopa Management Area, which may or may not include pumping restrictions in the future. This decision will be made as more information becomes available and the basin groundwater model is updated.

Central Basin Management Area

The Central Basin Management Area is located in the middle of the CBGSA area and includes the community of Cuyama as well as the surrounding agricultural land uses that are located in areas with greater than 2 feet overdraft. The Central Management Area has been updated for the 2025 GSP by utilizing the updated 2024 CBWRM. While the Cuyama Community Service District (CCSD) service area also has modeled overdraft exceeding 2 feet, it is not included in the management area because it is a domestic user of relatively small quantity (i.e., about 150 AFY).

¹ SGMA's requirements for GSPs can be read here:
https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/GSP_Emergency_Regulations.pdf



Ventucopa Management Area

The Ventucopa Management Area is located south of the Central Basin Management Area and includes the community of Ventucopa. The 2020 GSP noted that the CBGSA intended to re-evaluate the need for pumping reductions in the Ventucopa region of the Basin after further evaluating groundwater conditions over a two-to-five-year period following submission of the GSP. At this time, the CBGSA still believes that it is premature to prescribe pumping reductions in the Ventucopa region on the basis of CBWRM model results because the development of the model in that portion of the Basin posed significant challenges:

- Limited groundwater level data was available for model calibration. Only three calibration wells were available in that area of the Basin (wells 62, 85, and 617). Since submission of the GSP, a new multi-completion monitoring well has been installed in the area, which will provide additional information for model calibration going forward.
- Characterization of streamflows and their effect on the groundwater aquifer was challenging because there were no streamflow gages on the Cuyama River with measurements taken during the calibration period and limited information was available regarding stream geometry in the region. Since submission of the GSP, a new streamflow gage has been installed on the Cuyama River upstream of the Ventucopa region.
- Groundwater pumping levels in the region were based on estimates from available land use information. However, unlike the central area of the Basin, cropping patterns in this portion of the Basin were not provided by local landowners but were instead estimated using satellite imagery. Furthermore, specific well locations were not available in this portion of the Basin. The CBGSA has addressed these shortcomings through the requirement of landowners to install meters on production wells and to report well information starting in calendar year 2022.
- The magnitude of water budget estimates in the region were relatively small as compared to the Basin as a whole, which meant that a small change in the estimate for a single water budget component could have a large effect on the estimated change in storage (and corresponding estimates of long-term groundwater elevation change). In particular, some Basin stakeholders have raised a concern that the model may be underestimating stream seepage into the aquifer in this stretch of the Cuyama River.
- Due to time and budget constraints during GSP development, model development and calibration prioritized development of an accurate representation of the central Basin portion of the aquifer (where long-term overdraft was known to occur) with lesser emphasis on other parts of the model. The primary model calibration objective during CBWRM development of the Ventucopa region was to ensure that groundwater levels matched historical trends at the boundary of the central Basin and Ventucopa region.

In light of the uncertainties, and lack of sufficient data on the water budget components to verify the model projected water budget, the CBGSA determined that implementing a management action in the region at this stage may be premature. Instead, the CBGSA is determined to continue to compile and



analyze additional data and information on groundwater levels, surface water flows, groundwater pumping, as well as information on channel geometry and subsurface conditions. This information will be used to further enhance the capabilities of the model for analysis of projected water budgets and groundwater conditions in the region, and to determine possible management actions to address any possible projected overdraft conditions. As noted above, the CBGSA plans to develop a management plan for the Ventucopa Management Area in the future, which may or may not provide for pumping restrictions.

Northwestern Region (Not a Management Area)

In the northwestern region, management actions were not included in the GSP because the available information did not indicate a projected overdraft in that region. The following information was considered during development of the 2020 GSP, and continues to be relevant for this updated 2025 GSP:

- The CBWRM model indicated a balance between groundwater inflows and outflows in the region in all of the water budget scenarios that were simulated.
- The Cleath-Harris Geologists (CHG) document Sustainability Thresholds for Northwestern Region, Cuyama Valley, dated December 7, 2018, developed under contract with the North Fork Vineyard. This document identified minimum thresholds for this area that would be protective of groundwater pumping capacity for production wells in this area. CHG proposed minimum thresholds for the region would result in a twenty percent reduction in the saturated thickness screened by the production wells, which would produce a similar reduction in transmissivity and pumping capacity of the production wells. As discussed above, the CBGSA set thresholds that are somewhat more conservative than this, representing a fifteen percent reduction in saturated thickness.

The technical analyses described in Section 5.2 regarding Potential Corrective Action 1 indicates that the potential drawdown due to the minimum thresholds set for wells 841 and 845 could have a small effect on GDEs and domestic wells in the area. However, the thresholds set in the monitoring wells located in the vicinity of these Basin resources are set at protective levels that would be indicative of any issues that may arise, allowing the CBGSA to make an appropriate adaptive management response (Section 7.6). Therefore, the available evidence indicates that management actions are not required in this region at this time.

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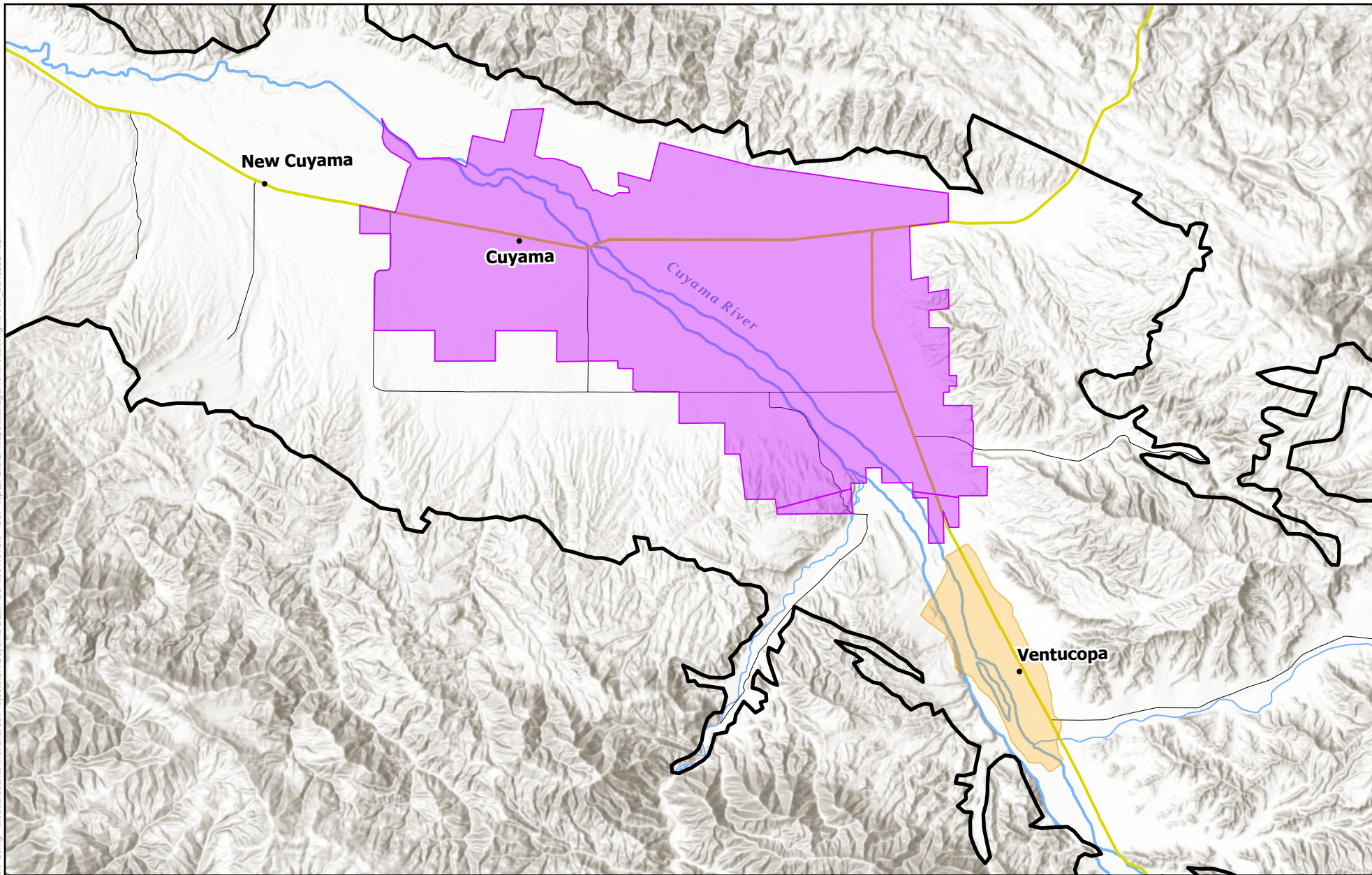


Figure 7-01: CBGSA Management Areas

Cuyama Valley Groundwater Basin

Legend

- | | | |
|---|--|--|
|  Central Management Area |  Highway |  Creek |
|  Ventucopa Management Area |  Local Road |  Cuyama River |
|  Town |  Cuyama Basin | |



0 0.5 1 2 Miles

Map Created: August 2024

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. Data sources: CA DWR, Esri, USGS



7.3 Overview of Projects and Management Actions

The CBGSA evaluated a range of potential projects and management actions to help address overdraft and move the Basin toward sustainability. Evaluation of the identified projects and management actions resulted in a set of proposed activities in the first approved GSP. These activities are shown in **Table 7-1**, along with their current status, potential timing, and estimated costs.

This list of activities has since been updated and expanded throughout implementation. Each annual reported included an updated version of **Table 7-1**, and new projects and management actions have been added. A more through description of each activity, including benefits and justification, are discussed in Sections 7.4 and 7.5.

Table 7-1: Proposed Projects, Management Actions, and Adaptive Management Strategies

Activity	Current Status	Anticipated Timing	Estimated Cost ^a
Project 1: Flood and Stormwater Capture	Water rights analysis of potential water supplies currently underway	<ul style="list-style-type: none"> Feasibility study: 0 to 8 years Design/Construction: 8 to 15 years 	<ul style="list-style-type: none"> Study: \$1,000,000 Flood and Stormwater Capture Project: \$600-\$800 per AF (\$2,600,000 – 3,400,000 per year)
Project 2: Precipitation Enhancement	Feasibility Study completed in August 2024	<ul style="list-style-type: none"> Refined project study: 0 to 8 years Implementation of Precipitation Enhancement: 8 to 15 years 	<ul style="list-style-type: none"> Study: \$200,000 Precipitation Enhancement Project: \$25 per AF (\$150,000 per year)
Project 3: Water Supply Transfers/Exchanges	Not yet begun	<ul style="list-style-type: none"> Feasibility study/planning: 0 to 8 years Implementation in 8 to 15 years 	<ul style="list-style-type: none"> Study: \$200,000 Transfers/Exchanges: \$600-\$2,800 per AF (total cost TBD)
Project 4: Improve Reliability of Water Supplies for Local Communities	In progress for CCSD; not yet begun for other communities	<ul style="list-style-type: none"> Feasibility studies: 0 to 5 years Design/Construction: 5 to 7 years 	<ul style="list-style-type: none"> Study: \$100,000 Design/Construction: \$1,800,000
Project 5: Flow Meter Calibration Program	Not yet begun	<ul style="list-style-type: none"> Implementation: 0 to 6 years 	<ul style="list-style-type: none"> \$50,000 for program setup \$2,500 per meter per year (100 meters) = \$250,000
Management Action 1: Basin-Wide Economic Analysis	Completed	December 2020	\$60,000



Management Action 2: Pumping Allocations in Central Basin Management Area	Allocations developed and implemented for 2023 and 2024	<ul style="list-style-type: none"> • Allocations implemented: 2023 through 2040 	<ul style="list-style-type: none"> • Plan: \$300,000 • Implementation: \$150,000 per year
Adaptive Management	Board ad-hoc committee has been formed and is considering potential actions	Only implemented if triggered; timing would vary	TBD
^a Estimated cost based on planning documents and professional judgment AF = acre-feet			

7.3.1 Addressing Sustainability Indicators

The projects would contribute toward eliminating the projected groundwater overdraft described in the Chapter 2’s Water Budget section and in maintaining groundwater levels above those identified in Chapter 5 by reducing groundwater pumping or enhancing net recharge into the groundwater aquifer. The sustainability indicators are measured directly or by proxy, with groundwater elevation used as either the direct or proxy indicator for all sustainability indicators with the exception of water quality and subsidence. **Table 7-2** summarizes of how the projects and management actions in this GSP will address the applicable sustainability indicators for the Basin. Seawater intrusion is not applicable to the Basin, due to distance from the Pacific Coast.

Physical benefits of the projects and management actions in the GSP are described under each project and action in Section 7.4 and Section 7.5, below.



Table Error! No text of specified style in document.-1: Summary of How Projects and Management Actions Address Sustainability Indicators

Activity	Sustainability Indicator				
	Chronic Lowering of Groundwater Levels	Reduction of Groundwater Storage	Degraded Water Quality	Subsidence	Depletions of Interconnected Surface Water
Project 1: Flood and Stormwater Capture	Would increase recharge in the Basin, directly contributing to groundwater levels.	Would increase recharge in the Basin, directly contributing to groundwater storage.	Would contribute to groundwater levels through increased recharge, reducing groundwater quality degradation associated with declining groundwater levels.	Would support maintaining groundwater levels in the Basin, reducing potential for subsidence.	Increasing groundwater recharge with flood and stormwater capture would reduce the potential for groundwater levels to decline and negatively impact surface water flows.
Project 2: Precipitation Enhancement	Increases precipitation and associated groundwater recharge; reduces groundwater pumping because increased precipitation would reduce irrigation needs.	Increases volume of stored groundwater; reduces groundwater pumping	Would increase groundwater recharge, reducing groundwater quality degradation associated with declining groundwater levels.	Reduced groundwater pumping and increased groundwater recharge reduces the cause of subsidence	Would increase surface water flows in the Basin and increase groundwater recharge, which together would reduce the potential for negative surface water flow impacts associated with decreasing groundwater levels.
Project 3: Water Supply Transfers/Exports	Would allow for increased stormwater capture without interfering with downstream water rights, directly contributing to groundwater levels.	Would allow additional groundwater recharge of stormwater, directly contributing to groundwater storage.	Would allow for increased groundwater recharge, reducing groundwater quality degradation associated with lowering of groundwater levels.	Would increase potential groundwater recharge, reducing the potential for subsidence.	Would increase groundwater recharge, which would reduce the potential for negative surface water flow impacts associated with decreasing groundwater levels.
Project 4: Improve Reliability of Water Supplies for Local Communities	Would provide an alternate pumping supply for CCSD, CMWC and VWSC customers to reduce water supply reliability issues caused by historical groundwater level reductions in the Basin.	N/A	Provides for improved water quality in the potable water system, and through construction of compliant wells, reduces potential for groundwater quality impacts of improperly designed/constructed wells and failing wells within CCSD and VWSC systems.	N/A	N/A
Project 5: Flow Meter Calibration Program	Would provide irrigation pump operators more accurate flow data to reduce accidental over pumping and better comply with pumping allocations	Would reduce potential unintentional over-pumping directly contributing to groundwater storage.	Could decrease potential unintentional over-pumping and reducing groundwater extraction therefore reducing groundwater quality degradation associated with declining groundwater levels.	Could mitigate unintentional groundwater extraction, reducing the potential for subsidence.	Could decrease potential unintentional over-pumping and reducing groundwater extraction therefore reducing groundwater quality degradation associated with declining groundwater levels.
Management Action 1: Basin-Wide Economic Analysis	Would evaluate the long-term economic impacts of project implementation, which will allow the region to plan for economic changes if implementation is pursued and help avoid economically catastrophic decision-making that could result in dramatic changes to groundwater use and levels.				
Management Action 2: Pumping Allocations in Central Basin Management Area	Would limit groundwater pumping, with allocations decreasing over time until groundwater pumping reaches sustainability	Reducing groundwater pumping will help decrease the reduction of groundwater storage associated with high levels of pumping.	Reducing groundwater pumping will help alleviate groundwater degradation associated with lowering of groundwater levels.	Reduced groundwater pumping would reduce the risk of subsidence associated with lowering of groundwater levels.	Reduced groundwater pumping would help protect groundwater levels, thereby reducing the potential for negative impacts to surface water flows associated with lowering groundwater levels.
Adaptive Management	Adaptive management actions would be triggered if groundwater levels decrease sufficiently or do not demonstrate adequate recovery as projects are implemented. Adaptive management projects that are implemented would be selected because they would help address these sustainability indicators.				
Notes: CCSD = Cuyama Community Services District CMWC = Cuyama Mutual Water Company VWSC = Ventucopa Water Supply Company					



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7.3.2 Overdraft Mitigation

The projects and management actions would support maintenance of groundwater levels above minimum thresholds through increased recharge or through reductions in pumping. Overdraft is caused when pumping exceeds recharge and inflows in the Basin over a long period of time. Improving the water balance in the Basin will help to mitigate overdraft.

7.3.3 Water Balance Management for Drought Preparedness

Communities in the Basin rely on groundwater to meet water needs. During drought, groundwater becomes more important due to limited precipitation. Projects that support groundwater levels through increased recharge help to protect groundwater resources for use during future drought, as well as help protect the Basin from the impacts of drought on groundwater storage. Projects that reduce pumping will help manage the Basin for drought preparedness by reducing demands on the Basin both before and during drought, supporting groundwater levels in non-drought years, and decreasing the impacts of drought on users, reducing the need to increase pumping when precipitation levels are low.

7.4 Projects

Projects included in this GSP are generally capital projects that could be implemented by the CBGSA or its member agencies on a volunteer basis that provide physical benefits to enhance supplies.

7.4.1 Flood and Stormwater Capture

Flood and stormwater capture would include infiltration of stormwater and flood waters to the groundwater basin using spreading facilities (recharge ponds or recharge basins) or injection wells. Spreading basins are generally more affordable than injection wells because water does not need to be treated prior to recharge into the Basin. While specific recharge areas have not yet been selected, areas of high potential for recharge were identified north and east of the Cuyama River near the Ventucopa Management Area, as well as in select areas of the Central Management Area. It is likely that locating spreading facilities near the Cuyama River represents the easiest method of capturing and recharging flood and stormwaters. Agricultural lands may be used in lieu of or in addition to specialized spreading facilities, or installation of “mini dams” on the Cuyama river to slow flows and increase in-stream recharge. The likeliest of these flood and stormwater capture and recharge options to be implemented is the use of spreading basins, because it will maximize volumes of water captured and recharged into the groundwater basin. Agricultural spreading is usually achieved through intentional overirrigation; in the Basin, agricultural irrigation uses groundwater, and new facilities would still be required to implement agricultural spreading that would not negatively impact groundwater levels. Mini dams could have negative environmental impacts and would not capture as much flow as dedicated spreading basins.

This project would include development of a feasibility study to identify specific flood capture and recharge locations and to refine the potential yield and cost, as well as determine the downstream impacts of implementation and how to address those potential impacts.



Current Status

The CBGSA received SGMA implementation grant funding from DWR to help understand the feasibility of future flood and stormwater capture. Specifically, the funding was sought to perform a water rights analysis on flood and stormwater capture flows in the Basin to understand the feasibility of further developing a stormwater capture project in the Basin given water availability and existing water rights. An analysis was performed using Lake Twitchell historical operations data to identify historical periods in which there were managed releases at the lake and therefore water could be diverted upstream without impacting water storage in the lake. This analysis indicated that upstream diversions could be made in approximately 11% of all years (i.e. 7 out of 62 years from 1962-2023). The CBGSA intends to perform additional analyses following submittal of the 2025 GSP to assess the feasibility of implantation of a flood and stormwater capture project. Updates on this project will continue to be included in Annual Reports and future GSP updates.

Public Notice and Outreach

Project notice and outreach would likely be conducted during implementation of a flood and stormwater capture project. Some of this outreach would likely occur as part of the California Environmental Quality Act (CEQA) process (see below), though additional outreach may be conducted depending on public perception of the proposed project. Public notice and outreach is not anticipated during development of the feasibility study, beyond potential outreach to landowners whose property is identified as potential sites for spreading facilities.

Permitting and Regulatory Processes

Completion of a feasibility study would not require any permits or regulatory approvals beyond approval of the governing board for the agency funding the study or contracting with any potential consultant who may be retained to complete the analysis.

Implementation of a flood and stormwater capture and recharge project would require construction permits, streambed alteration agreements from the California Department of Fish and Wildlife for diversions from the Cuyama River, CEQA compliance, and potential 401 permits from U.S. Army Corps of Engineers. Additional permits may be required to complete construction and initiate operation of spreading facilities. The CBGSA would need to secure easements to or purchase the land for the spreading facilities. Additionally, the CBGSA may need to obtain surface water rights agreements from the California State Water Resources Control Board. Any water rights would need to address water rights existing downstream water rights.

Project Benefits

Implementation of flood and stormwater capture projects would provide additional infiltration into the Basin, which would increase the volume of groundwater in the Basin, reducing overdraft and increasing available supply. The 2015 *Long Term Supplemental Water Supply Alternatives Report* (Santa Barbara



County Water Agency [SBCWA], 2015), completed an analysis of potential stormwater recharge options along multiple rivers in Santa Barbara County, including Cuyama River. The analysis assumed the Cuyama River would experience sufficient flows for stormwater recharge three of every 10 years, and a maximum available stormwater volume during those events as 14,700 acre-feet (AF). Capturing this volume of water would require 300 acres of land for spreading facilities, and could provide up to 4,400 acre-feet per year (AFY) of stormwater (averaged over 10 years), assuming the maximum event year supply is captured. As noted above, the analysis that was recently conducted of inflows into Lake Twitchell indicate that flows could be diverted approximately once every eleven years; therefore, the actual benefits would likely be lower. Benefits of an implemented floodwater/stormwater capture project would be measured by the volume of flow entering the spreading facility, less an assumed percentage of evaporative loss.

Actual benefits could be lower once evaporative loss is accounted for, and if the final design for spreading facilities is not sized for the maximum storm event, or if the maximum event year is not realized as frequently as anticipated. If coupled with precipitation enhancement (see Section 7.3.2), additional benefits may be realized, though some overlap in benefits may occur.

Project Implementation

The circumstance of implementation for a flood or stormwater capture project would be if the refined feasibility study recommends a project and finds it is both cost effective and would result in a meaningful volume of incremental supply.

Implementation of spreading facilities for stormwater capture would require land acquisition, construction of spreading facilities, diversion from Cuyama River, and associated pipelines and pumps. If pursued, the CBGSA anticipates implementing the project either directly or through one of its member agencies.

Supply Reliability

The success of a flood and stormwater capture project depends on the frequency of precipitation events that result in sufficient flows for capture and recharge, the recharge capacity of the spreading facilities, and the location of flows in relation to the diversion point to the spreading facilities. Rainfall is generally limited to November through March in the region, and total rainfall is low, averaging 13 inches over the last 50 years (see Water Budget section of Chapter 2). The project would allow for the limited surface water flows to be captured and used, and if implemented, a flood and stormwater capture project would improve supply reliability in the Basin by increasing groundwater recharge, allowing more water to be available to Basin users.

Legal Authority

The CBGSA, through its member water supply agencies, has the legal authority to develop a flood and stormwater capture project. The CBGSA does not have the authority to increase its stormwater capture at a level that would impede downstream senior water rights holders from accessing their water rights.



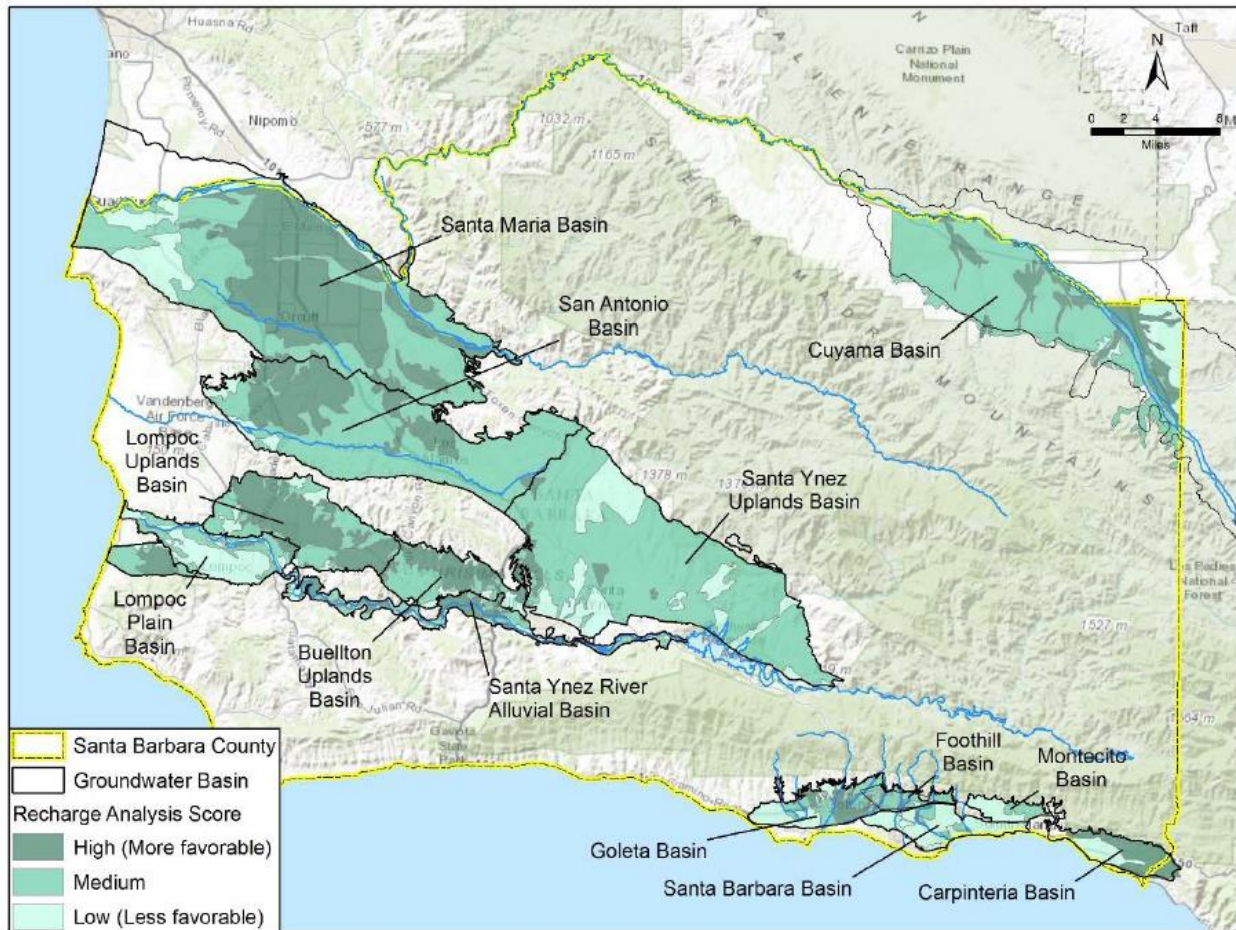
Project Costs

Implementation costs would vary depending on the ultimate size and location of the spreading facilities, and any compensatory measures required for downstream users. Per acre-foot costs would also vary depending on the amount of stormwater captured and successfully recharged. The primary cost for implementation of spreading facilities is the land purchase cost. Because the project would capture flood and stormwater (as opposed to imported or purchased water), there would be no supply costs to operate the project. The 2015 report estimated flood and stormwater capture and recharge from Cuyama River using spreading basins would cost \$600 to \$800 per AF (SBCWA, 2015).

Technical Justification

The use of spreading facilities for groundwater recharge is common in many areas across the state where groundwater basins are used for storage. The 2015 *Long Term Supplemental Water Supply Alternatives Report* (SBCWA, 2015) provides the basis for the estimated maximum volume of water that could be recharged by a flood or stormwater capture and recharge project. The storage potential of the Basin is based on the highest historical storage less the current storage, with the difference being unused storage potential. The Cuyama Basin has a high storage potential, greater than 100,000 AF, meaning it would be able to accommodate recharge of more than 100,000 AF. The size of the spreading facilities is based on the volume of water available for capture, and the recharge factor of a proposed site. The volume of water that could be recharged is based on the volume of water that could be diverted off of the river during peak storm flow events. Recharge potential was determined by analyzing the existing groundwater depth and hydrological soil type, and infiltration rates based on relative infiltration rate for hydrologic soil groups. High recharge potential were areas with hydrologic soils in group A/B, and had infiltration rates of 0.6 feet per day. As shown in **Source:** SBCWA, 2015

Figure 7-2, the majority of the Basin located in Santa Barbara County has medium or high potential for groundwater recharge, with the highest potential east of the Cuyama River in the Ventucopa Management Area. The 2015 report was limited to Santa Barbara County and does not cover the portions of the Basin located in Ventura, San Luis Obispo, and Kern counties.



Source: SBCWA, 2015

Figure 7-2: Groundwater Recharge Potential in Santa Barbara County

The 2015 report recommended additional studies to refine the high-level analysis in the report. Under this project, the CBGSA would develop a study to refine the areas of potential recharge, including areas of the Basin with potential to provide land for spreading facilities that were excluded from the 2015 report due to being located outside of Santa Barbara County. The feasibility study would, calculate the potential evaporative loss, evaluate alternatives to determine the preferred size and location of spreading facilities, refine costs for the alternatives, and calculate the potential supply from implementation of the preferred alternative.

Basin Uncertainty

This project would take advantage of the uncertain rainfall in the region and capture it for future use when precipitation levels are high. This would help bolster groundwater supplies and improve supply reliability in the Basin.



CEQA/NEPA Considerations

The feasibility study would not trigger CEQA or National Environmental Policy Act (NEPA) actions because it does not qualify as a project under either program. If a flood and stormwater capture project is implemented, CEQA would be required and completed prior to construction. NEPA would only be required if federal permitting, such as a 401 permit from U.S. Army Corps of Engineers, or if federal funding is pursued.

7.4.2 Precipitation Enhancement

A precipitation enhancement project would involve implementation of a cloud seeding program to increase precipitation in the Basin. This project would target cloud seeding in the upper Basin, southeast of Ventucopa, and would include introduction of silver iodide into clouds to increase nucleation (the process by which water in clouds freeze to then precipitate out). Based on the findings of the *Feasibility/Design Study for a Winter Cloud Seeding Program in the Upper Cuyama River Drainage, California* (SBCWA, 2016), such a program would use both ground-based seeding and aerial seeding to improve the outcomes of the program. Ground-based seeding would be conducted using remote-controlled flare systems, set up along key mountain ridges and could be automated. Aerial seeding would use small aircraft carrying flare racks along its wings to release silver iodide into clouds while flying through and above them.

Precipitation enhancement modeling assumed cloud seeding would increase precipitation by 10 percent from November through March, the time of the year with highest potential for rainfall in the Basin, for an average annual increase in precipitation of about 16,000 AF. With this assumption regarding precipitation increase, the numerical modeling estimated that an increase of 1,500 AF of additional annual average supply within the Basin over 50 years could be achieved. The portion of the increased precipitation would potentially benefit areas downstream of the Cuyama Basin.

This project would complete a detailed study to refine the potential yield and cost of implementation in the Basin.

Current Status

The CBGSA received SGMA implementation grant funding to perform a study to help understand the benefits of a potential precipitation enhancements project and help determine if this action should be pursued and implemented in the Basin. The CBGSA contracted with the Desert Research Institute (DRI) to assess cloud seeding effects on Santa Barbara County and the Cuyama Valley. A proposal was submitted in September 2023 and work was initiated in October 2023. The final report is expected to be completed in October 2023.



Public Notice and Outreach

Completion of the study included status updates at several CBGSA board meetings. The final results of the study were presented at the **MONTH YEAR** board meeting. At this time, the CBGSA has not approved the implementation of a precipitation enhancement project is pursued for implementation, but if it is pursued in the future the project would not require public notice or outreach, except for approval by a governing body for the CBGSA that would occur in a public meeting.

Permitting and Regulatory Processes

Completion of a study to refine the feasibility of a precipitation enhancement project did not require any permits or undergo a regulatory process. If a precipitation enhancement project is pursued for implementation, it is expected to be implemented under the existing SBCWA program, and would be covered under existing permits for that program.

Project Benefits

The *Feasibility/Design Study for a Winter Cloud Seeding Program in the Upper Cuyama River Drainage, California* (SBCWA, 2016) found that cloud seeding activities both in the region and in other locations around the world resulted in increased precipitation. This increase was found to be an increase in duration, rather than intensity. The existing cloud seeding program in Santa Barbara County was estimated to increase precipitation between 9 and 21 percent between December and March. The feasibility study estimated average seasonal increases of 5 to 15 percent if this program is implemented.

Based on a 10 percent increase in precipitation between November and March, modeling demonstrates an average annual benefit of 1,500 AF per year could be achieved over a 50 year period. This includes an annual average of 400 AF of deep percolation, 400 AF available in stream seepage, and 700 AF in boundary flow. There would also be an average annual increase in Cuyama River outflow of 2,700 AF. **Figure 7-3** shows the potential long-term benefits of a precipitation enhancement program. Actual benefits would be measured by evaluating rainfall data after seeding compared to long-term average rainfall in non-seeded years.

The project would complete a refined feasibility study to determine the expected precipitation yield and costs of a precipitation enhancement project. Expected benefits would be refined in that study, prior to the CBGSA making a decision to implement a precipitation enhancement program.

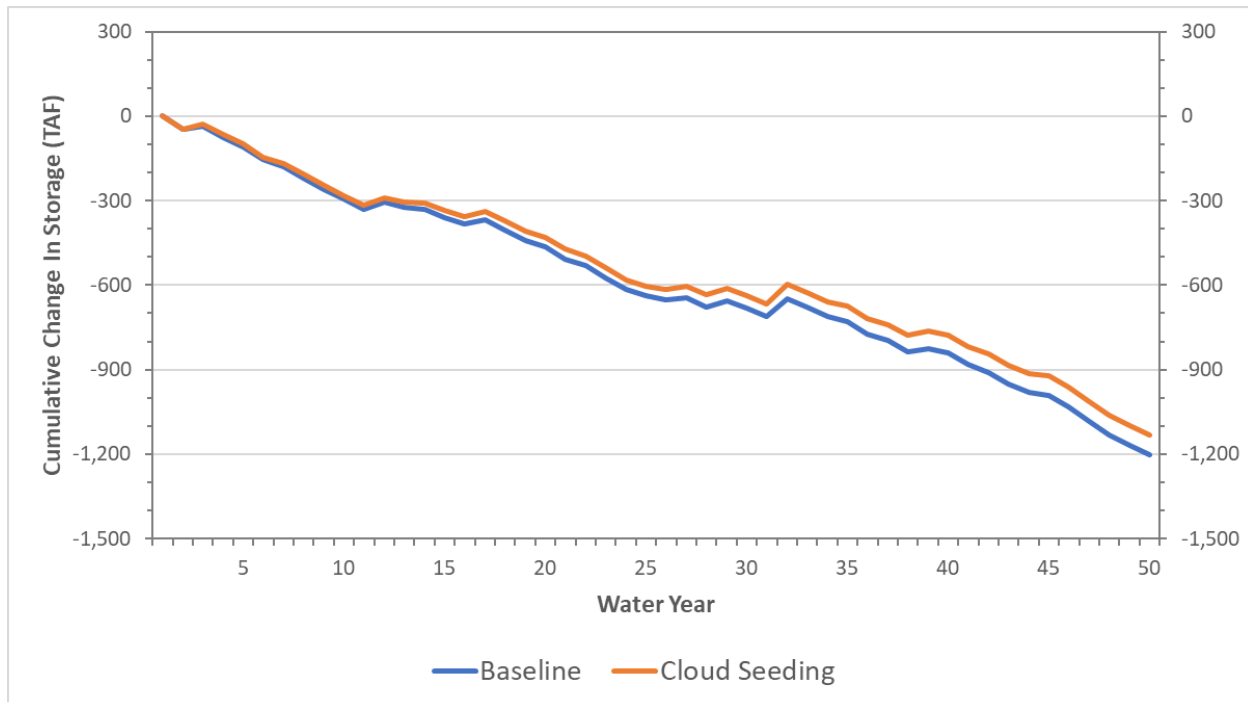


Figure 7-3: Potential Change in Groundwater Storage from Precipitation Enhancement

Project Implementation

The circumstance of implementation for a precipitation enhancement project would be if the refined project study determines it is a cost-effective measure likely to result in meaningful increases in precipitation in the Basin. The circumstance of implementation for the refined study is current conditions, where the CBGSA is ready to consider implementation of precipitation enhancement to support reduced overdraft in the Basin.

Implementation of this project would require installation of two or three additional ground-based seeding sites, referred to as an Automated High Output Ground Seeding System (AHOGS). Each AHOGS site would include:

- Two flare masts, which each hold 32 flares and includes spark arrestors to minimize fire risk
- A control box with communications system, firing sequence relays and controls, data logger, and battery
- A solar panel/charge regulation system to power the site
- Cell phone antenna
- Lightning protection

Aerial seeding would require outfitting the appropriate plane with flare racks.



Implementation of this project would likely be achieved by incorporating it into the existing precipitation enhancement activities being implemented by the SBCWA. Because implementation would be achieved through an existing program, the CBGSA does not anticipate needing to purchase and install new models or control systems beyond those necessary for the additional seeding sites and equipment.

Supply Reliability

Precipitation enhancement has been shown to provide measurable benefit to regions when implemented thoughtfully. Although the amount of precipitation increase that the project could provide is uncertain, evidence suggests potential for an average annual increase of 0.5 to 2.5 inches if this project is implemented (SBCWA, 2016), which would help to improve overall supply reliability in the Basin by increasing precipitation, reducing the need for groundwater pumping and increasing groundwater recharge. This project is not dependent on existing supplies or imported supplies for successful implementation and benefits to the Basin.

Legal Authority

The project would be implemented by the SBCWA, one of the member agencies of the CBGSA. The SBCWA already implements precipitation enhancement in the region, and has the legal authority to expand the program within its service area, which includes the Basin.

Project Costs

The 2016 *Feasibility Study* (SBCWA, 2016) recommended installing two or three AHOGS units for ground-based seeding. Each AHOGS unit would cost \$30,000 to build and test, and between \$4,000 and \$6,000 each to install. Annual maintenance was estimated at \$10,000 each. There would be minimal costs associated with initiating aerial seeding for the Basin because it would be implemented as part of the existing precipitation enhancement efforts in the region. Operational costs for aerial seeding would include flight costs (\$550 per hour in 2016), and the cost of the seeding flares. Seeding flares in 2016 cost \$90 apiece, and up to 50 flares used aurally and approximately 25 flares per AHOGS site in the four-month project period. Annual set-up, take-down, and reporting costs for this project are estimated at \$15,000 for a combined ground-based and aerial seeding effort for the Basin, as well as personnel costs of \$5,000 per month.

The 2015 *Feasibility Study* estimated that ground-based seeding would cost \$45,500 to \$67,500 for four months, and aerial seeding would cost \$37,750 for four months, assuming that aircraft costs are funded by the existing program.

Total costs are expected to be between \$20 and \$30 per AF of water under this project, though exact costs would depend on the success of the program in a given year, and market conditions for project materials and aircraft time.



Technical Justification

Cloud seeding as a concept has existed for decades, and target nucleation of supercooled water droplets that exist in clouds. Supercooled water is water that has been cooled below freezing temperatures (0 degrees Celsius or 32 degrees Fahrenheit), but remains in liquid form, rather than frozen. Supercooled water above -39 degrees Celsius must encounter an impurity to freeze, referred to as freezing nuclei. In the 1940s, particles of silver iodide were discovered to be able to cause freezing of supercooled water droplets in clouds. Silver iodide is the most common freezing nuclei used for cloud seeding in which silver iodide is injected into clouds to promote precipitation. A research program in Santa Barbara County on cloud seeding was conducted in the 1960-70s in which silver iodide was released into “convective bands” as random “seeded” or “non-seeded” (no iodide) convective bands, and resulting precipitation measured by a large network of precipitation gauges. This study evaluated both ground-based seeding and seeding by aircraft. Both methods found seeding resulted in a large area of increased precipitation. Additional studies in other regions in the 1990s found that additional precipitation from cloud seeding was a result of the increased duration of the precipitation event, rather than an increase in intensity. Cloud seeding has been conducted most winters since 1981 in portions of Santa Barbara County, which have had an estimated benefit of 9 to 21 percent increase in precipitation. The 2016 *Feasibility Study* for precipitation enhancement in the Upper Cuyama River Basin estimated a potential 5 to 15 percent increase in rainfall if a seeding project was implemented (SBCWA, 2016).

Basin Uncertainty

This project would improve precipitation yields in the Basin, helping to reduce the impacts of variable precipitation and providing for increased opportunities for groundwater recharge and stormwater capture. Further, increased precipitation duration and yields would reduce demands for groundwater for irrigation, reducing the risk of crop failure associated with water supply reliability challenges.

CEQA/NEPA Considerations

If this project is implemented, it is anticipated to be incorporated into the existing cloud seeding program implemented by SBCWA. The existing seeding program achieved CEQA coverage under the Santa Barbara Mitigated Negative Declaration (MND), finalized in 2013. This project would achieve CEQA coverage either under this existing MND, or Santa Barbara Water Agency would be required to prepare an addendum to the MND to incorporate the Cuyama Basin target area for the seeding program. Unless the project pursues federal funding, NEPA is not anticipated to be required.

7.4.3 Water Supply Transfers/Exchanges

This project would evaluate the feasibility of purchasing transferred water and exchanging it with downstream users (downstream of Lake Twitchell) to allow for additional stormwater and floodwater capture in the Basin to protect water rights of downstream users. Because this action is intended only as a complement to a potential stormwater or floodwater capture project, all potential purchase transfer water would originate outside of the Cuyama River watershed, and this action would not include the transfer or



sale of existing Cuyama basin groundwater out of the watershed. The study would be coordinated with the floodwater and stormwater capture in Section 7.3.1, as the feasibility of such an exchange would affect the maximum volumes of stormwater that would be captured under that project. If the feasibility study finds there is limited interest from downstream users, implementation would not be pursued.

Current Status

No progress was made toward implementation of this project since completion of the GSP in January 2020. This project will be explored if Project 1 mentioned above: flood and stormwater capture was feasible but greater volumes of water are desired.

Public Notice and Outreach

Public noticing would not be required for the feasibility study though outreach would be conducted as part of the study to determine willingness of downstream users to participate in an exchange.

Permitting and Regulatory Processes

No permits or regulatory processes would be necessary for development of the feasibility study. Agreements would need to be executed to secure additional water supply for use in a transfer/exchange, as well as to exchange water with downstream users. No other permits are anticipated to be required to implemented water transfers/exchanges.

Project Benefits

Implementation of a water transfer/exchange program would allow the CBGSA to increase stormwater capture if the Flood and Stormwater Capture project (see Section 7.3.1) is implemented because it would reduce the potential water rights conflicts that could arise from increased stormwater capture. The Basin does not have a physical connection to supplies outside the Basin, and is therefore limited in the types of projects that could be implemented to increase supplies. This project would allow the CBGSA to maximize the new water supply that could be available to the Basin if flood and stormwater capture is implemented. This project would be limited to the feasibility study, and would not have direct benefits. If a water transfer/exchange program is implemented as a result of the outcomes of the feasibility study, benefits would be measured by the successful execution of transfer/exchange agreements and the increased capacity of the stormwater capture and spreading facilities made possible by these agreements. Water supply benefits would be measured by the volume of water captured above the volume that would have been allowed had the transfer/exchange agreements not been implemented.

Project Implementation

The circumstance for implementation of the feasibility study would be exploration of the feasibility of flood and stormwater capture and recharge (see Section 7.3.1). Implementation of this project would occur if downstream users expressed interest in participation in water transfers/exchanges and the



feasibility study determined the potential increase in supply that transfer/exchanges would provide is cost effective for achieving supply reliability and groundwater sustainability goals.

The CBGSA would develop the feasibility study in coordination with the Flood and Stormwater Capture Project's feasibility study. Based on the outcomes of the two feasibility studies and the level of interest of downstream users, the CBGSA would determine whether implementation of a transfer/exchange project is a preferred action for the CBGSA. Implementation of the transfer/exchange program would entail coordination amongst participants: the CBGSA, agencies who own the water to be used in the transfer, and downstream users who participate in the exchange.

Supply Reliability

Transfers and exchanges would require access to a reliable water supply from outside the Basin currently owned by an agency that has sufficient water rights to be willing to sell a portion of their water to the CBGSA for this project. Because this project would be used to increase the capacity of the stormwater capture project, benefits would be experienced only following a heavy precipitation event. It is likely that in years with large precipitation events, other parts of the state will also experience wet winters, increasing available supplies from sources like the State Water project, or other surface water supplies. The feasibility study would require an evaluation of supply reliability, and explore the potential mechanisms for a successful transfer/exchange program that would account for the uncertainty of precipitation events on a year-to-year basis and available supply and potential benefit to the Basin.

Legal Authority

The CBGSA, through its member water supply agencies, has the legal authority to enter into transfer and exchange agreements with other water suppliers and users. The CBGSA does not have the authority to increase its stormwater capture at a level that would impede downstream senior water rights holders from accessing their water rights, making this project a critical component of an expanded capacity stormwater project (beyond what could be achieved without this project).

Project Costs

A feasibility study would likely cost between \$100,000 and \$200,000 to complete, including outreach to downstream water users and potential sources of supply for the transfer/exchange program. Costs to implement a transfer and exchange program would be evaluated in the feasibility study and are estimated to range from \$600 to \$2,800 per AF. Costs would vary depending on the details of the transfer/exchange, source of new water, and parties involved.

Technical Justification

A transfer/exchange program would be at minimum a one-to-one exchange, meaning for each AF of water provided to downstream users through the program, the CBGSA could capture an additional AF of stormwater. The feasibility study would identify which supplies could be purchased to exchange with



downstream users, based on supply availability, connectivity to downstream users, willingness of supply owners to participate, and cost. One purpose of the feasibility study would be to determine a preferred alternative for the transfer/exchange program, and provide a technical justification of the preferred program. If technical justification cannot be made, the program would be considered infeasible and would not be pursued.

Basin Uncertainty

The transfer/exchange project would help address uncertainty in the basin by allowing the CBGSA to increase groundwater recharge, using years with surplus surface water flows to supplement groundwater during dry years by increasing the volume of stormwater that can be captured without interfering with downstream users' water rights.

CEQA/NEPA Considerations

Development of a feasibility study would not trigger CEQA or NEPA. Water exchanges or transfers are not anticipated to include construction of new facilities. However, since a water exchange or transfer is a discretionary action, they are likely to be considered projects under CEQA or NEPA. NEPA documentation may be required if any of the water being exchanged or transferred is federal agency (i.e. Bureau of Reclamation of Corps of Engineers).

7.4.4 Improve Reliability of Water Supplies for Local Communities

The Basin is experiencing overdraft in the central portion of the Basin and Ventucopa areas, which are the population centers of the Basin. Domestic water users in these areas are experiencing water supply reliability challenges, and in the 2012-2016 drought experienced well failures. While the following actions would not affect the water budget in the Basin, they are intended to address ongoing water supply reliability issues affecting these communities. This management action would include consideration of opportunities to improve water supply reliability for Ventucopa and within the CCSD service area. Potential projects that would be considered under this management action include a replacement well for CCSD Well 2, which is currently abandoned, and improvements to Ventucopa Water Supply Company's (VWSC's) existing well. Specific information would be coordinated with the respective community water system entities and is therefore not available for this GSP.

Current Status

Since the 2020 GSP adoption, DWR's IRWM program awarded the CCSD a grant to install a new production well. Work by the CCSD to install the new well is ongoing.

CCSD Replacement Well

The CCSD Replacement Well would drill a new well in CCSD's service area to replace Well 2, which has been abandoned due to an electrical failure that damaged the well and pumping equipment and subsequent damage the well incurred when an attempt was made to remove the pump. Previously, a



replacement well for Well 2 was attempted, but found to produce water that was unsuitable for potable use due to the design and construction of the well. Construction of the new well is expected to be completed soon and would include:

- Drilling, installing, and testing a new well
- Installing a well head, submersible well pump, and electrical panel
- Construction of an 8-inch pipeline to connect the new well to CCSD's system

Ventucopa Well Improvements

The Ventucopa Well Improvements would construct a new water supply pump, pipelines, and meters for the existing Ventucopa Well 2 and seek approval for the well's use for drinking water from the County of Santa Barbara's Department of Health Services (DHS). These improvements would:

- Install a pump, electrical service, and controls at Well 2
- Construct an 8-inch pipeline from Well 2 to Ventucopa's existing hydropneumatic tank
- Install meters at Well #1 and Well 2
- Install a SCADA system for Well 2
- Install piping, valves, and inline mixer to blend water from Well 1 and Well 2

Public Notice and Outreach

Public notice and outreach would not be required beyond that necessary for approval at a public Board of Directors meeting or applicable CEQA.

Permitting and Regulatory Processes

CCSD's new well construction would require acquisition of a well drilling permit and approval of well design and well completion report. It would also require well testing that demonstrates the new well is capable of producing water that is suitable for drinking water. In addition to a well drilling permit from Santa Barbara County, CCSD's existing water system permits would need to be revised to include the new well and associated features.

Improvements to VWSC's well would require compliance with Santa Barbara County's regulations for water systems in the unincorporated county. VWSC would need to acquire the appropriate well drilling permits from the County as well as receive DHS certification of the suitability of the upgraded well for potable use before water from Well 2 can be delivered to customers.

Project Benefits

These projects would improve supply reliability for Ventucopa and CCSD residents and customers by creating system redundancies and upgrades to address challenges with meeting existing demands



associated with aging and failing infrastructure. As planned, up to 460 gallons per minute could be made available to CCSD and up to 55 gallons per minute available to VWSC as a result of this project. Benefits of this project would be measured by the volume of water produced by the two improved wells and reduction in the number of days system failures threaten access to water supplies.

Project Implementation

The circumstance of implementation for this project is identified need for system improvements to meet public health and safety concerns. Both CCSD and VWSC have documented challenges with their water supply systems, including lack of redundancy, wells that do not adequately meet domestic water supply requirements, and limited capacity (CCSD, 2018; VWSC, 2007).

The two components of this project would be implemented by their respective system owners, CCSD and VWSC. CCSD is responsible for planning, design, construction, testing, and permitting of the new Well 4, while VWSC would be responsible for planning, design, construction, testing, and permitting of the Well 2 improvements.

Supply Reliability

This project would improve supply reliability to customers through system improvements designed to address known issues with accessing and conveying groundwater suitable for potable use.

Legal Authority

CCSD owns the property for the proposed well site, and has the legal authority to design and construct a new well. As the owner-operator of the CCSD system, CCSD also has the legal authority to connect the new well to its existing distribution system and deliver water from the new well to customers once all appropriate permits have been acquired.

VWSC already owns Well 2 and the other existing components of the proposed project. It has the legal authority to implement projects that serve the water supply needs of its customers, and once all appropriate permits have been acquired, is legally able to connect Well 2 to its existing system.

Project Costs

In total, these improvements are expected to cost approximately \$1,175,000.

CCSD's 2018 Engineering Report for Well 4 estimated project costs of \$489,800 for drilling and \$485,280 for equipping, for a total cost of \$975,080 (CCSD, 2018).

VWSC's 2007 *Ventucopa Water System Evaluation Report* estimated the well improvements included in this GSP would cost \$191,200 (VWSC, 2007). Costs are assumed to have increased since 2007, and well improvements are currently expected to cost approximately \$200,000 to implement.



Technical Justification

Both components of this project have completed initial planning efforts. Preliminary engineering and design has been completed for the CCSD Well 4 improvements, including the 2018 Engineering Report and preliminary design drawings. VWSC's well improvements were described and evaluated in the 2007 Evaluation Report. Implementation of this project would include final design for all components, as well as testing to ensure that well improvements meet the needs they are designed to address.

Basin Uncertainty

These improvements would reduce uncertainty associated with supply reliability in CCSD and VSWC's service areas.

CEQA/NEPA Considerations

Well drilling permits are a discretionary action in Santa Barbara County, which would trigger CEQA. CCSD and VSWC would need to complete the appropriate CEQA document to comply with these requirements prior to construction of this project. The project would not trigger NEPA unless federal funding or permits are required for completion of the project. The size and location of the project indicates it is unlikely to require federal permits, and NEPA is likely to only be required if federal funding is pursued.

7.4.5 Flow Meter Calibration Program

During the implementation of the 2020 GSP, the CBGSA took action to require non-de minimis groundwater users in the Basin to install water meters on all groundwater extraction wells by the end of 2021. Groundwater flow data are used in conjunction with groundwater level data in a variety of ways, including to provide water production data and information on groundwater basin conditions. This is especially important for sustainable regional management of groundwater resources.

The flow meter recalibration program would require all flow meters to be tested for accuracy once every three years. Flow meters will need to be accurate within +/- 5% of actual flows, and testing would need to be conducted by a qualified company or person approved by the GSA.

Current Status

This project has been recently conceptualized and added this GSP for the first time. Work has not commenced on this project and will only commence if the CBGSA decides to pursue it.

Public Notice and Outreach

Public notice and outreach would not be required beyond that necessary for approval at a public Board of Directors meeting or applicable CEQA.



Permitting and Regulatory Processes

No permits or regulatory processes would be necessary for development of the Flow Meter Calibration Program.

Project Benefits

This project will help ensure the accurate reporting of pumping volumes from metered pumps in the in the Basin. Accurate pumping data is used by the CBGSA to ensure compliance with pumping allocations in the Central Management Area and to help calibrate and update the model. Calibration of the flow meters that provide this data will ensure pump owners have the best available flow data and the CBGSA has accurate data for its monitoring. This will help avoid potential accidental and unknown over-pumping if a flow meter begins to underestimate flows, or potential under-pumping (and therefore reduced water volumes for beneficial uses and users) that could impact pump owners detrimentally.

Project Implementation

The circumstance of implementation for this project is an identified need for meter calibration and verification of pumping volumes by applicable groundwater producers. Implementation would require outreach to stakeholders, and a detailed program for the requirements of meter calibration. A timeline and reporting period and methodology would also need to be established to ensure all calibration information is properly collected and reviewed by the CBGSA.

Supply Reliability

This project would not change supply reliability to beneficial uses and users. It would ensure more accurate data on pumping where flow meters are installed.

Legal Authority

The CBGSA has the legal authority to place reporting requirements on groundwater extractors within the Basin.

Project Costs

In total, it is expected that this project would cost approximately \$50,000 for the initial set up, and \$250,000 annually. The \$250,000 was calculated using conservative flow meter calibration cost estimates of \$2,500 per flow meter for the 100 flow meters installed in the Basin. The initial set up cost for this program includes the development of guidance materials and requirements, a reporting system, and analysis of collected data.



Technical Justification

The flow meter calibration program would ensure that accurate data from applicable groundwater producers is provided to the CBGSA which is used for monitoring groundwater extractions and used in GSP implementation and groundwater modeling. The calibration program will ensure data is accurate and can be used by the CBGSA for implementation of the GSP.

Basin Uncertainty

The flow meter calibration program would ensure that accurate data from applicable groundwater producers is provided to the CBGSA which is used for monitoring groundwater extractions and used in GSP implementation and groundwater modeling. This will ensure data used by the CBGSA for GSP implementation leads to equitable and accurate decision making to reach sustainability.

CEQA/NEPA Considerations

Development of a flow meter calibration program would not trigger CEQA or NEPA. A calibration program is not anticipated to include construction of new facilities.

7.5 Water Management Actions

Water management actions are generally administrative locally implemented actions that the CBGSA or its member agencies could take that affect groundwater sustainability. Typically, management actions do not require outside approvals, nor do they generally involve capital projects.

7.5.1 Basin-Wide Economic Analysis

Changes to pumping in the Basin and access to water supplies may have economic consequences given that the Basin is dominated by agricultural land uses that are dependent on groundwater availability. Implementation of stormwater capture may require purchase of agricultural land for the spreading facilities, which could affect agricultural output in the region. The small population of the Basin limits the available revenue to fund projects. This Project entailed developing a study of the economic impacts of the projects and management actions included in the GSP. It included an evaluation of how implementation of the project could affect the economic health of the region and the local agricultural industry. It would also consider the projected changes to the region's land uses and population and whether implementation of these projects would support projected and planned growth. The economic analysis will be considered by the CBGSA when deciding whether to implement a proposed project and potentially when to implement the projects.

Current Status

A Basin-wide direct economic analysis of proposed GSP actions has been completed. The results of this analysis were presented to the GSP Board on December 4, 2019, and the final report was completed in



December 2019. The final Basin-wide economic analysis report was provided in the 2020 Annual Report. This management action is 100% complete.

Public Notice and Outreach

This project was a study and did not require public notice or outreach. The results of the economic analysis were presented to the GSP Board on December 4, 2019.

Permitting and Regulatory Processes

No permits or regulatory approvals were required to complete the economic analysis.

Project Benefits

The economic analysis provided information to the CBGSA regarding the potential economic benefits and drawbacks to implementation of different projects under the GSP. This project did not provide direct benefits as related to water supply or groundwater sustainability, but will allow the CBGSA to move forward with implementation of projects that would continue to sustain local economies and would not inadvertently cause substantial economic harm, which could affect the ability of a proposed project to continue to provide benefits.

Project Implementation

The circumstance of implementation for this project were the consideration of the implementation of any project included in this GSP or otherwise considered by the CBGSA. The CBGSA implemented this project with the assistance of an economic consultant that completed the analysis based on data for the region and information provided by the CBGSA.

Supply Reliability

This project is a study and did not depend on any water supply for implementation or successful completion.

Legal Authority

The CBGSA is a joint-powers authority with authority to authorize an economic study for the projects in this GSP.

Project Costs

The basin-wide economic analysis had a cost of approximately \$60,000.



Technical Justification

This project is a study that would use economic methods and analysis tools consistent with the standards and practices of the industry.

Basin Uncertainty

This project will help the CBGSA understand the economic uncertainty around implementation of the projects in the GSP. Improved understanding of the economic implications of a project will help the CBGSA decide which projects should move forward to support basin sustainability without unintended consequences that could increase overall uncertainty in the basin, including uncertainty regarding groundwater demands in the basin associated with the local and regional economy.

CEQA/NEPA Considerations

As a study, the basin-wide economic analysis did not trigger CEQA or NEPA.

7.5.2 Pumping Allocations in Central Basin Management Area

As described in Section 2.3 of this GSP, the Basin is in overdraft conditions and to achieve balanced pumping and recharge groundwater users must decrease pumping by approximately 61 percent, in the absence of projects that increase recharge in the Basin or otherwise offset demands. While the projects identified in Section 7.4 would increase the water available to users in the Basin through increased recharge and precipitation, they are not expected to reduce the groundwater deficit sufficiently to achieve the Basin's sustainability goals. As such, the CBGSA has and will continue to implement pumping allocations.

Outlined here is a framework for how CBGSA has developed and implemented pumping allocations in the Central Management Area (CMA). As part of implementation of the pumping allocation program, the CBGSA allowed for operators within the CMA to create farming units, which irrigated land areas outside of the CMA that operate in common with areas inside the CMA. Consistent with the magnitude of projected overdraft estimated by the CBWRM, pumping allocations would not apply to users outside of the Central Management Area and farming units. Potential pumping allocations in other areas of the Basin may be considered in the future as additional data collection and technical analysis is performed to provide a better understanding of water balance conditions in these areas. CCSD would be provided allocations based on historical water use, and would not be required to reduce pumping over time, but would be limited in how much pumping could increase in the future.

There are four key steps to developing pumping allocations:

1. Determine the Sustainable Yield of the Basin and the Central Management Area
2. Allocate sustainable yield of native groundwater to users based on:
 - a. Historical use



- b. Land uses and irrigated areas
3. Determine how new/additional supplies would be allocated
4. Develop a timeline for reducing pumping to achieve allocations over time

Current Status

Pumping allocations in the CMA were implemented for 2023 and 2024. A notice of final allocations for these years was posted on the CBGSA website in May 2023. The CBGSA determined in its July 31st, 2024, Board Meeting to continue with allocations going forward, with an adjustment to the Central Management Area Boundary to conform with data available from the updated Cuyama Basin Water Resources Model. The CBGSA intends to use the model update in calculating allocations for the foreseeable future starting with 2025 allocations.

Sustainable Yield of the Basin Absent Projects and Water Management Actions

The sustainable yield of the Basin absent projects and water management actions is the volume of water that can be extracted from the Basin annually without affecting overall groundwater storage. and the sustainable yield of the Basin is estimated to be approximately 17,000 AFY, as described in the Water Budget section of Chapter 2. The sustainable yield of the Basin represents the volume of groundwater that can be allocated. Because pumping allocations would only be imposed on users in the Central Basin Management Area, the CBGSA would need to determine the sustainable yield for only the Central Basin Management Area, which would be less than the overall sustainable yield of the Basin.

Develop Allocations

The CBGSA will continue to develop allocations based on estimated historical use, existing land uses, or total irrigated acreage. For the 2023 and 2024 allocations, the CBGSA determined historical use by analyzing data about water use during the 20-year historical period from 1998 to 2017. This period aligns with the historical period of the water budget analysis described in Chapter 2. For this period, water use was estimated using data from the CBWRM model. In the future, the CBGSA intends to continue to use the same methodology; however, use of remote sensing and land use data to estimate agricultural consumption or of data provided by pumpers in the Basin may be considered in the future. CCSD's allocation is based on historical use, with an allowance for changes in population in the CCSD service area. CCSD is not required to reduce use in the future under this action. As such, once CCSD's allocation has been determined, it is removed from the total volume of groundwater available for allocation to non-CCSD users in the Central Management Area.

Determine Allocation of New or Additional Supplies

As the CBGSA implements projects in this GSP, additional groundwater supplies are expected to become available. These supplies would be used to reduce groundwater overdraft. The CBGSA anticipates that any new supplies made available through project implementation would be added to the total volume of



water that would be allocated to the beneficiaries of those projects identified during project development. The mechanism for accounting for additional water made available by project implementation would be determined when the allocation method is refined.

Timeline for Implementation

The required decreases in pumping volumes to achieve balanced groundwater use in the Basin may result in substantial reductions in water availability over current use. The CBGSA completed the initial pumping allocation plan in 2022, with pumping reductions beginning in 2023 at 5 percent of the total required reduction to achieve sustainability, and an additional 5 percent reduction in 2024. From 2025 to 2038, pumping will be reduced by 6.5 percent annually, so as to achieve sustainability in the Basin in 2038. Figure 7-4 shows the planned pumping reduction in the Basin. Individual users will be expected to reduce pumping at different rates to achieve the overall pumping reductions and meet their individual pumping allocations. The pumping allocation plan will identify how much each user or user-type would be required to reduce pumping annually to achieve the allocation and the overall Basin sustainability goals.

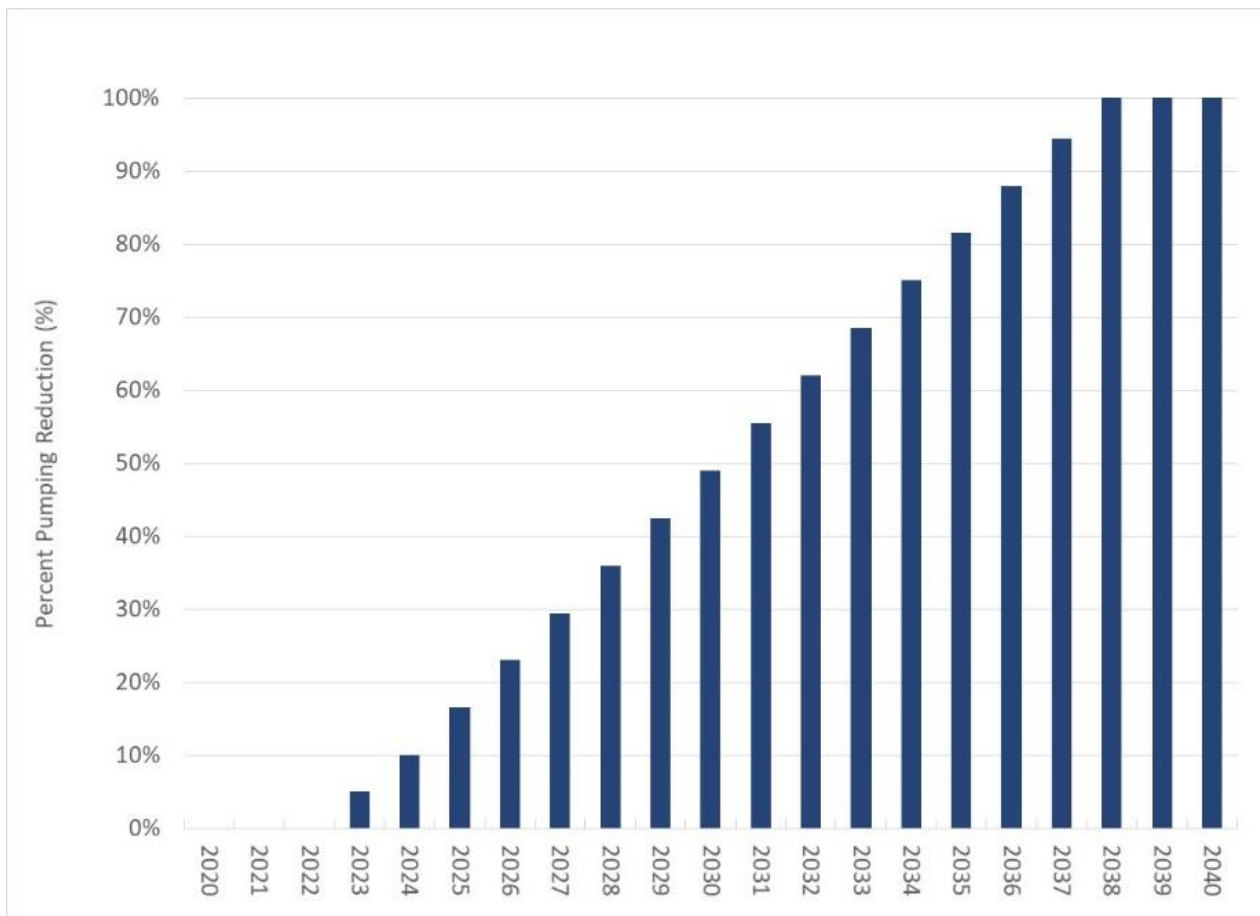


Figure 7-4: Glide Path for Central Basin Management Area Groundwater Pumping Reductions



Public Notice and Outreach

Development of a pumping allocation plan required and will continue to require substantial public input to understand the potential impacts of pumping allocations and baseline needs that should be accounted for. The CBGSA held public workshops and meetings, updated the website, and sent out email announcements and other public notices about workshops. Updates to the pumping allocation plan will be circulated for public comment before finalized, though final approval of the plan would be made by CBGSA in partnership with its member agencies.

Permitting and Regulatory Processes

Development of a pumping allocation plan does not require any permitting, but does require consideration of existing water rights and applicable permits and regulations associated with groundwater pumping in the Basin.

Management Action Benefits

A pumping allocation plan will identify how the region will achieve sustainable pumping in the Basin. Implementation and enforcement of a pumping allocation plan will directly reduce groundwater pumping. Benefits would be measured by the change in total volume of groundwater pumped from the Basin and how many users are in compliance with their pumping allocations.

Management Action Implementation

The circumstance of implementation for developing a pumping allocation plan is identification of unsustainable groundwater pumping practices in the Basin. The CBGSA recognized recharge and pumping in the Basin is and continues to be unbalanced, and action must be taken to achieve sustainability. CBGSA developed a pumping allocation plan, in partnership with its member agencies and local groundwater users. The initial planning process was completed in 2023, with allocations implemented beginning in 2023. Successful implementation required compliance from groundwater users with the pumping allocation plan, and enforcement by the CBGSA and its member agencies. Successful roll-out of the pumping allocation plan required substantial public outreach to inform users of their annual allocation and expected annual reduction in groundwater pumping. Mechanisms for enforcement are outlined in the pumping allocation plan and are expected to be enforced by CBGSA's member agencies.

Supply Reliability

This project does not rely on supplies from outside the Basin because it is a planning effort that will result in conservation. It will support overall supply reliability by reducing overdraft in the Basin and moving the Basin towards sustainability.



Legal Authority

CBGSA has the authority to develop a pumping allocation plan and will perform implementation and enforcement of allocations through metering, water accounting, and implementing pumping fees.

Management Action Costs

Development and initiation of a pumping allocation management and tracking program is expected to cost up to \$300,000 to conduct the analysis, set up the measurement and tracking system and conduct outreach. Costs to implement the plan would depend on the level of enforcement required to achieve allocation targets and the level of outreach required annually to remind users of their allocation for a given year. The pumping allocation plan would include a cost estimate for enforcement and implementation. Annual management of the program is estimated to cost about \$150,000 per year.

Technical Justification

Pumping allocations will provide direct reductions of groundwater pumping. The pumping allocation plan developed allocations based on historical use data and land use data and will clearly describe the methodology and justification for the methodology used when setting pumping allocations.

Basin Uncertainty

The Basin is currently experiencing overdraft, and if current pumping practices continue conditions in the Basin are expected to worsen, increasing uncertainty regarding the availability of reliable groundwater supplies. Development and implementation of a pumping allocation plan will provide an opportunity to reduce overdraft-related uncertainty in the Basin by shifting pumping towards sustainable levels over time.

CEQA/NEPA Considerations

Development and implementation of the pumping allocation plan is not a project as defined by CEQA and NEPA and therefore did not trigger either. Reducing pumping over time is also not expected to trigger CEQA or NEPA because it does not meet the definition of a CEQA or NEPA project. As any plan is developed, CEQA and NEPA will be considered to determine if compliance is required.

7.6 Adaptive Management

Adaptive management allows the CBGSA to react to the success or lack of success of actions and projects implemented in the Basin and make management decisions to redirect efforts in the Basin to more effectively achieve sustainability goals. The GSP process under SGMA requires annual reporting and updates to the GSP at minimum every 5 years. These requirements provide opportunities for the CBGSA to evaluate progress towards meeting its sustainability goals and avoiding undesirable results.



Adaptive management triggers are thresholds that, if reached, initiate the process for considering implementation of adaptive management actions or projects. For CBGSA, the trigger for adaptive management and CBGSA's next steps would be as follows:

- **Pumping reductions are more than 5 percent off the glide path identified in the pumping allocation plan:** CBGSA would evaluate why pumping allocations are not being met and implement additional outreach or enforcement, as appropriate.
- **If the Basin is within the Margin of Operational Flexibility, but trending toward Undesirable Results, and within 10 percent of the Minimum Threshold:** CBGSA will investigate the cause and determine appropriate actions.

Adaptive management strategies may also be triggered for other reasons, such as reports by stakeholders of Basin conditions that have impacted beneficial uses or users. Stakeholders may notify the CBGSA of their concerns by (i) submitting a publicly available well reporting form (available on the CBGSA website) to the GSA, (ii) contacting the Basin manager as described in Section 1.1.1 – Contact Information, or (iii) bringing the concerns to public meetings.

If an investigation based on monitoring data and/or stakeholder reporting indicates that groundwater management in the Basin may be adversely affecting beneficial users, the CBGSA Board will determine if a response by the CBGSA is required. This will include the formation of an ad hoc committee to investigate the cause(s) of changing Basin conditions, conducting data analysis, and discussion of potential adaptive management response strategies. If appropriate, the CBGSA will implement response strategies to correct the issue; these strategies could include localized pumping management plans, installation of additional monitoring, installation of replacement wells, potential changes to sustainability criteria or pumping reduction schedule included in the GSP, or other solutions to address specific concerns and Basin conditions.

7.7 References

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