



EXECUTIVE SUMMARY

Introduction

In 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA) in response to continued overdraft of California’s groundwater resources. The Cuyama Groundwater Basin (Basin) is one of 21 basins and subbasins identified by the California Department of Water Resources (DWR) as being in a state of critical overdraft. SGMA requires preparation of a Groundwater Sustainability Plan (GSP) to address measures necessary to attain sustainable conditions in the Basin. Within the framework of SGMA, sustainability is generally defined as the conditions that result in long-term reliability of groundwater supply, and the absence of undesirable results.

In 2017, in response to SGMA, the Cuyama Basin Groundwater Sustainability Agency (CBGSA) was formed. The CBGSA is a joint-powers agency that is comprised of Kern, Santa Barbara, San Luis Obispo and Ventura

counties, the Cuyama Community Services District and the Cuyama Basin Water District. The CBGSA is governed by an 11-member Board of Directors, with one representative from Kern, San Luis Obispo and Ventura counties, two representatives from Santa Barbara County, one member from the Cuyama Community Services District, and five members from the Cuyama Basin Water District.

SGMA requires that the CBGSA develop a GSP that achieves groundwater sustainability in the Basin by the year 2040. The Draft Cuyama Basin GSP was adopted on December 4, 2019 by the CBGSA Board and submitted to DWR on January 28, 2020. On January 21, 2021, DWR determined that the GSP was “incomplete” and recommended CBGSA to amend the GSP to address four corrective actions. To address these corrective actions, CBGSA developed supplemental sections to the GSP and resubmitted to DWR on July 18, 2022. On March 2, 2023, DWR announced that the Revised GSP had been Approved.

This 2025 GSP Update is now available for public review and comment. SGMA requires the CBGSA to develop a GSP that achieves groundwater sustainability in the Basin by 2040. Although SGMA references 2015 as a basis for groundwater planning, SGMA does not require a GSP to address undesirable results that occurred before 2015. The GSP outlines the need for significant reductions in pumping in the central portion of the Basin and has identified projects and management actions that could help offset the projected reductions in pumping. Although current analysis indicates groundwater pumping reductions on the order of 60 percent may be required Basin-wide to achieve sustainability, additional efforts are required to confirm the amount and location of pumping reductions required to achieve sustainability. These efforts include collecting additional data and a review of the Basin’s groundwater model, along with other efforts as outlined in this document.

Critical Dates for the Cuyama Basin

- ✓ 2020 By January 31: submit GSP to DWR (complete)
- ✓ 2025 Review and update GSP
- 2030 Review and update GSP
- 2035 Review and update GSP
- 2040 Achieve sustainability for the Basin

Plan Area

The CBGSA’s jurisdictional area is defined by DWR’s 2013 Bulletin 118, and in the 2016 Interim Update¹. The Basin generally underlies the Cuyama Valley, as shown in Figure ES-1, above.

Outreach Efforts

A stakeholder engagement strategy was developed to ensure that the interests of all beneficial users of groundwater in the Basin were considered. The strategy incorporated monthly CBGSA Standing Advisory Committee (SAC) meetings, monthly CBGSA Board meetings, quarterly community workshops, and information distribution to all property owners and residents in the Basin. A total of 131 public

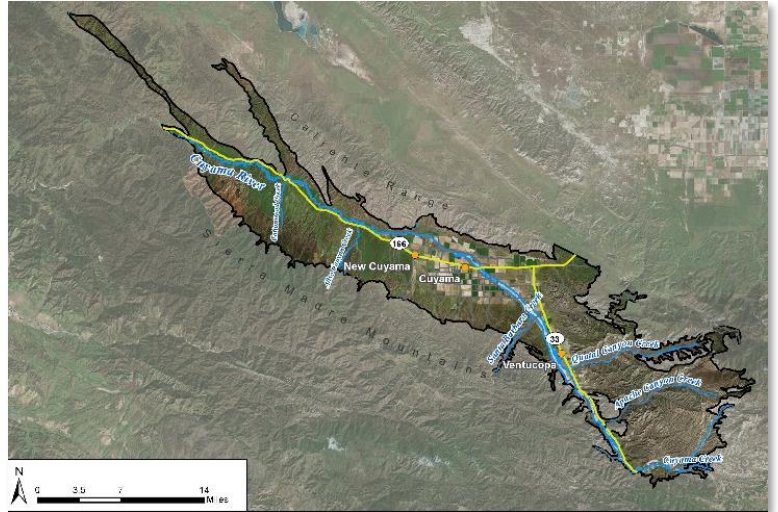


Figure ES- 1: GSP Plan Area



Figure ES- 2: Community Workshops

Public Meeting	Number
Cuyama Basin GSA Board Meetings	59
Cuyama Basin GSA Standing Advisory Committee Meetings	53
Joint Meetings of Cuyama Basin GSA Board and Standing Advisory Committee	10
Community Workshops	9

meetings were held between June 2017 and August 2024 as summarized in the table below. Figure ES-2 shows attendees at one of the community workshops conducted during development of the GSP.

The SAC was established to encourage active involvement from diverse social, cultural, and economic elements of the population in the Basin. The SAC members represent large and small landowners and growers from different geographic locations in the Basin, longtime residents including Hispanic community members, and a manager of an environmental educational non-profit organization. The

¹ <https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118>

community workshops were conducted in both English and Spanish creating an opportunity for local individuals to engage in the GSP development process.

Basin Setting

The Basin is at the southeastern end of the California Coast Ranges, near the San Andreas and Santa Maria River fault zones, and is bounded on the north and south by faults. These faults create several constraints on groundwater flow through the Basin. Groundwater and surface water generally flow from the eastern portions of the Basin toward the westernmost portion of the Basin. The major surface stream is the Cuyama River. Multiple smaller streams flow into the Cuyama River; and the Cuyama River flows to the west and eventually joins with the Santa Maria River. The location of the Basin is shown in Figure ES-3.

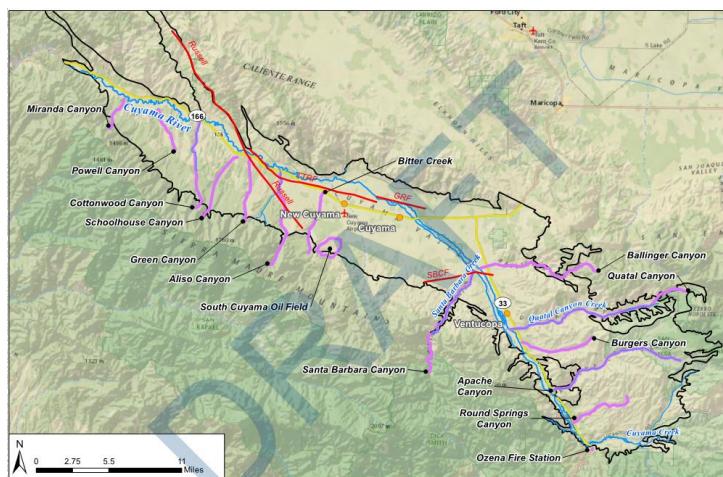


Figure ES- 3: Basin Setting

Existing Groundwater Conditions

Groundwater levels in some portions of the Basin have been declining for many years, while other areas of the Basin have experienced no significant change in groundwater levels. Figure ES-4 shows depth-to-groundwater contours for fall 2023, which reflects the most recent recorded status of groundwater levels in the Basin. The change in groundwater levels vary across the Basin, with the greatest declines occurring in the central portion of the Basin, where the greatest concentration of irrigated agriculture occurs. The western and eastern portions of the Basin have experienced significantly less change in groundwater levels. However, additional irrigated agricultural acreage has been developed recently in the western portion of the Basin, warranting additional levels of monitoring to determine if there are any impacts to long-term groundwater levels and sustainability.

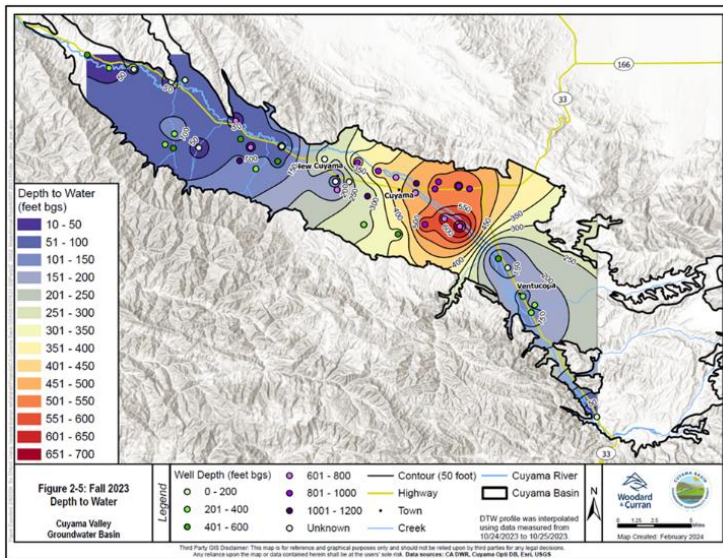


Figure ES- 4: Depth-to-Groundwater in Fall 2023

Groundwater quality in the Basin varies, particularly along the Basin boundary. Water quality in the Basin has historically had high levels of total dissolved solids (TDS) and sulfates. The United States Geological Survey (USGS) has conducted several water quality studies in the Basin. High concentrations of other constituents, including nitrate and arsenic, are generally localized and not widespread. Groundwater quality ranges from hard to very hard and is predominantly of the calcium-magnesium-sulfate type. Average TDS concentrations across the Basin in the last year are about 1,100 to 1,300 milligrams per liter (mg/L) along portions of the Basin’s southern

boundary. These values exceed the California recommended secondary maximum contaminant level (MCL) for drinking water of 500 mg/L.

Undesirable Results

Undesirable results are conditions that cause significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses of the Basin’s groundwater. SGMA identifies six defined areas for classification of undesirable results, as shown in the adjacent callout. The one undesirable result that does not impact the Basin is seawater intrusion. Water quality in the Basin is generally poor due to high TDS and other constituents, and there is limited subsidence in the Basin, but the major areas of undesirable results are associated with the following:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction in groundwater storage
- Depletions of interconnected surface water

Undesirable Results Categories

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion (does not apply in the Basin)
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
- Significant and unreasonable land subsidence that substantially interferes with surface land uses
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

Figure ES-5 is a graph showing the modeled annual and cumulative long-term reduction in groundwater storage in the Basin. This reduction in groundwater storage coincides with the observed lowering of groundwater levels.

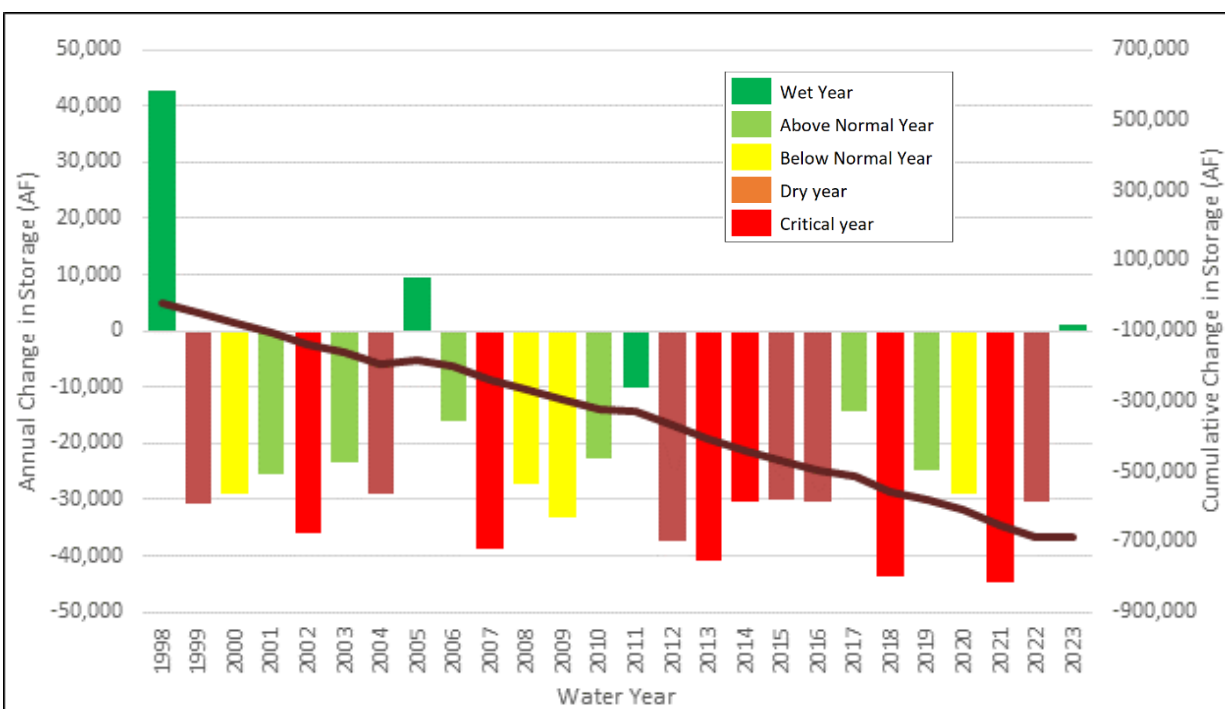


Figure ES- 5: Annual and Cumulative Changes in Groundwater Storage

The lowering of groundwater levels has corresponded with degradation of groundwater quality, and particularly in elevated levels of TDS. Additionally, lowering of groundwater levels has contributed to some subsidence in the central portion of the Basin (i.e., about 1 foot over the past 20 years), and has contributed to depletions in interconnections of surface and groundwater systems.

Sustainability

SGMA introduces several terms to measure sustainability, including the following:

- **Sustainability Goals** – These goals are the culmination of conditions resulting in an absence of undesirable results within 20 years.
- **Undesirable Results** – Undesirable results are the significant and unreasonable occurrence of conditions that adversely affect groundwater use in the Basin.



- **Sustainability Indicators** – Sustainability indicators refer to any of the adverse effects caused by groundwater conditions occurring throughout the Basin that, when significant and unreasonable, cause undesirable results, including the following:
 - Lowering groundwater levels
 - Reduction of groundwater storage
 - Seawater intrusion (does not apply in the Basin)
 - Degraded water quality
 - Land subsidence
 - Depletion of interconnected surface water
- **Minimum Thresholds** – Minimum thresholds are a numeric value for each sustainability indicator and are used to define when undesirable results occur, including if minimum thresholds are exceeded in a percentage of sites in the Basin’s monitoring network.
- **Measurable Objectives** – Measurable objectives are a specific set of quantifiable goals for the maintenance or improvement of groundwater conditions. They will be included in the adopted GSP, and will help the CBGSA achieve their sustainability goal for the Basin.

Representative wells were identified in the Basin to provide a basis for measuring groundwater conditions without having to measure each existing well, which would have been cost prohibitive. Representative wells were selected based on availability, their history of recorded groundwater levels, and their potential to effectively represent groundwater conditions near the identified well. During GSP implementation, well owners have to consent to the use of their wells for monitoring. During the first four years of GSP implementation, monitoring networks have been revised to provide efficient and adequate coverage of the Basin while expanding data collection efforts.

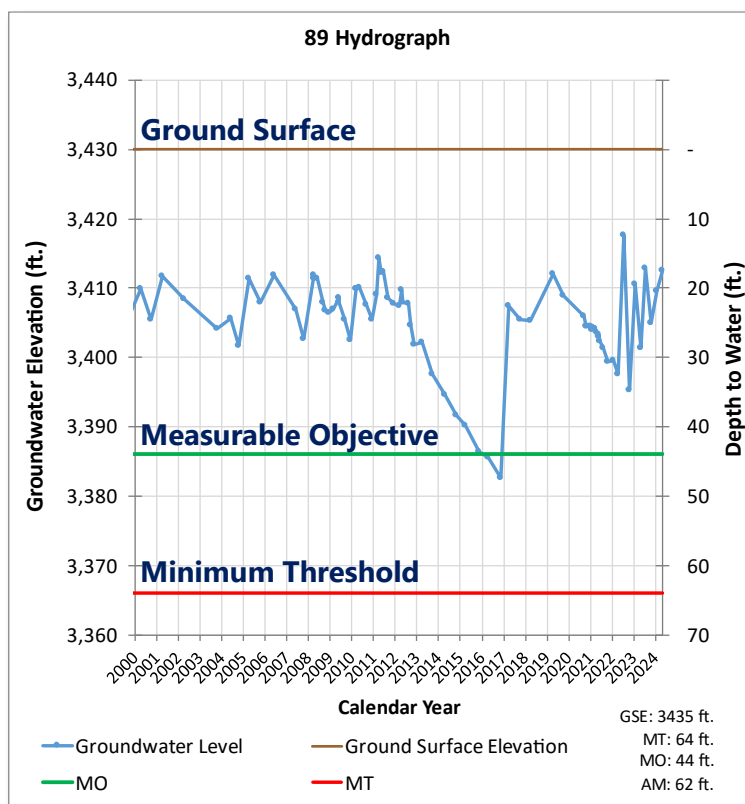


Figure ES- 6: Sample Relationship Between Minimum Threshold and Measurable Objective

function that utilizes a well/GDE protection depth, historical data, projected modeled glidepath declines, and the saturated thickness in areas with greater geologic understanding. Measurable objectives were calculated by using the same margin of operation flexibility as described in the original GSP but utilizing the new minimum thresholds as the starting value.

A table summarizing minimum thresholds and measurable objectives is included in the GSP Section 5. Graphs showing the minimum threshold and measurable objective for each representative well are in an appendix to the GSP.

Water Budgets

The Basin has been in an overdraft condition for many years. Overdraft conditions in the Basin were first documented in the 1950s. Since then, groundwater pumping has increased in response to increased levels of agricultural production, leading to increased levels of groundwater overdraft.

The revised groundwater level representative network includes 49 wells, and the revised groundwater quality monitoring network includes 27 wells. There are also five selected ground surface subsidence monitoring stations. Using groundwater level data as the basis for measuring change in groundwater storage, these representative wells and subsidence monitoring stations provide the basis for measuring the five potential undesirable results across the Basin.

Minimum thresholds and measurable objectives were developed for each of the identified representative wells. Figure ES-6 shows a typical relationship of the minimum thresholds, measurable objectives, and other data for a sample well.

Minimum thresholds were developed through a stepwise

The current analysis was prepared using the best available information and through development of groundwater modeling tool. The groundwater model was significantly updated in advance of the 2025 GSP Update to reflect information collected to date, including updated geologic representation reflecting Airborne Electromagnetic (AEM) survey data and the results of a fault investigation conducted by the CBGSA, updated pumping well location and land use information, and updated evapotranspiration estimates that were calibrated to better match metered pumping data for 2022 and 2023. Although the Basin has been studied for many years, the available data are still not as robust in areas outside the center of the Basin as compared to many other basins, thus leading to some level of uncertainty in the analyses. It is expected that the model will continue to be refined in the future as improved and updated monitoring information becomes available for the Basin. These refinements may result in changes in the estimated water budgets in the future.

The groundwater evaluations conducted as a part of this 2025 GSP Update provided estimates of historical, current and future groundwater budget conditions.

These analyses show that at current groundwater pumping levels, the average annual overdraft is estimated to be approximately 17,500 acre-feet, and the reduction in groundwater pumping required to achieve sustainability is approximately 25,600 acre-feet per year.

Future groundwater conditions in the Basin will continue to show decreased groundwater levels based on projections of current land and water uses. Assuming no projected changes in land use or population in the Basin, the projected annual decline in groundwater storage is estimated to be the same as under current conditions.

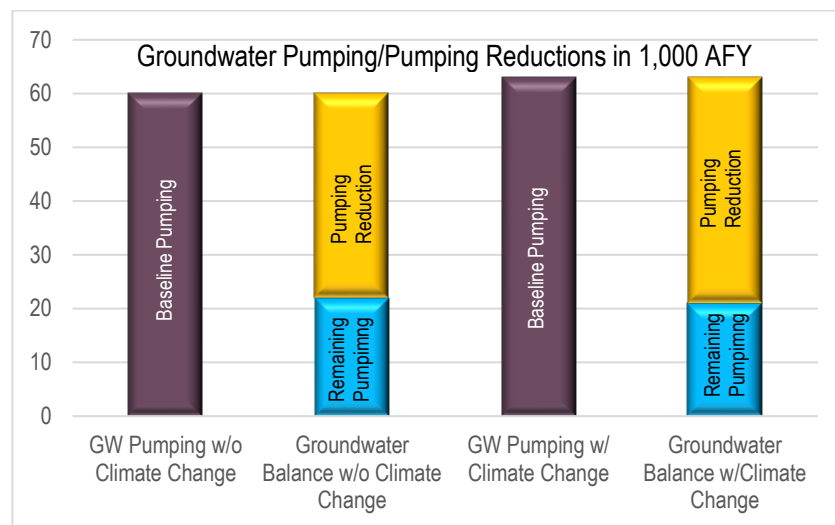


Figure ES- 7: Basin-Wide Groundwater Pumping and Reductions Required to Achieve Sustainability

The projected Basin water budget was also evaluated under climate change conditions. Under the intermediate climate change scenario prescribed by DWR, the annual groundwater overdraft is projected to increase to approximately 20,000 acre-feet, requiring an approximate 28,300 acre-feet per year reduction in groundwater pumping to achieve sustainability. These changes are shown in Figure ES-7.



Analysis of the Basin as a whole shows that much of the Basin is in hydrologic balance. Existing and projected groundwater levels in the western portions of the Basin, along with the southeastern region, show those areas to be sustainable under current and projected conditions. However, the model results project significant groundwater level reductions in the central portion of the Basin.

Monitoring Networks

The GSP outlines the monitoring networks for the five sustainability indicators that apply to the Basin. The objective of these monitoring networks is to monitor conditions across the Basin and to detect trends toward undesirable results. Specifically, the monitoring network was developed to do the following:

- Monitor impacts to the beneficial uses or users of groundwater
- Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds
- Demonstrate progress toward achieving measurable objectives described in the GSP

Five Sustainability Indicators Applicable to the Cuyama Groundwater Basin

- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Degraded water quality
- Land subsidence
- Depletions of interconnected surface water

The monitoring networks, such as the groundwater level monitoring network shown in Figure ES-8, were designed by evaluating data sources provided by DWR, including the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, the USGS, participating counties, and private landowners. The monitoring network consists of wells that are already being used for monitoring in the Basin and was updated in September of 2023 following an evaluation of the existing monitoring network by the CBGSA. Additional wells have been added with DWR grant funding and by the DWR Technical Support Services program. The wells in the monitoring network are measured by the CBGSA on either a quarterly schedule. Historical measurements have been entered into the Basin Data Management System (DMS), as well as data collected during GSP implementation. All future data will also be stored in the Basin DMS.

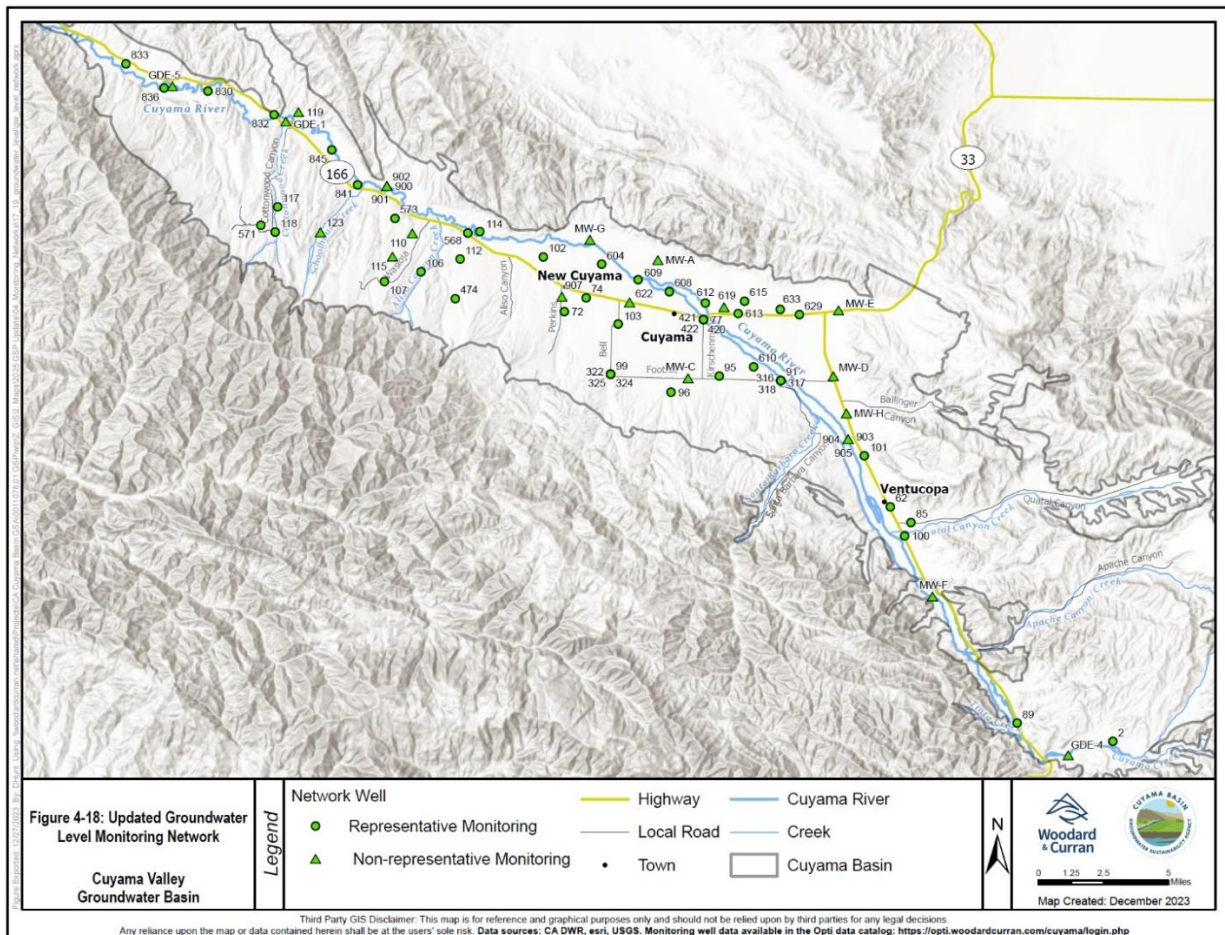


Figure ES- 8: Groundwater Monitoring Wells

Data Management System

The Basin DMS was built on a flexible, open software platform that uses familiar Google maps and charting tools. Typical views generated by the Basin DMS are shown in Figure ES-9. The Basin DMS serves as a data-sharing portal that enables use of the same data and tools for visualization and analysis. These tools support sustainable groundwater management and create transparent reporting about collected data and analysis results.

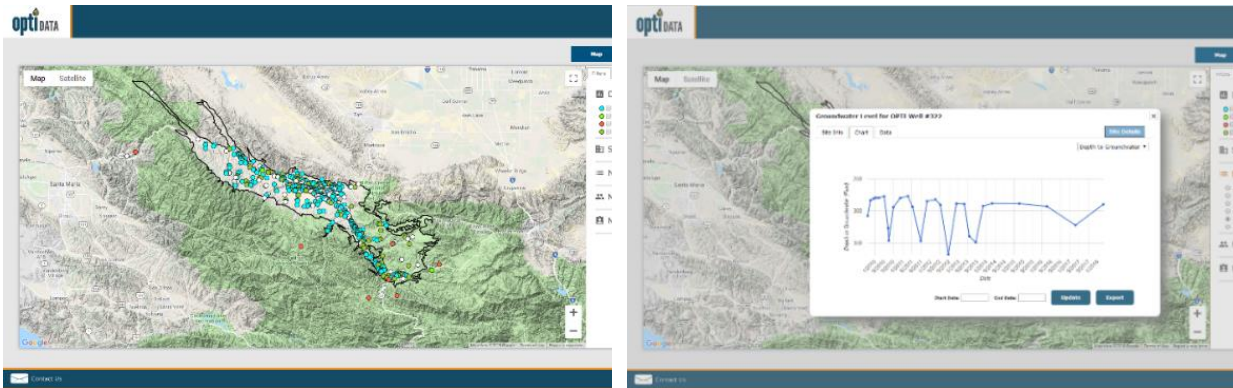


Figure ES- 9: Opti DMS Screenshots

The Basin DMS is web-based; the public can easily access this portal using common web browsers such as Google Chrome, Firefox, and Microsoft Edge. The Basin DMS is currently populated with available historical data; additional data will be entered into the system as it is collected.

The Basin DMS portal provides easy access and the ability to query information stored in the system. Groundwater data can be plotted for any of the available data points, providing a pictorial view of historical and current data. The DMS can be accessed at <https://opti.woodardcurran.com/cuyama/login.php>.

Projects and Management Actions

Achieving sustainability in the Basin requires implementation of management actions and, if demonstrated to be feasible, projects that will increase water supply. One management action, reductions in groundwater pumping through pumping allocations, is required to achieve sustainability irrespective of the feasibility of any other water supply projects. The exact amount of required reduction in groundwater pumping has been reevaluated since the submittal of the original GSP and updated for the 2025 GSP Update. Based on current information, groundwater pumping reductions are estimated to need to be about 60 percent. Additional evaluations of pumping reductions will continue during GSP implementation. These additional evaluations may lead to modification of levels of pumping reduction associated with the attainment of reliability.

Additional management actions included in the GSP include the following:

- Monitoring and recording groundwater levels, groundwater quality, and subsidence data
- Maintaining and updating the Basin DMS with newly collected data
- Monitoring groundwater use using satellite imagery
- Annual monitoring of progress toward sustainability
- Annual reporting of Basin conditions to DWR as required by SGMA

Several alternative projects to potentially increase water supply availability in the Basin were identified and considered. The initial set of alternatives were reviewed with the CBGSA SAC and Board of Directors, resulting in two potential water supply projects included in the GSP. These projects require further analysis and permitting to determine feasibility and cost effectiveness, and are listed below.

The first project is rainfall enhancement through what is commonly referred to as cloud seeding. Cloud seeding is a type of weather modification with the objective to increase the amount of precipitation that



Figure ES- 10: Target Area for Potential Rainfall Enhancement

would fall in the Basin watershed. The concept is to introduce silver iodide, or a similar substance, into the clouds to induce greater rainfall. Cloud seeding has been used in numerous areas throughout California and other western states. Preliminary estimates suggest up to approximately 4,000 acre-feet per year of additional water supply could be added to the Basin. The target area for rainfall enhancement is shown in Figure ES-11.

The next step toward implementation of this water supply project is to refine the analysis to better determine the potential increase in precipitation that could be achieved, and to refine the estimated cost of implementation. An analysis was performed in 2024 to provide updated information. Full implementation of a precipitation enhancement project would require completion of an environmental document consistent with the requirements of the California Environmental Quality Act (CEQA).

The second potential project is capture of high stormwater flows in the Cuyama River and diversion into recharge basins that would be sited in the Central region of the Basin. The captured stormwater flows would percolate into the groundwater basin resulting in increased recharge of groundwater. The potential stormwater recharge project has several challenges associated with it, including water rights availability, managing sediment that will be present in any diverted stormwater flows, and obtaining lands for construction of the recharge basins. Preliminary estimates suggest that up to 4,000 acre-feet per year of additional water supply could be added to the Basin. The general location of the potential recharge basins are shown in Figure ES-12.

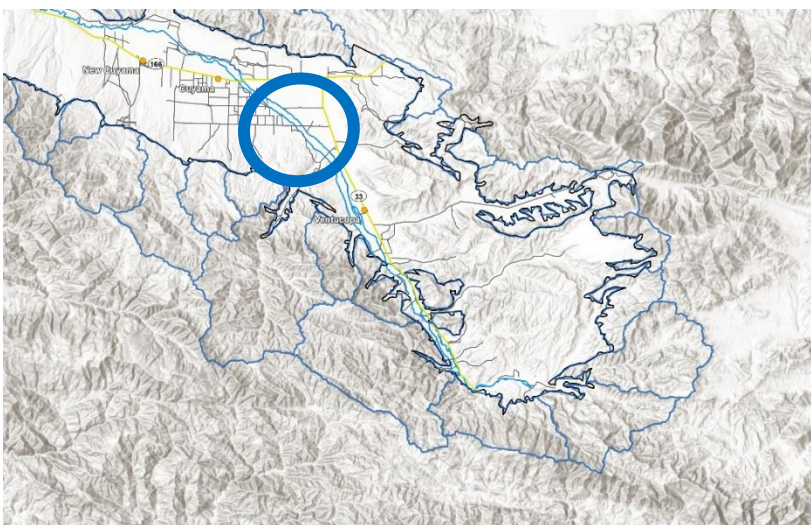


Figure ES- 11: General Location of Potential Recharge Basins

Since the original GSP was submitted, the CBGSA performed an analysis of the frequency of diversions

that could be available for diversion, which indicated that upstream diversions could be made in approximately 11% of all years (i.e. 7 out of 62 years from 1962-2023). The next step toward implementation of this potential project is to evaluate each of these areas of uncertainty and to develop more refined estimates of potential water supply benefit and cost.

The GSP also includes projects specific to the domestic water systems in Ventucopa, Cuyama, and New Cuyama. These projects include installing new wells to secure reliability of water supply to residents of these communities. Implementation of these community well projects would be the responsibility of each of the three communities, as the projects address reliability of available supply for each community.

GSP Implementation

Achieving sustainability in the Basin requires implementation of management actions and, if demonstrated to be feasible, projects that will increase water supply. One management action, which is reductions in groundwater pumping, is required to achieve sustainability irrespective of the feasibility of any other water supply projects. Implementing project and management actions can best be achieved through development of Basin Management Areas to focus necessary activities on the areas of the Basin with projected long-term overdraft.

Two Management Areas have been established in the Basin to aid in administering projects and management actions, as shown in Figure ES-13. The Central and Ventucopa management areas were identified based on the model’s projection of groundwater levels decreasing at a rate of 2 feet or more per year over a 50-year hydrologic period.

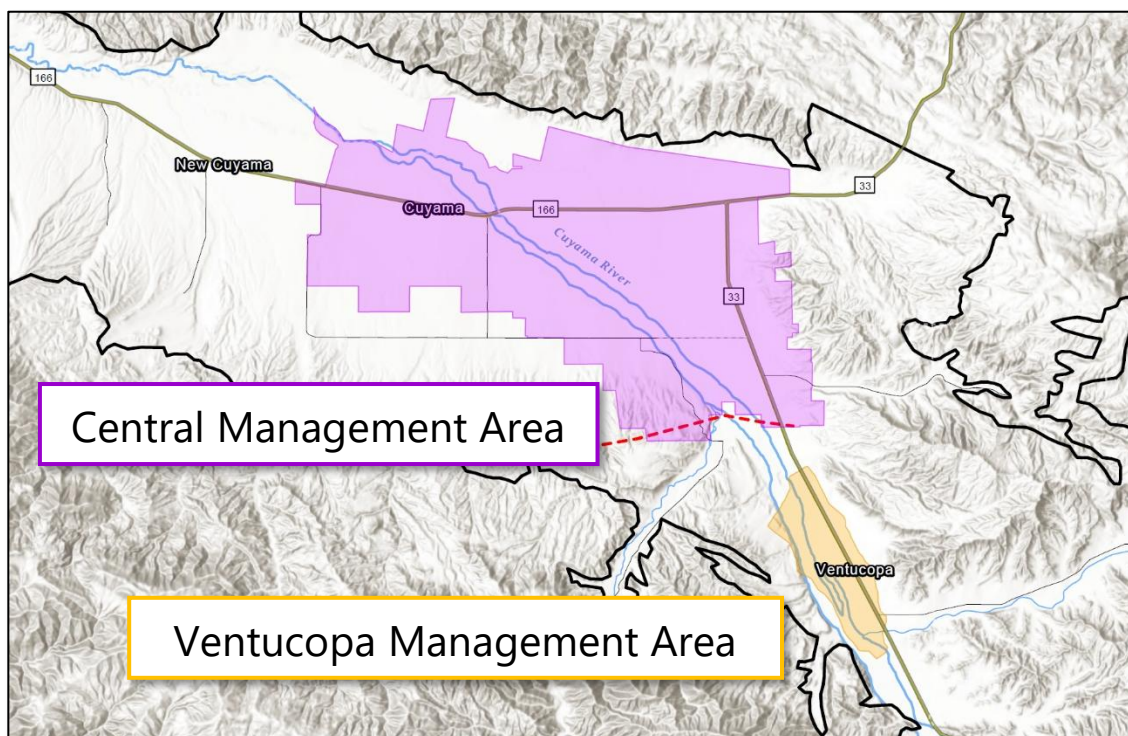


Figure ES- 12: Location of Central and Ventucopa Management Areas

Figure ES-13 depicts the general boundaries of the proposed Management Areas. The highlighted colors show the projected annual change in groundwater levels, with clear and green indicating no change to less than 2 feet of projected annual decline in groundwater levels, and the yellow, orange and red areas indicating areas of increasing projections of annual declines in groundwater levels, ranging from more than 2 feet per year up to more than 6 feet per year.

Overdraft conditions in the Central Management Area requires reductions in groundwater pumping. The exact amount of required reduction in groundwater pumping will be reevaluated after additional data are collected and analyzed. However, based on current information, total Basin-wide groundwater pumping may have to be reduced by as much as 60 percent, with the major proportion or reduction required in the Central Management Area.

Management actions and projects within the Cuyama Basin Water District (CBWD) may be managed by the CBWD if agreed to by the CBGSA.

Implementing the GSP will require numerous management activities that will be undertaken by the CBGSA, including the following:

- Preparing annual reports summarizing the conditions of the Basin and progress towards sustainability and submitting them to DWR
- Monitoring groundwater conditions for all five sustainability indicators twice each year
- Entering updated groundwater data into the Basin DMS
- Monitoring basin-wide groundwater use using satellite imagery
- Updating the GSP as necessary
- Preparing Periodic Evaluations once every five years and submitting to DWR

The CBGSA Board adopted a preliminary schedule for reduction of groundwater pumping in the Central Management Area.

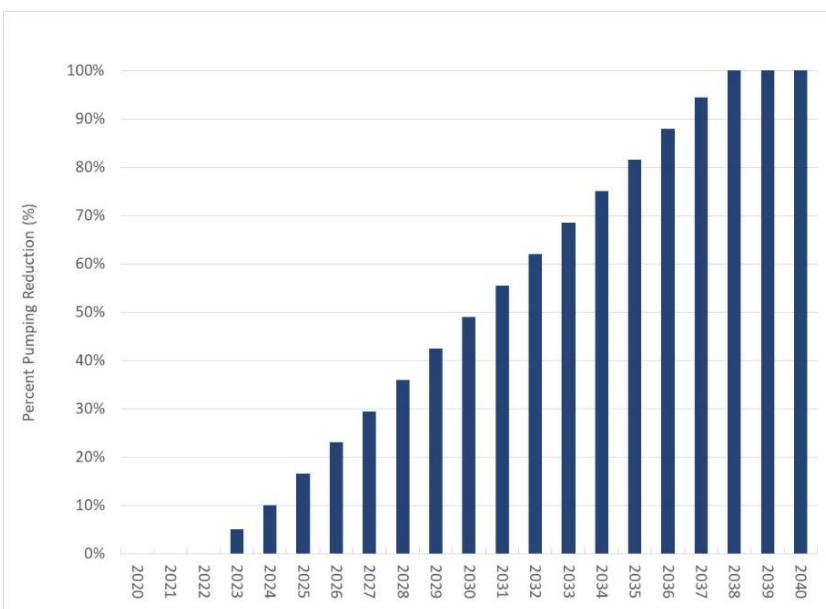


Figure ES- 13: Schedule for Proposed Reductions in Groundwater Pumping

For the Central Management Area, pumping reductions began in 2023 with full implementation by 2038, as shown in Figure ES-14. This approach provides adequate time to put into place methods necessary to monitor groundwater use and reductions. A pumping reporting program has been established, and a flow meter calibration program is currently being developed.

Pumping reductions are not currently recommended for the Ventucopa Area. The recommendation is to perform additional monitoring, incorporate new monitoring

wells, and further evaluate groundwater conditions in the area. Once additional data are obtained and evaluated, the need for any reductions in pumping will be determined.



The CBGSA has also begun implementing other projects and management actions. These include:

- Completing a water rights study for Project 1, Flood and Stormwater Capture
- Completing a preliminary study for Project 2, Precipitation Enhancement.
- Supporting the CCSD in the efforts to replace their supply well (Project 4)
- Completing Management Action 1, Basin-Wide Economic Analysis
- Establishing pumping allocations under Management Action 2 (this will continue)

The table below presents an overall schedule of GSP activities over the 20-year planning horizon.

Time Range	2020 to 2024	2025 to 2029	2030 to 2034	2035 to 2040
Phase	Set up and initiate monitoring and pumping allocation programs	Project implementation and GSP evaluation/update	Project implementation and GSP evaluation/update	Achieve Basin sustainability
Tasks	<ul style="list-style-type: none"> • Establish monitoring network and initiate monitoring and reporting • Evaluate/refine thresholds and monitoring network • Install new wells • Develop pumping monitoring program* • Set up and initiate pumping allocation program* • Project analysis and feasibility • Public outreach 	<ul style="list-style-type: none"> • CBGSA conducts five-year evaluations/update • Monitoring and reporting continues • Evaluate/refine thresholds and monitoring network • Refine water budget • Pumping monitoring program continues* • Continue implementation of pumping allocation program* • Plan/design/construct small- to medium-sized projects* • Public outreach continues 	<ul style="list-style-type: none"> • CBGSA conducts five-year evaluations/update • Monitoring and reporting continues • Evaluate/refine thresholds and monitoring network • Refine water budget • Pumping monitoring program continues* • Continue implementation of pumping allocation program* • Plan/design/construct larger projects* • Public outreach continues 	<ul style="list-style-type: none"> • CBGSA conducts five-year evaluations/update • Monitoring and reporting continues • Evaluate/refine thresholds and monitoring network • Refine water budget • Pumping monitoring program continues* • Pumping allocation program fully implemented* • Project implementation completed* • Public outreach continues
Status	Complete	In Progress	Planned	Planned
*Represents activities that will take place in CBGSA-designated management areas				



Funding

Implementation of the GSP requires funding. To the degree they become available, outside grants will be sought to help reduce the cost of implementation. However, funds will need to be collected to support implementation, and costs associated with Basin-wide management and GSP implementation will likely be borne by residents and landowners across the Basin. These costs include the following:

- CBGSA administration
- Groundwater level monitoring and reporting
- Groundwater quality monitoring and reporting
- Ground surface subsidence monitoring and reporting
- Water use estimation
- Data management
- Stakeholder engagement
- Annual report preparation and submittal to DWR
- Funding mechanism development and implementation
- Grant applications
- GSP updates and submittal to DWR (every five years)

For budgetary purposes, the estimated initial cost of these activities ranges from \$800,000 to \$1.3 million per year. The CBGSA Board of Directors will evaluate options for securing needed funding. Options for funding include instituting fees based on groundwater pumping, acreage, or combinations of these, and pursuit of any available grant funds.

Activities associated with the two Management Areas will be borne by the landowners and water users within the two Management Areas.

The CBGSA Board of Directors will evaluate options for securing the needed funding. Similar to the funding options for the CBGSA basin-wide activities, options for funding management area costs include fees based on groundwater pumping, acreage, or combinations of these, and pursuit of any available grant funds.

Funding for new community wells or well improvements is the responsibility of the three Basin communities. There are potential opportunities for securing grant funds, depending on timing and State and federal grant funding availability.