Cuyama Valley Groundwater Basin

Groundwater Sustainability Plan

Periodic Evaluation 2025

Prepared by:

January 2025

This page intentionally left blank.

Table of Contents

Tables

Figures

Acronyms

Basin	Cuyama Valley Groundwater Basin
BGS	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CBGSA	Cuyama Basin Groundwater Sustainability Agency
CBWD	Cuyama Basin Water District
CCSD	Cuyama Community Services District
CDFW	California Department of Fish and Wildlife
DWR	California Department of Water Resources
GAMA	Groundwater Ambient Monitoring and Assessment
GICIMA	Groundwater Information Center Interactive Map
GSP	Groundwater Sustainability Plan
IRWM	Integrated Regional Water Management
LID	Low Impact Development
NMFS	National Marine Fisheries Service
PBO	Plate Boundary Observatory
RCD	Resource Conservation District
RWQCB	Regional Water Quality Control Board
SAC	Standing Advisory Committee
SBCWA	Santa Barbara County Water Agency
SGMA	Sustainable Groundwater Management Act
SLOCFC&WCD	San Luis Obispo County Flood Control & Water Conservation District
SR	State Route
TDS	total dissolved solids
UNAVCO	University NAVSTAR Consortium
USGS	United States Geological Survey
VCWPD	Ventura County Watershed Protection District
WDL	Water Data Library
WMP	Water Management Plan

This page intentionally left blank.

ES- EXECUTIVE SUMMARY

The Sustainable Groundwater Management Act (SGMA), passed in 2014, requires the formation of local Groundwater Sustainability Agencies (GSAs) to oversee the development and implementation of Groundwater Sustainability Plans (GSPs), with the goal of achieving sustainable management of California's groundwater basins. Additionally, SGMA requires GSPs to be evaluated in the form of a Periodic Evaluations every five years or whenever a GSP is amended. The purpose of this Periodic Evaluation is to provide an update to the Department of Water Resources, interested parties, and the public on the progress the Cuyama Basin Groundwater Sustainability Agency (CBGSA) has made on implementing the Cuyama Valley Groundwater Basin GSP (GSP).

In 2017, in response to SGMA, the 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 that the CBGSA amend the GSP to address four corrective actions. The 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.

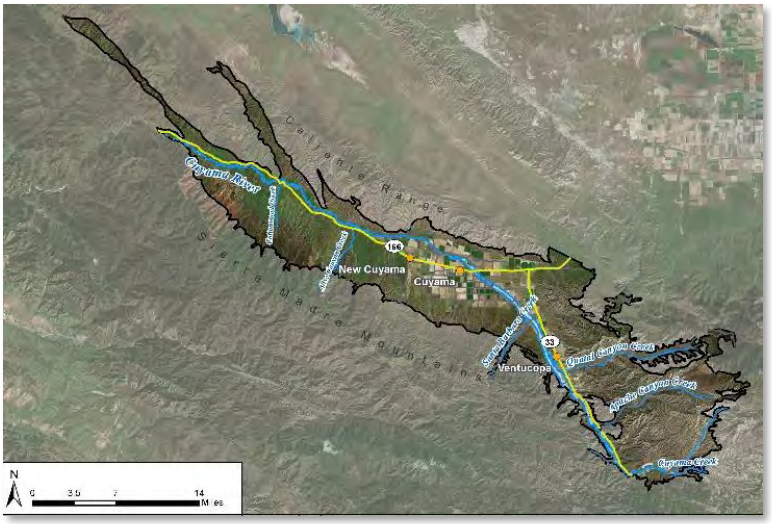

Figure ES- 1: GSP Plan Area

Since then, the CBGSA has continued implementation of the GSP and developed the 2025 GSP Update, which was amended and re-adopted by the CBGSA Board on November 6, 2024.

This Periodic Evaluation assesses the implementation period between the water years (WYs) 2020 through 2024 and is accompanied by the updated 2025 Cuyama Groundwater Basin Groundwater

Sustainability Plan (referred to as the 2025 GSP Update), which was amended and adopted by the CBGSA in November, 2024.

New Information Collected

During the evaluation cycle (Water Years (WYs) 2020 through 2024), significant new information warranted changes to several sections of the GSP. For instance, in 2021, DWR conducted an airborne electromagnetic (AEM) Basin which resulted in processed data that was used to update the and Basin Settings section of the GSP, including the Hydrogeologic Conceptual Model, and help update the Cuyama Basin Water Resources Model (CBWRM).

Much more detail about new information collected is provided in Section 2, but includes:

- 2022 GSP Update
- Representative well field survey
- Representative monitoring network and monitoring network revisions
- New monitoring wells installed
- Airborne Electromagnetic Survey
- CBGSA Investigation of the Russell and Santa Barbara Canyon Faults
- Data collected through CBGSA monitoring
- GDE Study
- Active pumping well survey
- Model update
- 2025 GSP Update

Groundwater Conditions Relative to Sustainable Management Criteria

The CBGSA received a GSP Determination Letter on January 21, 2022, that was intended to provide recommendations on how to revise the GSP before final review and approval. The Determination Letter included four Potential Corrective Actions. In response, the CBGSA developed a revised GSP in 2022 to address these corrective actions. DWR then provided a GSP Approval Letter on May 23, 2023, that approved the plan and included five Recommended Corrective Actions. The 2025 GSP Update addresses all of the potential corrective actions in the 2022 Determination Letter and the recommended corrective actions included in the 2023 Approval Letter. Section 3 below describes the current Basin conditions by each applicable sustainability indicator and includes a discussion of how the 2022 GSP and now the 2025 GSP Update address each corrective action provided by DWR.

The sustainability goal for the Basin is:

> *To maintain a sustainable groundwater resource for beneficial users of the Basin now and into the future consistent with the California Constitution.*

The sustainability goal is supported by the locally defined minimum thresholds that prevent undesirable results. Achievement of the goal is demonstrated by the avoidance of undesirable results. The Cuyama Basin is on track to achieve sustainability by SGMA regulation's timeline of 2040. Managing groundwater resources and related sustainability indicators requires a multifaceted and flexible approach while adjusting to external independent conditions such as climatic variations. However, the CBGSA's data driven, modeling based, and flexible approach has kept the Basin on the planned path towards sustainability.

Groundwater Levels

CBGSA has conducted regular groundwater level monitoring since the adoption of the 2020 GSP. When comparing the most recent measurements (as of production of this report) from April, 2024, to the new thresholds and interim milestones presented in the 2025 GSP Update, 37 of the 47 groundwater level representative wells (79%) are ahead of the schedule interim milestones for 2025, eight wells (17%) are on schedule and near the 2025 interim milestone, and two wells (4%) are behind their interim milestone targets.

Undesirable results conditions have not been reached within the Basin, however, there have been minimum threshold exceedances. In January 2024, the CBGSA approved revised sustainability criteria, which have been updated based on newly available data. These revised minimum thresholds and measurable objectives are more reflective of potential impacts to beneficial uses and users of water and better reflect conditions and hydrogeologic conditions within the Basin.

Reduction of Groundwater Storage

Groundwater levels are used as proxy for monitoring groundwater storage, as allowed by SGMA regulations. A quantitative estimate of the annual change in groundwater storage was estimated using the CBWRM model, which currently includes data through Water Year 2023. The CBWRM was used to estimate the full groundwater budget for each year in the Cuyama Basin, which consists of a single principal aquifer. Because groundwater levels are used as a proxy and undesirable results conditions have not been met for groundwater levels, the same holds true for groundwater storage.

Degraded Water Quality

In January 2024, the CBGSA approved updated methodology for calculating the groundwater quality minimum thresholds and the measurable objectives. These modifications expanded the available data used to calculate each threshold (i.e. longer period of record) as well as ensured wells that had very low historic TDS levels were not given overly restrictive threshold levels. Data collected by the CBGSA shows that 25 of the 29 representative monitoring sites are ahead of schedule when compared to the 2025 IM, while four wells do not have measurements available for this period. Undesirable results for the degradation of groundwater quality have not occurred within the Basin.

Inelastic Land Subsidence

Subsidence data were collected from five GPS monitoring stations in the area in and around the Basin, including two representative stations located within the Basin and are used to measure subsidence relative to Basin activities. The only significant subsidence is measured at the station in the central portion Basin, which show subsidence trends of approximately 0.876 inches per year, which is much less than the subsidence minimum threshold is set at 2 inches per year, which has not occurred and is not close to occurring at this time. The measurable objective for subsidence is 0 inches per year, and no interim milestones were set in the GSP because minimum thresholds had not been reached. Undesirable results conditions have not occurred for subsidence within the Basin and are not anticipated to occur in the foreseeable future.

Depletion of Interconnected Surface Waters

During 2024, DWR released three draft papers on the depletion of interconnected surface waters (ISW). A fourth paper on guidance for establishing SMCs for depletion of ISW was expected sometime in 2025. The technical papers released by DWR for the estimation of ISW depletion were not available in time to be used in the 2025 GSP Update. Therefore, the GSP includes the same information that was included in the 2022 GSP for ISW depletions and for the ISW monitoring network and sustainability criteria. The CBGSA will reassess the approaches used for ISW in future years.

The 2022 GSP utilized a subset of groundwater level monitoring wells and sustainability indicators as the monitoring sites for interconnected surface waters and the methodology for setting groundwater level thresholds incorporated considerations and protections for beneficial uses and users of interconnected surface waters. When comparing the most recent measurements (as of production of this report) from April, 2024, to the new thresholds and interim milestones presented in the 2025 GSP Update, six of the seven groundwater level representative wells (79%) are ahead of the schedule interim milestones for 2025, one well (17%) are on schedule and near the 2025 interim milestone, and no wells (0%) are behind their interim milestone targets. Undesirable results conditions have not been reached within the Basin, and there have been no minimum threshold exceedances.

Projects and Management Actions

Since adoption of the original 2020 GSP, one management action has been completed and the other management action has been started and is continuing as a long-term and ongoing activity. Progress has been made on completion of three of the four projects included in the GSP. Because current work is focused on initial analysis of feasibility for each project, quantified benefits were not able to be determined for all projects. However, these projects have allowed the CBGSA to better understand groundwater conditions in the Basin and informed future implementation of planned projects. The status of all projects and management actions included in the GSP is shown in the table below.

Project or Management Action name	Project or Management Action Description	Project Status	Benefits Observed to Date or Anticipated Benefits
Project 1: Flood and Stormwater Capture	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.	Water rights analysis of potential water supplies currently underway	Understanding of available stormwater potentially available to the Basin if projects were built.
Project 2: Precipitation Enhancement	Perform a feasibility study of the precipitation enhancement action identified in the GSP to determine if this action should be pursued and implemented in the Basin	Feasibility Study currently underway by Desert Research Institute;	Understanding of benefits from potential precipitation enhancement activities
Project 3: Water Supply Transfers/Exchanges	Evaluate the feasibility of purchasing transferred water and exchange it with downstream users. To allow for additional stormwater and floodwater capture in the Basin to protect water rights of downstream users.	Not yet begun	Understanding potential benefits and challenges to water exchanges with downstream users
Project 4: Improve Reliability of Water Supplies for Local Communities	Explores opportunities to improve water supply reliability for Ventucopa within CCSD service area. Potential projects include a replacement well for CCSD and improvement of Ventucopa Water Supply Company (VWSC's) existing well	In progress for CCSD; not yet begun for other communities	Improved water supply to local communities
Management Action 1: Basin-Wide Economic Analysis	Development of a study of the economic impacts of the projects and management actions included in the GSP	Completed	Understanding of Basin to provide economic impacts based on other proposed projects and GSP implementation

Project or Management Action name	Project or Management Action Description	Project Status	Benefits Observed to Date or Anticipated Benefits
Management Action 2: Pumping Allocations in Central Management Area	Implement planned pumping reductions that increase annually until sustainable yield has been reached. These allocations reflect a 5% reduction in 2023 and a 10% reduction in 2024 relative to baseline levels.	Allocations developed for 2023 and 2024 and implemented in 2023 calendar year	Reduction in groundwater production in the Basin during implementation of GSP
Adaptive Management	NA	Board ad-hoc committee has been formed and is considering potential actions	NA

Monitoring Networks

The Original 2020 GSP established monitoring networks for groundwater levels, degraded water quality, inelastic land subsidence, and depletions of interconnected surface waters. Through the implementation of the 2020 GSP and data collection, the CBGSA has modified the monitoring networks for groundwater levels, degraded water quality, and depletions of interconnected surface waters based on data and site availability, filling data gaps, reducing redundancy, making data collection more efficient, and incorporating new monitoring sites.

A high-level summary of monitoring network changes is provided below, with more details in the main body of the Periodic Evaluation:

- **Groundwater Levels:** Monitoring network was refined to reduce redundancy and remove wells no longer suitable for monitoring or accessible. Have added new monitoring wells installed by CBGSA/partners.
- **Groundwater Storage:** continues to use groundwater levels as a proxy.
- **Groundwater Quality:** Monitoring network was refined to reduce redundancy and remove wells no longer suitable for monitoring or accessible. Have added new monitoring wells installed by CBGSA/partners.
- **Land Subsidence:** Remains unchanged from the Original 2020 GSP.
- **Interconnected Surface Waters:** Updated to be a subset of groundwater level monitoring network based on criteria, incorporates new monitoring wells.

Outreach and Engagement

During GSP development, the CBGSA used multiple channels of outreach to communicate SGMA-related information, provide opportunities for engagement, and solicit public input. This included encouraging public participation at public meetings, providing access to GSP information online, and continuing to coordinate with entities conducting outreach to DAC communities within the Basin. As outreach and engagement activities are crucial in the development of the Periodic Evaluation and GSP, the GSAs regularly presented components of these documents during public meetings to gain input from stakeholders and distributed emails as key deliverables were finalized, when opportunities were either available for stakeholder input, or when items of interest to the stakeholder group arose. Topics of discussion included but were not limited to establishment and refinement of sustainable management criteria; modeling efforts used to develop water budgets; changes to basin setting based on new information; and progress updates on PMAs. These meetings allowed the public, local stakeholders, and regulatory agencies to provide input on the CBGSA's approach to developing the GSP and Periodic Evaluation.

1. INTRODUCTION

This section describes the Cuyama Basin Groundwater Sustainability Agency (CBGSA), its authority in relation to the Sustainable Groundwater Management Act (SGMA), and the purpose of this Periodic Evaluation (PE).

1.1 Introduction and Plan Authority

The Sustainable Groundwater Management Act (SGMA), passed in 2014, requires the formation of local Groundwater Sustainability Agencies (GSAs) to oversee the development and implementation of Groundwater Sustainability Plans (GSPs), with the goal of achieving sustainable management of California's groundwater basins. Additionally, SGMA requires GSPs to be evaluated in the form of Periodic Evaluations every five years and whenever a GSP is amended. The purpose of this Periodic Evaluation is to provide an update to the California Department of Water Resources (DWR), interested parties, and the public on changing conditions in the Merced Subbasin, the progress the GSAs within the Merced Subbasin have made on implementing the Merced Groundwater Subbasin GSP, and the need, if any, for an amendment to the GSP.

The Cuyama Basin is designated as a critically overdrafted, high priority basin by the California Department of Water Resources (DWR), resulting in the Basin being subject to SGMA with a requirement to adopt a GSP by January 31, 2020. In accordance with SGMA requirements, the Cuyama Basin Groundwater Sustainability Agency (CBGSA) was formed and is the sole GSA for the Basin and covers the full extent of the Basin.

In January 2020, the GSAs submitted the first GSP to DWR and received an incomplete determination on January 21, 2022. The GSP was revised and resubmitted to DWR in July 2022 as the July 2022 Revised Groundwater Sustainability Plan (2022 GSP) on July 21, 2022. DWR approved the revised GSP in the determination letter issued to the GSAs on May 25, 2023, which included recommended corrective actions to be addressed in this Periodic Evaluation.

This Period Evaluation assesses the implementation period that covers WYs 2020 through 2024 and is accompanied by the Cuyama Valley Groundwater Basin Updated Groundwater Sustainability Plan, which was amended and re-adopted by the CBGSA Board on November 6, 2024.

1.2 Purpose of Periodic Evaluation

The purpose of this Periodic Evaluation is to provide an assessment of the progress the CBGSA has made toward achieving the Basin's sustainability goal. As stated in the regulations,

> *Water Code § 10728.2. A groundwater sustainability agency shall periodically evaluate its groundwater sustainability plan, assess changing conditions in the basin that may warrant modification of the plan or management objectives, and may adjust components in the plan. An evaluation of the plan shall focus on determining whether the actions under the plan are meeting the plan's*

management objectives and whether those objectives are meeting the sustainability goal in the basin.

The Periodic Evaluation also provides DWR, interested parties, and the public with the progress the CBGSA has made on implementing the revised 2022 GSP. Further, the Periodic Evaluation also discusses amendments to the 2022 GSP in response to the 2023 DWR Determination Letter that included Recommended Corrective Actions.

The Periodic Evaluation summarizes and assesses new and significant information, groundwater conditions for each applicable sustainability indicator identified in the approved GSP, actions taken to address recommended corrective actions issued by DWR, status of projects and management actions, updates to the basin setting, monitoring network updates, and the authorities and actions taken by the CBGSA during this evaluation cycle.

Development of the information included in the Periodic Evaluation was guided by feedback received by the CBGSA, Standing Advisory Committee, Technical Forum, stakeholders, and the public. Extensive outreach was also conducted to seek input from additional beneficial users of groundwater through multiple venues including public workshops held in locations and times specifically selected to provide access to disadvantaged communities.

2. NEW INFORMATION COLLECTED

Through the implementation of the GSP, significant new data and information have been collected and analyzed by the CBGSA and staff. This includes both regular data collection and detailed studies. Table 2-1 summarizes the new information collected since the submittal of the original GSP in January 2020. Additional detail is provided in the following subsections.

Table 2-1. Summary of New Information Since Submittal of the 2020 GSP

Significant New Information (e.g., new monitoring data, reports, coordination with other agencies, data provided by the Department)	Description	Aspects of Plan Affected (e.g., Basin Setting, Sustainable Management Criteria, Projects and Management Actions, Monitoring Network, Coordination Agreement)	Warrant Change to Any Aspects of the Plan (Yes/No) If yes, include section of the Plan
Monitoring data collected through representative monitoring wells (RMWs)	This includes all monitoring data collected from each applicable sustainability indicators representative monitoring network wells.	The Basin Settings was updated to incorporate new data to reassess trends (e.g., groundwater levels, subsidence, etc.); monitoring data was used to amend the monitoring networks and thresholds and for re-calibration of the Cuyama Basin Water Resources Model (CBWRM)	Yes Chapter 4: Monitoring Networks Chapter 5: Minimum Thresholds, Measurable Objectives, And Interim Milestones

Significant New Information (e.g., new monitoring data, reports, coordination with other agencies, data provided by the Department)	Description	Aspects of Plan Affected (e.g., Basin Setting, Sustainable Management Criteria, Projects and Management Actions, Monitoring Network, Coordination Agreement)	Warrant Change to Any Aspects of the Plan (Yes/No) If yes, include section of the Plan
Monitoring data from new wells	This includes groundwater levels from new wells in areas that did not previously have groundwater level data, and in many cases, comes from multi-completion wells allowing for vertical gradient data. Three of the new wells are in the vicinity of groundwater dependent ecosystems (GDEs)	The updated monitoring networks include the newly installed monitoring wells. Data will be incorporated into future revisions of the GSP and CBWRM	Yes Chapter 4: Monitoring Networks
Airborne Electromagnetic (AEM) Survey	Geophysical data collected in August 2021 and processed by the Department.	Data were incorporated in refining the thickness of layers in the CBWRM.	Yes Chapter 2: Basin Settings
Fault Investigations	Surface geophysical surveys of the Santa Barbara Canyon and Russell faults.	Data were evaluated to better understand potential impacts of the faults on local groundwater conditions.	Yes Chapter 2: Basin Settings
Groundwater dependent ecosystem (GDE) study	This was an assessment of GDE data and field study to determine the locations of potential GDEs.	This study influenced the Basin Conditions section and the SMC thresholds	Yes Chapter 2: Basin Settings Chapter 5: Minimum Thresholds, Measurable Objectives, And Interim Milestones

Significant New Information (e.g., new monitoring data, reports, coordination with other agencies, data provided by the Department)	Description	Aspects of Plan Affected (e.g., Basin Setting, Sustainable Management Criteria, Projects and Management Actions, Monitoring Network, Coordination Agreement)	Warrant Change to Any Aspects of the Plan (Yes/No) If yes, include section of the Plan
Active Well List	The CBGSA conducted a survey and assessment to determine which wells in the Basin are active or abandoned.	This assessment influenced SMC thresholds and will likely influence future assessments or work within the Basin	Yes Chapter 5: Minimum Thresholds, Measurable Objectives, And Interim Milestones
Updated Cuyama Basin Water Resources Model (CBWRM)	The CBWRM was upgraded with newly available data and recalibrated to support the preparation of the 2025 GSP 5-year evaluation.	The updated model was used to develop updated water budgets and sustainable yield estimates	Yes Chapter 2: Basin Settings Chapter 5: Minimum Thresholds, Measurable Objectives, And Interim Milestones

2.1 2022 GSP Update

Following submittal of the Groundwater Sustainability Plan (GSP) in January 2020, the Cuyama Valley Groundwater Basin Groundwater Sustainability Agency (CBGSA) received a Determination Letter (Letter) on January 21, 2022, from the California Department of Water Resources (DWR). The Letter provided the CBGSA with an Incomplete Determination for the GSP and the necessary corrective actions required for approval. Per SGMA regulations, the CBGSA was given a 180-day correction period to update and address any deficiencies in the GSP. DWR's Incomplete Determination identified four areas of deficiency that required revisions to and resubmittal of the GSP. The four deficiencies are summarized as follows:

- Potential Corrective Action 1: Provide justification for, and effects associated with, the sustainable management criteria and how they may affect beneficial users.
- Potential Corrective Action 2: Use of groundwater levels as a proxy for depletion of interconnected surface water.

- Potential Corrective Action 3: Further address degraded water quality by providing additional clarification and justification of available data, monitoring, and thresholds.
- Potential Corrective Action 4: Provide explanation for how overdraft will be mitigated in the basin.

To address these deficiencies, the CBGSA developed supplemental information that was included in the 2022 revised version of the GSP in the form of inserted pages with blue text. Supplemental information has now been fully integrated into the revised 2025 version of the GSP.

Both the original and 2022 version of the GSP are still available on the GSP website.

2.2 Representative Well Field Survey

During the fall of 2021, field surveys were conducted at 75 wells within the Basin. Additional wells were intended to be surveyed, but land access agreements were not granted. For these wells, previous estimates of ground-surface elevation will continue to be used going forward. The survey data measured included:

- Latitude/longitude
- General site or well notes
- Elevation of the center of the well
- Elevation of the top of the concrete well pad
- Primary monitoring point elevation ("reference point elevation")
- Secondary monitoring point elevation (if applicable)
- Ground-surface elevation
- Elevation of the top of the well vault (if applicable)

The data collected in the survey allows for the analysis and further processing of historical and recently collected data in each of the surveyed wells. This new metadata has been updated in the Cuyama online Opti DMS system, and the GSA is working with DWR to ensure that data submitted in previous uploads through the SGMA Data Portal are also updated appropriately. Notes have been added to each well within Opti explaining when, how, and by how much these data corrections have been performed for public transparency.

Data has been updated using the updated reference point elevations for each surveyed well, more technically described as a vertical datum correction or update. While the depth to water measurements does not change, groundwater elevation values were updated based on the vertical datum corrections.

These vertical datum corrections and updates to the historical data do not impact or alter the GSP in any significant way. Minimum thresholds and measurable objectives described in the submitted GSP were calculated using depth to water, which are not affected by the survey results. While the well survey may cause the elevations of these thresholds to change by a small amount, the same changes are applied to groundwater level measurements at each well, with the result that there are no differences in regard to groundwater level versus threshold comparisons for assessing basin sustainability.

2.3 Representative Monitoring Network and Monitoring Network Revisions

The CBGSA has gone through two representative monitoring network revisions since the adoption of the 2020 GSP. The primary focus during the development of the 2020 GSP development was to ensure that the monitoring network maximized the potential pool of monitoring locations and gain a broad understanding of available data sources. Through this approach, all wells with recent measurements (data taken on or after January 1, 2018) were included in the monitoring network. This resulted in 101 wells in the monitoring network, including 60 representative wells, which achieved a spatial density of 26.7 wells per 100 square miles.

The CBGSA Board determined at its January 2021 meeting to reduce the monitoring network to eliminate spatially redundant wells from the network. This reduced the representative monitoring network to 52 wells at 46 locations (this includes three multi-completion wells). Through the installation of additional wells through DWR's TSS program, the revised network consisted of 61 wells at 49 locations.

The second representative monitoring network revision is for the 2025 GSP Update. The CBGSA completed a comprehensive review of the groundwater levels network and the monitoring program for all representative and non-representative wells. The review included identification of field sampling issues at each well. These included a lack of landowner agreement for monitoring, access issues due to issues at the well site, and access issues due to winter flooding. Other factors were also considered, such as if the well is projected to go dry during implementation, whether the well is an active pumping well and the magnitude of pumping, and whether a nearby or similar well shows similar groundwater level changes and therefore makes the well redundant.

The review concluded that all issues related to onsite access and weather at the wellsite were temporary and did not preclude the well from continued inclusion in the monitoring network. In addition, no wells were identified for removal due to redundancy. However, there were three wells (98, 121, and 124) where the GSA was unable to obtain an access agreement with the landowner; therefore, these three wells have been removed from the monitoring network. Furthermore, monitoring wells that have been identified as active pumping wells are recommended for long-term replacement.

In addition, the CBGSA has worked to address the spatial gaps identified in the 2020 GSP. The CBGSA is using funding available from a SGMA implementation grant agreement with DWR to install three piezometers in the vicinity of groundwater dependent ecosystems (GDEs) as well as multi-completion wells at seven other locations within the Basin. Additional information about the new monitoring wells is provided in the next subsection.

2.4 New Monitoring Wells Installed

The CBGSA has overseen the construction of 19 multi-completion (or multi-depth) nested monitoring wells at nine locations and three piezometers (shallow groundwater monitoring wells) since the adoption of the 2020 GSP (Table 2-2).

In mid-2021, the CBGSA worked with DWR's Technical Support Services (TSS) to construct nine new multi-completion nested monitoring wells (also referred to as the TSS wells). These nine wells, Opti Wells 900 through 908, each with different completion depths, were constructed in three different locations.

In 2023 and 2024, the CBGSA constructed three new piezometers near mapped GDE locations and new multi-completion nested monitoring wells at six locations using grant funding from DWR. These new wells are located in areas that were identified by the CBGSA as spatial data gaps in the 2020 GSP. Data collection began after the wells were surveyed. The new piezometers and monitoring wells have been integrated into the GSA's monitoring network, and data collected by these wells will be uploaded to the DMS.

Table 2-2: New Monitoring Wells and Piezometers

Opti Well #	Other Name	Well Type	Latitude	Longitude	Well Depth (Feet bgs*)	Screen Interval (Feet bgs*)
900		TSS Multi-Completion	35.002893	-119.811860	61	50-60
901		TSS Multi-Completion	35.002845	-119.811883	215	165-205
902		TSS Multi-Completion	35.002845	-119.811883	375	325-365
903		TSS Multi-Completion	34.865465	-119.495837	315	265-305
904		TSS Multi-Completion	34.865465	-119.495837	410	360-400
905		TSS Multi-Completion	34.865465	-119.495837	580	540-570
906		TSS Multi-Completion	34.942696	-119.691663	160	130-150
907		TSS Multi-Completion	34.942696	-119.691663	535	515-525
908		TSS Multi-Completion	34.942696	-119.691663	670	650-660
909	GDE-5	Piezometer	35.0564108	-119.958465	90	50-80
910	GDE-1	Piezometer	35.0378602	-119.881735	50	25-45
911	GDE-4	Piezometer	34.760046	-119.417531	45	10-40
912	MW-F (S)	Multi-completion	34.760046	-119.417531	210	180-200
913	MW-F (D)	Multi-completion	34.760046	-119.417531	380	350-370
914	MW-C	Multi-completion	34.8981859	-119.605228	540	500-520
915	MW-H (S)	Multi-completion	34.876228	-119.495663	690	660-680
916	MW-H (D)	Multi-completion	34.876228	-119.495663	900	880-900
917	MW-E (S)	Multi-completion	34.941221	-119.50438	640	610-630
918	MW-E (D)	Multi-completion	34.941221	-119.50438	750	720-740

Opti Well #	Other Name	Well Type	Latitude	Longitude	Well Depth (Feet bgs*)	Screen Interval (Feet bgs*)
919	MW-G (S)	Multi-completion	34.974892	-119.673272	310	280-300
920	MW-G (D)	Multi-completion	34.974892	-119.673272	450	420-440
921	MW-D	Multi-completion	34.900588	-119.506756	850	820-840

**bgs – below ground surface*

2.5 Airborne Electromagnetic Survey

To better characterize the subsurface hydrogeology in the Basin, DWR coordinated a regional Airborne Electromagnetic (AEM) Survey. This survey was performed in August 2021 and involved scanning the Basin with helicopter-mounted geophysical equipment to measure electrical resistivity at depths of up to 1,500 feet bgs. Twenty-three survey lines were flown with one line generally parallel to the Cuyama River and the remaining lines perpendicular to the river valley to generate a 3-D cross sectional model of the Basin. Figure 2-1 shows the AEM survey flight lines over the Basin.

The raw survey data were processed by Ramboll on behalf of DWR and released to the public. The released data were provided in cross sections showing resistivity and interpreted ratios of the texture of the subsurface lithology (coarse vs fine grained). Woodard & Curran staff analyzed the public AEM data in both formats to generate a more refined conceptual model of the Basin. The AEM data were used to update the thickness of layers in the CBWRM Model, as well as model parameterization and calibration. Lithologic data gathered from well logs were correlated with the AEM data as well as general knowledge of the geology of the Basin from previous USGS work. Faults were also identified in the AEM data and were taken into consideration in refining model layering and hydraulic conductivity.

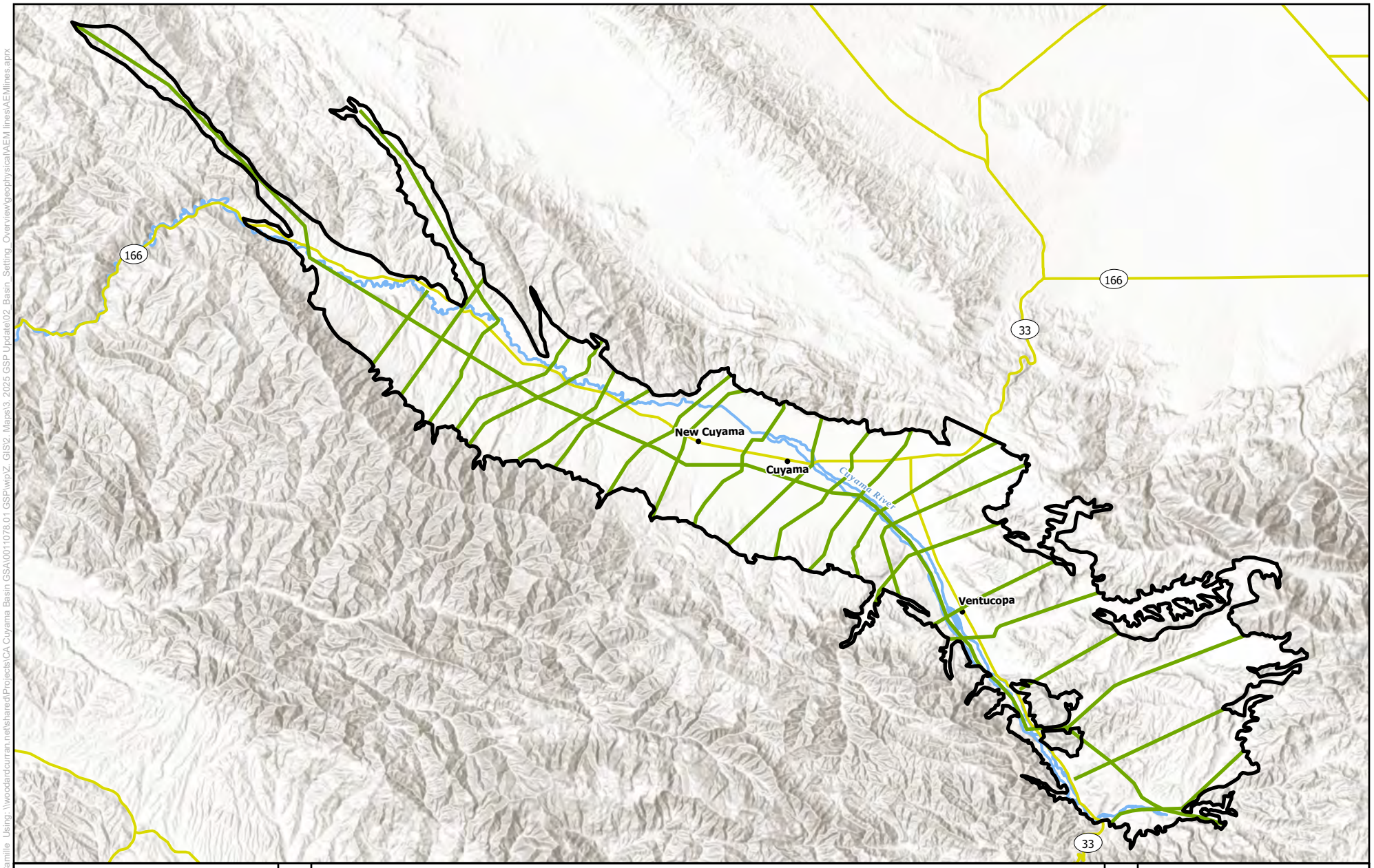

Figure 2-1: Distribution of AEM Flight Lines

Cuyama Valley Groundwater Basin

Legend

- Highway
- Town
- Cuyama River
- Cuyama Basin
- AEM Flight Lines

N

Woodard & Curran

0 1.75 3.5 7 Miles

Map Created: July 2024

2.6 CBGSA Investigation of Russell and Santa Barbara Canyon Faults

In 2024, the CBGSA conducted a geophysical investigation to locate and characterize the Santa Barbara Canyon Fault and the Russell Fault. The objective was to provide a detailed image of the geologic/lithologic units and structural features in each fault zone to depths of 600 to 800 feet below ground surface. The geophysical data were used to evaluate how deep the faults were buried, their orientation (vertical or dipping), historic movement, and the depth to groundwater on both sides of the faults. Some of the information was used in the model recalibration.

The investigation measured two-dimensional direct current (DC) electrical resistivity and induced polarization data along two linear transects of 3,000 to 3,600 feet long across the mapped or suspected fault locations. The electrical resistivity data were presented in cross sections for each transect to show lateral and vertical variations in resistivity and interpreted lithology. In some cases, the variations in electrical resistivity were abrupt, indicating the presence of a fault. By correlating the electrical resistivity measurements with lithologic data from nearby water wells and previous geologic studies, different subsurface units were identified. Depth to groundwater was also identified along each transect.

Analysis of the geophysical data indicates that the Santa Barbara Canyon Fault is present beneath the Cuyama River near the location inferred by the USGS in 1970. The vertical/subvertical north-dipping fault is buried by approximately 200 to 300 feet of alluvium and the Upper Morales. A younger, unnamed south-dipping thrust fault was detected on this transect a short distance to the south. This younger fault appears to be thrusting the Lower Morales over the Upper Morales. Depth to groundwater south of this fault is about 50 to 100 feet bgs and markedly lower to the north. Water bearing zones were not observed north of the buried Santa Barbara Canyon Fault to the investigation depth of about 600 feet bgs. Interpretation of the geophysical data indicates that the fault zone offsets both the Lower and Upper Morales as well as deep alluvium (water bearing units), contrary to published literature. The geophysical data confirm the presence of the fault beneath the Cuyama River and the significant change in groundwater elevations on either side. The Santa Barbara Canyon Fault was not identified on a second transect along Highway 33 where its location was inferred by the USGS in 1970.

Analysis of geophysical data collected across the Russell Fault shows abrupt lateral changes in resistivity that are interpreted to be faults. The Russell Fault appears to be vertical and is buried by approximately 200 to 250 feet. A younger, apparently east-dipping thrust fault identified east of the Russell Fault is interpreted to be the Turkey Trap Ridge Fault. This interpretation is consistent with mapping of the Russell, Turkey Trap Ridge, and Whiterock faults in this area by the USGS and others. The Lower Morales has been mapped east of the Russell Fault. A similarly very low resistivity unit is interpreted to be the Lower Morales west of the fault overlying the older Monterrey Formation. The younger Turkey Trap Ridge Fault appears to be trusting the older Monterrey Formation over the Lower Morales east of the fault. Groundwater appears to be about 50 feet bgs beneath the two transects and is unaffected by the faults. The thickness of saturated alluvium appears to be greater east of the fault zone.

Abrupt lateral changes in resistivity were also observed beneath the second transect, consistent with the other nearby transect. Groundwater appears to be about 40 feet bgs beneath this transect which is closer to the Cuyama River.

Interpretation of the geophysical data indicates that the Russell Fault offsets the Morales and deep alluvium, contrary to published literature. The Turkey Trap Ridge Fault offsets both the Upper and Lower Morales and deep alluvium. Similar to the investigation of the Santa Barbara Canyon Fault, the geophysical survey identified a more complex fault system than previously reported in published literature. In contrast to the Santa Barbara Canyon Fault, the Russell Fault does not appear to offset the depth to groundwater in saturated alluvium overlying it and does not appear to be a barrier to groundwater flow.

2.7 Data Collected through CBGSA Monitoring

During the development and subsequent submittal of the GSP, the CBGSA has conducted groundwater level and groundwater quality monitoring in the Basin. Data collected by the CBGSA is published and/or submitted in three ways:

Groundwater Conditions Reports – Every quarter, the CBGSA publishes a groundwater conditions report summarizing data collected during the previous quarter, including each wells relative status when compared with the minimum thresholds and the Basin's overall status relative to undesirable results. Additionally, a groundwater quality conditions report is published once a year with similar data summaries and analytics as it relates to groundwater quality thresholds and undesirable results definitions. All groundwater conditions reports are published on the CBGSA website.

Opti Online DMS – All data collected by the CBGSA is uploaded to the Opti online DMS system, which is the Basin's regulatorily required online public portal for data. As described in Chapter 6 of the GSP, data is provided in geographical, graphical, and tabular formats for public viewing, can be filtered, and is available for download.

SGMA Portal – As is stipulated in the SGMA regulations, seasonal high and low measurements are submitted to DWR's SGMA Portal which is also accessible by the public. Data is only reported twice a year to this portal, and all data in the SGMA Portal is also available on the CBGSA's Opti webpage.

2.8 GDE Study

As part of the development of the 2020 GSP, a GDE study was conducted and included as Appendix D with a summary provided in Chapter 2, *Basin Settings*. A licensed wetland biologist utilized and verified the NCCAG dataset using remote sensing techniques supported by in-person field verification. The analysis was performed by groupings, and the results of analysis concluded that there were 123 probable GDEs and 275 probable non-GDEs in the Basin.

2.9 Active Pumping Well Survey

During the development of the 2020 GSP, data was compiled from as many sources as possible to create a comprehensive dataset of active pumping wells. While this methodology yielded the most comprehensive dataset possible, it also included wells that were no longer functional, destroyed, or could not be confirmed but suspected as duplicates. Due to these foreseen consequences, in mid-2023 the CBGSA began work on an Active Well dataset through a systematic analytical approach using data and a stakeholder survey. Wells that landowners had previously identified to the CBGSA were assumed to be still active, while stakeholders were given the opportunity to fill out surveys confirming either an active or inactive status for wells within their properties or operational responsibilities. The survey also asked for additional well metadata or verification of existing well metadata.

The result of this survey was the establishment of an active pumping well dataset that is being used by the CBGSA moving forward to conduct current and future analysis within the Basin. All wells categorized as inactive are no longer used during data processing or analysis (for example in the assessment of hypothetical well impacts in the event of a modeled groundwater production adjustment). All future analysis will focus only on using active wells, including analyses in the 2025 GSP Update. Through the CBGSA website, all stakeholders have access to a form to update metadata for any well, including the ability to request a wells active/inactive status be updated or changed.

2.10 Model Update

As required by SGMA Regulations, the CBGSA developed the CBWRM model, which is a fully integrated surface and groundwater flow model covering the Basin and used to develop water budgets. The CBWRM was developed in consultation with members of the Technical Forum, which includes technical staff and consultants representing a range of public and private entities in the Basin, with many additional follow-up calls during the subsequent updates. Technical Forum meetings provided opportunities for members to review and comment on all major aspects of model development.

The CBWRM integrates the groundwater aquifer with the surface hydrologic system and land surface processes and operations. The CBWRM was calibrated for the hydrologic period of October 1995 to September 2023 by comparing simulated evapotranspiration, groundwater levels, and streamflow records with historical observed records. Development of the model involved study and analysis of hydrogeologic conditions, agricultural and urban water demands, agricultural and urban water supplies, and an evaluation of regional water quality conditions.

The first version of CBWRM, v0.10, was originally used to develop water budget and sustainability estimates for the 2020 GSP and for the 2020 and 2021 GSP Annual Reports. In July 2022, the CBWRM was updated to version 0.20, which incorporated the updated data available by that time. This version was used for the 2022 and 2023 GSP Annual Reports and the development of Central Management Area allocation tables for 2023 and 2024. Recently, in July 2024, the CBWRM was upgraded with significantly more data and recalibrated to support the preparation of the 2025 GSP Update. The updated model used

for the 2025 GSP Update was developed based on the best available data and information as of September 2023. The data changes include the following:

- Updated geologic representation developed using:
    - The results of a fault investigation conducted by the CBGSA for the Santa Barbara Canyon and Russell faults
    - Airborne Electromagnetic (AEM) survey data collected by the California Department of Water Resources
    - Well log data from new monitoring wells installed in the Basin
- Updated pumping well locations using data provided by landowner surveys
- Updated land use using data and designations of non-irrigated land areas based on in information provided by landowners
- Updated evapotranspiration estimates calibrated to better match metered reporting data provided by landowners for 2022 and 2023
- Calibration period extended to incorporate groundwater level measurements taken by the GSA's monitoring program up through WY 2023

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 described in this section.

2.11 2025 GSP Update

Following resubmittal of the Groundwater Sustainability Plan (GSP) in July 2022, the Cuyama Valley Groundwater Basin Groundwater Sustainability Agency (CBGSA) received an Approval letter in May of 2023 from DWR. While DWR approved the plan, they included five recommended corrective actions as provided below:

1. **Recommended Corrective Action 1:**
    a. Monitor impacts to beneficial uses and users, including impacts to domestic wells, as Plan implementation continues. Provide DWR with an update of impacts and the adaptive management strategies implemented in annual reports and periodic evaluations.
    b. Explain and justify how and why using a subset of representative wells available in the region is appropriate to simulate the potential impacts to all beneficial uses and users in the region. Consider including additional wells within the region to further assess the impacts to the Northwestern Region and downstream users. If it is identified that overdraft will occur in this scenario, the GSA should clarify whether the implementation of proposed projects and management actions will avoid or mitigate significant and unreasonable impacts to beneficial users.

2. **Recommended Corrective Action 2:** Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, basinwide pumping is a complex task and that developing suitable tools may take additional time; however, it is critical for the

Department's ongoing and future evaluations of whether GSP implementation is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs to sustainably manage depletions of interconnected surface water.

In addition, the GSA should work to address the following items by the first periodic evaluation:

Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

a. Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.

b. Prioritize collaborating and coordinating with local, state, and federal regulatory agencies, as well as interested parties, to better understand the full suite of beneficial uses and users that may be impacted by pumping-induced surface water depletion within the GSA's jurisdictional area.

3. **Recommended Corrective Action 3:** Provide an update regarding the status of the planned project to construct a new replacement production well near the community of New Cuyama, including whether wellhead treatment of arsenic will be performed and whether routine analysis of groundwater samples will be performed to monitor the effectiveness of the arsenic mitigation. If this project is not effective or not implemented by the periodic evaluation, then the GSA should develop sustainable management criteria for arsenic.

4. **Recommended Corrective Action 4:** By the periodic evaluation to be submitted by 2025, Department staff recommend the GSA develop sustainable management criteria for nitrate.

5. **Recommended Corrective Action 5:** Clarify the GSA's intent to perform ongoing measurements and analysis of groundwater samples for arsenic and nitrate, which will be important for the GSA to quantitatively demonstrate, using evidence-based analysis, that implementation of the GSP is achieving the intended effect of avoiding significant and unreasonable impacts to beneficial uses and users of groundwater. Discuss the frequency of the ongoing measurements for nitrate and arsenic.

Some of these recommended corrective actions were addressed in the revised 2022 GSP; the remainder have been addressed in the 2025 GSP Update.

3. CURRENT BASIN CONDITIONS BY SUSTAINABILITY INDICATOR

The CBGSA received a GSP Determination Letter on January 21, 2022 (included as Supplemental Appendix A of the revised 2022 GSP) that was intended to provide recommendations on how to revise the GSP before final review and approval. The Determination Letter included four *Potential Corrective Actions*, which were addressed in the 2022 GSP. After submittal of the 2022 GSP by the CBGSA, DWR then provided a GSP Approval Letter on May 23, 2023 that approved the plan and included five *Recommended Corrective Actions*.

The following subsections describe the current Basin conditions by each applicable sustainability indicator. Within each description is a discussion on how the 2022 GSP and the 2025 GSP Update address each applicable *Potential Corrective Actions* and *Recommended Corrective Actions* provided by DWR in both their 2022 and 2023 letters.

3.1 Chronic Lowering of Groundwater Levels

The chronic lower of groundwater levels is arguably the most important and symbolic sustainable management criteria that SGMA addresses, although that does not diminish the importance of other SMCs. However, robust monitoring, data collection, and data analysis is conducted on groundwater levels across the Basin and that data is the most scrutinized by the CBGSA, stakeholders and regulators.

The following subsections provide a summary of groundwater level conditions experienced since the adoption of the 2020 GSP, how those conditions relate to the SMCs and URs defined in the GSP, and how the CBGSA has updated and addressed recommended corrective actions related to groundwater levels in their determination.

3.1.1 Potential Corrective Actions in 2022 Determination Letter

DWR provided three Potential Corrective Actions related to the chronic lowering of groundwater levels. In summary they are:

1. **Potential Corrective Action 1:** Provide justification for, and effects associated with, the sustainable management criteria including:
    a. Provide a more detailed description of the criterion used to identify undesirable results (URs); and
    b. Provide additional information regarding how the groundwater level minimum thresholds (MTs) are consistent with avoiding undesirable results, with a particular emphasis on the MTs in the Northwestern Region.
2. **Potential Corrective Action 2:** Use of groundwater levels as a proxy for depletion of interconnect ted surface water.
3. **Potential Corrective Action 4:** Provide explanation for how overdraft will be mitigated in the Basin.

All Potential Corrective Actions were addressed in the revised 2022 GSP that included supplemental pages and a standalone memorandum (attached as an appendix to the revised 2022 GSP) that provides greater detail on how each were addressed by the CBGSA. This content has been retained in the revised 2025 GSP. A brief summary of the three potential corrective actions related to groundwater levels are provided in the following subsections.

Potential Corrective Action 1

DWR requested additional information regarding the justification for the sustainable management criteria included in the GSP and the effects of those criteria on beneficial users in the Basin. DWR identified two issues as part of this corrective action:

1. Provide a more detailed description of the criterion used to identify undesirable results (URs); and *(applies to all applicable sustainability indicators)*
2. Provide additional information regarding how the groundwater level minimum thresholds (MTs) are consistent with avoiding undesirable results, with a particular emphasis on the MTs in the Northwestern Region *(applicable only to chronic lowering of groundwater levels SMC)*

To address the first part of potential corrective action 1, the CBGSA highlighted where in the original 2020 GSP and in the revised 2022 GSP the cause, quantifiable criterion, and potential effects on beneficial uses and users could be found for each applicable SMC. Additionally, supplemental text was inserted into the revised 2022 GSP providing clarity on the quantifiable criteria used to define an undesirable result.

The second part of this potential corrective action seeks additional information to explain how each threshold region's groundwater level MTs are consistent with avoiding URs, "particularly… in the Northwestern threshold region." For every threshold region, DWR requests that the CBGSA evaluate and provide the potential effects that MTs and URs would have on:

- Well infrastructure, including domestic, community, public, and agricultural wells; and
- Environmental uses and users of groundwater.

The supplemental text included in the revised 2022 GSP includes a detailed table outlining, by threshold region, the MT calculation approach and a detailed description of the justification for each approach. In addition, a detailed analysis was conducted to assess the potential impacts on domestic and production wells based on a worst-case scenario where groundwater levels reached the MT in each RMW. The result of this analysis concluded that in this worst case and highly unlikely scenario, approximately 2% of domestic and production wells (a total of 8 wells) could go dry, although these conditions are not anticipated to occur. A highly detailed description of this analysis including tables and maps is included in the 2022 revised GSP.

Potential Corrective Action 2

As described in the Letter, DWR requests supporting evidence to justify the CBGSA's use of the basin-wide groundwater level MTs as a reasonable proxy for thresholds for depletions of ISW. It was the understanding of the CBGSA that the primary objective of the 2020 GSP approach was to use the entire

groundwater level representative network as a one-for-one proxy for ISWs. However, not all groundwater level representative wells provide data related to interconnected surface waters.

As stated in the SGMA regulations, utilizing a sustainability indicator as a proxy for another is allowed if supported by adequate evidence. As such, the CBGSA conducted analysis to determine the potential locations for interconnected surface waters based on available data and identified a subset of groundwater monitoring wells and has used the groundwater levels from only those wells as a proxy for monitoring interconnected surface waters. The criteria were:

1. Wells that are within 1.5-miles of the Cuyama River and/or 1-mile of one of the four major contributing streams to the Cuyama River, including Aliso Creek, Santa Barbara Creek, Quantal Canyon Creek, and Cuyama Creek,
2. Wells that have screen intervals within 100 feet below ground surface (bgs). In some cases, wells without screen interval information but with well depths greater than 100 feet bgs were included, under the assumption that the top of the screen interval was likely to be less than 100 feet bgs. In many of these wells, recent groundwater depth to water measurements were 40 feet bgs or less.

The monitoring network includes 12 wells, nine of which are representative wells for which minimum thresholds and measurable objective have been defined. The MT, MO, and UR criteria (30 percent of representative wells below their MTs for two consecutive years) are the same as those calculated and provided in the groundwater level representative network for the groundwater level monitoring. MTs at the representative well locations are protective of GDE locations in the upper and lower portions of the river, with MTs less than 30 feet from the bottom of the river channel in the vicinity of four wells (89, 114, 830 and 832). Additional detail including maps is provided in the revised 2022 GSP and the 2025 GSP.

Potential Corrective Action 4

This potential corrective action is related to the lack discussion of how overdraft will be mitigated in the entire Basin. In particular, DWR requested additional information for why the GSP does not include pumping reductions in the Ventucopa management area (where the Cuyama Basin Water Resources Model (CBWRM) predicts long-term groundwater level declines) and why projects and management actions are not included to prevent groundwater level declines in the northwest region.

In response, supplemental text was attached to Section 7, Projects and Management Actions that included the following actions:

- The CBGSA plans to re-evaluate pumping reductions in the Ventucopa region after assessing groundwater conditions over a two-to-five-year period following the GSP submission.
- Challenges in modeling the Ventucopa area included limited groundwater level data for calibration and difficulties characterizing stream flows due to lack of gages and stream geometry information.
- Groundwater pumping levels were estimated from land use data, but specific well locations were unavailable. The CBGSA now requires landowners to install meters on production wells.

- Water budget estimates in the region were relatively small, making small changes impactful. Concerns exist about underestimating stream seepage into the aquifer.
- Model development prioritized the central region, focusing on historical groundwater levels at the boundary between the central region and Ventucopa region.

Additionally, the Ventucopa region faces a projected groundwater deficit of about 700 acre-feet per year (AFY), but this is relatively small compared to the overall storage deficit and falls within the error range of the model. Due to uncertainties, the CBGSA decided that implementing management actions could be premature and decided to wait until additional data would make the modeling results for this area more robust.

3.1.2 Recommended Corrective Actions in 2023 Approval Letter

In the May 23rd, 2023, GSP Approval Letter from DWR, the CBGSA received five recommended corrective actions, one of which relating to groundwater levels:

1. **Recommended Corrective Action 1:**
    a. Monitor impacts to beneficial uses and users, including impacts to domestic wells, as Plan implementation continues. Provide DWR with an update of impacts and the adaptive management strategies implemented in annual reports and periodic evaluations.
    b. Explain and justify how and why using a subset of representative wells available in the region is appropriate to simulate the potential impacts to all beneficial uses and users in the region. Consider including additional wells within the region to further assess the impacts to the Northwestern Region and downstream users. If it is identified that overdraft will occur in this scenario, the GSA should clarify whether the implementation of proposed projects and management actions will avoid or mitigate significant and unreasonable impacts to beneficial users.

As described in detail in the 2025 GSP Update, the sustainable management criteria thresholds established for monitoring the chronic lowering of groundwater levels takes into consideration beneficial uses and users of groundwater by incorporating and protecting domestic and production wells depths, as well as areas with potential GDEs (as determined by a licensed wetland biologist). Furthermore, the CBGSA has implemented adaptive management strategies (allocations) to reduce groundwater production and bring the Basin into sustainability by the end of the implementation period. As discussed below, the Basin is currently on track with reaching sustainability as established by the interim milestones and has not experienced undesirable results for groundwater levels.

Additionally, as described in more detail in the 2025 GSP Update, a subset of representative wells is appropriate to simulate potential impacts to beneficial uses and users in a region of the Basin because those wells have been selected due to their locations, monitor availability, access, historical record, and because the monitoring network exceeds BMPs for monitoring well density. As described in Section 2.3 and 2.4 above, monitoring network revisions have helped improve and increase CBGSA efficiency while additional wells have been installed in other areas. While the Northwestern Region of the Basin was specifically mentioned for additional monitoring, the CBGSA believes the addition of new

wells/piezometers along with model projections that do not show overdraft are sufficient to keep the monitoring network as provided in the 2025 GSP Update.

3.1.3 Current Conditions and Relation to Thresholds

As discussed in Subsection 2.7 above, the CBGSA has conducted regular groundwater level monitoring since the adoption of the 2020 GSP. Groundwater level data has been posted to the CBGSA's online data management system (DMS) called Opti, the SGMA Portal, and provided via groundwater conditions reports accessible online at the CBGSA's website. Groundwater conditions reports have been posted since November 2020, through April of 2024, and there have been 20 reports posted to the CBGSA website. These reports utilize the thresholds established and described in the 2020 and revised 2022 GSP. The 2025 GSP uses revised thresholds supported by recalibrated models and recent data. Groundwater conditions reports provided after the adoption of the 2025 GSP will utilize these updated thresholds, as does the discussion included in this periodic evaluation.

When comparing the most recent measurements (as of production of this report) from April, 2024, to the new thresholds and interim milestones presented in the 2025 GSP Update, 37 of the 47 groundwater level representative wells (79%) are ahead of the schedule interim milestones for 2025, eight wells (17%) are on schedule and near the 2025 interim milestone, and two wells (4%) are behind their interim milestone targets. These results are shown in Figure 3-1. Data for each well is shown in Table 3-1.

Undesirable results conditions have not been reached within the Basin, however, there have been minimum threshold exceedances. As described in this Periodic Evaluation, the CBGSA intends to revise the minimum thresholds and update them based on new data and the updated model, which is anticipated to provide minimum thresholds and measurable objectives that better reflect conditions and hydrogeologic conditions within the Basin.

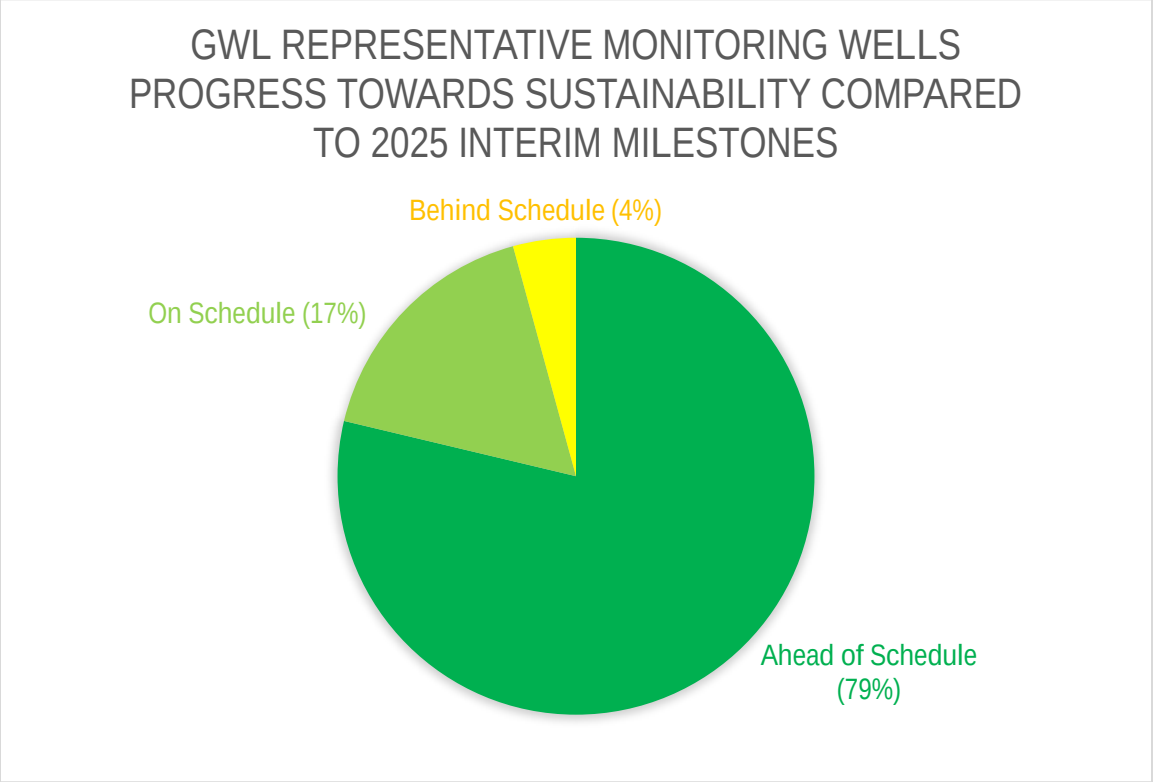

Figure 3-1. Groundwater Level Representative Monitoring Network Conditions Compared to 2025 Interim Milestones

Table 3-1. Groundwater Level Representative Monitoring Network Wells and Levels Compared to Interim Milestones

Opti Well	MT (ft. bgs)	2025 IM (ft. bgs)	2030 IM (ft. bgs)	2035 IM (ft. bgs)	MO (ft. bgs)	April 2024 GWL (ft. bgs)	Status
72	373	362	351	339	328	131.3	Ahead of Schedule
74	322	319	316	312	309	246.06	Ahead of Schedule
77	514	502	489	477	464	489.27	On Schedule
91	730	718	706	693	681	667.34	Ahead of Schedule
95	597	588	580	571	562	67.15	Ahead of Schedule
96	369	367	365	363	361	337.42	Ahead of Schedule
99	379	376	374	371	368	287.81	Ahead of Schedule
102	470	461	451	442	432	288	Ahead of Schedule
103	379	365	352	338	324	233.41	Ahead of Schedule
112	102	102	101	101	100	84.4	Ahead of Schedule
114	58	58	57	57	56	45.18	Ahead of Schedule
316	731	719	707	694	682	668.59	Ahead of Schedule
317	700	688	675	663	650	666.85	On Schedule
322	387	385	383	380	378	288.31	Ahead of Schedule
324	365	362	359	356	353	289.52	Ahead of Schedule
325	331	329	327	325	323	289.59	Ahead of Schedule
420	514	502	489	477	464	490.46	On Schedule
421	514	502	490	478	466	484.66	On Schedule
474	197	192	188	183	178	130.78	Ahead of Schedule
568	47	47	47	46	46	33.95	Ahead of Schedule
604	544	534	525	515	505	460.61	Ahead of Schedule
608	504	497	490	482	475	431.24	Ahead of Schedule
609	499	490	481	471	462	435.09	Ahead of Schedule
610	557	550	542	535	527	629.28	Behind Schedule
612	513	507	502	496	490	472.64	Ahead of Schedule
613	578	571	564	557	550	527.84	Ahead of Schedule
615	588	580	572	564	556	514.74	Ahead of Schedule
629	613	605	597	589	581	557.23	Ahead of Schedule
633	605	592	578	565	551	563.67	On Schedule
62	212	206	200	193	187	110.63	Ahead of Schedule
85	200	194	188	182	176	156.76	Ahead of Schedule
100	186	179	172	164	157	66.88	Ahead of Schedule
101	138	132	127	121	115	87.29	Ahead of Schedule
841	203	191	178	166	153	50.05	Ahead of Schedule

Opti Well	MT (ft. bgs)	2025 IM (ft. bgs)	2030 IM (ft. bgs)	2035 IM (ft. bgs)	MO (ft. bgs)	April 2024 GWL (ft. bgs)	Status
845	203	191	178	166	153	69.11	Ahead of Schedule
2	52	48	44	39	35	14.1	Ahead of Schedule
89	62	57	52	47	42	21.11	Ahead of Schedule
106	164	161	158	155	152	141.36	Ahead of Schedule
107	122	117	113	108	103	72.44	Ahead of Schedule
117	163	161	159	156	154	151.4	Ahead of Schedule
118	40	33	25	18	10	49.62	Behind Schedule
571	142	136	130	124	118	78.29	Ahead of Schedule
573	93	80	68	55	42	67.66	On Schedule
830	63	62	62	61	60	49.14	Ahead of Schedule
832	50	46	43	39	35	32.86	Ahead of Schedule
833	48	39	29	20	10	20.11	On Schedule
836	49	39	30	20	10	27.2	On Schedule

3.1.4 Progress Towards Sustainability

The Cuyama Basin is on track to achieve groundwater level sustainability by SGMA regulation's timeline of 2040. Managing groundwater resources and related sustainability indicators requires a multifaceted and flexible approach while adjusting to external independent conditions such as climatic variations. However, the CBGSA's data driven, modeling based, and flexible approach has kept the Basin on the planned path towards sustainability.

To accomplish this, the CBGSA has:

- Modified the groundwater level representative monitoring network to reduce redundancy while maintaining above SGMA BMP density requirements.
- Recalculated sustainability thresholds (MTs, MOs, and IMs) are more appropriately aligned with the Basin's definition of sustainability, historical and modeled conditions, and based on updated modeling and newly acquired data.
- Installed new monitoring wells to fill data gaps that, may in the future, be incorporated into the groundwater level representative network once enough historical data has been collected.
- Initiated a pumping reduction plan and pumping reduction schedule to reduce overall extractions from the Basin.
- Initiated a groundwater production metering program to ensure accurate data collection and equitable reductions for landowners.
- Held public meetings and workshops to communicate the CBGSA goals, path to achieve those goals, and elicit feedback from stakeholders.

As stated above, 45 of the 47 groundwater level representative wells show conditions that either meet or exceed the interim milestones established in the 2025 GSP. This means two wells (118 and 610) have not yet met the 2025 interim milestones.

It should be noted that although the thresholds for groundwater levels were modified and adopted with the 2025 GSP, the thresholds are protective of beneficial uses and users. As discussed in Section 5.2 of the 2025 GSP, the new thresholds are calculated from a stepwise function that takes into consideration GDEs, the well protection depth (which is used to ensure that active production and domestic wells within the Basin are protected from harm to their beneficial uses), well construction information, beneficial users, projected water depth in 2040, and the saturated thickness in areas of greater geologic understanding.

To ensure potential impacts to beneficial uses or users is monitored and understood, the CBGSA has created a dry well reporting form accessible via the CBGSA website, and tracks dry wells posted to the DWR Dry Well Reporting System (https://mydrywatersupply.water.ca.gov/report/). At the time of this report drafting (July 2024), six wells were reported dry since 2020. Five of the six wells were used for agriculture and irrigation, one was for a household. None of these wells were reported through the CBGSA's dry well reporting form.

The CBGSA will continue to monitor groundwater levels and report associated data via the DWR SGMA portal, the Cuyama Basin DMS, Annual Reports, and regular groundwater conditions reports.

3.2 Reduction of Groundwater Storage

The GSP uses groundwater levels as a proxy for monitoring groundwater storage and uses the groundwater model to estimate changes in storage.

3.2.1 Potential Corrective Actions and Recommended Corrective Actions

DWR provided one Potential Corrective Actions in its 2022 Determination Letter related to the chronic lowering of groundwater levels:

1. **Potential Corrective Action 1:** Provide justification for, and effects associated with, the sustainable management criteria including:
    a. Provide a more detailed description of the criterion used to identify undesirable results (URs)

Because the GSP uses groundwater levels as a proxy for groundwater storage, the response to this potential corrective action is the same as what is described above in the groundwater levels section.

There were no recommended corrective actions included in the 2023 DWR Approval Letter that relate to reductions of groundwater storage.

3.2.2 Current Conditions and Relation to Thresholds

Groundwater levels have been used to create change in storage contour and raster maps for each water year and are included in each annual report. These contours are useful at the planning level for understanding groundwater levels across the Basin, and to identify general horizontal gradients and regional groundwater level trends. The contour map is not indicative of exact values across the Basin because groundwater contour maps approximate conditions between measurement points, and do not account for topography.

A quantitative estimate of the annual change in groundwater storage was estimated using the CBWRM model, which at the time of writing includes data through Water Year 2023. The CBWRM was used to estimate the full groundwater budget for each year in the Cuyama Basin, which consists of a single principal aquifer. The estimated values for each water budget component for all years since GSP adoption and implementation are shown in Table 3-2.

Table 3-2. Groundwater Budget Estimates for Water years 2019 through 2023

Component	Water Year 2019 (AFY)	Water Year 2020 (AFY)	Water Year 2021 (AFY)	Water Year 2022 (AFY)[1]	Water Year 2023 (AFY)
Inflows					
Deep percolation	26,200	25,700	17,500	20,900	33,800
Stream seepage	3,900	2,800	800	4,900	11,700
Subsurface inflow	1,600	1,500	900	1,400	5,300
Total Inflow	31,700	30,000	19,200	27,200	50,800
Outflows					
Groundwater pumping	46,500	53,600	64,000	57,400	49,900
Total Outflow	46,500	53,600	64,000	57,400	49,900
Change in Storage	**-14,800**	**-23,600**	**-44,800**	**-30,200**	**+900**

[1] The data for water year 2022 differs from the previous Annual Report due to updates in land use classifications

Figure 3-2 shows the historical change in groundwater storage by year, water year type,[1] and cumulative water volume in each year for the period from 1998 through 2023.[2] The change in groundwater storage in each year was estimated by the CBWRM model. The color of bar for each year of change in storage correlates a water year type defined by Basin precipitation.

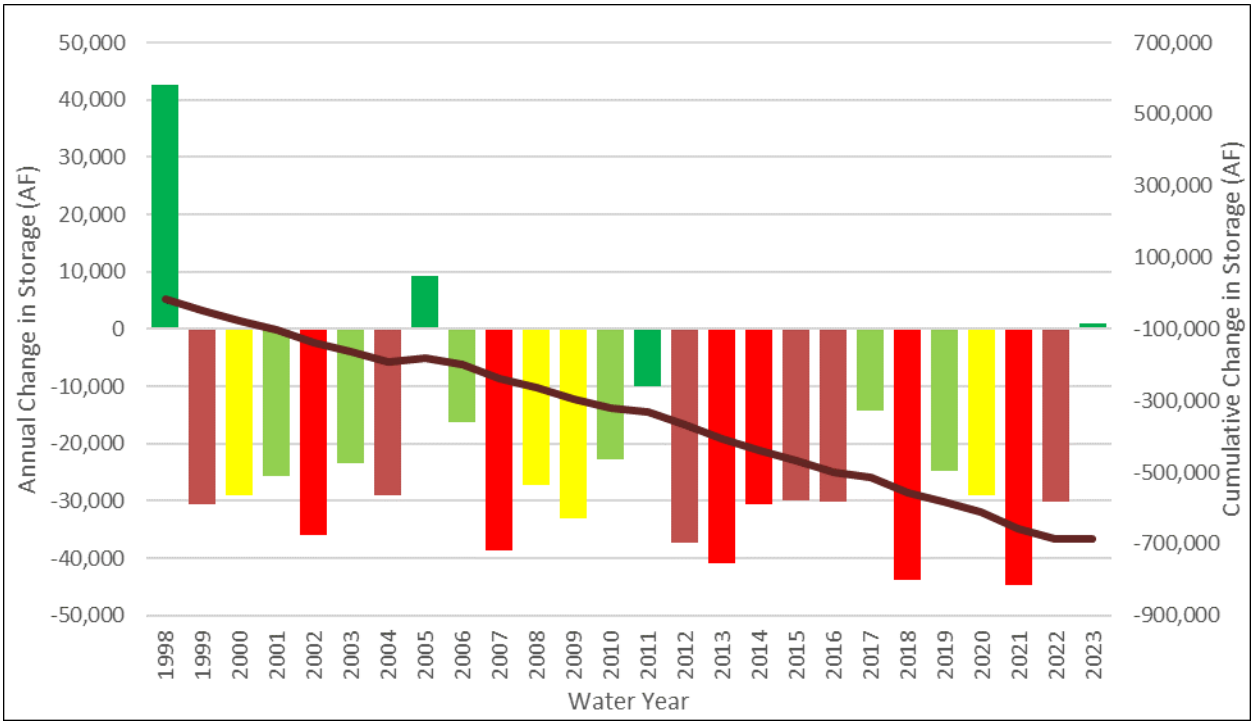

Figure 3-2. Change in Groundwater Storage by Year, Water Year Type, and Cumulative Water Volume

[1] Water year types are customized for the Basin watershed based on annual precipitation as follows:

- Wet year = more than 19.6 inches
- Above normal year = 13.1 to 19.6 inches
- Below normal year = 9.85 to 13.1 inches
- Dry year = 6.6 to 9.85 inches
- Critical year = less than 6.6 inches.

[2] Groundwater storage change estimates for years 1998 through 2021 differ from estimates reported in previous Cuyama Basin Annual Reports due to model updates using the most recent land use data.

3.2.3 Progress Towards Sustainability

Groundwater levels are used as a proxy for groundwater storage in the Basin. Please see Section 3.1.4 for details.

3.3 Seawater Intrusion

Seawater intrusion is not an applicable sustainability indicator for the Cuyama Valley Groundwater Basin.

3.4 Degraded Water Quality

3.4.1 Potential Corrective Actions in 2022 Determination Letter

As described above, the CBGSA received a GSP Determination Letter on January 21, 2022, from DWR. Four potential correct actions were provided in the Letter, one of which relate to the groundwater quality SMC. The corrective action was for the CBGSA to further address degraded water quality. Specifically, DWR's Letter expressed two main concerns about the water quality analysis and constituent thresholds used in the GSP. First, the GSP acknowledges that nitrate and arsenic have been historical constituents of concern, but due to regulatory limitations, did not set thresholds for these two constituents. Second, based on feedback provided in a public comment, there was concern that some public data was not included in the water quality analysis conducted for the Basin. DWR believes that the GSA may have approached the management strategies differently (through setting thresholds for these constituents) if this data had been utilized. DWR recommended the following to address the concerns raised in the letter:

1. Groundwater conditions information related to water quality should be updated to include all available data, in particular as recommended by the Regional Water Quality Control Board, so as to reflect the best available information regarding water quality.
2. The GSA should either develop sustainable management criteria for arsenic and nitrate or provide a thorough, evidence-based description for why groundwater management is unlikely to cause significant and unreasonable degradation of groundwater.
3. The GSA should appropriately revise its monitoring network based on the above updates. At a minimum, the GSA should include monitoring for arsenic and nitrates as they have been identified as constituents of concern in the Basin.

As discussed in Section 4.3.3 of the original 2020 and revised 2022 GSP, as well as Section 4.3.3 of the 2025 GSP Update, water quality data for the Basin was collected from the Irrigated Lands Program (ILP), Groundwater Ambient Monitoring and Assessment (GAMA) Program, United States Geological Survey (USGS), Cuyama Community Services District (CCSD), Ventura County Water Protection District, and private landowners. Staff performed detailed analysis to ensure that wells included in multiple datasets were paired correctly to the best of their ability and remove duplicate measurements and data.

The GSP discussion noted that the CBGSA does not have the ability or authority to perform actions to address nitrate or arsenic levels in the Basin. Nitrate concentrations are directly related to fertilizer application on agricultural crops, and SGMA regulations do not provide GSAs the regulatory authority to

manage fertilizer application. This regulatory authority is, however, held by the SWRCB through the Irrigated Land Program (ILP). Additionally, arsenic is a naturally occurring constituent and has only been measured in limited regions of the Basin.

To specifically respond to the three actions recommended by DWR, supplemental text was included in the revised 2022 GSP that included:

- A more thorough description of groundwater conditions relative nitrates and arsenic including summary statistics and maps showing well and sample locations and a summary of collected data (Supplemental Section 2.2.7)
- A description of why groundwater management is unlikely to affect nitrate and arsenic concentrations (Supplemental Section 4.3.2)
- A monitoring approach for nitrates and arsenic, including how the CBGSA will reevaluate available data (including new monitoring data) at the next GSP update in 2025 (Supplemental Section 4.3.3)

Additional detail is included in the revised 2022 GSP and the 2025 GSP Update.

As further described in Section 4.8 of the 2025 GSP Update, arsenic and nitrate measurements will be taken by the CBGSA at water quality monitoring network wells once every five years.

In addition, to gain a better understanding of nitrate in the Basin, the CBGSA will download arsenic monitoring measurements collected by third party sources, especially SWRCB GAMA Database, on an annual basis. The GAMA database includes data collected by USGS, California Natural Resources Agency, National Quality Monitoring Council Water Quality Portal, as well as other sources as shown in Table 3-3.

Table 3-3: GAMA Databases and Frequency of Updates

Data Set Name	Dataset Abbreviation	Update Frequency (Approximate)
Department of Pesticide Regulation	DPR	Yearly
Department of Water Resources	DWR	Yearly
Division of Drinking Water	DDW	Quarterly
GAMA Domestic Well	GAMA_DOM	No longer updated
GAMA Local Groundwater Projects	GAMA_LOCALGW	Various
GAMA Special Studies	GAMA_SP-STUDY	No longer updated
GAMA US Geological Survey	GAMA_USGS	Quarterly
Local Groundwater Projects	LOCALGW	Monthly
US Geological Survey - National Water Information System	USGS_NWIS	Quarterly
Water Board Cleanup and Permitted Sites	WB_CLEANUP	Monthly
Water Board Irrigated Lands Regulatory Programs	WB_ILRP	Monthly
Water Replenishment District	WRD	Yearly

Figure 4-21 of the 2025 GSP Update shows the locations where nitrate monitoring has occurred over the past 10- and 5-year Periods. A total of 104 wells were sampled over the 10-year period from 2013-2023. The majority of Nitrate data is collected through the California Central Coast Water Board Irrigated Lands Regulatory Program (ILRP). The Central Coast Water Board regulates discharges from irrigated agricultural lands to protect surface water and groundwater through Order 4.0 (RE-2021-0040). In 2023, in the Cuyama Basin, the ILRP program had 16 operations and 88 ranches enrolled in the program reporting Nitrate data. Parties enrolled in the program are required to monitor and report results for the primary irrigation wells to GeoTracker annually, which is updated to GAMA.

The CBGSA will utilize the GAMA database to monitor arsenic water quality in the Basin. Arsenic samples are taken at seven wells, all municipal and domestic. These samples are from DDW, GAMA USGS, and USGS NWIS. The Cuyama Groundwater Basin has two public water systems according to the System Area Boundary Layer (SABL) tool developed by the SWRCB. The first public water system is called the Cuyama Community Services District water system number CA4210009, which serves a population of 700. This public water system is classified as a community water system. The second is Cuyama Mutual Water Company water system number CA4200514, which serves a population of 48 and is classified as a transient noncommunity water system. All wells were sampled in the past five years. These two water systems provide 87% of the sampling results for arsenic in the Basin taken over the 10-year period from 2013-2023. There have been 87 samples from these 7 wells taken over the past 10 years. These locations are shown in Figure 4-22 of the 2025 GSP Update.

3.4.2 Recommended Corrective Actions in 2023 Approval Letter

In the 2023 GSP Approval Letter from DWR, the CBGSA received five recommended corrective actions, three of which related to groundwater quality. They are:

- **Recommended Corrective Action 3:** Provide an update regarding the status of the planned project to construct a new replacement production well near the community of New Cuyama, including whether wellhead treatment of arsenic will be performed and whether routine analysis of groundwater samples will be performed to monitor the effectiveness of the arsenic mitigation. If this project is not effective or not implemented by the periodic evaluation, then the GSA should develop sustainable management criteria for arsenic.

- **Recommended Corrective Action 4:** By the periodic evaluation to be submitted by 2025, Department staff recommend the GSA develop sustainable management criteria for nitrate.

- **Recommended Corrective Action 5:** Clarify the GSA's intent to perform ongoing measurements and analysis of groundwater samples for arsenic and nitrate, which will be important for the GSA to quantitatively demonstrate, using evidence-based analysis, that implementation of the GSP is achieving the intended effect of avoiding significant and unreasonable impacts to beneficial uses and users of groundwater. Discuss the frequency of the ongoing measurements for nitrate and arsenic.

Recommended Corrective Action 3

As described in Section 7.4.4 of the 2025 GSP Update, the CCSD obtained DWR funding to install a new production well. A replacement well was attempted at the CCSD's Well 2 location but found to produce water that was unsuitable for potable use due to the design and construction of the well. A new location is currently being identified for a CCSD replacement 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. 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

As any new CCSD well would be used for domestic purposes, monitoring for constituents such as arsenic is anticipated as part of normal operations. This data would be requested by the CBGSA for inclusion into its analysis.

Recommended Corrective Action 4

Recommended Corrective Action 4 suggests developing sustainable management criteria for nitrate, which is discussed in detail in Section 3.4.1 above.

Recommended Corrective Action 5

Recommended Corrective Action 5 suggests clarifying the CBGSA's ongoing monitoring and evaluating of arsenic and nitrate. This is discussed in detail in Section 3.4.1 above.

3.4.3 Current Conditions and Relation to Thresholds

In January 2024, the CBGSA voted to modify the calculations methodology for calculating the groundwater quality sustainability thresholds for both the minimum threshold and the measurable objective. The MT was modified so that data sampled between the submittal of the 2020 GSP and the current update would be incorporated into the calculation, as well as putting a minimum cap of 1,000 mg/L for TDS. These modifications were done to expand the available data used to calculate each threshold (i.e. longer period of record) as well as ensure wells that had very low historic TDS levels were not unduly limited in the event of TDS concentration increases that still did not exceed established drinking water standards. The MO was also updated to include recent monitoring data in its methodology calculation. Table 3-4 provides both the updated representative well list and the measurements collected in Q3 of 2024 relative to the 2025 IMs. Provided data shows that 25 of the 29 representative monitoring sites are ahead of schedule when compared to the 2025 IM, while four wells do not have measurements available for this period. Undesirable results for the degradation of groundwater quality have not occurred within the Basin.

Table 3-4: Groundwater Quality Representative Monitoring Network Wells and Measurements Compared to Interim Milestones

Opti Well	Q3 2024 TDS (mg/L)	MO (mg/L)	MT (mg/L)	2025 IM (mg/L)	2030 IM (mg/L)	2035 IM (mg/L)	Status Relative to 2025 IM
61	-	585	1000	896	793	689	NA
72	894	900	1106	1055	1003	952	Ahead of Schedule
74	1360	1310	1872	1732	1591	1451	Ahead of Schedule
77	1165	1,120	1682	1542	1401	1261	Ahead of Schedule
79	1630	1,500	2318	2114	1909	1705	Ahead of Schedule
83	1110	1,120	1816	1642	1468	1294	Ahead of Schedule
88	337	320	1000	830	660	490	Ahead of Schedule
90	1120	1,400	1596	1547	1498	1449	Ahead of Schedule
91	1059	1,020	1558	1424	1289	1155	Ahead of Schedule

Opti Well	Q3 2024 TDS (mg/L)	MO (mg/L)	MT (mg/L)	2025 IM (mg/L)	2030 IM (mg/L)	2035 IM (mg/L)	Status Relative to 2025 IM
95	1310	1340	1950	1798	1645	1493	Ahead of Schedule
96	1220	1100	1676	1532	1388	1244	Ahead of Schedule
99	1060	1,140	1658	1529	1399	1270	Ahead of Schedule
101	1230	1210	1735	1604	1473	1341	Ahead of Schedule
102	1640	1,500	2551	2288	2026	1763	Ahead of Schedule
157	-	1,360	2468	2191	1914	1637	NA
204	348	380	1000	845	690	535	Ahead of Schedule
242	883	780	1656	1437	1218	999	Ahead of Schedule
316	1105	1,060	1524	1408	1292	1176	Ahead of Schedule
317	1068	692	1444	1256	1068	880	Ahead of Schedule
322	1170	1,140	1504	1413	1322	1231	Ahead of Schedule
324	700	740	1000	935	870	805	Ahead of Schedule
325	1040	1,070	1687	1533	1378	1224	Ahead of Schedule
420	1121	1,080	1560	1440	1320	1200	Ahead of Schedule
421	1390	1,280	1761	1640	1520	1400	Ahead of Schedule
424	1270	1,260	1658	1559	1459	1360	Ahead of Schedule
467	1080	1070	1846	1652	1458	1264	Ahead of Schedule
568	841	860	1118	1054	989	925	Ahead of Schedule
841	-	561	1000	890	781	671	NA
845	-	1,250	1250	1250	1250	1250	NA

3.4.4 Progress Towards Sustainability

The Cuyama Basin is on track to achieve groundwater quality sustainability by SGMA regulation's timeline of 2040. Managing groundwater resources and related sustainability indicators requires a multifaceted and flexible approach while adjusting to external independent conditions such as climatic variations. However, the CBGSA's data driven, modeling based, and flexible approach has kept the Basin on the planned path towards sustainability.

To accomplish this, the CBGSA has:

- Recalculated sustainability thresholds (MTs, MOs, and IMs) are more appropriately aligned with the Basin's definition of sustainability, historical and modeled conditions, and based on updated modeling and newly acquired data.

- Installed new monitoring wells to fill data gaps that, may in the future, be incorporated into the groundwater level representative network once enough historical data has been collected.
- Initiated a pumping reduction plan and pumping reduction schedule to reduce overall extractions from the Basin.
- Initiated a groundwater production metering program to ensure accurate data collection and equitable reductions for landowners.
- Held public meetings and workshops to communicate the CBGSA goals, path to achieve those goals, and elicit feedback from stakeholders.

As stated above, 25 of the 29 groundwater quality representative wells show conditions that exceed the interim milestones established in the 2025 GSP. Four wells did not have measurements for the most recent period and could not be assessed.

It should be noted that although the thresholds for groundwater quality were modified and adopted with the 2025 GSP, the thresholds are protective of beneficial uses and users. As discussed in Section 5.5 of the 2025 GSP, the MT was modified so that data sampled between the submittal of the 2020 GSP and the current update would be incorporated into the calculation, as well as putting a minimum cap of 1,000 mg/L for TDS. These modifications were done to expand the available data used to calculate each threshold (i.e. longer period of record) as well as ensure wells that had very low historic TDS levels were not unduly limited in the event of TDS concentration increases that still did not exceed established drinking water standards. The MO was also updated to include recent monitoring data in its methodology calculation.

The CBGSA will continue to monitor groundwater quality and report associated data via the Cuyama Basin DMS, Annual Reports, and regular groundwater quality conditions reports.

3.5 Subsidence

3.5.1 Potential Corrective Actions and Recommended Corrective Actions

DWR provided one Potential Corrective Actions in its 2022 Determination Letter related to subsidence:

1. **Potential Corrective Action 1:** Provide justification for, and effects associated with, the sustainable management criteria including:
    a. Provide a more detailed description of the criterion used to identify undesirable results (URs)

The response to this potential corrective action is the same as what is described above in Section 3.1.1 in the groundwater levels section.

There were no recommended corrective actions included in the 2023 DWR Approval Letter that relate to subsidence.

3.5.2 Current Conditions and Relation to Thresholds

Subsidence data were collected from the University NAVSTAR Consortium (UNAVCO) database. UNAVCO maintains data on five GPS monitoring stations in the area in and around the Basin. Three stations (P521, OZST, and BCWR) are located just outside the Basin. The three stations' measurements show ground surface level as either staying constant or slightly increasing. The increase is potentially due to tectonic activity in the region. Two stations (VCST and CUHS) are located within the Basin. Station VCST is located near Ventucopa and indicates that subsidence is not occurring in that area. Station CUHS indicates that 339 millimeters (approximately 1.1 feet) of subsidence have occurred in the vicinity of New Cuyama over the 25 years that were monitored (1999 - 2023). The subsidence at this station increases in magnitude following 2010, and generally follows a seasonal pattern. The seasonal pattern is possibly related to water level drawdowns during the summer, and elastic rebound occurring during winter periods.

In the fall of 2024, an investigation was completed of the Cuyama Valley High School (CUHS) station. This station is currently operated and maintained by USGS. An onsite inspection was performed and USGS staff were contacted to investigate the construction, sort term and seasonal fluctuations in all position's displacement components. USGS regularly reviews the data collected and did not identify any data quality issues and the site inspection did not identify any potential issue. It was concluded that the longer-term subsidence is occurring consistent with groundwater pumping and drought. Seasonal fluctuations are likely due to rainfall and possible the absence of bedrock anchoring allowing the station to move up and down on a titled axis.

As shown in Figure 3-3, subsidence trends are approximately 0.073 ft per year, or 0.876 inches per year in the central portion of the Basin. The subsidence minimum threshold is set at 2 inches per year, which has not occurred and is not close to occurring at this time. The measurable objective for subsidence is 0 inches per year, and no interim milestones were set in the GSP because minimum thresholds had not been reached.

Undesirable results conditions have not occurred for subsidence within the Basin and are not anticipated to occur in the foreseeable future.

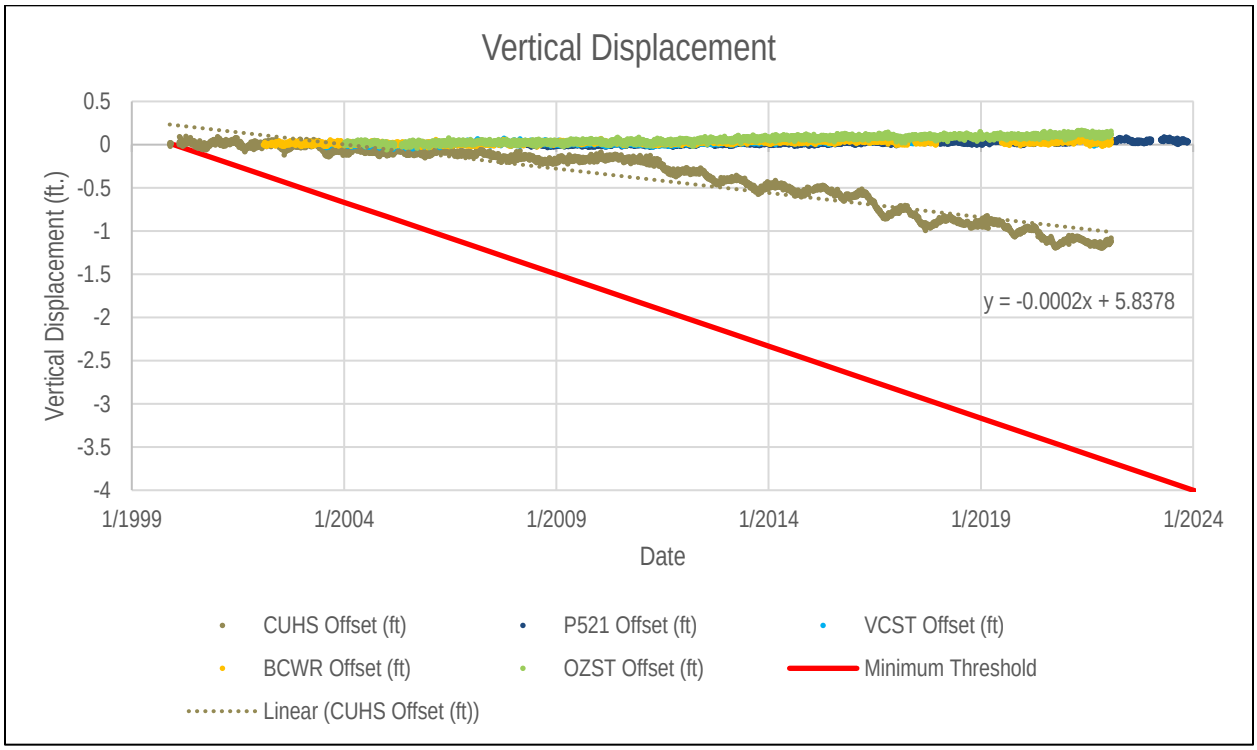

Figure 3-3: Vertical Displacement at Cuyama Groundwater Basin Monitoring Sites

3.5.3 Progress Towards Sustainability

Subsidence within the Basin is already sustainable and does not show signs of reaching or approaching conditions that would trigger undesirable results. No beneficial users or uses have been detrimentally impacted by subsidence in the Basin. Additionally, subsidence trends are likely to decrease (less vertical declination) through the implementation of the GSP and groundwater allocations as the Basin works towards sustainability by the end of the implementation period. The Basin is expected to see a gradual shift towards a decreased rate of subsidence in the future due to the implementation of the GSP.

3.6 Depletions of Interconnected Surface Waters

3.6.1 Potential Corrective Actions in 2022 Determination Letter

DWR provided two Potential Corrective Actions related to interconnected surface waters. In summary they are:

1. **Potential Corrective Action 1:** Provide justification for, and effects associated with, the sustainable management criteria including:

a. Provide a more detailed description of the criterion used to identify undesirable results (URs); and

2. **Potential Corrective Action 2:** Use of groundwater levels as a proxy for depletion of interconnected surface water.
3. **Potential Corrective Action 4:** Provide explanation for how overdraft will be mitigated in the Basin.

Because the GSP currently uses groundwater levels to establish sustainable management criteria for interconnected surface water, the responses to these potential corrective actions included in the 2022 GSP are the same as what is described above in Subsection 3.1.

3.6.2 Recommended Corrective Actions in 2023 Approval Letter

DWR provided Recommended Corrective Action 2 related to depletions of interconnected surface waters in its approval letter:

> *Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, basinwide pumping is a complex task and that developing suitable tools may take additional time; however, it is critical for the Department's ongoing and future evaluations of whether GSP implementation is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs to sustainably manage depletions of interconnected surface water.*
>
> *In addition, the GSA should work to address the following items by the first periodic evaluation:*
>
> *a) Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.*
>
> *b) Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.*
>
> *c) Prioritize collaborating and coordinating with local, state, and federal regulatory agencies, as well as interested parties, to better understand the full suite of beneficial uses and users that may be impacted by pumping-induced surface water depletion within the GSA's jurisdictional area.*

At the time of production of the 2025 GSP Update, DWR continues (as of early October 2024) to develop technical papers and eventually guidance documents to assist GSAs in addressing the interconnected surface waters sustainability indicator. The first technical paper, *Depletions of ISW: An Introduction,* was published in February of 2024. Paper 2, *Techniques for Estimating ISW Depletion Caused by Groundwater Use*, and Paper 3, *Examples for Estimating ISW Depletion Caused by Groundwater Use*, were published in September of 2024. Paper 4, *Guidance for Establishing SMCs for Depletions of ISW*, is expected sometime in 2025.

The 2022 GSP uses groundwater levels as a proxy for interconnected surface waters. The 2022 GSP specifies that only a subset of wells, selected based on specific criteria, are used to monitor areas with potential interconnected surface waters. The 2025 GSP Update includes this same subset of groundwater level monitoring wells, with thresholds that incorporate protection for interconnected surface waters and beneficial uses and users such as GDEs. The CBGSA will reassess the monitoring network and sustainability criteria for interconnected surface water once Paper 4 is released.

The technical papers released by DWR for the estimation of ISW depletion were not available in time to be used in the 2025 GSP Update. Therefore, the GSP includes the same information that was included in the 2022 GSP, discussed further in Section 5.2.5 below. The CBGSA will re-assess the estimation of ISW depletion using the approaches contained in the DWR technical papers in future years.

3.6.3 Current Conditions and Relation to Thresholds

As discussed in Subsection 2.7 above, the CBGSA has conducted regular groundwater level monitoring since the adoption of the 2020 GSP. As allowed by SGMA regulations, sustainability indicators may use proxy data for monitoring purposes and the Cuyama GSA utilizes groundwater levels as a proxy for interconnected surface waters. A subset of wells that monitor groundwater levels have been used as the monitoring sites for interconnected surface waters, and the methodology for setting groundwater level thresholds incorporated considerations and protections for beneficial uses and users of interconnected surface waters. Therefore, the subset of wells used as proxy for interconnected surface waters also uses the same thresholds established for groundwater levels.

Groundwater level data has been posted to the CBGSA's online data management system (DMS) called Opti, the SGMA Portal, and provided via groundwater conditions reports accessible online at the CBGSA's website. Groundwater conditions reports have been posted since November 2020, through April of 2024, and there have been 20 reports posted to the CBGSA website. These reports utilize the thresholds established and described in the 2020 and revised 2022 GSP. The 2025 GSP uses revised thresholds supported by recalibrated models and recent data. Groundwater conditions reports provided after the adoption of the 2025 GSP will utilize these updated thresholds, as does the discussion included in this periodic evaluation.

When comparing the most recent measurements (as of production of this report) from April, 2024, to the new thresholds and interim milestones presented in the 2025 GSP Update, six of the seven groundwater level representative wells (79%) are ahead of the schedule interim milestones for 2025, one well (17%)

are on schedule and near the 2025 interim milestone, and no wells (0%) are behind their interim milestone targets. These results are shown in Figure 3-4. Data for each well is shown in Table 3-5.

Undesirable results conditions have not been reached within the Basin, and there have been no minimum threshold exceedances. As described in this Periodic Evaluation, the CBGSA intends to revise the minimum thresholds and update them based on new data and the updated model, which is anticipated to provide minimum thresholds and measurable objectives that better reflect conditions and hydrogeologic conditions within the Basin.

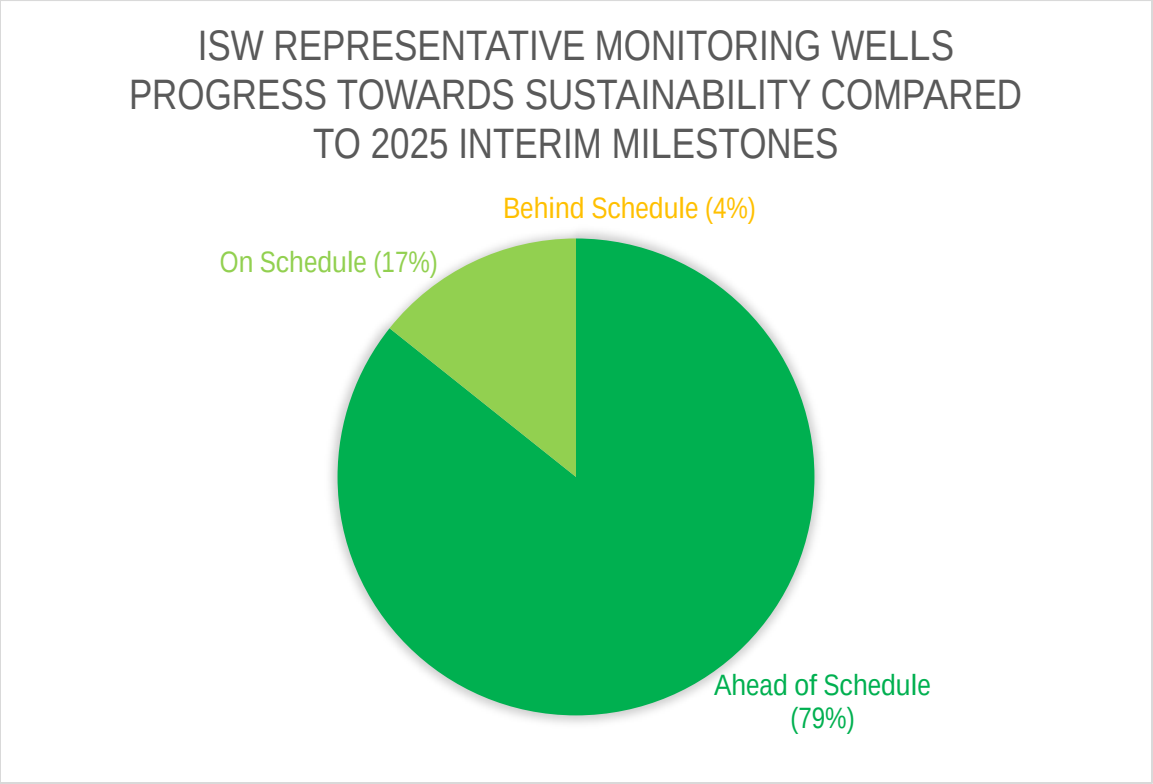

Figure 3-4. Interconnected Surface waters Representative Monitoring Network Conditions Compared to 2025 Interim Milestones

Table 3-5. Interconnected Surface Waters Representative Monitoring Network Wells and Levels Compared to Interim Milestones

Opti Well	MT (ft. bgs)	2025 IM (ft. bgs)	2030 IM (ft. bgs)	2035 IM (ft. bgs)	MO (ft. bgs)	April 2024 GWL (ft. bgs)	Status
114	58	58	57	57	56	45.18	Ahead of Schedule
568	47	47	47	46	46	33.95	Ahead of Schedule
2	52	48	44	39	35	14.1	Ahead of Schedule
89	62	57	52	47	42	21.11	Ahead of Schedule
830	63	62	62	61	60	49.14	Ahead of Schedule
832	50	46	43	39	35	32.86	Ahead of Schedule
833	48	39	29	20	10	20.11	On Schedule

3.6.4 Progress Towards Sustainability

The Cuyama Basin is on track to achieve interconnected surface waters sustainability by SGMA regulation's timeline of 2040. Managing groundwater resources and related sustainability indicators requires a multifaceted and flexible approach while adjusting to external independent conditions such as climatic variations. However, the CBGSA's data driven, modeling based, and flexible approach has kept the Basin on the planned path towards sustainability.

To accomplish this, the CBGSA has:

- Recalculated sustainability thresholds (MTs, MOs, and IMs) are more appropriately aligned with the Basin's definition of sustainability, historical and modeled conditions, and based on updated modeling and newly acquired data.
- Installed new monitoring wells and piezometers to fill data gaps that, may in the future, be incorporated into the interconnected surface waters and groundwater level representative networks once enough historical data has been collected.
- Initiated a pumping reduction plan and pumping reduction schedule to reduce overall extractions from the Basin.
- Initiated a groundwater production metering program to ensure accurate data collection and equitable reductions for landowners.
- Held public meetings and workshops to communicate the CBGSA goals, path to achieve those goals, and elicit feedback from stakeholders.

As stated above, all seven interconnected surface representative wells show conditions that either meet or exceed the interim milestones established in the 2025 GSP.

It should be noted that although the thresholds for groundwater levels (and therefore the subset of wells used to monitor interconnected surface waters) were modified and adopted with the 2025 GSP, the thresholds are protective of beneficial uses and users. As discussed in Section 5.2 of the 2025 GSP, the

new thresholds are calculated from a stepwise function that takes into consideration GDEs, the well protection depth (which is used to ensure that active production and domestic wells within the Basin are protected from harm to their beneficial uses), well construction information, beneficial users, projected water depth in 2040, and the saturated thickness in areas of greater geologic understanding.

The CBGSA will continue to monitor interconnected surface waters and groundwater levels and report associated data via the DWR SGMA portal, the Cuyama Basin DMS, Annual Reports, and regular groundwater conditions reports.

4. STATUS OF PROJECTS AND MANAGEMENT ACTIONS

The 2020 GSP included several projects and management actions (PMAs) that have been either implemented, are planning to be implemented, in design, and/or undergoing initial planning and studies.

Full descriptions of these projects are included in the 2020 GSP. Consistent with SGMA requirements, the project descriptions in the 2020 GSP and contained information regarding:

- Project descriptions,
- Significant new information,
- Reported or expected benefits,
- Evaluation of project impacts or benefits,
- Permitting and regulatory processes,
- Public notice and engagement processes, and
- Estimated costs and funding source.

4.1 Completed Projects and Other Activities

Since adoption of the 2020 GSP, one management action has been completed and another management action has been started and is continuing as a long-term and ongoing activity. Progress has been made on the completion of three of the four projects included in the GSP. Table 4-1 includes all projects and management actions included in the GSP, their status, and anticipated or realized benefits. The completed projects/components include:

- Precipitation enhancement feasibility study
- Water rights analysis for potential stormwater capture project
- Secured funding for new water supply well for CCSD
- Basin-wide economic study
- Pumping allocations for 2023 and 2024

While not included as project and management actions in the 2020 GSP, several other studies and activities have been undertaken to assist in the development of the GSP. Many of these activities are described in further detail in Section 2 and include:

- Investigation of Russell and Santa Barbara Canyon faults
- Model updates and recalibration
- Installation of new monitoring wells and piezometers
- GDE study
- Active well survey

- Representative well field survey

Table 4-1: Projects and Management Actions Status and Benefits

Project or Management Action name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Expected Schedule	Benefits Observed to Date or Anticipated Benefits	Estimated Accrued Benefits at Completion
Project 1: Flood and Stormwater Capture	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.	• GW Levels • GW Storage • GW Quality • Subsidence • ISW	Water rights analysis of potential water supplies currently underway	• Feasibility study: 0 to 5 years • Design/Construction: 5 to 15 years	Understanding of available stormwater potentially available to the Basin if projects were built.	NA
Project 2: Precipitation Enhancement	Perform a feasibility study of the precipitation enhancement action identified in the GSP to determine if this action should be pursued and implemented in the Basin	• GW Levels • GW Storage • GW Quality • Subsidence • ISW	Feasibility Study currently underway	• Refined project study: 0 to 2 years • Implementation of Precipitation Enhancement: 0 to 5 years	Understanding of benefits from potential precipitation enhancement activities	NA
Project 3: Water Supply Transfers/Exchanges	Evaluate the feasibility of purchasing transferred water and exchange it with downstream users. To allow for additional stormwater and floodwater capture in the Basin to protect water rights of downstream users.	• GW Levels • GW Storage • GW Quality • Subsidence • ISW	Not yet begun	• Feasibility study/planning: 0 to 5 years • Implementation in 5 to 15 years	Understanding potential benefits and challenges to water exchanges with downstream users	NA

Project or Management Action name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Expected Schedule	Benefits Observed to Date or Anticipated Benefits	Estimated Accrued Benefits at Completion
Project 4: Improve Reliability of Water Supplies for Local Communities	Explores opportunities to improve water supply reliability for Ventucopa within CCSD service area. Potential projects include a replacement well for CCSD and improvement of Ventucopa Water Supply Company (VWSC's) existing well	• GW Levels • GW Quality	In progress for CCSD; not yet begun for other communities	• Feasibility studies: 0 to 2 years • Design/Construction: 1 to 5 years	Improved water supply to local communities	NA
Management Action 1: Basin-Wide Economic Analysis	Development of a study of the economic impacts of the projects and management actions included in the GSP	NA	Completed	• December 2020	Understanding of Basin to provide economic impacts based on other proposed projects and GSP implementation	NA
Management Action 2: Pumping Allocations in Central Management Area	Implement planned pumping reductions that increase annually until sustainable yield has been reached. These allocations reflect a 5% reduction in 2023 and a 10% reduction in 2024 relative to baseline levels.	• GW Levels • GW Storage • GW Quality • Subsidence • ISW	Allocations developed and implemented for 2023 and 2024	• Allocations implemented: 2023 through 2040	Reduction in groundwater production in the Basin during implementation of GSP	5% reduction in 2023 and 10% reduction in 2024 in the Central Management Area

Project or Management Action name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Expected Schedule	Benefits Observed to Date or Anticipated Benefits	Estimated Accrued Benefits at Completion
Adaptive Management	NA	Variable	Board ad-hoc committee has been formed and is considering potential actions	Only implemented if triggered; timing would vary	NA	NA

4.1.1 Management Action 1: Basin-Wide Economic Analysis

A Basin-wide direct economic analysis of proposed GSP actions was 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 did not require the use of a monitoring network and does not directly impact or influence any specific sustainability indicator or basin conditions but does provide valuable information on the potential economic impacts of future activities and costs associated with GSP implementation. This management action did not negatively impact any beneficial uses or uses of groundwater within the Basin but has the potential to ensure GSP implementation activities provide a better and more detailed understanding of economic impacts within the Basin.

4.2 Projects in Progress

4.2.1 Management Action 2: Pumping Allocations in Central Management Area

CBGSA staff has worked and continues to work with the Board and stakeholders to implement pumping allocations in the Central Management Area, which began in the 2023 calendar year. As directed by the Board, in July 2022, CBGSA staff developed pumping allocations for 2023 and 2024 for each parcel located within the Central Management Area (CMA). These allocations reflect a 5% reduction in 2023 and a 10% reduction in 2024 relative to baseline levels. Actual pumping was reported for most water users in the Central Management Area in 2023, with all users at or below their pumping allocation amount for 2023.

Pumping allocations in 2023 and 2024 reduced allowable pumping in the CMA by approximately 2,000 AF in 2023 and 2024 respectively (from the model estimated WY 2021 for the original CMA area and glidepath reduction schedule) but actual pumping via flow meters showed actual pumping of only 50% of the allocation at 23,454.91 AF total pumped in 2023. This reduction in pumping, along with a wet precipitation year, improved groundwater levels in many parts of the CMA, and did not cause any known negative impacts to beneficial uses or users of groundwater.

Pumping allocations will continue in 2025 and future years, with additional reductions in allowable pumping in the Central Management Area per the glide path specified in the GSP until the sustainable yield is met in 2038.

4.2.2 Project 1: Flood and Stormwater Capture

This project would include the capture of flood and stormwater, which would include infiltration of stormwater and flood waters to the groundwater basin using spreading facilities (recharge ponds or recharge basins) or injection wells. As a first step to determine feasibility for such a project, the CBGSA is performing a water rights analysis on flood and stormwater capture flows in the Basin to understand the availability of water for capture given existing water rights. This includes reviewing reservoir operations data at Twitchell Reservoir to better understand the frequency of flood releases at the Reservoir, which

could potentially be captured upstream in the Cuyama Basin. Current data suggests that this has historically occurred in approximately 11% of all years.

Additional analysis will be done in the coming years to assess the feasibility of implementing a flood and stormwater capture project. The flood and stormwater capture feasibility study will not directly impact groundwater supplies in the Basin but will allow the CBGSA to assess the feasibility of implementing a flood and stormwater capture project in the future. The feasibility study will not impact beneficial uses or users of groundwater in the Basin, but any future potential flood and stormwater capture project the feasibility study addresses may.

4.2.3 Project 2: Precipitation Enhancement

A precipitation enhancement project would involve implementation of a cloud seeding program to increase precipitation in the Basin. As a first step to evaluate the feasibility of precipitation enhancements in the Cuyama Valley Basin, the CBGSA contracted with the Desert Research Institute (DRI) to assess the potential benefits and costs of a cloud seeding project in the Cuyama Valley. A final report which will provide an assessment of the potential increase in precipitation from cloud seeding is expected in late 2024.

The ongoing precipitation enhancement study will not directly impact groundwater supplies in the Basin but allow the CBGSA to assess the feasibility of implementing a precipitation enhancement project in the future. If a cloud seeding project is implemented, it could enhance groundwater supplies by increasing precipitation into the Basin watershed. This would provide a potential benefit for beneficial uses or users of groundwater in the Basin.

4.2.4 Project 4: Improve Reliability of Water Supplies for Local Communities

This management action includes consideration of opportunities to improve water supply reliability for Ventucopa and within the CCSD service area. Potential projects include a replacement well for CCSD and improvement of Ventucopa Water Supply Company (VWSC's) existing well. 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.

This project is not directly implemented by the CBGSA, but the CBGSA fully supports the improvements outlined in this project. If new wells are installed in the future or improvements are made to existing wells, groundwater levels and pumps tests may be able to assess the successful implementation of this project.

4.2.5 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 decision to redirect efforts in the Basin to more effectively achieve sustainability goals.

As discussed in some of the Annual Reports, because several wells in the Basin are trending towards undesirable results, the CBGSA Board undertook efforts to review wells with threshold exceedances, investigated potential causes of the exceedances, and identified if any domestic or production wells were affected by declining groundwater levels. During the wet WY 2023, several wells with groundwater levels that previously exceeded minimum thresholds recovered to or above these threshold levels.

The Board considered and continues to consider potential actions to address minimum threshold exceedances, including restricting pumping in individual wells, adjusting minimum thresholds or the undesirable result criteria identified in the GSP to more appropriate levels, and accelerating basin-wide pumping reductions.

4.3 Projects Not Begun

4.3.1 Project 3: Water Supply Transfers/Exchanges

This project has not yet begun and is not scheduled to begin at this time. This project will be explored if the CBGSA decides to pursue Project 1, Flood and Stormwater Capture.

Funding for this project would either come from CBGSA operational funds or from future grant opportunities. If the CBGSA decides to proceed with this project, the public would be informed through the CBGSA website, public meetings and/or workshops, and during Board Meetings which are open to the public.

5. BASIN SETTING BASED ON NEW INFORMATION OR CHANGES IN WATER USE

As discussed in greater detail in Section 2, New Information Collected, the CBGSA oversaw data collection efforts, data processing, physical surveys of the Basin, and integration of this new data into the 2025 GSP Update and CBWRM.

Results of these new sources of information and how they have influenced the Basin Setting are summarized briefly below.

5.1 Hydrogeologic Conceptual Model

The Hydrogeologic Conceptual Model (HCM) of the 2025 GSP Update provides an understanding of the physical characteristics related to regional hydrology, land use, geologic structure, water quality, principal aquifers, and principal aquitards. Below are the new sources of information that assisted with the update of the HCM in the 2025 GSP Update and improved understanding of the Basin.

5.1.1 New Monitoring Wells and Piezometers

Drilling at the new multi-completion nested monitoring well and piezometer locations provided a better understand the geologic and lithologic characteristics of the Basin in areas identified with data gaps. Borehole geophysical logging at the new multi-completion nested monitoring well locations further improved the understanding of subsurface lithology to depths of 1,000 feet bgs.

5.1.2 Airborne Electromagnetic Surveys

As described in Section 2, New Information Collected, the CBGSA coordinated with DWR to conduct an Airborne Electromagnetic (AEM) survey. This survey was performed in August 2021 and involved scanning the Basin with helicopter-mounted geophysical equipment to measure electrical resistivity at depths of up to 1,500 feet bgs.

The AEM data were used to improve the design of the layering in the CBWRM Model, as well as model parameterization and calibration. Lithologic data gathered from well logs were correlated with the AEM data as well as general knowledge of the geology of the Basin from previous work by the USGS and others. Faults were also identified in the AEM data and were taken into consideration in refining model layering and hydraulic conductivity.

5.1.3 CBGSA Investigation of Russell and Santa Barbara Canyon Faults

As described in Section 2, New Information Collected, the CBGSA conducted a streamlined investigation of the Santa Barbara Canyon Fault in the southeastern portion of the Basin and the Russell Fault in the western portion of the Basin. The impact of these faults on groundwater flow has been speculated but not studied. The location of the Santa Barbara Canyon Fault was inferred by the USGS in 1970 based on local

differences in depth to groundwater in widely spaced wells. The location of the Russell Fault, on the other hand, has been mapped by numerous researchers. The investigation consisted of assessing multiple lines of evidence with surface geophysical surveys being the primary component.

The surface geophysical surveys were designed to evaluate the depth of the buried faults since both are reportedly inactive and buried by alluvium after movement ceased, the orientation and historic movement (i.e., normal, strike-slip, or thrust), the juxtaposition of formations with different water transmitting capacities resulting from past movement, and evidence of the presence of groundwater on both sides of the faults.

Results of the fault investigations provided a better understanding of the location and potential impact of the faults on groundwater flow in the vicinity of each fault. The investigations generated new data that showed the faults are not singular features but zones consisting of two or more faults. The inactive, buried Santa Barbara Canyon and Russell faults are apparently overprinted by younger thrust faults. The data provided by the fault investigation informed the updated of the CBWRM and will be incorporated into future updates to the groundwater model.

5.1.4 GDE Study

As described in Section 2, New Information Collected, the CBGSA conducted a groundwater dependent ecosystem (GDE) study within the Basin. A GDE is "ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface." Section 354.16(g) of the same regulations requires identification of GDEs in the Basin using data available from DWR, or the best available information. GDEs are not mentioned elsewhere in the emergency regulations. Because the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset includes a number of possible GDEs, DWR recommends the verification of NCCAG-identified locations by a licensed biologist.

DWR provided the NCCAG dataset through the SGMA data portal at https://gis.water.ca.gov/app/NCDatasetViewer/. The NCCAG dataset was compiled using a set of six pre-existing dataset sources and is explained in detail at: https://gis.water.ca.gov/app/NCDatasetViewer/sitedocs/#.

A wetlands biologist verified the NCCAG dataset using remote sensing techniques supported by in-person field verification. This work is documented in a Technical Memorandum (Appendix D) of the 2020 GSP. The analysis was performed by groupings, and the results of analysis at the groupings level is shown in the GSP. Analysis concluded that there were 123 probable GDEs and 275 probable non-GDEs in the Basin.

Since the GSP was adopted, the CBGSA has installed three new piezometers in the vicinity of GDEs to measure groundwater levels. These are shallow wells, which are often called piezometers. These wells include:

- Opti well 909 is completed to a depth of 90 feet bgs with a screen interval from 50-80 feet bgs.
- Opti well 910 is completed to a depth of 50 feet bgs with a screen interval from 25-45 feet bgs.

- Opti well 911 is completed to a depth of 45 feet bgs with a screen interval from 10-40 feet bgs.

These three new wells are used in conjunction with seven existing representative monitoring wells to monitor groundwater levels near GDEs. The representative monitoring wells near GDEs have minimum thresholds based on a GDE protection depth as described in Section 5.2.2 of the 2025 GSP Update.

The CBGSA now uses these 10 wells (three new wells and seven existing groundwater level representative monitoring wells) to monitor groundwater levels that help identify potential impacts to groundwater dependent ecosystems.

5.2 Groundwater Conditions

Below is a summary of the groundwater conditions and data presented and used in the 2025 GSP Update for each applicable sustainability indicator. Greater detail about groundwater conditions is provided in the 2025 GSP Update.

5.2.1 Groundwater Levels

Since 2020, the CBGSA has performed monitoring of groundwater levels on a quarterly basis through the development of its own monitoring network. This network is described in detail in Chapter 4 of the 2025 GSP Update. Data collection was begun in August 2020. Additional efforts have improved understanding of the wells in the monitoring network, including a well survey that was completed in 2021, which surveyed the latitude, longitude, and elevation of each monitoring network well. In addition, in October 2022, a well information survey was sent to all landowners in the Basin. Through this survey, landowners provided information on well ownership, location, and completion information (if available), well type (irrigation, residential, etc.), and well status (pumping vs not pumping).

Processing of these data has been refined as additional information on wells from landowners has been received. This information has been included in the public Opti data management system (DMS) for review by Cuyama Basin Stakeholders. In addition to collecting data on wells already identified during GSP development, the CBGSA has constructed three new piezometers near mapped GDE locations and new multi-completion nested monitoring wells at six locations using grant funding from DWR. In addition, DWR constructed three new multi-completion nested wells under its Technical Support Services program. These new wells are located in areas that were identified by the CBGSA as spatial data gaps in the 2020 GSP.

Much of the new information has provided a finer resolution to the data distribution across the Basin and has supported the assumptions and analysis performed by the CBGSA. Groundwater conditions have been reported quarterly since the adoption of the Original 2020 GSP and are available on the CBGSA website. Groundwater conditions have also been reported annually in the Basin's Annual Reports submitted to DWR.

To prepare the groundwater elevation contour maps in the 2020 GSP an inverse distance weighting (IDW) interpolation was conducted and then manually adjusted to conform with standard hydrogeology

practices. A new methodology was used in the 2025 GSP Update that interpolates groundwater elevations using a specialized algorithm to create a 'hydrologically connected' potentiometric surface through use of an ArcGIS Topo to Raster tool. This methodology better represents interpolated groundwater elevations as it helps to reduce depressions and variance in areas with limited data. The resulting interpolation and contours were then cropped within the bounding area based on available data using a concave hull. Some minor manual adjustments were applied at the Basin boundaries to reduce or remove contours in areas with sparse data. Contours greater than one mile away from any well were labeled as 'approximate.' Conceptual flowlines were added based on the interpolated groundwater elevation contours to represent generalized horizontal groundwater flow directions.

To visualize the depth to groundwater in the Basin and areas with localized drawdown, an IDW was used for interpolation of depth to water measurements. Resulting rasters and contours were then cropped using the same procedure described above.

The new methodology is an improvement over the original methodology because it does not rely on manual contouring except near Basin boundaries. Data can be processed following a set protocol, producing consistent results.

Analysts prepared groundwater contour maps for both groundwater elevation and depth to water for the following periods for the 2025 GSP Update:

- Spring 2024 *(included in this Periodic Evaluation below)*
- Fall 2022
- Fall 2020
- Spring 2018
- Fall 2017
- Spring 2017
- Spring 2015

These years were selected for display because they are representative of current conditions and seasonal patterns. The contour maps are described below.

Each contour map follows the same general format using a 100-foot contour interval, with contour elevations indicated in white numeric labels, and measurements at individual monitoring points indicated in black numeric labels. Areas where the contours are dashed and not colored between are inferred because the available data are spaced far apart and are included for reference only. The groundwater contours were also based on certain assumptions to accumulate enough data points to generate useful contour maps. Assumptions are as follows:

- Measurements from wells of different depths are representative of conditions at that location and there are no vertical gradients. Due to the limited spatial amount of monitoring points, data from wells of a wide variety of depths were used to generate the contours.

- Measurements from dates that may span up to three months are representative of conditions during the spring or fall season, and conditions have not changed substantially from the time of the earliest measurement used to the latest within that season.

These assumptions allow for the generation of contours that are useful at the planning level for understanding groundwater levels across the Basin, and to identify general horizontal gradients and regional groundwater level trends. The contour maps are not indicative of exact values across the Basin because the interpolated groundwater contours reflect approximate conditions between measurement points.

Figure 5-1 shows groundwater elevation contours for spring of 2024. In the southeastern portion of the Basin near the Ozena fire station, the groundwater gradient indicates flow that follows the Cuyama River. The contour map shows a steep gradient across the Santa Barbara Canyon Fault with groundwater flow to an area of lower groundwater elevations northeast of the town of Cuyama. From the town of New Cuyama to the west, the groundwater elevation contours reflect a gradient and flow to the north-northeast, from areas with higher land surface elevations towards areas with lower land surface elevations and towards the Cuyama River.

Figure 5-2 shows depth to groundwater contours for spring of 2024. South of the SBCF, depth to groundwater is about 100-200 feet bgs. North of the SBCF, depth to groundwater declines rapidly to over 600 feet bgs. Depth to groundwater is shallower to the west towards New Cuyama, where the depth is around 200-300 feet bgs. West of Bitter Creek, groundwater is shallower than 200 feet bgs in many locations and shallower than 100 feet bgs at some well locations.

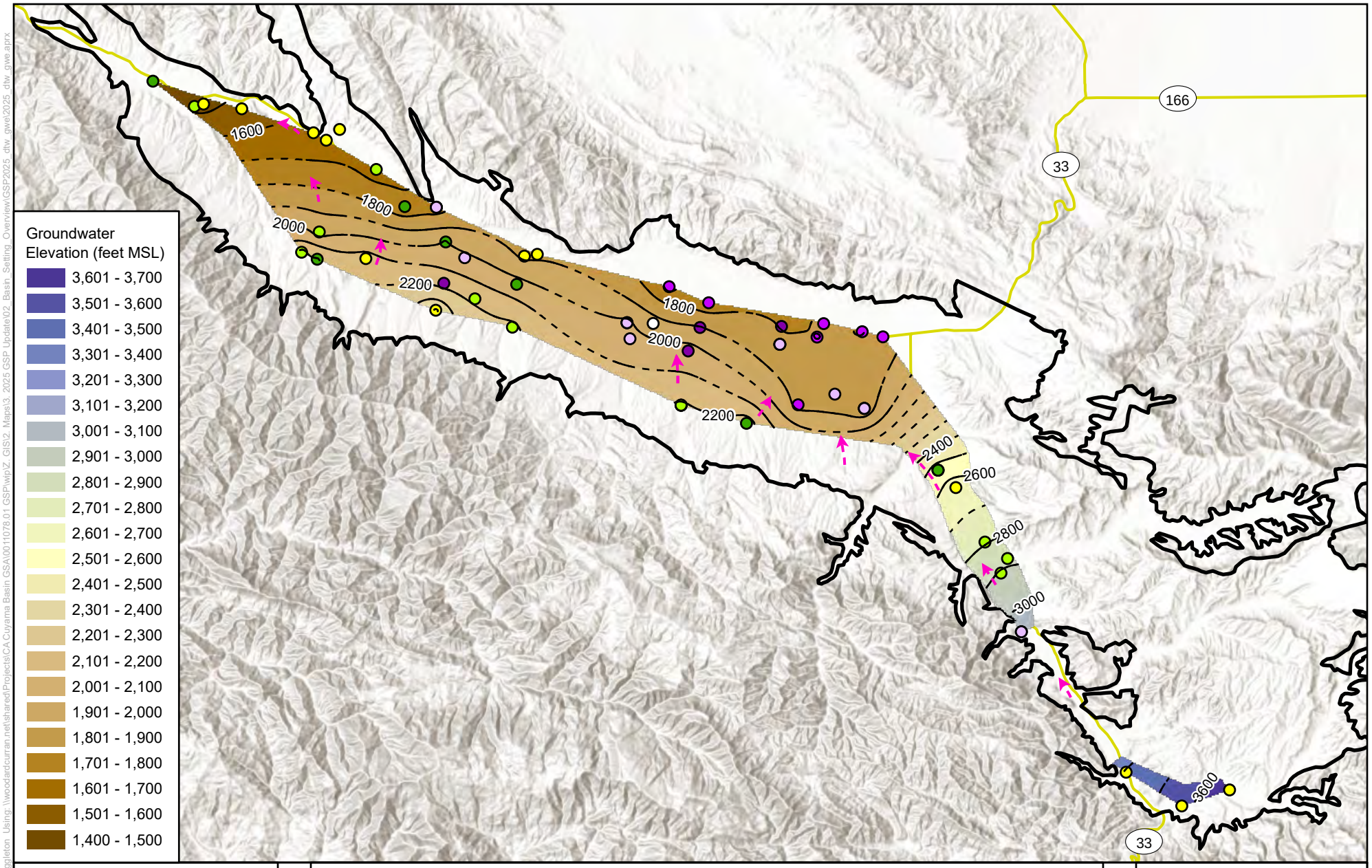

Figure **5-1**: Spring 2024 Groundwater Elevation

Cuyama Valley Groundwater Basin

Legend

Groundwater Elevation Contour
Approximate Contour
Conceptual Flowline
Highway
Cuyama Basin

Well Depth (feet)
Unknown
0 - 200
201 - 400
401 - 600
601 - 800
801 - 1000
1001 - 1200

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: July 2024

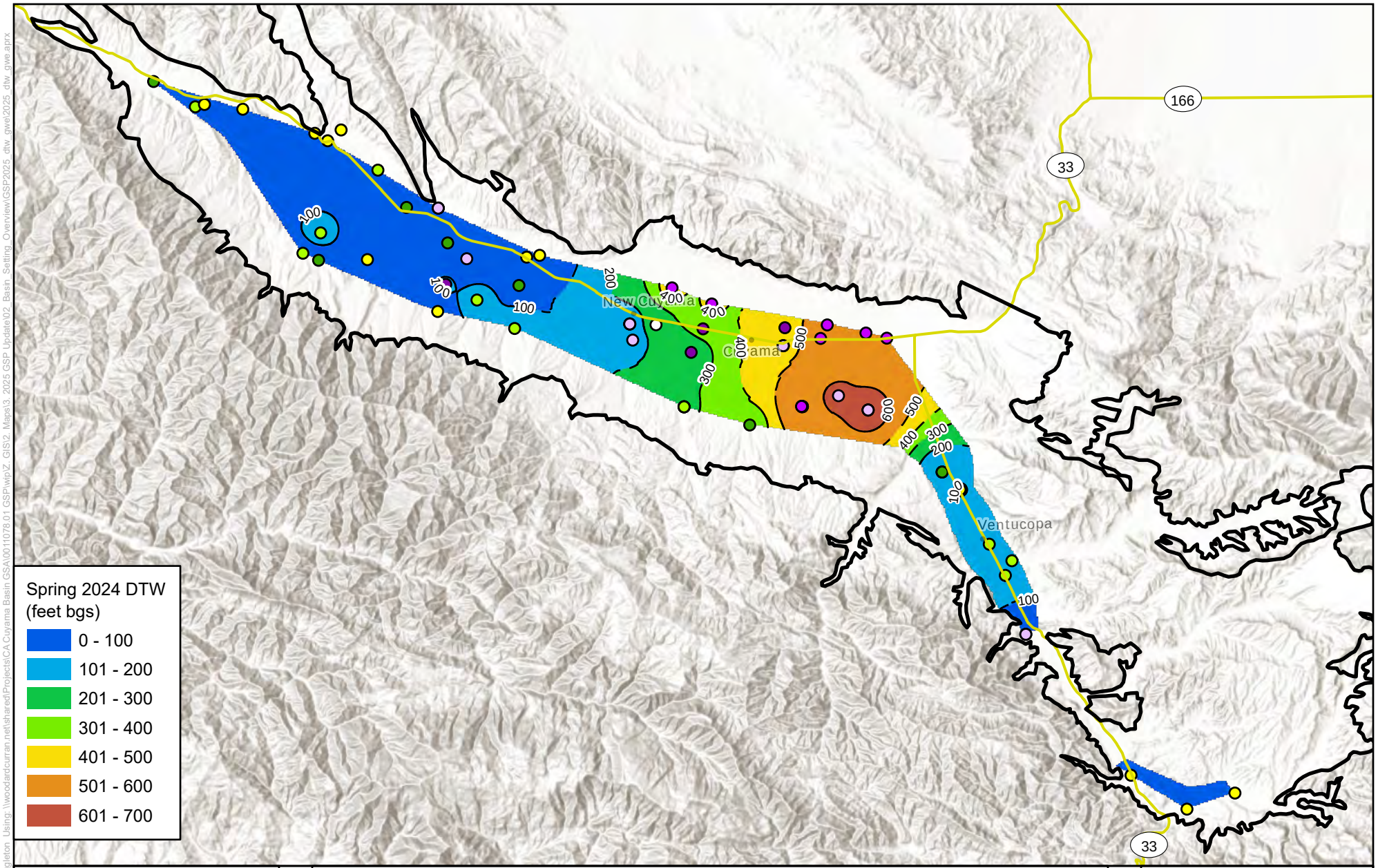

Figure **5-2**: Spring 2024 Depth to Water

Cuyama Valley Groundwater Basin

Legend

- Depth to Water Contour
- Approximate Contour
- Highway
- Local Road
- Town
- Cuyama Basin

Well Depth

- Unknown
- 0 - 200
- 201 - 400
- 401 - 600
- 601 - 800
- 801 - 1000
- 1001 - 1200

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: July 2024

5.2.2 Groundwater Storage

Historical changes in groundwater storage in the Basin have shown a consistent decline. Figure 5-3 shows changes in storage by year, water year type,[1] and cumulative water volume for the last 26 years. Change in storage was calculated using the Cuyama Basin Water Resources Model (CBWRM). Average annual depletion of groundwater storage over the 26-year period was -20,400 acre-feet per year. The color of the bar shown for each year of change in storage correlates with the water year type defined by Basin precipitation. Change in storage was negative in 23 of the 26 years, and was positive during three of the four wet years, as designated by the water year type.

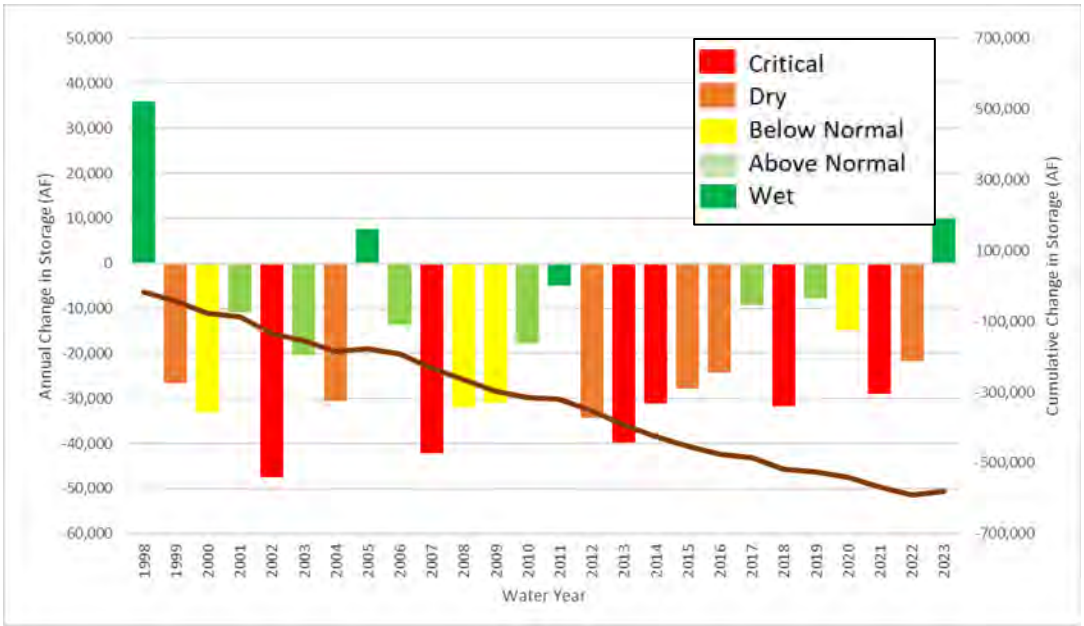

Figure 5-3: Cuyama Groundwater Storage by Year, Water Year Type, and Cumulative Water Volume

[1] Water year types are customized for the Basin watershed based on annual precipitation as follows:

- Wet year = more than 19.6 inches
- Above normal year = 13.1 to 19.6 inches
- Below normal year = 9.85 to 13.1 inches
- Dry year = 6.6 to 9.85 inches
- Critical year = less than 6.6 inches.

5.2.3 Land Subsidence

In 2015, the United Stats Geologic Survey (USGS) measured land subsidence as part of its technical analysis of the Cuyama Valley. The USGS used two continuous global positioning systems (GPS) sites and five reference point InSAR sites. There are 308 monthly observations from 2000 to 2012, and total subsidence during this period ranged from 0.0 to 0.4 feet. The USGS simulated subsidence using the CUVHM and estimated that inelastic subsidence began in the late 1970s[1].

Subsidence data were collected from the University NAVSTAR Consortium (UNAVCO) database. UNAVCO maintains data on five GPS monitoring stations in and around the Basin. Three stations (P521, OZST, and BCWR) are located just outside the Basin. The three stations' measurements show ground surface level as either staying constant or slightly increasing. The increase is potentially due to tectonic activity in the region. Two stations (VCST and CUHS) are located within the Basin. Station VCST is located near Ventucopa and indicates that subsidence is not occurring in the area. Station CUHS in New Cuyama indicates that 339 millimeters (approximately 1.1 feet) of subsidence have occurred in the area over the 25-year monitoring period (1999 - 2023). The subsidence at this station increases in magnitude following 2010, and generally follows a seasonal pattern. The seasonal pattern is possibly related to water level drawdowns during the summer, and elastic rebound occurring during winter periods.

In the fall of 2024, an investigation was completed of the Cuyama Valley High School (CUHS) station. This station is currently operated and maintained by the USGS. An onsite inspection was performed and USGS staff were contacted to investigate the construction and short term and seasonal fluctuations in the displacement components. The USGS reported that the data are regularly reviewed and no data quality issues had been identified. The site inspection did not identify any potential issues. It was concluded that the longer-term subsidence is occurring consistent with groundwater pumping and drought. Seasonal fluctuations are likely due to rainfall and possibly by the absence of a bedrock anchor that may allow the station to move up and down on a titled axis.

5.2.4 Groundwater Quality

Groundwater quality data were collected and compiled during development of the 2020 GSP from the following sources:

- USGS National Water Quality Monitoring Council. Downloaded data on June 1, 2018, from https://www.waterqualitydata.us/portal/
- DWR GeoTracker California Groundwater Ambient Monitoring and Assessment (GAMA) Program. Downloaded data on June 5, 2018 for each county, from http://geotracker.waterboards.ca.gov/gama/datadownload

[1] United States Geological Survey (USGS). 2015. Hydrologic Models and Analysis of Water Availability in Cuyama Valley, California. https://pubs.usgs.gov/sir/2014/5150/pdf/sir2014-5150.pdf. Accessed June 4, 2018.

- DWR California Natural Resources Agency data. Downloaded on June 14, 2018, from https://data.cnra.ca.gov/dataset/periodic-groundwater-level-measurements
- County of Ventura
- Private landowners

In addition to accessing the public portals for each program, CBGSA staff coordinated with the Central Coast Regional Water Quality Control Board (RWQCB) staff to ensure that all publicly available data was collected. It was confirmed by RWQCB staff that all available data for the Irrigated Lands Program (ILP) program was included in the online GAMA data portal download. Some of these public portals have overlapping data that, where possible, were removed, to develop a comprehensive data set for the Basin. Data were then compiled into a database for analysis.

Analysts also compiled references containing groundwater quality information. The information included in these references was used to enhance understanding of groundwater quality conditions beyond the data obtained from the sources listed above. These references included the following:

- Singer and Swarzensky. 1970. *Pumpage and Ground-Water Storage Depletion in Cuyama Valley, 1947-1966.* This report focuses on groundwater depletion, but also includes information about groundwater quality.
- USGS. 2008 *Groundwater-Quality Data in the South Coast Interior Basins Study Unit, 2008: Results from the California Groundwater Ambient Monitoring and Assessment (GAMA) Program*. This study summarizes water quality testing on 12 wells in the Cuyama Valley; wells were tested for a variety of constituents.
- SBCWA. 2011. *Santa Barbara County 2011 Groundwater Report.* This report provides groundwater conditions from throughout the county and provides water quality information for the Cuyama Valley.
- USGS. 2013c. *Geology, Water-Quality, Hydrology, and Geomechanics of the Cuyama Valley Groundwater Basin, California, 2008-12*. This report investigates a wide variety of groundwater conditions in the Cuyama Valley, including water quality.

Since the GSP adoption, the CBGSA has started collecting its own water quality data through the development of a water quality monitoring network. The CBGSA conducts its own sampling for TDS annually and samples for nitrate and arsenic once every five years. In the interim years, the CBGSA leverages existing monitoring programs for nitrate and arsenic data. These data are obtained from the GAMA database, which includes data from the RWQCB's ILP for nitrate.

Figure 5-4 shows TDS measurements from the water quality monitoring network sampled by the CBGSA in 2023. TDS ranges from less than 500 milligrams per liter (mg/L) in the eastern part of the Basin to over 1,700 mg/L in the central part of the Basin, where most of the agricultural production is located.

Figure 5-5 shows nitrate concentrations from 2022 and 2023 from the CBGSA monitoring network and results from the GAMA database. Nitrate concentrations over the MCL occur in the central part of the basin where most of the agricultural production is located.

Figure 5-6 shows arsenic concentrations from 2022 and 2023 from CBGSA monitoring network and results from the GAMA database. All wells with arsenic concentrations exceeding MCLs are located in the central portion of the Basin. High arsenic concentrations occur south of New Cuyama near the existing Cuyama Community Services District (CCSD) well. This issue is being mitigated by the construction of a replacement well for the CCSD, which is included as a project in the GSP (see Chapter 7).

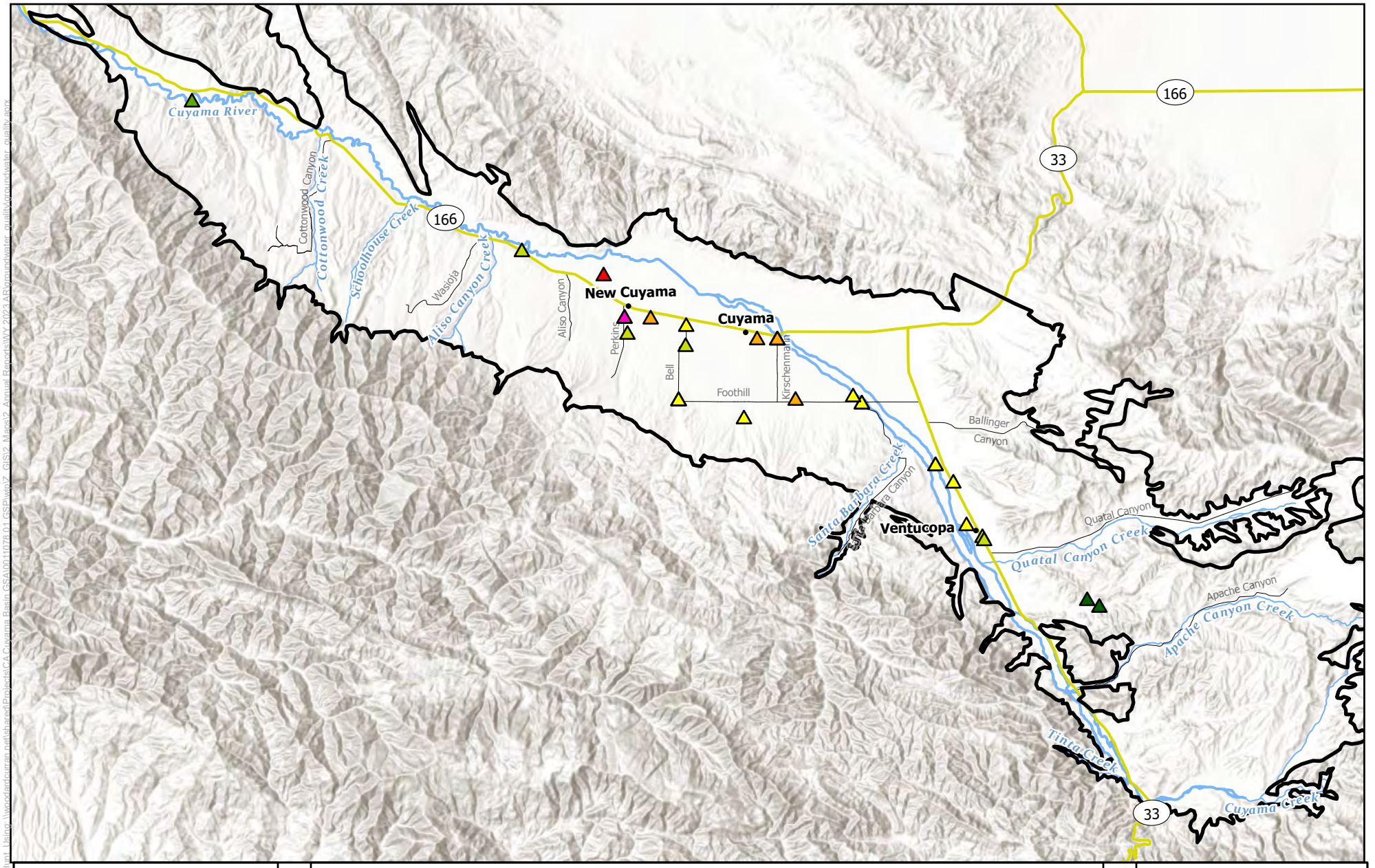

Figure 5-4: Groundwater Quality Measurements - TDS

2023 Data

Cuyama Valley Groundwater Basin

Legend

- < 500 mg/L
- 501 - 750 mg/L
- 751 - 1,000 mg/L
- 1,001 - 1,250 mg/L
- 1,251 - 1,500 mg/L
- 1,501 - 1,750 mg/L
- 1,751 - 2,000 mg/L
- 2,001 - 2,250 mg/L
- Highway
- Local Road
- Town
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: March 2024

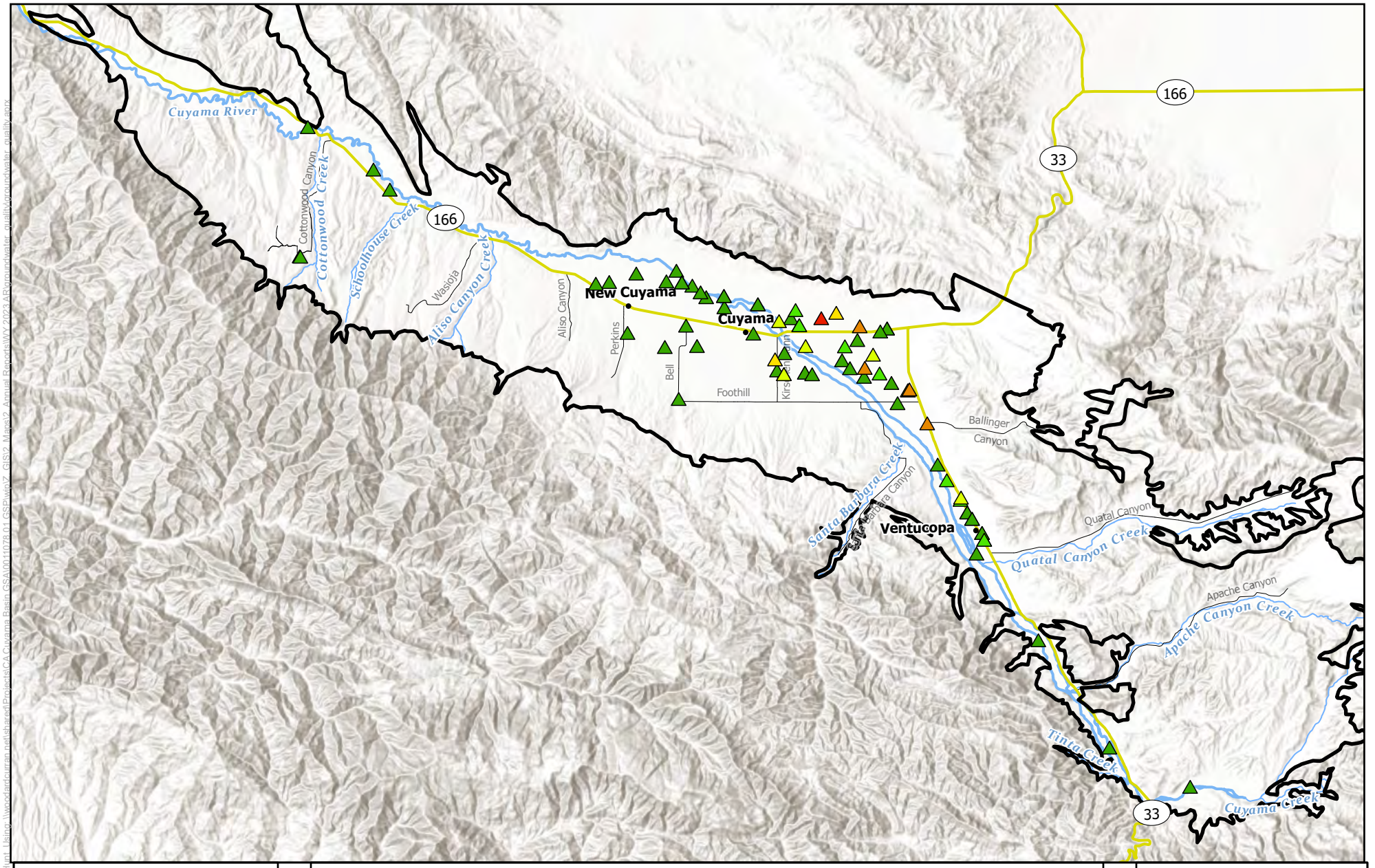

Figure 5-5: Groundwater Quality Measurements - Nitrate

Years 2022 and 2023

Cuyama Valley Groundwater Basin

Legend

- < 5 mg/L
- 5 - 8 mg/L
- 8 - 10 mg/L
- 10 - 15 mg/L
- 15 - 20 mg/L
- > 20 mg/L
- Highway
- Local Road
- Town
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: April 2024

*Values from monitoring wells with multiple observations were averaged with respect to year sampled. **Nested well at this location.

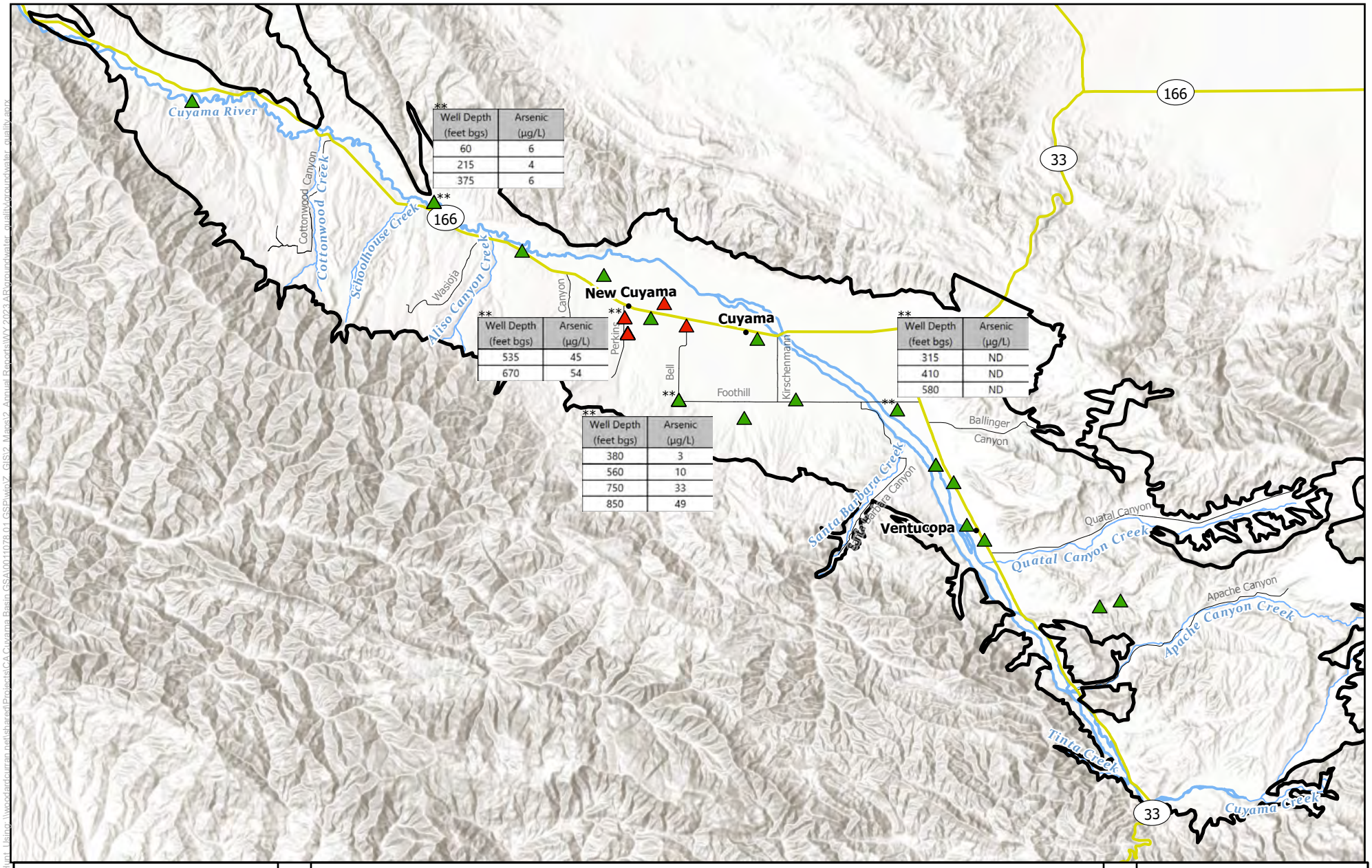

Figure 5-6: Groundwater Quality Measurements - Arsenic

Years 2022 and 2023

Cuyama Valley Groundwater Basin

Legend

- < 5 µg/L
- 5 - 8 µg/L
- 8 - 10 µg/L
- 10 - 15 µg/L
- 15 - 20 µg/L
- > 20 µg/L
- Highway
- Local Road
- Town
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: April 2024

*Values from monitoring wells with multiple observations were averaged with respect to year sampled. **Nested well at this location.

5.2.5 Interconnected Surface Waters

At the time of production of the 2025 GSP Update, DWR continues (as of early October 2024) to develop technical papers and eventually guidance documents to assist GSAs in addressing the interconnected surface waters sustainability indicator. The first technical paper, *Depletions of ISW: An Introduction,* was published in February of 2024. Paper 2, *Techniques for Estimating ISW Depletion Caused by Groundwater Use*, and Paper 3, *Examples for Estimating ISW Depletion Caused by Groundwater Use*, were published in September of 2024. Paper 4, *Guidance for Establishing SMCs for Depletions of ISW*, is expected sometime in 2025.

The 2022 GSP uses groundwater levels as a proxy for interconnected surface waters. The 2022 GSP specifies that only a subset of wells, selected based on specific criteria, are used to monitor areas with potential interconnected surface waters. The 2025 GSP Update includes this same subset of groundwater level monitoring wells, with thresholds that incorporate protection for interconnected surface waters and beneficial uses and users such as GDEs. The CBGSA will reassess the monitoring network and sustainability criteria for interconnected surface water once Paper 4 is released.

The technical papers released by DWR for the estimation of ISW depletion were not available in time to be used in the 2025 GSP Update. Therefore, the GSP includes the same information that was included in the 2022 GSP, which is described below. The CBGSA will reassess the estimation of ISW depletion using the approaches contained in the DWR technical papers in future years. The 2022 GSP utilized the CBWRM to analyze interactions between surface water flows and groundwater in the Basin. Surface water flows in the model were assigned to reaches with five on the Cuyama River and four in creeks that are tributaries to the river (i.e., Reach 1 to Reach 9):

1. **Reach 1 – Alamo Creek:** This reach was gaining in each year analyzed, with an average gain of 380 AF per year. The highest gain of 692 AF was in 1998, and the lowest gain was 192 AF in 2016.
2. **Reach 2 – Cuyama River, from edge of basin to Alamo Creek**: This reach was losing in each year analyzed, with an average loss of 26 AF. The smallest loss was 1 AF in 2007, and the largest loss was -109 AF in 2005.
3. **Reach 3 – Cuyama River from Alamo Creek, to Quatal Canyon Creek:** This reach was mostly gaining in each year and lost in one year. The average of gains and losses was a gain of 931 AF. The highest gain of 2,781 was in 1998, and the loss of 300 AF occurred in 2017.
4. **Reach 4 – Quatal Canyon Creek:** This reach was losing in each year analyzed, with an average loss of 83 AF. The smallest loss was 1 AF in 2007, and the largest loss was -347 AF in 1998.
5. **Reach 5 – Cuyama River from Quatal Canyon Creek to Santa Barbara Canyon Creek:** This reach was losing in each year analyzed, with an average loss of 926 AF. The smallest loss was 180 AF in 2013, and the largest loss was 2,394 AF in 2005.
6. **Reach 6 – Santa Barbara Canyon Creek:** This reach was gaining in each year analyzed, with an average gain of 95 AF per year. The highest gain of 222 AF was in 1999, and the lowest gain was 222 AF in 2016.

7. **Reach 7 – Cuyama River from Santa Barbara Canyon Creek to Schoolhouse Canyon Creek:** This reach was losing in each year analyzed, with an average loss of 5,218 AF. The smallest loss was 797 AF in 2013, and the largest loss was 16,472 AF in 1998
8. **Reach 8 – Schoolhouse Canyon Creek:** This reach was gaining in each year analyzed, with an average gain of 175 AF/year. The highest gain of 249 AF was in 1998, and the lowest gain was 134 AF in 2017.
9. **Reach 9 – Cuyama River west of Schoolhouse Canyon Creek:** This reach was gaining in each year analyzed, with an average gain of 1,333 AF/year. The highest gain of 2,743 AF was in 1998, and the lowest gain was 750 AF in 2015.

5.3 Water Use Changes and Associated Water Budget

Groundwater and surface water use in the Basin has been relatively consistent since the adoption of the 2020 GSP. Primary groundwater use is for agricultural purposes, with a small amount for domestic use. Surface water users include deep percolation (from irrigation and precipitation), runoff, native vegetation, and agriculture. There were no changes to surface water supplies or their reliability since the adoption of the 2020 GSP, although surface water supply numbers have been updated through the model calibration reflecting new data.

Similarly, land use in the Basin has been relatively consistent since the adoption of the 2020 GSP. The 2025 GSP Update includes land use maps for years 1996, 2000, 2003, 2006, 2009, 2012, 2014, 2016, 2018, 2020, 2022, and 2023. The 1996 land use data are from historical DWR county land use surveys while the 2014 through 2022 land use data were developed for DWR using remote sensing data. Data for the remaining years were developed by the CBGSA using the same remote sensing method that DWR used for 2014 through 2022. Agricultural land is located primarily in the New Cuyama and Ventucopa areas, and along the SR 166 and SR 33 corridors between those communities. There were about 34,000 acres of irrigated land in 2023, including about 19,000 acres of idle land. There is a regular rotation of crops with between 9,000 and 19,000 acres of agricultural area left idle each year between 2000 and 2023. Areas that are in active agricultural use primarily produce miscellaneous truck crops, carrots, potatoes and sweet potatoes, miscellaneous grains and hay, and grapes. Various other crop types are produced in the Basin as well, such as fruit and nut trees, though at smaller production scales.

In addition to the crop types shown on the maps, much of the land area in the Basin, particularly in the western and eastern areas, consists of non-irrigated pasture. These are not present on the map because they are not detected by the remote sensing approach. Some recently planted crops may also not be shown on the maps because they were either not detected by the remote sensing approach or were planted subsequent to the most recently mapped year. As data becomes available, these additional land uses will be accounted for in the numerical modeling used to develop water budgets for the GSP.

Since groundwater pumping allocations began in 2023, there have been gradual declines in groundwater pumping within the Central Management Area (CMA) as scheduled in the pumping reductions glidepath (Figure 5-7). This reduction, paired with a wet water year in 2023, caused a small increase in storage for WY 2023 (Figure 5-3).

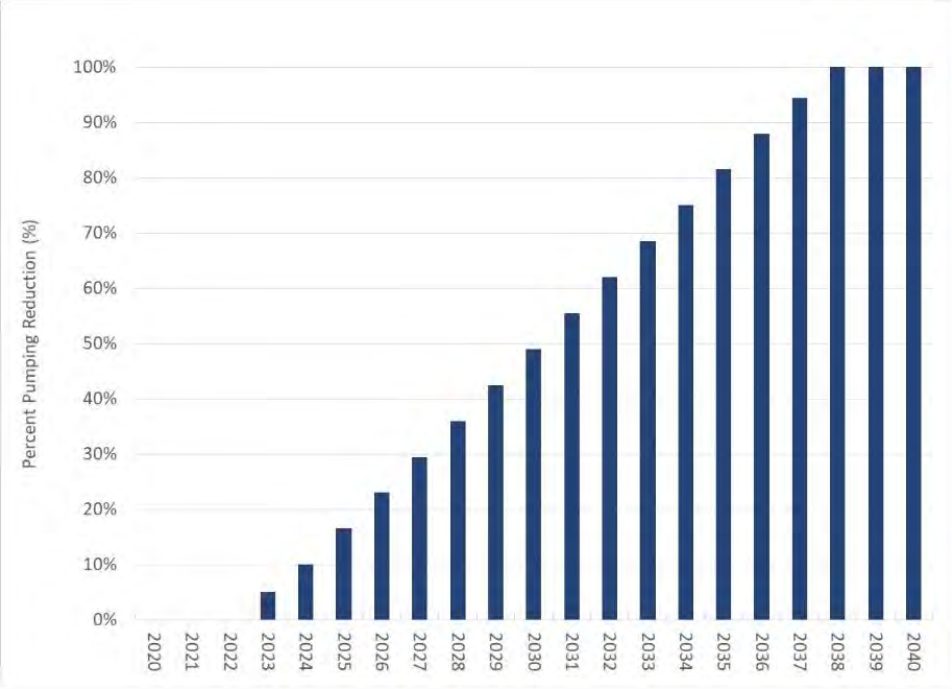

Figure 5-7: Glide Path for Central Management Area Groundwater Pumping Reductions

The CBWRM was updated and re-calibrated in 2024, a process which was able to utilize the first two years of metered groundwater pumping data. This calibration and update, along with extending the "current period" used in the model to extend through 2023, resulted in a reduction in the modeled pumping estimate of about 20,000 AFY compared to previously reported values, with a corresponding reduction in the long-term storage reduction estimate of approximately 14,000 AFY. The updated model results for the historical, current and projected, and projected with climate change conditions are presented in Table 5-1 below. These updated estimates better reflect the metered data that was collected in 2022 and 2023 as compared to previous estimates. The updated sustainable yield estimate for current and projected conditions with planned pumping reduction is now 16,800 AFY which is a 60% reduction compared to baseline pumping.

Table 5-1: Average Annual Groundwater Budget

Component	Historical Water Volume[a] (AFY)	Current and Projected Water Volume[b] (AFY)	Projected Water Volume with Climate Change[b] (AFY)
Inflows			
Deep percolation	19,000	16,700	16,800
Stream seepage	4,000	5,400	6,000
Subsurface inflow	2,800	2,800	3,200
Total Inflow	**25,800**	**24,900**	**26,000**
Outflows			
Groundwater pumping	46,200	42,400	46,000
Total Outflow	**46,200**	**42,400**	**46,000**
Change in Storage	**(20,400)**	**(17,500)**	**(20,000)**

Notes:
AFY = acre-feet per year
[a]From water years 1998 to 2023
[b]Based on 50-year hydrology

5.4 Model Updates

As described above in Section 2.10, the CBWRM has been updated multiple times during the period between submittal of the 2020 GSP and the 2025 GSP Update. The first version of CBWRM, v0.10, was originally developed to develop water budget and sustainability estimates for the 2020 GSP and was used for the 2020 and 2021 GSP Annual Reports. Additionally, it helped inform areas within the Basin that would benefit from additional monitoring data, which eventually was used in the initial siting of the new monitoring wells installed described above in Section 2.4 above. In July 2022, the CBWRM was updated to version 0.20, which incorporated the updated data available by that time. This version was used for the 2022 and 2023 GSP Annual Reports and the development of Central Management Area allocation tables for 2023 and 2024. Recently, in July 2024, the CBWRM was upgraded with significantly more data and recalibrated to support the preparation of the 2025 GSP 5-year evaluation. The updated model used for the 2025 GSP Update was developed based on the best available data and information as of September 2023.

This version of the model includes substantial data changes compared to the version that was released in 2020, reflecting additional data and information that was not available at that time. The data changes include the following:

- Updated geologic representation developed using:

    - The results of a fault investigation conducted by the CBGSA for the Santa Barbara Canyon and Russell faults
    - Airborne Electromagnetic (AEM) survey data collected by the California Department of Water Resources
    - Well log data from new monitoring wells installed in the Basin
- Updated pumping well locations using data provided by landowner surveys
- Updated land use using data and designations of non-irrigated land areas based on in information provided by landowners
- Updated evapotranspiration estimates calibrated to better match metered reporting data provided by landowners for 2022 and 2023
- Calibration period extended to incorporate groundwater level measurements taken by the GSA's monitoring program up through WY 2023

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 described in this section.

6. MONITORING NETWORK

This section discusses and assesses the monitoring networks established in the revised 2022 GSP and changes made to the monitoring network during the evaluation cycle. Section 4 of the 2025 GSP describes the changes to the monitoring network for each applicable sustainability indicator and identifies any additional data gaps.

6.1 Groundwater Level Representative Network Changes

During the implementation period since the GSP adoption in 2020, the CBGSA has continued refining and improving the groundwater monitoring network within the Basin. Based on the information gathered to date, the CBGSA determined at its January 2021 Board meeting to reduce the monitoring network to eliminate spatially redundant wells from the network. This revised the monitoring network to 62 wells at 50 locations, including six multi-completion wells. These included nine new wells at three multi-completion well locations installed as part of DWR's Technical Support Services (TSS) program. The refinement of the monitoring network decreased the spatial density to 16.4 wells per 100 square miles, still greater than the recommended threshold of 0.2-10 wells per 100 square miles. This monitoring network refinement is documented in the Annual Report for the 2019-2020 Water Year[1].

To refine the monitoring network for the 2025 GSP Update, the CBGSA performed a comprehensive review of the groundwater levels network and the monitoring program for all representative and non-representative wells. The review included identification of field sampling issues and other issues for each well, such as:

- A lack of landowner agreement for monitoring
- Access issues due to issues at the well site
- Environmental access issues (such as due to winter flooding)
- Long term trends (such as the well going dry within the implementation period)
- Active vs. inactive well status
- Magnitude of pumping for active wells
- Proximity of nearby wells

The review concluded that all issues related to onsite access and weather at the wellsite were temporary and did not preclude the well from continued inclusion in the monitoring network. In addition, no wells were identified for removal due to redundancy. However, there were three wells (98, 121, and 124) where the GSA was unable to obtain an access agreement with the landowner; therefore, these three wells have been removed from the monitoring network. Furthermore, monitoring wells that have been identified as

[1] https://cuyamabasin.org/assets/pdf/WY-2019-20-Cuyama_GSP_Annual_Report_Compiled.pdf

active pumping wells are recommended for long-term replacement; this is discussed in the data gaps section below.

In addition, the CBGSA has worked to address the spatial gaps identified in the 2020 GSP. The CBGSA used funding available from a SGMA implementation grant agreement with DWR to install three piezometers in the vicinity of groundwater dependent ecosystems (GDEs) as well as multi-completion wells at six other locations within the Basin. The multi-completion wells have 2 to 3 completions at each location. Two existing wells have also been provided to the CBGSA by landowners for monitoring and have been added to the groundwater levels monitoring network. These additional wells fill many of the data gaps identified in the 2020 GSP.

The revised groundwater level representative monitoring network is presented in Figure 6-1.

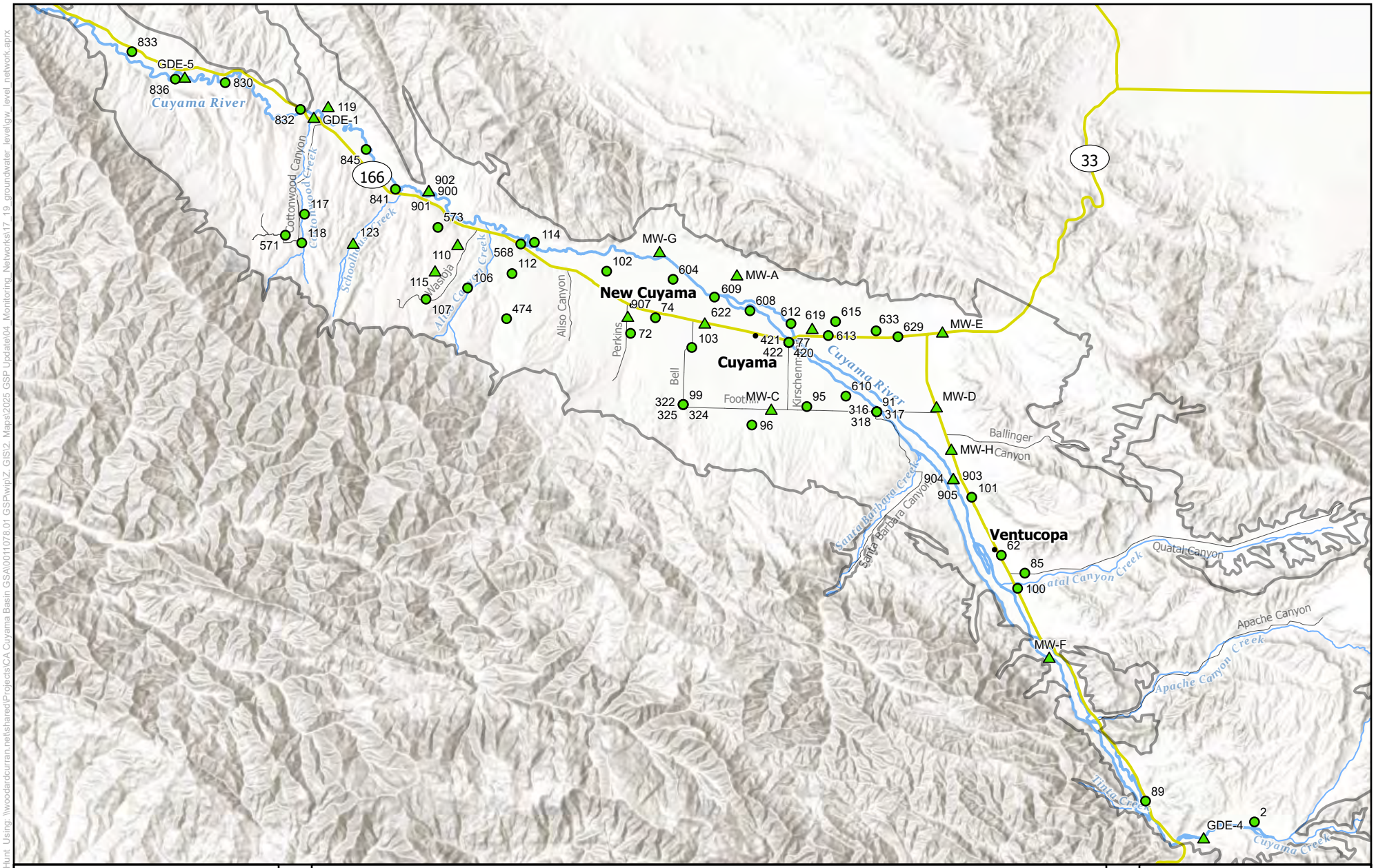

Figure 6-1: Updated Groundwater Level Monitoring Network

Cuyama Valley Groundwater Basin

Legend

Network Well
- Representative Monitoring
- Non-representative Monitoring

Highway
Local Road
Town
Cuyama River
Creek
Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: December 2023

Figure Exported: 12/27/2023 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\2025 GSP Update\04. Monitoring_Networks\17_19_groundwater_levelgw_level_network.aprx

The 2020 GSP identified data gaps in the groundwater level monitoring network. As noted above, the CBGSA has installed new wells to address many of these data gaps using funding from DWR's TSS and SGMA grant programs. These new wells have filled all of the spatial data gaps identified in the 2020 GSP. However, there continue to be some data gaps that should be addressed by the CBGSA in the future:

- Several wells that are currently included in the monitoring network are active pumping wells, some of which are used for a significant level of pumping each year; these wells should be replaced with dedicated monitoring wells.
- Well construction information is not available for many wells in the Basin. Monitoring wells with construction information featuring total depth and screened interval are preferred for inclusion in the monitoring network, because that information is useful in understanding what monitoring measurements mean in terms of Basin conditions at different depths.

To fill these data gaps the GSA has identified the following activities:

- Seek additional grant funding to install monitoring wells to replace active pumping wells that are currently included in the monitoring network. Alternatively, transducers could be installed in these wells to better understand the temporal effects of pumping on groundwater levels.
- Apply for additional assistance from DWR's Technical Support Services (TSS), which provides support to GSAs as they develop GSPs. TSS opportunities include help installing new monitoring wells, and downhole video logging services.
- Improve understanding of well construction information through digital entry of data from well completion reports into the data management system.

6.2 Groundwater Storage Monitoring Network Changes

Groundwater in storage is monitored through the measurement of groundwater levels as a proxy. Therefore, the groundwater storage monitoring network will use the groundwater level monitoring network.

6.3 Seawater Intrusion Monitoring Network Changes

The Basin is geographically and geologically isolated from the Pacific Ocean and any other large source of saline water. As a result, the Basin is not at risk for seawater intrusion. Salinity (i.e., total dissolved solids, or TDS) is monitored as part of the groundwater quality network, but seawater intrusion is not a concern for the Basin.

6.4 Groundwater Quality Monitoring Network Changes

Salinity (measured as TDS), arsenic, and nitrates have all been identified by local stakeholders as potentially being of concern for water quality in the Basin. However, in contrast to salinity, there is no evidence to suggest a causal nexus between potential actions under the CBGSA's authority and arsenic or nitrates. Therefore, the groundwater quality network in the Cuyama Basin only monitors TDS.

The original groundwater quality network consisted of 64 wells compiled from several different monitoring programs and has been used to collect several years of sampling data. For the 2025 GSP, a comprehensive review was conducted on the monitoring network with respect to the following issues:

- A lack of landowner agreement for monitoring
- Access issues due to issues at the well site
- Environmental access issues (such as due to winter flooding)
- Long term trends (such as the well going dry within the implementation period)
- Magnitude of pumping for active wells
- Proximity of nearby wells

Based on this analysis, 32 wells were removed from the network; in most cases because the CBGSA had been unable to secure an agreement with the landowner. In November of 2023, the CBGSA Board approved a revised monitoring network, which will include 58 wells, 27 of which are representative wells. This includes nine new TSS wells that were installed under the DWR's Technical Support Services (TSS) program and will be equipped by DWR with permeant transducers to provide electroconductivity measurements for TDS. In addition, new monitoring wells are currently being installed at 10 locations using grant funding from DWR with 1-3 completions per well. These wells will also be equipped with transducers and be included in the TDS water quality network as non-representative wells.

The revised groundwater level representative monitoring network is presented in Figure 6-2.

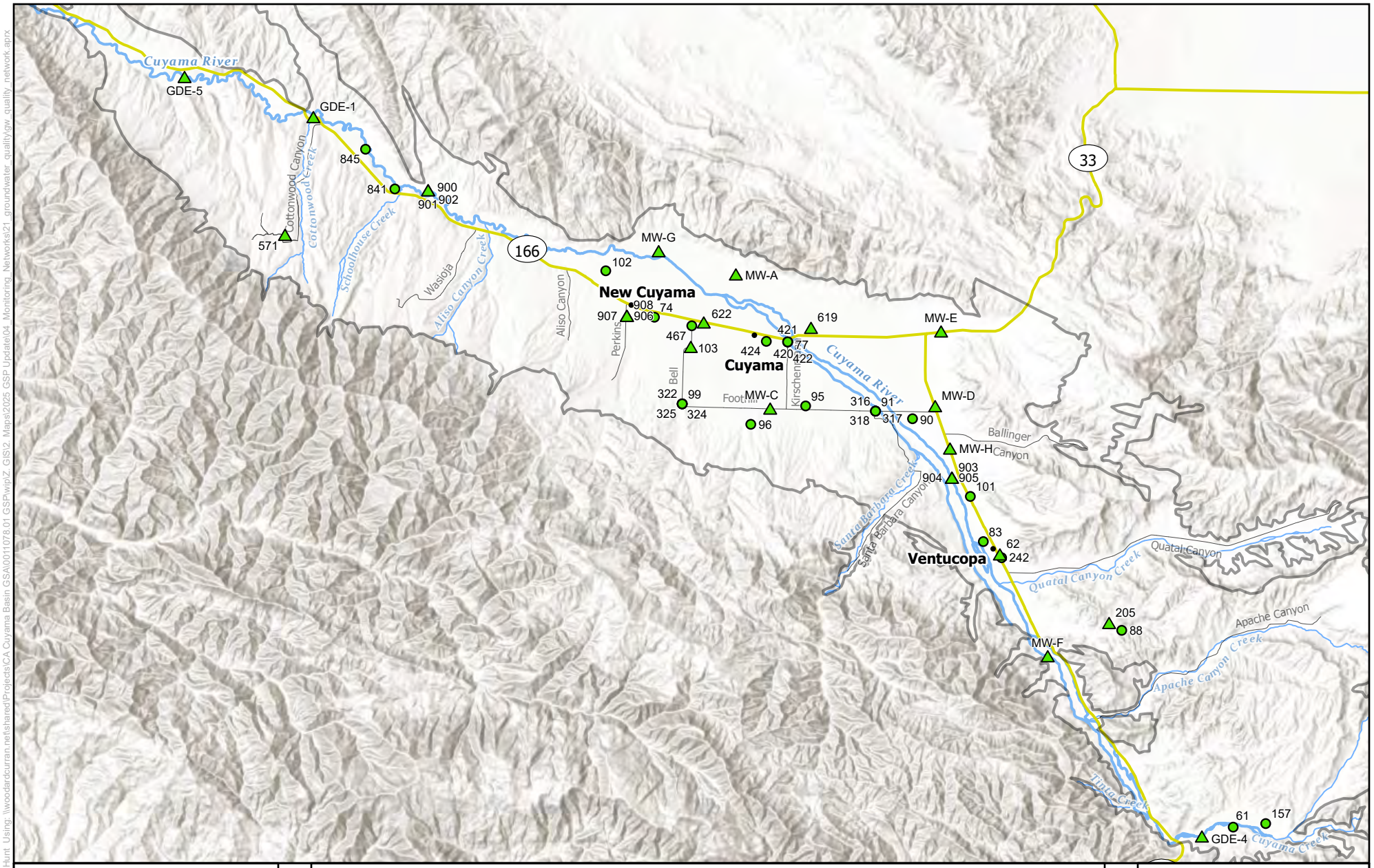

Figure 6-2: Updated Groundwater Quality Monitoring Network

Cuyama Valley Groundwater Basin

Legend

Network Well
- Representative Monitoring
- Non-representative Monitoring

Highway
Local Road
Town
Cuyama River
Creek
Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: December 2023

Figure Exported: 12/27/2023 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\2025 GSP Update\04. Monitoring_Networks\21_groundwater_quality\gw_quality_network.aprx

In the 2020 GSP, the CBGSA identified groundwater quality monitoring data gaps:

- Spatial distribution of the wells
- Well/measurement depths for three-dimensional constituent mapping
- Temporal sampling

With the addition of new wells installed through DWR's TSS program and with grant funding, the spatial distribution of the groundwater quality monitoring network now provides coverage of all of the spatial data gaps that were identified in the 2020 GSP.

With the newly constructed wells, there will now be multiple locations within the Basin that can provide water quality information at multiple depths. This will allow the monitoring network to collect additional information about how salinity may change at different depths in the aquifer. This information needs to be evaluated to determine if additional multi-completion wells will be required to adequately understand three-dimensional constituent mapping within the Basin.

Water quality sampling historically has been inconsistently performed throughout the Basin; as a result, the Basin itself was identified in the 2020 GSP as a groundwater quality monitoring temporal data gap. Since adoption of the GSP, the CBGSP has undertaken its own annual sampling effort, which addressed this previously identified data gap.

The CBGSA has filled the temporal and spatial data gaps identified in the 2020 GSP by implementing its own salinity sampling program and has filled the three-dimensional constituent mapping knowledge gap at least partially through installation of new multi-completion monitoring wells.

The CBGSA will evaluate the data collected by the monitoring program going forward to assess whether additional three-dimensional monitoring is needed. This includes an assessment of nitrate and arsenic data collected from GAMA and other data sources.

6.5 Land Subsidence Monitoring Network Changes

There have been no changes to the subsidence monitoring network. There are two subsidence monitoring stations in the Basin and three outside of the Basin. Figure 6-3 shows the locations of existing subsidence monitoring stations. The two stations in the Basin, sites CUHS and VCST, are both included in the monitoring network as representative sites because they are active and provide Basin-specific data. The three stations located outside of the Basin, sites P521, BCWR, and OZST, are also included in the monitoring network as non-representative sites. These stations are important for understanding general dynamic movement trends in the Basin because they detect tectonic movement in the Basin.

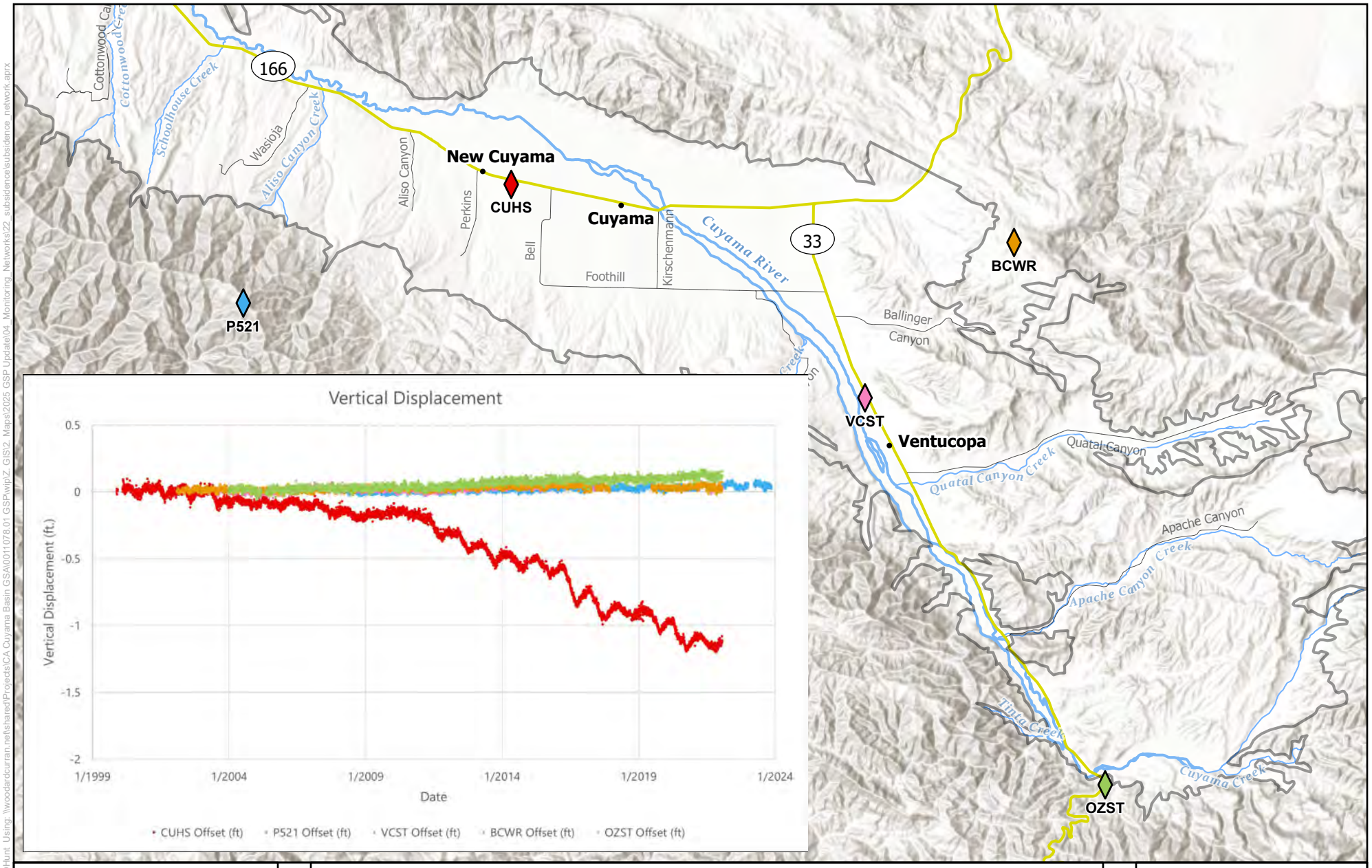

Figure Exported: 12/27/2023 By: DHunt Using: \\woodardcurran.net\shared\Projects\CA Cuyama Basin GSA\001078.01 GSP\wip\Z. GIS\2. Maps\2025 GSP Update\04. Monitoring_Networks\22_subsidence\subsidence_network.aprx

Figure 6-3: Subsidence Monitoring Network

Cuyama Valley Groundwater Basin

Legend

- Plate Boundary Observatory GPS Station
- Town
- Cuyama Basin
- Highway
- Cuyama River
- Local Road
- Creek

N

Woodard & Curran

0 1 2 4 Miles

Map Created: December 2023

Subsidence does not currently have any identified data gaps. While more stations could provide additional data on vertical changes in the Basin, current conditions do not indicate subsidence as being a sustainability indicator with negative impacts in the Basin. The 2025 GSP Update includes information about how new monitoring sites and types could be installed, but these are not needed at this time.

6.6 Depletions of Interconnected Surface Water Monitoring Network Changes

In February 2024, DWR published the first of several guidance documents on Interconnected Surface Water called *Depletions of ISW: An Introduction.* In September of 2024, DWR released Papers two and three of the series titled *Techniques for Estimating ISW Depletion Caused by Groundwater Use* and *Examples for Estimating ISW Depletion Caused by Groundwater Use* respectively. The fourth and final paper, *Guidance for Establishing SMCS for Depletions of ISW,* is anticipated during the winter of 2024/2025.

While the guidance documents provided to date of writing (Fall 2024) are helpful and have provided the CBGSA with helpful information and guidance on how to start management and monitoring of ISW, thresholds cannot yet be developed. The CBGSA will evaluate monitoring and management of ISW once all guidance documents have been provided, and plan to provide updates during the next GSP update.

The current subset of wells that are used to monitoring groundwater levels for areas of interconnected surface waters is shown in Figure 6-4.

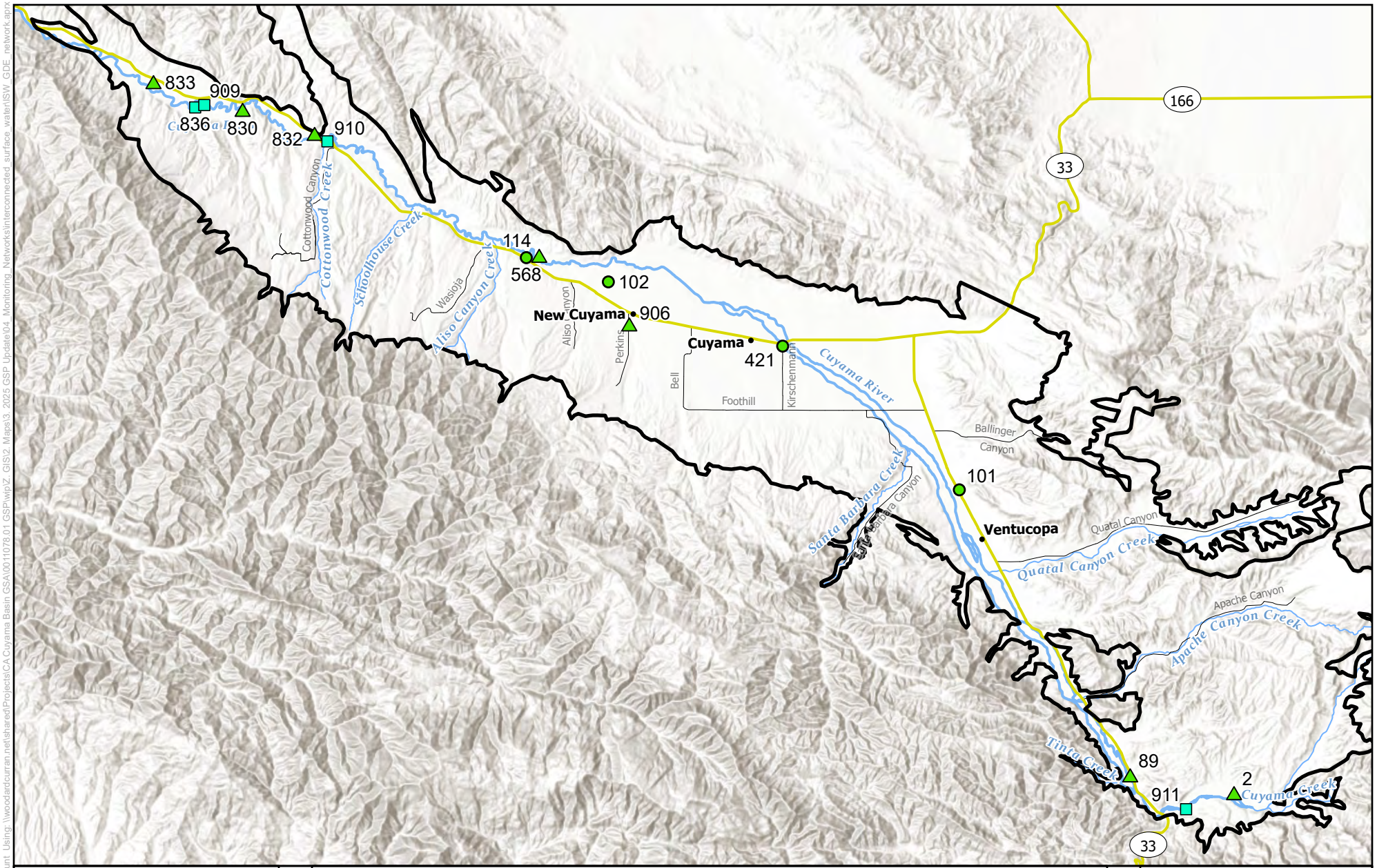

Figure 6-4: Interconnected Surface Water Monitoring Network

Cuyama Valley Groundwater Basin

Legend

- Representative Monitoring Well
- Non-representative Monitoring Well
- GDE Monitoring Well
- Highway
- Local Road
- Town
- Creek
- Cuyama River
- Cuyama Basin

N

Woodard & Curran

0 1.25 2.5 5 Miles

Map Created: August 2024

7. GSA AUTHORITIES AND ENFORCEMENT ACTIONS

7.1 Relevant Actions

The Cuyama GSA has initiated several actions through GSP implementation to support the Basin's continued effort towards groundwater sustainability. This has included compliance with new and evolving executive orders and legislation, programs to monitor and directly address overdraft, and participation in legal proceedings. The following subsections go into these activities in detail.

7.1.1 GSA Compliance with Executive Order N-7-22 Action 9, Drought Well Permitting Requirements

On March 28, 2022, Governor Gavin Newsom issued Executive Order N-7-22 (Executive Order) in response to ongoing drought conditions throughout the State. The Executive Order requires groundwater sustainability agencies (GSAs) in medium- and high-priority basins to evaluate and determine the impacts of new and replacement wells to the basin's sustainability goals prior to county approval of well permits.

The CBGSA, in compliance with EO N-7-22, established an application process including a *Replacement Well Form* and *New Well Form* to ensure that any new or replacement wells were in compliance with the executive order. The forms are posted to the CBGSA website and is still accessible.[1]

7.1.2 Pumping Allocations

On May 3, 2023, the Cuyama Basin Groundwater Sustainability Agency (CBGSA) approved the final 2023 and 2024 Central Management Area groundwater allocations. Allocations for 2025 through 2029 are currently under development. As part of this development, CBGSA provides each landowner within the Central Management Area with an opportunity to submit a Variance rebutting or otherwise challenging CBGSA's proposed allocation for said landowner. Generally, CBGSA conducts the Variance process as follows:

1. CBGSA publishes proposed Central Management Area groundwater allocations and provides notice of the opportunity to submit a Variance request.
2. CBGSA staff and relevant consultants review each submitted Variance request and develop a preliminary recommendation regarding how to address the requested Variance for consideration by an ad hoc committee of the CBGSA Board of Directors.
3. CBGSA staff then hold a meeting with an ad hoc committee of the CBGSA Board of Directors to explain CBGSA's staff's preliminary recommendation and answer any questions from the committee.

[1] https://www.cuyamabasin.org/assets/pdf/CBGSA-Well-Permit-Policy.pdf

4. CBGSA then provides each landowner who submitted a Variance request with an opportunity to meet with CBGSA staff and relevant consultants and the ad hoc committee to explain their request.
5. After this meeting, the ad hoc committee prepares its recommendation regarding how to address the requested Variance for consideration by the CBGSA Board of Directors. CBGSA publishes the ad hoc's recommendation to the public and invites each landowner who submitted a Variance request to address the CBGSA Board of Directors at its next regularly scheduled meeting.

To ensure allocations are met by landowners, CBGSA Board adopted the following administrative policy at the January 18, 2023, Board meeting:

1. The CBGSA will develop a water allocation for each parcel in the CMA and part of a "Farming Unit."
2. Each landowner/operator must submit monthly meter readings for the preceding year by January 31st according to the CBGSA meter reporting instructions (provided at www.cuyamabasin.org)
3. Each landowner must list the APNs the well served and how many acre-feet of water was used on each APN as listed in the water use reporting forms.
4. Staff will develop a water accounting to report at the March Board meeting to confirm annual pumping reduction goals are met for the net water use for landowners/operators.

7.1.3 Pumping Allocations Enforcement

On July 6, 2022, the CBGSA Board established a penalty fee and enforcement options for landowners who pump more than their allocation. If a landowner/farming unit does not meet their annual pumping reduction target (allocation), any and all over-pumped water will be debited against that landowner's allocation for the following year. Additional over-pumping will carry a tiered financial penalty as follows:

- Tier 1: 5 percent over pumping = $250/acre-foot
- Tier 2: >5 percent pumping = $500/acre-foot

These penalties fees for over-pumping will be invoiced in March and be due by May 1st of each year and any penalty fees collected will be used for projects in the CMA. If a landowner over-pumps 20% or more of his or her allocation in any given year, the CBGSA may consider legal action.

7.1.4 Well Metering

The CBGSA has utilized groundwater extraction fees to promote sustainable extraction volumes of groundwater from the Basin and help fund the implementation of the GSP. Since the GSP was adopted in January 2020, groundwater pumping volumes were calculated using evapotranspiration data from remote sensing to determine estimated water use on irrigated lands, as this was the only Basin wide method for data collection available at the time. During the November 4th, 2020, CBGSA Board meeting, a motion

was passed to require all non-de minimis groundwater users to install water measuring devices (flow meters) on all groundwater extraction wells no later than December 31, 2021.

Collection and reporting of well flow data are integral to enable proactive and adaptive management of groundwater resources and documentation of seasonal fluctuation in water demand. This data is more accurate than evapotranspiration estimates and will provide additional data for model calibration. In addition to providing an estimate of groundwater production, groundwater flow data may be used by the CBGSA in conjunction with groundwater level data to improve understanding of groundwater basin conditions. This is especially important for sustainable regional management of groundwater resources.

7.1.5 Actions to Identify Non-Reporters

On March 29, 2023, the CBGSA Board directed staff to consider enforcement options for potentially non-reporting pumpers. CBGSA developed the following process to identify potential non-reporting pumpers and while staff has successfully communicated with several previously non-reporting pumpers, additional outreach is required to confirm all pumpers have reported their water use since 2019.

The process to identify potential non-reporting pumpers includes the following:

1. Refine the existing analysis that compared irrigated lands cross-referenced with the parcels of reporting pumpers with 1) Land IQ 2022 water use data and 2) reported 2022 water use.
2. Land IQ to assist in quality assurance/quality control of potential un-reported, potentially irrigated areas.
3. Mail potential out of compliance letters to identified landowners.
4. Attempt to contact landowners (via phone or email, if known).
5. Perform in-field visits to landowners if phone and email attempts are unsuccessful.

7.1.6 Actions Against Non-Reporters / Non-Payers

Following the identification of potentially un-reported pumpers, CBGSA staff developed the below enforcement process.

The process to enforce compliance for potential non-reporting pumpers includes the following:

1. Staff to develop plan for out of compliance landowner(s) to become current on groundwater reporting and fees.
2. Coordinate with ad hoc and communication with landowner(s).
3. Hold hearing with landowner(s) at a Board meeting.
4. If outstanding fees are not paid, place outstanding fees owed on county tax roll.
5. Legal involvement for un-cooperating/un-responsive landowner(s).

7.1.7 Adjudication

On August 17, 2021, Bolthouse Land Company, LLC and Grimmway Enterprises, Inc., et al, filed a "Complaint for Comprehensive Groundwater Adjudication of the Cuyama Valley Groundwater Basin (No. 3-013), Quiet Title, and Preliminary Injunction" (the "Adjudication") in Kern County Superior Court pursuant to the Streamlined Adjudication Act (Code Civ. Proc., § 830, et seq.). Shortly thereafter, the Adjudication was transferred to Los Angeles County Superior Court and has been litigated there ever since.

The Court set a non-jury trial date for August 7, 2023, to address Phase 1 of the Adjudication, establishing the jurisdictional boundaries of the Cuyama Valley Groundwater Basin ("Basin"). Later, the Court postponed this trial date to January 5, 2024.

On November 13, 2023, CBGSA intervened in the Adjudication.

On January 5, 2024, the parties, including CBGSA, participated in a non-jury trial regarding Phase 1 of the Adjudication.

On February 23, 2024, the Court issued a Statement of Decision and found that "the jurisdiction boundary of this comprehensive groundwater adjudication is coterminous with the boundaries of the [Basin] as described and depicted in Bulletin 118, Basin No. 3-103, and that there are no subbasins within the Basin." Regarding the phrase, "there are no subbasins within the Basin," the Court incorporated the following into its Statement of Decision from CBGSA's trial brief:

> *"... [this finding] would not foreclose addressing that basin management concerns of the objectors. The Court has been scrupulous to confine Phase 1 of this adjudication to the jurisdictional boundaries of the Court's in rem jurisdiction. Later phases of this adjudication may be used to determine whether management areas should be utilized (or not) and whether the basin should be differentially or homogenously managed.'"*

Now, the parties are in Phase 2 of the Adjudication, establishing the "safe yield" of the Basin. Trial regarding this phase of the adjudication is currently scheduled for February 24, 2025.

8. OUTREACH, ENGAGEMENT, AND COORDINATION WITH OTHER AGENCIES

8.1 Outreach and Engagement

Public input was used to help shape the GSP development including the original, resubmitted, and updated GSPs. The input was also used to develop context and content for CBGSA meetings, SAC meetings, community workshops, CBGSA newsletters, and for content posted to the CBGSA website.

On June 30, 2017, the CBGSA Board of Directors met for the first time. The 11-member board is the designated decision-making entity for GSP development and is subject to the Brown Act.[1] According to the requirements of the act, all meetings were noticed 72 hours in advance, were open to the public and included a public comment period. Board membership and meeting agendas, minutes, and materials are available online at http://cuyamabasin.org/cuyama-gsa-board.html. Meeting agendas were also posted at the meeting location, the Family Resource Center, in New Cuyama.

In September 2017, the CBGSA Board appointed the seven-member SAC to provide advice and input to the CBGSA Board on GSP development and implementation, and to assist with stakeholder engagement throughout the Cuyama Basin. In March 2018, the CBGSA Board expanded the SAC membership to nine members, including representatives from the Hispanic community in the Basin. One member resigned in March 2019, and the CBGSA Board of Directors is currently considering a replacement process. According to the requirements of the Brown Act, all SAC meetings were noticed 72 hours in advance and were open to the public. SAC membership, agendas, minutes, and meeting materials are available at http://cuyamabasin.org/standing-advisory-committee.html.

8.1.1 Public Comments

CBGSA-hosted public meetings were designed to encourage input, discussion, and questions from both the CBGSA Board of Directors and SAC members as well as public audience members. The minutes of CBGSA Board and SAC meetings reflect the questions and comments raised by members and the general public. For each community workshop, public comments were summarized and provided to the CBGSA staff and technical team, the CBGSA Board of Directors, and SAC for further consideration.

Examples of how public input helped shape the GSP are described below.

During the development of the GSP, community input was valuable in identifying and closing groundwater data gaps. Residents and agricultural businesses provided additional data about groundwater levels, historical pumping, and cropping patterns.

[1] http://ag.ca.gov/publications/2003_Intro_BrownAct.pdf

During discussion of projects and management actions, several community members and CBGSA Board members expressed concern about unreliable community water supplies in New Cuyama, Cuyama, and Ventucopa. The GSP's list of projects was revised to include construction of new wells for these communities.

Community input also shaped other actions carried forward for further analysis in the GSP. Two projects to improve water resources in the basin came from public input: cloud seeding and rangeland management. The technical team evaluated each approach and discussed benefits and impacts with the CBGSA Board, SAC, and the community. Cloud seeding as a project is included in the GSP for further evaluation. Rangeland management was not carried forward in the GSP due to concerns about the potential impacts of vegetation management, and institutional concerns about coordination with the United States Forest Service.

Stakeholder input continued to be valuable in the development of the 2025 GSP Update. Many meetings (listed below) allowed for public comment and influence on the plan and how to refine plan elements to better align with stakeholder concerns and input.

Chapter 1 Appendix D of the 2025 GSP Update includes a summary of public comments and responses.

8.1.2 Public Engagement Efforts

Establishment of the SAC in September 2017 was intended to encourage active involvement from diverse social, cultural, and economic elements of the population in the Basin. All meetings of the CGBSA Board and SAC were open to the public and included a public comment period. Community members participated in the public meetings. Community workshops were held in both English and Spanish, provided time for discussion of each topic presented, and provided comment forms for written comments. Workshop materials were also available in English and Spanish. The quarterly CBGSA newsletter was available in English and Spanish and described GSP planning status and opportunities for participation. Notices for community workshops were available in both English and Spanish. Distribution channels included email, hand-delivered postings throughout the Cuyama Valley, and postcard mailings to parcel owners within Basin boundaries. A website (www.cuyamabasin.org) was designed and made available early in the GSP process to assist in keeping stakeholders informed and up to date.

To inform the public about GSP progress and to seek public input, the following methods were used:

- Notice of public meetings, including CBGSA Board meetings, SAC meetings, and community workshops (in both English and Spanish).
- Website (www.cuyamabasin.org).
- Email distribution via a stakeholder email list was maintained throughout the process and grew to 185 contacts.
- Postcards were mailed to 675 parcel owners in the Basin to announce community workshops and provide a link to the website to follow the progress of GSP development.

- A quarterly, four-page CBGSA newsletter was mailed to all New Cuyama, CA post office box holders as a part of the Cuyama Recreation District Newsletter. The newsletter was also distributed via the stakeholder email list.
- Volunteers at the Family Resource Center distributed community workshop notices to locations throughout the Cuyama Basin.
- A member of the SAC posted community workshop notices in some of the finger areas in the west part of the Cuyama Basin.

The development of the mailing list and email list was informed by SGMA Section 10723.2, which calls for consideration of interests for all beneficial uses and users of groundwater. The initial email list of approximately 80 stakeholders grew to 185 stakeholders by March 2019. Additionally, a conventional mailing list was used that included 675 parcel owners in the Cuyama Basin identified by each of the four counties and the 17 agencies and organizations listed in Section 1.3.1 of the GSP.

8.1.3 Outreach and Engagement Activities

Community input was encouraged and received at CBGSA Board meetings, SAC meetings, and community workshops. This GSP was shaped by community input, SAC input, and CBGSA Board direction and decisions.

Public input was used to help shape the GSP development. The input was also used to develop context and content for CBGSA meetings, SAC meetings, community workshops, CBGSA newsletters, and for content posted to the CBGSA website.

CBGSA-hosted public meetings were designed to encourage input, discussion, and questions from both the CBGSA Board of Directors and SAC members as well as public audience members. The minutes of CBGSA Board and SAC meetings reflect the questions and comments raised by members and the general public. For each community workshop, public comments were summarized and provided to the CBGSA staff and technical team, the CBGSA Board of Directors, and SAC for further consideration.

During the development of the GSPs, community input was valuable in identifying and closing groundwater data gaps. Residents and agricultural businesses provided additional data about groundwater levels, historical pumping, and cropping patterns.

During discussion of projects and management actions, several community members and CBGSA Board members expressed concern about unreliable community water supplies in New Cuyama, Cuyama, and Ventucopa. The GSP's list of projects was revised to include construction of new wells for these communities.

Community input also shaped other actions carried forward for further analysis in the GSP. Two projects to improve water resources in the basin came from public input: cloud seeding and rangeland management. The technical team evaluated each approach and discussed benefits and impacts with the CBGSA Board, SAC, and the community. Cloud seeding as a project is included in the GSP for further

evaluation. Rangeland management was not carried forward in the GSP due to concerns about the potential impacts of vegetation management, and institutional concerns about coordination with the United States Forest Service.

Chapter 1 Appendix D of the 2025 GSP Update includes a summary of public comments and responses.

8.2 Responsibilities of GSA Board

The CBGSA is governed by an 11-member Board of Directors that meets approximately six times a year. The Executive Director manages the day-to-day operations of the CBGSA, while Board Members vote on actions of the CBGSA; the Board is the CBGSA's decision-making body. The CBGSA Board of Directors now includes the following individuals:

- Cory Bantilan, Chair, Santa Barbara County Water Agency (SBCWA)
- Arne Anselm, Secretary, County of Ventura
- Byron Albano, Treasurer, Cuyama Basin Water District (CBWD)
- Rick Burnes, CBWD
- Jimmy Paulding, County of San Luis Obispo
- Katelyn Zenger, County of Kern
- Matthew Young, SBCWA
- Deborah Williams, Cuyama Community Services District (CCSD)
- Jane Wooster, CBWD
- Derek Yurosek, CBWD
- Steve Jackson, CBWD

In addition, the following individuals serve as alternatives to regular CBGSA Board members:

- Darcel Elliott – SBCWA
- Steve Lavagnino – SBCWA
- Brad DeBranch – CBWD
- Matt Klinchuch – CBWD
- Blaine Reely – County of San Luis Obispo

During GSP development, a Standing Advisory Committee (SAC) was formed to act in an advisory capacity to the CBGSA Board of Directors. The SAC was established in September 2017 to encourage active involvement from diverse social, cultural, and economic elements of the population within the Basin. The SAC membership reflects this diversity. The members represent large and small landowners and growers from different geographic locations in the Basin, longtime residents of New Cuyama, and a manager of an environmentally centric non-profit organization. SAC's role is described in Section 1.3.4 of the GSP, and includes the following individuals:

- Brenton Kelly (Chair)
- Brad DeBranch (Vice Chair)
- John Caufield
- Jean Gaillard
- Joe Haslett
- Roberta Jaffe
- David Lewis

A technical forum was established to allow for technical input from interested parties within the Cuyama Basin. The forum had no decision-making authority. For the original 2020 GSP, periodic conference calls were held with technical professionals representing a stakeholder in the Basin and the following organizations participated in this effort:

- CBWD and consultants EKI Environment & Water, Inc. (EKI) and Provost & Pritchard Consulting Group (Provost & Pritchard)
- CCSD and consultants Dudek
- Grapevine Capital Partners, North Fork Vineyard and consultants Cleath-Harris Geologists
- San Luis Obispo County
- Santa Barbara Pistachio Company
- SBCWA

For the 2025 GSP Update, periodic conference calls were again held to received technical feedback from professionals in the basin and the representatives listed above, along with the representatives below participated in this effort:

- Bolthouse Farms and Grimmway Farms, and their consultants GSI Water Solutions, Inc.
- Sunrise Olive Ranch, and consultants Stetson Engineers
- Coalition of Landowners for Commonsense Groundwater Solution, and consultants Montgomery & Associates
- Various Cuyama Basin landowners, and consultants Aquilogic, Inc.

The GSP team conducted additional consultations regarding GSP matters via email, telephone, or via in-person meetings with representatives from the following groups:

- Bolthouse Farms
- Community representatives from the Family Resource Center and Blue Sky Center
- Duncan Family Farms
- DWR
- Grimmway Farms

- Individual landowners in the Cuyama Basin
- Kern County
- Santa Barbara County Fire Department, New Cuyama Station
- Santa Barbara County Public Works Department
- Santa Barbara IRWM Program
- United States Department of Agriculture's Forest Service Mount Pinos Ranger District, Los Padres National Forest
- University of California at Santa Barbara
- USGS
- Ventura County
- Wellntel Network

The CBGSA developed a stakeholder engagement strategy to ensure that the interests of all beneficial uses and users of groundwater in the Basin were considered. Multi-organization planning processes can be complex. It can be challenging for community members to understand required decision-making steps, and where and how stakeholder issues and concerns are considered. Groundwater management as a practice is also complex. Educating and engaging groundwater stakeholders and the community about complex issues while simultaneously meeting deadlines established by SGMA, required an organized stakeholder engagement strategy.

An additional challenge to the engagement strategy is that the Basin area is rural and has no news media outlets serving the area. The combined population per the 2010 Census of the three disadvantaged communities is 666 (Ventucopa 92, Cuyama 57, and New Cuyama 517). The engagement strategy relied primarily on mail and email communications about community workshop and GSA meetings. Mailings were sent to 675 parcel owners. Additionally, the CBGSA sent 185 emails to stakeholders, engaged with counters who distributed notices, and word of mouth.

In January 2018, and to inform development of stakeholder engagement strategy, the CBGSA conducted 22 phone interviews with members of the CBGSA Board of Directors, SAC, CBGSA staff, staff from each of the four counties, and community representatives from the New Cuyama Family Resource Center and the Blue Sky Center, which are both located in New Cuyama. Several common themes emerged, which were used to form the basis for constructive stakeholder engagement and planning for the GSP. The prevailing ideas expressed included the following outreach and planning objectives:

- Provide a fair, balanced, and transparent public process that builds trust and understanding towards the common goal of a GSP that can best benefit everyone in the Basin.
- Provide a public meeting environment that is inclusive of all perspectives and all stakeholders.
- Provide education on a range of topics, at key milestones throughout the planning process, beginning with education about SGMA and what a GSP includes.

- Provide education and outreach specifically inclusive of smaller farmers/ranchers and the Hispanic community.
- Develop a GSP that is fair for all stakeholders in the Basin.

The stakeholder engagement strategy was developed to support the themes listed above, and in March 2018, the strategy was approved by the CBGSA Board. The strategy can be found online at: http://cuyamabasin.org/assets/pdf/CBGSP-Engagement-Strategy_May2018.pdf.

8.3 Coordination with Other Agencies

The Cuyama Valley Basin does not share or border any other groundwater basins, nor does it host or intersect the operational boundaries of many other agencies. The CBGSA regularly coordinates with the counties that intersect the Basin, with representatives from each county sitting on the CBGSA Board. However, the CBGSA does have a list of agencies that may or could have interest in the Basin and were notified by mail about GSA-hosted community workshops. These include:

- Cachuma Resource Conservation District in Santa Maria, California
- California Department of Fish and Wildlife, Headquarters in Sacramento, California
- California Natural Resources Agency in Sacramento, California
- California Wildlife Conservation Board in Sacramento, California
- Kern County, Cooperative Extension in Bakersfield, California
- Leadership Council for Justice and Accountability in Bakersfield, California
- Los Padres Forest Watch in Santa Barbara, California
- Morro Coast Audubon Society in Morro Bay, California
- San Luis Obispo County, Cooperative Extension in San Luis Obispo, California
- United States Department of Agriculture's Natural Resource Conservation Service in Fresno, California
- United States Fish and Wildlife Service in Ventura, California
- United States Fish and Wildlife Service, Attention Friends of California Condors Wild and Free in Ventura, California
- United States Forest Service, Bitter Creek National Wildlife Refuge, Refuge Manager, Debora Kirkland in Ventura, California
- United States Forest Service, Los Padres National Forest, Headquarters in Goleta, California
- Ventura County Audubon Society Chapter in Ventura, California
- Ventura County, Cooperative Extension in Ventura, California

The CBGSA does not hold any coordination agreements with any other Agencies but has worked with the USGS for monitoring and stream gage installation, and CalTrans during the installation of new monitoring wells.

9. OTHER INFORMATION

9.1 Consideration of Adjacent Basins

The Cuyama Valley Basin is adjacent to the Carrizo Basin, the Mil Potrero Area Basin, and Lockwood Valley Basin, which are very low priority basins per the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, and not yet required to comply with SGMA. Downstream from the Basin is the Santa Maria River Valley Basin, which is currently undergoing prioritization evaluation under the CASGEM Program. A GSA has formed for the Santa Maria Basin Fringe Areas, which are located downstream from Twitchell Reservoir, and could be affected by a potential stormwater capture project in the Cuyama Basin; if the CBGSA pursues such a project, it may need to coordinate with this GSA in the future.

At this time, no coordination has been needed with adjacent basins, nor is it possible because the basins that share a border with the Cuyama Valley Basin do not have a GSA managing them.

9.2 Challenges Not Previously Discussed

There are no additional challenges to GSP implementation and development of the 2025 GSP beyond those that are already described in other sections of this document.

9.3 Legal Challenges

The only legal challenge currently facing CBGSA that may affect GSP implementation is the comprehensive groundwater adjudication, described in more detail in Section 7.1.7, above.

9.4 Completed and Planned GSP Amendments

The Cuyama Valley Basin GSP was first amended and resubmitted in 2022 based on feedback received from DWR. The revised 2022 GSP did not edit any of the original text submitted in 2020 but provided supplemental "blue" pages to provide clarification on several components based on DWR deficiencies. DWR approved the 2022 GSP in the determination letter issued to the GSAs on May 25, 2023, which included recommended corrective actions to be addressed in this Periodic Evaluation.

Additionally, the CBGSA developed a plan amendment to accompany this Periodic Evaluation. As discussed in previous sections, stakeholders were heavily involved in guiding the amended GSP, along with the CBGSA board, technical analysis based on new data, and data provided from technical studies. Opportunities for public involvement in the 2025 GSP Update are described in greater detail above in Section 8.

A brief summary of the components included in the 2025 GSP Update are:

- **Agency Information, Plan Area and Communication**: updated public meetings, list of public engagement and CBGSA meetings, Board members list, and SAC members list.

- **Hydrologic Conceptual Model**: updated land and water use data, incorporation of new information for technical studies.
- **Basin Settings**: updating and incorporating recent monitoring g data and Basin conditions.
- **Water Budget**: updated groundwater modeling and water budget components and results.
- **Monitoring Networks**: revised monitoring networks focused on new sites and reducing redundancies and problematic sites.
- **Minimum Thresholds, Measurable Objectives, and Interim Milestones**: updated thresholds that incorporate new information, updating modeling, and technical analyses.
- **Projects and Management Actions**: updated status of projects and management actions.
- **Plan Implementation**: Describes progress on plan implementation, completed activities, and planned activities.

Ultimately, the GSP was amended because of the amount of new information, changes to thresholds based on newly available data, additional information and data from technical studies and analysis, and incorporation of the updated CBWRM.

10. SUMMARY OF PROPOSED OR COMPLETED REVISIONS TO PLAN ELEMENTS

SGMA requires GSPs to be evaluated in the form of Periodic Evaluations every five years and whenever a GSP is amended. The purpose of this Periodic Evaluation was to provide an update to the DWR, interested parties, and the public on the progress the CBGSA has made on implementing the Cuyama Valley Groundwater Basin GSP. The Periodic Evaluation includes updates to activities implemented by CBGSA, recent groundwater conditions and their progress towards meeting sustainable management criteria, new information collected and used by the CBGSA, and changes incorporated into the 2025 GSP.

Since the adoption of the 2020 GSP, the Basin has not experienced undesirable results for any applicable sustainability indicator. Although groundwater levels did approach undesirable results conditions, a wet year provided recovery and undesirable results did not occur. However, based on data collected since GSP adoption, thresholds have been adjusted to more accurately represent undesirable conditions and measurable objectives for the Basin, and at this time, undesirable results are not expected or projected to occur.

The implementation of projects and management actions has and continues to occur. Studies have been completed and pumping allocations have begun so that reaching sustainability is on schedule.

Considerable data has been collected and analyzed, with additional studies to increase Basin understanding. The representative network was surveyed leading to revisions, new monitoring wells and piezometers were installed, an airborne electromagnetic survey was conducted, a geophysical survey was conducted, and a study to assess GDEs and active pumping wells were completed. Much of this data has been incorporated into the updated groundwater model as well.

As discussed previously, the 2025 GSP was amended to incorporate new information collected and to address Recommended Corrective Actions included in DWR's 2023 determination letter. The most significant revisions to the 2025 GSP include:

- Revised monitoring networks
- Updated Hydrogeologic Conceptual Model based on new information and studies
- Updated Groundwater Conditions section based on recent monitoring data
- Updated Groundwater budget
- Updated CBWRM incorporation new monitoring data and studies
- Updated sustainability thresholds based on new information and data collected
- Updated Projects and Management Actions based on implementation progress

The CBGSA will continue with implementation of projects and management actions, data collection, and pumping allocations to ensure timely and efficient progress towards sustainability as scheduled in the 2025 GSP Update. The CBGSA will continue to use annual reports and groundwater conditions reports as their primary mechanism for regular updates on the status of the Basin relative to groundwater conditions, water use, and progress on GSP implementation.