

DRAFT REPORT | NOVEMBER 2027

SOLANO SUBBASIN GROUNDWATER SUSTAINABILITY PLAN PERIODIC EVALUATION 2027

PREPARED FOR

SOLANO COLLABORATIVE



PREPARED BY



**Luhdorff &
Scalmanini**
Consulting Engineers

TABLE OF CONTENTS

1. Introduction	1
1.1. Plan Area.....	1
1.2. GSA Authority	1
1.3. Periodic Evaluation Contents	2
2. New Information Collected	2
2.1. Installation of nested monitoring wells.....	4
2.2. Interferometric Synthetic Aperture Radar	4
2.3. DWR Survey Area 6 Airborne Electromagnetic Survey	5
2.4. Model Refinements and Updates.....	5
2.5. Multi-Benefit Solutions Planning.....	6
2.6. Well and Surface Water Diversion Inventory	6
2.7. Inventory of Critical Infrastructure.....	7
2.8. GDE Refinement	7
3. Groundwater Conditions.....	7
3.1. Chronic Lowering of Groundwater Levels	9
3.1.1. Description of Sustainable Management Criteria	10
3.1.2. SMC Refinement.....	11
3.1.3. Current Conditions Relative to Sustainable Management Criteria.....	13
Fall Groundwater Level Conditions at RMS	13
Evaluation of Spring Groundwater Level Conditions	3
Impact on Beneficial Users	6
Summary of Groundwater Level Conditions.....	6
3.2. Reduction in Groundwater Storage.....	7
3.2.1. Description of Sustainable Management Criteria	7
3.2.2. Current Conditions Relative to Sustainable Management Criteria.....	8
Change in Storage	10
Impact on Beneficial Users	11
3.3. Land Subsidence	11
3.3.1. Description of Sustainable Management Criteria	12
3.3.2. Response to Recommended Corrective Actions	13
Critical Infrastructure	13
Updates to Subsidence Monitoring Approach and SMC Refinement	14
3.3.3. Current Conditions Relative to Sustainable Management Criteria.....	18

TABLE OF CONTENTS

Impact on Beneficial Users	20
3.4. Degraded Water Quality.....	21
3.4.1. Description of Sustainable Management Criteria	21
3.4.2. SMC Refinement.....	22
3.4.3. Current Conditions Relative to Sustainable Management Criteria.....	22
Arsenic	1
Chloride.....	1
Chromium-6.....	1
Nitrate	2
TDS	2
Impact on Beneficial Users	2
3.5. Depletion of Interconnected Surface Water	3
3.5.1. Description of Sustainable Management Criteria	3
3.5.2. SMC Refinement.....	4
3.5.3. Response to Corrective Actions	4
ISW Monitoring Enhancements	4
Refined Hydrogeologic Conceptualization and Characterization of ISW.....	5
Evaluation of Surface Water Beneficial Users	5
Hydrologic Modeling Refinements and Analysis	5
3.5.4. Current Conditions Relative to Sustainable Management Criteria.....	5
Impact on Beneficial Users	1
3.6. Seawater Intrusion	1
3.7. Response to Corrective Actions.....	1
3.7.1. Recommended Corrective Action 1	1
3.7.2. Recommended Corrective Action 2	2
3.7.3. Recommended Corrective Action 3	2
3.8. Summary of Existing and Refined SMC.....	3
4. Projects and Management Actions.....	1
4.1. Overview.....	1
4.2. Policies and Ordinances Developed	1
4.3. PMAs Identified in 2022 Solano Subbasin GSP.....	1
4.3.1. Projects Implemented	4
Recharge Project Implementation.....	6

TABLE OF CONTENTS

Domestic Well Vulnerability	9
5. Updates to Basin Setting.....	9
5.1. Hydrogeological Conceptual Model	9
5.1.1. Northwest Area of the Subbasin	10
5.1.2. Montezuma Hills and Southern Subbasin	10
5.1.3. Middle and Basal Tehama Formation Uses.....	11
5.2. Groundwater Conditions	11
5.3. Water Use Changes and Associated Water Budgets	11
5.3.1. Updated Water Budgets.....	11
Historical Water Budget.....	12
Current Water Budget	13
5.4. Model Updates	14
5.4.1. Updates to the Groundwater System	14
5.4.2. Updates to the Surface Water System Simulation.....	14
6. Monitoring Networks.....	16
6.1. Groundwater Levels	18
6.1.1. Changes to Monitoring Network.....	18
6.1.2. Data Gaps	1
6.2. Groundwater Storage.....	1
6.2.1. Changes to Monitoring Network.....	1
6.2.2. Data Gaps	1
6.3. Land Subsidence	1
6.3.1. Changes to Monitoring Network.....	2
6.3.2. Data Gaps	3
6.4. Groundwater Quality.....	3
6.4.1. Changes to Monitoring Network.....	1
6.4.2. Data Gaps	1
6.5. Seawater Intrusion	1
6.6. Interconnected Surface Water	1
6.6.1. Changes to Monitoring Network.....	2
6.6.2. Data Gaps	1
7. GSA Authority and Enforcement Actions.....	1
7.1. Description of Relevant Actions Taken by GSAs.....	1

TABLE OF CONTENTS

7.2. Description of Enforcement of Legal Actions Taken by GSAs	2
8. Outreach, Engagement, and Coordination	2
8.1. Public Engagement	2
8.2. Engagement with Public Agencies within the Subbasin	4
8.3. Engagement with Agencies in Hydrologically Connected Subbasins	4
8.4. Summary of Comments Submitted to the GSAs Since GSP Approval	4

1. INTRODUCTION

1.1. Plan Area

The Solano Subbasin (Subbasin) is a medium-priority subbasin as classified by the California Department of Water Resources (DWR) in 2019, and in January 2022, Groundwater Sustainability Agencies (GSAs) within the Solano Subbasin submitted a Groundwater Sustainability Plan (GSP) (LSCE et al., 2022) covering the entire Subbasin. The California Department of Water Resources (DWR) completed its review of the GSP and approved the GSP on January 18, 2024. The Solano Subbasin is located in the southernmost portion of the Sacramento Valley Groundwater Basin and extends into the northern portion of the Sacramento-San Joaquin Delta (Delta). The Subbasin covers 354,600 acres, including small parts of Sacramento and Yolo Counties (**Figure 1-1**). Solano County encompasses about 79% of the Subbasin, about 20% is within Sacramento County, and about 1% is within Yolo County. Subbasin boundaries are defined by Putah Creek on the north, the Yolo County line on the east, the North Mokelumne River on the southeast (from Walnut Grove to the San Joaquin River), and the San Joaquin River on the south (from the North Mokelumne River to the Sacramento River). The western Subbasin boundary is defined by consolidated rocks of the Coast Range and a groundwater divide present between the Sacramento Valley Groundwater Basin within the Sacramento River Hydrologic Region and the Suisun-Fairfield Valley Groundwater Basin within the San Francisco Bay Hydrologic Region.

The Solano Subbasin is hydrogeologically complex with influences from a variety of surface water features and tidal influences (e.g., Sacramento-San Joaquin Delta) and encompasses both shallow and deeper groundwater resources. The hydrogeologic conceptualization of the Solano Subbasin is described in detail in the GSP (LSCE et al., 2022). This conceptualization includes fundamental descriptions of the groundwater system and hydrogeologic setting, including topography, surface water bodies, soils, regional and structural geologic setting and features, extent of the groundwater subbasin (laterally and vertically), identification and discussion of configuration and characterization of major aquifers and aquitards, presentation of groundwater recharge and discharge areas, and identification of surface water and imported water supply sources. The primary sources of surface water for the Subbasin are watersheds in the lower elevation Coast Range Mountains, which lack significant snowpack.

Water supplies within the Subbasin, including groundwater extracted from within the Subbasin and surface water sources are used extensively for local agricultural, municipal, residential, and industrial uses. Additionally, ecosystems and natural habitats rely on these water resources. Land use areas in the Solano Subbasin are broadly classified across three sectors: agricultural, urban (domestic and industrial), and native vegetation. Urban land uses are concentrated around the cities of Vacaville, Rio Vista, Dixon, Walnut Grove, and Isleton.

1.2. GSA Authority

The agencies in the Solano Collaborative (Collaborative) entered into a formalized Collaboration Agreement in 2020 to facilitate GSP development. The Collaborative is made up of five GSAs including the City of Vacaville, Solano Irrigation District (SID), Northern Delta GSA, Sacramento County GSA and Solano Subbasin GSA. The Solano Subbasin GSA is a Joint Powers Agency representing City of Dixon, City of Rio Vista, Solano County, Solano County Water District (SCWD), Dixon RCD, Solano RCD, Maine Prairie Water

District, and Reclamation District (RD) 2068 and associated members from the Solano Farm Bureau, Solano County Agricultural Advisory Committee, and California Water Service. The Collaboration Agreement outlines meeting and voting protocol, the structure of subcommittees and workgroups, and responsibilities of the agencies involved. The Collaboration Agreement demonstrates the legal authority of the Solano Collaborative to prepare and implement the GSP.

The Solano Collaborative, has prepared this Periodic Evaluation (PE) of the Solano Subbasin GSP in compliance with GSP Regulations. Although this PE includes limited refinements to the monitoring network and management criteria the Subbasin intends to use to track groundwater sustainability, the Subbasin determined that a GSP amendment is not warranted at this time. A GSP amendment will be considered during the following implementation to provide a comprehensive update as it relates to the management of the Subbasin. Luhdorff and Scalmanini Consulting Engineers (LSCE) was contracted by the Subbasin to prepare a PE covering the first five years of the GSP implementation period covering Water Years (WY) 2021 through WY 2025 with additional information through Spring of 2026. The Subbasin has tracked SGMA related conditions throughout the Subbasin for each water year since the submission of the GSP, documenting these conditions in annual reports. The most recent Annual Report, which covers WY 2025, is included in **Appendix A**.

1.3. Periodic Evaluation Contents

The PE was prepared in accordance with the requirements outlined in Section 356.4 of the GSP Regulations. Accordingly, this report reviews and evaluates recent and noteworthy information, groundwater conditions related to applicable sustainability indicators, efforts undertaken to address corrective actions recommended by DWR, progress on projects and management actions (PMAs), updates to the basin setting and monitoring network, as well as the authorities and measures implemented by the GSAs throughout this evaluation period.

2. NEW INFORMATION COLLECTED

GSP Regulation § 356.4 (f)

A description of significant new information that has been made available since Plan adoption or amendment, or the last five-year assessment. The description shall also include whether new information warrants changes to any aspect of the Plan, including the evaluation of the basin setting, measurable objectives, minimum thresholds, or the criteria defining undesirable results.

Table 2-1 below provides a summary of the new significant information collected since GSP adoption and how that information was incorporated during the implementation period.

Table 2-1. Summary of Significant New Information		
Significant New Information	Description	Aspect of Plan Affected
Installation of nested monitoring wells	Construction of nested dedicated monitoring wells consisting of two wells at each of six sites and installation of pressure transducers.	• Monitoring Networks • Sustainable Management Criteria • Projects and Management Actions
Assessment of DWR Interferometric Synthetic Aperture Radar (InSAR)	Evaluation of monthly InSAR data provided by DWR	• Basin Setting • Monitoring Network • Sustainable Management Criteria • Corrective Actions
Assessment of DWR Airborne Electromagnetic (AEM) Survey	Assessment of and incorporation of AEM survey data provided by DWR.	• Basin Setting
Model Refinements and Updates	Refine model with improved understanding of Subbasin water use including ET, surface water and documenting model updates	• Basin Setting
Multi-Benefit Solutions Planning	Exploration of projects and actions to achieve multiple benefits focused on enhanced groundwater recharge and stormwater management. Evaluation of feasibility of utilizing existing ag drainage and conveyance infrastructure and natural landscape features to enhance recharge and reduce stormwater runoff	• Projects and Management Actions
Well and Surface Water Diversion Inventory	Refining, updating, expanding, and verifying the accuracy of domestic well locations. Identifying domestic well locations vulnerable to groundwater level impacts. Refined inventory of surface water points of diversion, volumes of surface water diverted, and where possible the place of use for these diversions. Includes sampling of domestic wells to improve the characterization of water quality conditions	• Basin Setting • Sustainable Management Criteria • Projects and Management Actions

Table 2-1. Summary of Significant New Information		
Significant New Information	Description	Aspect of Plan Affected
Inventory of Critical Infrastructure	Technical Memorandum summarizing infrastructure found within the Subbasin that may be susceptible to subsidence	• Basin Setting • Monitoring Network • Sustainable Management Criteria • Corrective Actions a
GDE Refinement	Technical Memorandum summarizing GDEs within the Subbasin, current health and their vulnerability to changes in groundwater levels	• Basin Setting • Sustainable Management Criteria • Projects and Management Actions

2.1. Installation of nested monitoring wells

In 2020 and 2026, the Subbasin installed two nested dedicated monitoring wells at each of six sites within the Subbasin (**Figure 2-1**) for a total of 12 dedicated monitoring wells for monitoring groundwater level and interconnected surface water conditions. Pressure transducers were deployed in each of the monitoring wells to provide continuous groundwater level measurements. The monitoring wells helped to fill data gaps identified in the GSP and were added to the GSP monitoring networks.

2.2. Interferometric Synthetic Aperture Radar

InSAR is a remote sensing technique that uses radar signals from satellites to measure ground surface deformation with high precision. By comparing radar images taken at different times, InSAR detects small changes in elevation at high precision. InSAR is highly effective for large-scale monitoring, providing detailed, time-series data of changes in the land surface elevation indicating rates of land subsidence. Existing and recent InSAR datasets developed in the Sacramento Valley were acquired and evaluated to gain insights into historical and current rates of subsidence in the Subbasin (Farr et al., 2015; TRE ALTAMIRA, 2024). These include:

- InSAR developed the NASA JPL, which was collected by satellite from the Canadian Radarsat-2 mission (May 2014 – January 2015).
- InSAR from Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) mission launched by NASA (May 2013 – November 2018).
- InSAR developed the NASA JPL produced from Japanese PALSAR data (2006 – 2010). These data were evaluated but not used due to suspected issues with data accuracy and/or post-processing.
- Monthly InSAR from TRE ALTAMIRA collected from the Sentinel-1 satellite mission by the European Commission and European Space Agency and distributed quarterly by DWR.

Although there are a number of continuous global positioning system (CGPS) stations in the Subbasin monitored through the Earthscope Consortium that provide high accuracy and precision vertical displacement data at discrete locations, the InSAR data have been instrumental in gaining a better understanding of the rates, distribution, and localized causes of recent subsidence across the entire Subbasin, resulting in revisions to the Sustainability Management Criteria (SMC) and augmentation of the monitoring network outlined in **Section 3.3 and Section 6.3**

2.3. DWR Survey Area 6 Airborne Electromagnetic Survey

An AEM survey is a geophysical technique used to map subsurface conditions by measuring variations in electrical conductivity. Conducted from aircraft or helicopters, AEM systems generate electromagnetic fields that induce currents in the ground, which are measured to create detailed 3D models of underground structures. Data and results from a regional AEM survey area 6 were published in 2023 (Behroozmand et al., 2023). These datasets include both raw resistivity models and models of the spatial distribution of predicted subsurface lithology interpreted using lithologic data (**Figure 2-1**).

The AEM Survey data have been used to further enhance the understanding of shallow hydrostratigraphy in the Subbasin. The AEM data have been used to evaluate near-surface geology near Putah Creek in the northern portion of the Subbasin, refine the sediment textural model used in the integrated hydrologic model for the Subbasin, and evaluate recharge favorability for consideration in the implementation of PMAs.

2.4. Model Refinements and Updates

Extensive work has been completed related to updating and refining the Solano Integrated Hydrologic Model Documentation (Solano IHM) since the initial development and application of the model for the purpose of preparing the GSP in 2022. Updates to the Solano IHM completed since the submittal of the GSP include the following:

- Refinements to the hydrogeologic conceptual model (HCM) and sediment textural model used to assign aquifer parameters that were informed by new monitoring well data and AEM data provided by DWR (DWR, 2023),
- Updated hydrology and land uses (precipitation, surface water deliveries, surface water inflows, reference evapotranspiration [ET]) for the period from WY 2018 through WY 2025,
- Updated simulation of surface system processes, including refinements to stream channel characteristics and rating curves, the representation of irrigated and non-irrigated pasture, improved delineation of managed wetland areas, adjustments to rooting depths, and modifications to crop coefficients based on review and analysis of remote sensing ET data, and
- Recalibration of the model using expanded dataset of groundwater level observations.

The updated Solano IHM provides a means for evaluating water budgets and specific interests, including interconnected surface water. Further model documentation of the updated Solano IHM is provided in **Section 5** of this 2027 Periodic Evaluation.

2.5. Multi-Benefit Solutions Planning

In 2024 a committee was formed to discuss and plan multi-benefit solutions in the Subbasin. The committee consists of representatives and staff from the Solano Subbasin GSA and Solano County Water Agency (SCWA), Solano Resource Conservation District (SRCD), Dixon Resource Conservation District (DRCD) and the Subbasins technical consultant LSCE. The group explored and identified projects and actions that would provide benefits within the Subbasin through enhanced groundwater recharge and stormwater management (**Figure 2-1**). **Section 4** provides more details on the projects and actions being implemented and considered in the Subbasin. Although the committee identified and directed implementation of a range of actions to support sustainable groundwater management, the outcomes from the committee were generally consistent with the projects and management actions described in the GSP and will continue to guide future groundwater management in the Subbasin.

2.6. Well and Surface Water Diversion Inventory

The Subbasin has completed an inventory of wells and surface water diversions in the Subbasin to improve the characterization of groundwater beneficial users and representation of the location of surface water diversions and deliveries in GSP analyses. The inventory included identification of likely active wells, with a focus on key areas of interest where groundwater reliance is greatest and where the domestic well beneficial users of groundwater are most sensitive to effects from groundwater management and groundwater conditions. The effort included refining available information for locations, type, depths, and point of use for water supplied by active wells. LSCE worked closely with Solano County (well permitting agency in the Subbasin) in formulating and implementing a plan and process to develop and maintain a database of accurate information on active water supply wells across the entire Subbasin. Improved data on the locations of active wells in the Subbasin are displayed in **Figures 2-2a and 2-2b**. To improve the characterization of groundwater quality conditions in areas of the Subbasin with high domestic well densities, a subset of domestic wells were identified from the well inventory to be sampled to characterize groundwater quality conditions. Sampling is occurring in Fall 2026 and it is estimated that 10 wells will be sampled and water will be analyzed for a range of constituents, especially those analytes identified to be of interest in the GSP.

The refined surface water diversion datasets were used to update water budget components, improve groundwater pumping volumes estimate and spatial distribution (**Figure 2-3**). More accurate surface water use data allows for better assessments of unmet water demand, ultimately refining calculations of groundwater reliance. In addition to groundwater modeling, the dataset will improve the overall water budget of the Subbasin by providing a more detailed accounting of total water demand, surface water supplies, and groundwater use.

The data developed through the well and surface water inventory will support water management planning efforts throughout the Subbasin, including refinements to the HCM, hydrologic modeling, water budget accounting, development of projects and management actions to maintain sustainability, evaluation of SMC, and approaches to implementing fees to support implementation of the GSP.

2.7. Inventory of Critical Infrastructure

In response to DWR's corrective action *Revise the proposed sustainable management criteria for land subsidence*, the Subbasin prepared a TM summarizing the review of infrastructure within the Subbasin that may be susceptible to land subsidence. The TM outline work that occurred to identify and characterize critical infrastructure and discusses the potential for subsidence conditions that may create risks of adverse impacts to the beneficial uses and users of that critical infrastructure. The information was used to update SMC for Land Subsidence the monitoring network.

2.8. GDE Refinement

The Subbasin consulted with The Freshwater Trust (TFT) to complete a study on GDEs within the Subbasin. TFT utilized Normalized Difference Vegetation Index (NDVI) imagery, plant rooting depth, groundwater elevation data to track GDE health changes in the Subbasin. They concluded the overall GDE health in the Subbasin is stable but noted the dominate species found in the Subbasin are the Valley oak and multiple bulrush species. The rooting depth for Valley oak is typically 24 feet or greater and bulrush species is typically around a foot which, represent the extremes of rooting depth for both dominate species found in the Subbasin. TFT concluded that while GDE health was sufficient, groundwater levels are lower than rooting depths for the two dominate species suggesting that surface water or a perched aquifer maybe providing a significant amount of influence on GDE health and furth investigations should be considered.

3. GROUNDWATER CONDITIONS

GSP Regulation § 356.4 (a)

A description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones and minimum thresholds.

This section describes current groundwater conditions and the relationship between current conditions and SMCs in the GSP for each applicable sustainability indicator (SI) for the GSP implementation period from WY 2021 through WY 2025. Additionally, in response to DWR's recommended corrective actions included in the original GSP approval letter, this section of the PE includes a discussion and documentation of the Subbasin's review of the GSP monitoring network and minor revisions to the network of representative monitoring sites (RMS) and SMCs. As part of completion of the PE, the Subbasin also proposes minor refinements to the GSP monitoring program and SMC based on review of conditions and GSP implementation efforts to date; these refinements are presented in this section. A description of all revisions and refinements related to the GSP monitoring network and SMCs is provided here with those made to address DWR's recommended corrective actions highlighted for reference.

The SMCs defined in the GSP were developed using information from stakeholder and public input and correspondence with the GSAs, Community Advisory Committees, public meetings, and analyses of hydrogeology and groundwater conditions in relation to beneficial users, including relationships between

groundwater conditions and interconnected surface water and groundwater dependent ecosystems (GDEs). The sustainability goal for the Plan area is to continue to operate the Subbasin in a sustainable manner to:

- Protect and maintain safe and reliable sources of groundwater for all beneficial uses and users.
- Ensure current and future groundwater demands account for changing groundwater conditions due to climate change.
- Establish and protect sustainable yield for the Subbasin by achieving measurable objectives set forth in this GSP in accordance with implementation and planning periods¹.
- Avoid undesirable results defined under SGMA.

The evaluation of groundwater conditions in the Subbasin is informed by review of conditions in relation to the SMCs for each applicable sustainability indicator as defined in the GSP. Draft Best Management Practices developed by DWR (DWR, 2017) provides terminology and definitions of SMCs as follows (GSP Regs., § 351):

- “Minimum threshold” (MT) refers to a numeric value for each sustainability indicator used to define undesirable results.
- “Measurable objective” (MO) refers to specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted Plan to achieve the sustainability goal for the basin.
- “Interim milestone” (IM) refers to a target value representing measurable groundwater conditions, in increments of five years, set by an Agency as part of a Plan.
- “Representative monitoring site” (RMS) refers to a monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.
- “Basin Wide monitoring sites” (basin wide) refers to the broader wide monitoring network of sites that typifies one or more conditions within the basin or an area of the basin.

The overarching Subbasin sustainability goal and the avoidance of undesirable results was maintained over the first five years of the GSP implementation period through WY2025 and Spring 2026. The GSP included a definition for URs for each of the six sustainability indicators with MTs assigned to a network of RMS as indicators for when URs may be occurring. MO were also set forth in the GSP as targets to avoid URs and ensure continued sustainable groundwater management of the Subbasin over the planning and implementation horizon. The Solano Subbasin has not experienced any undesirable results during the GSP implementation period to date, as defined in the GSP. **Table 3-1** summarizes groundwater conditions in the Subbasin in relation to each of the six SI and the occurrence of any URs over a range of historical periods including prior to, during, and since GSP development.

¹ As defined under SGMA, the GSP implementation period is 20 years. The planning and implementation horizon is a 50-year time period over which the GSAs determine that plans and measures will be implemented to ensure that the basin or subbasin is operated within its sustainable yield.

Table 3-1: Summary of Undesirable Results Applicable to the Plan Area

Sustainable Indicator	Pre-Historical Period (pre 1990)	Historical Period (1991 to 2015)	GSP Development Conditions (2016 to 2020)	GSP Implementation Conditions (2021 to 2025)
Chronic Lowering of Groundwater Levels	Yes, before Solano Project	No	No	No
Reduction of Groundwater Storage	Yes, before Solano Project	No	No	No
Land Subsidence	No	No	No	No
Seawater Intrusion	NA ¹	NA ¹	NA ¹	NA ¹
Degraded Water Quality	No ²	No ²	No ²	No ²
Depletion of Interconnected Surface Water	No	No	No	No

¹ Seawater intrusion is not applicable to the Solano Subbasin; however, chloride concentrations are monitored as part of the degraded water quality SMC.

² Historically, in localized areas groundwater exhibits somewhat elevated concentrations of various constituents, although concentrations have not increased as a result of groundwater management under the GSP.

3.1. Chronic Lowering of Groundwater Levels

This section evaluates recent, short-term, and long-term groundwater level trends in the Solano Subbasin and compares groundwater conditions before and during GSP implementation. Groundwater conditions at RMS are evaluated against established MT, MO, IM, and URs to assess whether GSP implementation has been effective in achieving and maintaining sustainability.

The GSP outlined two primary aquifer zones for the Subbasin: 1) the Alluvial Aquifer consisting of Quaternary alluvium and the Montezuma and Upper Tehama zone, and 2) the Basal Tehama zone. The Quaternary alluvium, Montezuma Formation, and Upper Tehama have similar hydrogeologic characteristics and behave as a hydraulically connected aquifer zone and represent a single primary aquifer, Alluvial/Upper Tehama zone. The Basal Tehama zone, which coincides with the Basal Tehama formation, is not utilized throughout the entire Subbasin primarily utilized near the Cities of Dixon and Vacaville. The Basal Tehama is generally found at great depth and under confined (i.e., under pressure) conditions within the Subbasin, except for along parts of the western Subbasin boundary where it is steeply dipping and crops out at the surface.

Groundwater recharge in the Alluvial/Upper Tehama zone occurs primarily through infiltration and deep percolation of precipitation falling directly on the landscape within the Subbasin and through applied water (e.g., irrigation), seepage from natural surface waterways, seepage from water conveyance systems (e.g., leaky canals, ditches, and pipes), and deeper subsurface recharge from adjacent and upland recharge source areas outside of the Subbasin. Because of the generally greater depths to the Basal

Tehama zone throughout the Subbasin, recharge to the Basal Tehama zone is more limited to areas where the formation is exposed at the surface or at shallow depths. These areas and conditions exist in the northwestern part of the Subbasin and outside of the Subbasin to the west. Deep recharge of the Basal Tehama zone also potentially occurs through recharge of geologically equivalent formations at much greater distances to the east outside the Subbasin. A significant portion of the recharge to the deeper Basal Tehama may also be due to leakage from the overlying Alluvial Aquifer and Upper Tehama zone.

Prevailing groundwater flow directions in the Subbasin within the Alluvial Aquifer and Upper Tehama zone tend to be from west/northwest to east/southeast away from the English Hills and Montezuma Hills towards the Sacramento River and Delta. In the deeper confined Basal Tehama zone where groundwater is under pressure, there are fewer groundwater level data, but groundwater gradients indicate flow is generally to the southwest towards the city of Vacaville, largely because this is the area where the most historical groundwater pumping in the Basal Tehama zone has occurred. Groundwater elevation contours for spring 2026 for each of the primary aquifer zones in the Solano Subbasin (and select areas of Suisun-Fairfield Valley Basin) are presented in **Figures 3-1 and 3-2**. Groundwater elevation contours for all other years from 2015 through the present are included in **Appendix B**.

Water levels in the Solano Subbasin are generally stable with seasonal fluctuations, temporary downward trends during drought period, and recovery during wet periods. Chronic lowering of groundwater levels representative of widespread conditions is not present in the Subbasin. However, some historical localized and well-specific groundwater level declines are noted in the northwestern part of the Subbasin within a general area of greater attention for groundwater management referred to as the Northwest Focus Area (NWF Area). The groundwater level monitoring network in the Subbasin was expanded and refined over the GSP implementation period and period of this evaluation. Improvements to the GSP groundwater level monitoring network include addition of RMS and supplemental monitoring sites in key data gap areas, addition of automated monitoring on wells, and establishment and refinements to some MTs for wells that did not have sufficient monitoring records at the time of the GSP development.

3.1.1. Description of Sustainable Management Criteria

A UR for chronic lowering of groundwater levels is defined in the GSP as excessive regional groundwater pumping that causes a significant and unreasonable decline in groundwater levels over an extended period of time that results in existing water supply wells (drinking water, industrial, and irrigation wells) not being viable for intended beneficial uses due to reduction in pumping capacity, or groundwater levels exhibit lowering that significantly affects other beneficial uses (e.g., GDEs). The GSP states that such an undesirable condition exists when 30 percent or more of RMS wells exceed their respective groundwater level MT for two consecutive years, indicating a persistent lowered condition that could significantly and unreasonably adversely impact beneficial uses and users of groundwater in the Subbasin. Should there be an occurrence of any UR, circumstances of the UR would be evaluated by the GSAs with respect to the causes for such conditions and the relationship to sustainable management activities occurring within the Subbasin. Trigger levels for chronic lowering of groundwater levels are defined as any MT exceedance, which prompts evaluation of factors related to groundwater declines.

In the GSP, separate MTs were developed for RMS in the Alluvial/Upper Tehama zone and the Basal Tehama zone. In the Alluvial/Upper Tehama zone, the MT was set at the minimum static groundwater

elevation measured in each RMS well over the historical base period (WY 1991 through January 2015).. At select RMS locations, especially where groundwater may not have been extensively utilized in the past, the MT was set deeper than the minimum static groundwater elevation over the base period to provide sufficient operational flexibility for some potential future groundwater utilization. For wells constructed in the highly confined Basal Tehama zone, groundwater levels are reflective of potentiometric head which produce higher magnitudes of fluctuations in response to small changes in storage. In these wells, a similar review of historical groundwater level data was conducted and MTs were generally set at a level 50 feet below the recent five-year average (prior to January 2015) groundwater level to allow sufficient operational flexibility for beneficial users of groundwater from the Basal Tehama zone, which consist almost entirely of public water systems.

MOs for groundwater levels were determined based on average static groundwater elevations over the base period. In select cases, such as for RMS in the Basal Tehama zone where the response in groundwater levels to the initiation of groundwater development from the Basal Tehama in the northern part of the Subbasin did not stabilize for some time, the MO was set as the average groundwater level after the new equilibrium was established. Because the Subbasin was and is considered to be in a sustainable condition, the IMs for groundwater levels were set equal to the MOs.

3.1.2. SMC Refinement

At the time of GSP development MOs were established using the average of all groundwater level observations at each RMS during the base period (1991-2014). Since the preparation of the GSP, recognizing the potential for the mixing of groundwater levels from different times of year and potential for biasing caused by such measurement timing, the GSAs determined that a more representative approach for tracking overall groundwater conditions in relation to the target MOs would be to use the average of only the seasonal low groundwater levels during the GSP base period for determining the MOs and compare seasonal low groundwater levels during the implementation period to evaluate whether MOs are being achieved. Similar to the original SMC definition, the refined MO methodology uses a different baseline period for determining the MOs for RMS where groundwater levels were stabilizing after initial installation and utilization. For these wells, the MOs were based on the average of the seasonal low groundwater levels calculated using only measurements collected after groundwater levels had reached an equilibrium condition after installation and operation of the RMS well. This refined approach to defining and tracking MOs is also more consistent with the methodology used to develop and track MTs in the Subbasin. **Table 3-2** compares the MO outlined in the GSP with the revised MO developed as part of this PE. Most RMS had minor changes to the MO changes of less than 3 feet.

Table 3-2 Groundwater Measurable Objective Changes			
Well Name	Original MO	Revised MO	MO Change
Alluvial/ Upper Tehama			
06N01E12M001M	32.20	30.4	-1.80
5340	-3.70	15.78636	19.49
03N03E07N001M	-10.61	29.24	39.85
04N01E02E001M	54.90	54.1	-0.80

Table 3-2 Groundwater Measurable Objective Changes

Well Name	Original MO	Revised MO	MO Change
04N02E09A001M	21.71	20.9	-0.81
05N02E25K001M	-0.57	-1.4	-0.83
06N01E17M001M	55.82	55.3	-0.52
06N01E33L001M	39.13	38.4	-0.73
06N01W36C004M	67.71	67	-0.71
06N02E19J001M	19.20	17.7	-1.50
07N01E04P003M	70.24	68.9	-1.34
07N01E11M001M	52.83	50.7	-2.13
07N01E14J001M	26.12	25.7	-0.42
07N01E16B002M	47.57	39.5	-8.07
07N01E21H003M	33.78	22.2	-11.58
07N01E25M001M	22.20	17.6	-4.60
07N01E29P001M	65.98	64.8	-1.18
07N01W04C002M	87.82	79.1	-8.72
07N01W05R001M	85.39	77.4	-7.99
07N01W13H001M	94.45	92.9	-1.55
07N01W33J002M	46.71	41.2	-5.51
07N02E15E001M	10.93	6.3	-4.63
07N02E33D002M	11.05	4.1	-6.95
07N02E35D002M	2.78	6.2	3.42
08N01E24Q001M	2.17	-1.3	-3.47
08N01E32E001M	61.06	65.1	4.04
08N01E33H001M	62.56	63.4	0.84
08N01W26A002M	79.28	77.2	-2.08
08N01W33A001M	94.30	90.8	-3.50
08N01W35R001M	72.46	67.1	-5.36
08N02E27C002M	9.98	2	-7.98
08N03E31N001M	-6.18	-7.3	-1.12
MW-15-188ft	75.21	73.2	-2.01
Basal Tehama			
06N01E10J004M	-44.32	-45.4	-1.08
06N01E30N003M	-51.35	-52.7	-1.35
07N01E11G002M	-1.72	-2	-0.28
07N01W15A001M	74.55	72.1	-2.45
MW-14	-73.18	-77.8	-4.62
MW-15-1815ft	-25.87	-74.81	-48.94
MW-98A	29.33	15.45	-13.88
MW-98C	-32.83	-52.71	-19.88

3.1.3. Current Conditions Relative to Sustainable Management Criteria

Fall Groundwater Level Conditions at RMS

A comparison of seasonal low groundwater level conditions observed during the fall months and SMC at all RMS monitored during the evaluation period is presented in **Table 3-3**. Seasonal low groundwater levels in the Subbasin have remained relatively stable with the majority (68%) of RMS wells exhibiting a positive increase in seasonal low groundwater levels during the implementation period to date.

During the implementation period to date there have been 13 wells with levels that exceeded the MT value; however, only six wells had actual MT exceedances over the implementation period, as characterized by two consecutive years with fall groundwater levels exceeding the MT (**Figures 3-3 and 3-4**). While every year of the implementation period had at least one MT exceedance, these MT exceedances only represented between 10% and 24% of RMS wells and did not rise to the level of a UR. WY 2022 had the highest count of MT exceedances at 10 or 24% of wells. WY 2021 had the second highest count with eight wells exceeding the MT. WY 2023 through WY 2025 each had 5 MT exceedances, four of which occurred at the same locations. Water levels in the Alluvial/Upper Tehama zone, which is the source for much of the groundwater extracted for agricultural uses, are strongly influenced by climate conditions, especially precipitation and also temperature. The implementation period began with some remarkable hydrologic conditions. The period was directly preceded by very dry conditions during WY 2021, which was classified as a critical year in the Sacramento River watershed with only about 6.5 inches of precipitation in the area of the Subbasin (as measured at the Davis station), less than half of the annual average precipitation measured at the Davis station (long-term annual average is about 18.4 inches) (**Figure 3-5**). Precipitation during the following year (WY 2022) was similar to the long-term annual average at about 19.1 inches; however, approximately 75 percent of the precipitation in WY 2022 occurred during the three months of October 2021-December 2021, and the water year was classified as a critical year for the Sacramento River watershed. A wet year occurred in WY 2023, with annual precipitation of about 150 percent of average at the Davis station. Groundwater level conditions in the Subbasin exhibit a strong response to precipitation with notably lower levels correlating with the dry conditions during WYs 2021 and 2022 and rising levels following the wet conditions of WY 2023. The recovery in groundwater levels following the wet conditions appears to be more muted than the response to dry conditions, likely because of the delayed effect of recharge in contrast to the much more immediate effect from increased groundwater extractions during dry periods.

The six wells with three or more MT exceedances are located in the northern portion of the Subbasin, within the area referred to as the NWF Area. This is an area of the Subbasin described in the GSP as a localized area with modest lowering groundwater levels over the last several decades. Groundwater level monitoring data for the period since the GSP submittal indicates that continued attention to this area for groundwater management is important and additional attention may also be warranted in the area east and south of Dixon, where some wells also exhibit recent lowered groundwater levels. Although all six of the RMS wells with MT exceedances are in the NWF Area, there is no strong spatial pattern to their locations within the area to suggest a strong connection between the conditions observed at each of the wells beyond the broader climate conditions in the Subbasin; however, local hydrogeologic characteristics in the vicinity of Dixon and to the south and east of Dixon, including potentially more fine-grained nature of the Upper and Middle Tehama Formations in the area, may contribute to the pattern in groundwater levels in the area. A

review of water levels trends for the six wells with MT exceedances is provided below, and time-series hydrographs are presented in **Appendix C**.

DRAFT

Table 3-3 Summary of Groundwater Level RMS Monitoring Status

Well Name	Aquifer Designation	Current Status in GWL Monitoring Network	RPE	Minimum Threshold (ft, NAVD88)	Measurable Objective (ft, NAVD88)	Fall Minimum Groundwater Elevation (ft, NAVD88)					Count of MT exceedances	Count of achieving MO
						WY 2021	WY 2022	WY 2023	WY 2024	WY 2025		
06N01E12M001M ¹	Alluvial/Upper Tehama	In Original Network	42.55	25.7	30.4			10.8	21.7	20.5	3	0
07N01E04P003M	Alluvial/Upper Tehama	In Original Network	92.60	54.6	68.9	52.00	49.20	49.30	49.70	50.60	5	0
07N01E11M001M	Alluvial/Upper Tehama	In Original Network	78.10	37.0	50.7	29.90	27.50	35.70	34.10	34.30	5	0
07N02E15E001M ¹	Alluvial/Upper Tehama	In Original Network	44.54	-12.2	6.3			-	-	-	3	0
						13.95	25.94	26.38				
07N02E33D002M	Alluvial/Upper Tehama	In Original Network	36.04	-7.3	4.1	-9.76	-	-3.89	-9.70	-	4	0
						14.56	13.86					
MW-15-188ft	Alluvial/Upper Tehama	In Original Network	95.40	63.3	73.2	76.40	76.40	77.40	76.40	76.90	0	5
5340 ²	Alluvial/Upper Tehama	Removed from Monitoring Network	12.00	-4.4	15.8	-3.60	-4.00	-3.60	-4.20	-2.45	0	0
03N03E07N001M	Alluvial/Upper Tehama	In Original Network	24.50	-14.1	29.2	-0.60		1.10	0.40	0.50	0	0
04N01E02E001M	Alluvial/Upper Tehama	In Original Network	62.52	44.8	54.1	51.82	53.28	56.22	55.94	55.42	0	3
04N02E09A001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	41.67	14.6	20.9							
05N02E25K001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	3.55	-8.4	-1.4	-0.75					0	1

06N01E17M001M ⁴	Alluvial/Upper Tehama	In Original Network	66.27	48.1	55.3	56.2	54.89	54.77	55.37	55.47	0	2
06N01E33L001M ⁴	Alluvial/Upper Tehama	In Original Network	47.54	30.3	38.4		35.14	36.44	35.54	35.14	0	0
06N01W36C004M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	82.86	61.2	67.0	65.9					0	0
06N02E19J001M	Alluvial/Upper Tehama	In Original Network	26.02	10.8	17.7	15.92	14.52	16.41	17.99	17.32	0	1
07N01E14J001M	Alluvial/Upper Tehama	In Original Network	63.07	-6.9	25.7	-1.93	3.07	14.07	14.07	18.07	0	0
07N01E16B002M ⁵	Alluvial/Upper Tehama	In Original Network	77.60	-21.5	39.5	4.50	8.20	6.70	20.70	21.70	0	0
07N01E21H003M	Alluvial/Upper Tehama	In Original Network	73.58	-14.5	22.2	-15.82	-35.92	-1.02	-1.12	1.88	2	0
07N01E25M001M	Alluvial/Upper Tehama	In Original Network	51.00	-15.7	17.6	-9.00	11.90	8.90	2.30	5.80	0	0
07N01E29P001M	Alluvial/Upper Tehama	In Original Network	76.59	61.6	64.8	61.99	62.89	64.59	63.99	63.49	0	0
07N01W04C002M	Alluvial/Upper Tehama	In Original Network	148.40	47.9	79.1	39.10	27.90	50.90	58.70	65.10	2	0
07N01W05R001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	173.10	53.3	77.4							
07N01W13H001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	108.60	88.0	92.9							
07N01W33J002M	Alluvial/Upper Tehama	In Original Network	133.12	25.6	41.2	53.52	54.12	59.78	60.62	59.02	0	5
07N02E35D002M	Alluvial/Upper Tehama	In Original Network	37.73	-25.6	6.2	-14.87	-14.97	-0.22	-14.69	-18.27	0	0

08N01E24Q001M	Alluvial/Upper Tehama	In Original Network	71.00	-60.1	-1.3	-	-	-	-	-	0	0
08N01E32E001M	Alluvial/Upper Tehama	In Original Network	102.88	4.2	65.1	30.78	31.08	46.48	46.28	47.78	0	0
08N01E33H001M	Alluvial/Upper Tehama	In Original Network	84.57	37.6	63.4	34.57	28.87	40.97	41.87	41.77	2	0
08N01W26A002M	Alluvial/Upper Tehama	In Original Network	124.59	60.4	77.2	54.59	52.39	53.89	63.99	64.39	3	0
08N01W33A001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	137.80	67.0	90.8							
08N01W35R001M	Alluvial/Upper Tehama	In Original Network	112.00	26.1	67.1	42.00	25.50	45.20	45.70	52.60	1	0
08N02E27C002M	Alluvial/Upper Tehama	In Original Network	54.50	-15.4	2.0	-	-	-	-6.70	-6.30	2	0
08N03E31N001M	Alluvial/Upper Tehama	In Original Network	33.50	-34.9	-7.3	-	-	-	-	-	1	0
MW-98A	Basal Tehama	In Original Network	104.02	-34.6	15.5	8.02	3.02	5.02	4.60	5.19	0	0
MW-98C	Basal Tehama	In Original Network	81.07	-97.9	-52.7	-	-	-	-	-	0	0
MW-15-1815ft	Basal Tehama	In Original Network	94.97	-116.2	-74.8	-	-	-	-	-	0	0
MW-14	Basal Tehama	In Original Network	92.98	-125.8	-77.8	-	-	-	-	-	0	0
06N01E10J004M	Basal Tehama	In Original Network	53.58	-93.9	-45.4	-	-	-	-	-	0	1
06N01E30N003M	Basal Tehama	In Original Network	77.98	-101.3	-52.7	-	-	-	-	-	0	0
07N01E11G002M	Basal Tehama	In Original Network	79.53	-51.7	-2.0	-5.54	-8.25	-9.50	-8.90	-9.31	0	0
07N01W15A001M	Basal Tehama	In Original Network	132.81	21.9	72.1	40.63	35.66	38.02	36.63	33.16	0	0

08N01W33B002M	Alluvial/Upper Tehama	Added to Network	139.10	58.3	88.0			54.70	63.40	64.80	1	0
Well 14087 ⁷	Alluvial/Upper Tehama	Added to Network	13.47	-58.5	-31.5	-	40.13	-	-	-	0	2
Well 14092 ⁷	Alluvial/Upper Tehama	Added to Network	35.82	-56.2	-35.9	-	48.88	-	-	-	0	0
SSGSA-01a ⁷	Alluvial/Upper Tehama	Added to Network	115.75	77.0	86.2			76.96	80.02	82.57	0	0
SSGSA-01b ⁷	Alluvial/Upper Tehama	Added to Network	115.82	55.6	74.1		55.58	77.03	80.09	82.64	0	3
SSGSA-02a ⁷	Alluvial/Upper Tehama	Added to Network	107.57	48.6	57.4		48.59	51.79	58.41	64.55	0	2
SSGSA-02b ⁷	Alluvial/Upper Tehama	Added to Network	107.45	16.5	42.8		16.50	38.31	43.41	43.36	0	2
SSGSA-03a ⁷	Alluvial/Upper Tehama	Added to Network	95.77	70.1	73.3		71.79	70.09	72.53	72.91	0	0
SSGSA-03b ⁷	Alluvial/Upper Tehama	Added to Network	95.75	10.4	38.9		10.41	30.78	39.94	35.86	0	1
SSGSA-05a ⁷	Alluvial/Upper Tehama	Added to Network	100.81	52.5	55.6		52.48	53.19	56.11	56.45	0	2
SSGSA-05b ⁷	Alluvial/Upper Tehama	Added to Network	100.64	51.6	55.1		51.55	52.71	55.84	55.73	0	2
SSGSA-06a ⁷	Alluvial/Upper Tehama	Added to Network	10.46	0.1	1.2		1.10	0.06	1.38	1.14	0	1
SSGSA-06b ⁷	Alluvial/Upper Tehama	Added to Network	10.32	3.3	3.5		3.25	3.39	3.39	3.26	0	4
SSGSP-11 ⁸	Alluvial/Upper Tehama	Added to Network	74.11	--	--							
SSGSP-12 ⁸	Alluvial/Upper Tehama	Added to Network	74.883	--	--							

SSGSP-15 ⁸	Alluvial/Upper Tehama	Added to Network	23	--	--							
Count of Observations Below the MT						8	10	5	5	5		
Count of Observations above the MO						5	2	5	12	11		

Notes:

- 1- Successfully re-recruited, monitoring resuming Spring 2024
- 2- Well Destroyed Spring 2026
- 3- No Access, ongoing efforts to re-recruit unsuccessful
- 4- MT is set 5 feet below deepest depth to water over the base period to allow for operational flexibility
- 5- MT and MO have been updated. Recent investigation has revealed that multiple agencies were monitoring, MT and MO have been updated to reflect changes
- 6- MT and MO is based on SMC outlined in GSP
- 7- MT and MO is based recent available data
- 8- Monitoring began in 2026 MT and MO will be set after sufficient monitoring

Meets MO
Within two ft of meeting MO
Within two ft exceeding MT
Exceeds MT

RMS 06N01E12M001M is a shallow well in the Alluvial/Upper Tehama zone that is 109 feet deep and located south of Dixon. This well has a long monitoring history starting in 1962, shortly after completion of the Solano Project. When monitoring began groundwater levels were about 50 feet deeper than recent conditions. With completion of the Solano Project in the late 1950s, the availability of surface water supplies increased throughout much of the Subbasin leading to reduced groundwater pumping and as a result groundwater levels rose steadily through the 1960s and stabilized at a much higher elevation by the 1970s and 1980s. In 2020, DWR ceased monitoring of the well because of lack of known well construction details. The Solano Subbasin determined the well was of high priority to recruit back into the monitoring network due to the long monitoring record and location in the Subbasin. In partnership with the local RCDs the well was recruited back into the monitoring network and monitoring resumed in Fall 2023. Groundwater levels in the well exhibit relatively small seasonal fluctuations of about 10 feet and conditions from the 1980s through 2020 were relatively consistent and stable with seasonal low water levels commonly around the MT, which is only about 17 feet below ground surface. The well has had groundwater levels exceeding the MT since 2023. Water levels have rebounded since the more recent low level during Fall 2023, but current fall levels are still a few feet below the average seasonal low for the base period. An automated pressure transducer was installed in the well in July 2025 to better understand the trends and variability in groundwater levels reflected in the well. In spite of the noted groundwater level MT exceedances at the well, the shallow groundwater level conditions also suggest that there is likely limited potential for adverse effects on beneficial users under the recent conditions.

RMS 07N01E04P003M has exhibited water levels below the MT during every year of the implementation period. This well is 222 feet deep, and although no other construction details are available, the total depth suggests the well is completed within the Alluvial/Upper Tehama zone. Groundwater level monitoring at the well began in Fall 1949 and has continued semi-annually since. Early in the monitoring record water levels were much lower than recent conditions and were trending downward until completion of the Solano Project led to a rapid rise in water levels and eventual stabilization until the early 2000s. Since the early 2000s water levels have been on a general downward trend, although water levels in the well have been relatively stable over the implementation period to date and over the last decade since 2015.

RMS 07N01E11M001M has exhibited groundwater levels below the MT during every year of the implementation period with MT exceedances occurring in 2023, 2024, and 2025. The well is 150 feet deep and completed in the Alluvial/Upper Tehama zone (although screen interval is not known) and is located north of Dixon with a very long monitoring record extending back to 1931. Groundwater levels in the 1930s and early 1940s were very similar to current conditions, but declined to historic lows by the late 1950s. Like many other wells in the area with longer periods of record, water levels rose rapidly and substantially starting in the early 1960s with the completion of the Solano Project. Groundwater levels measured in the well appear to have a stronger correlation to water year type, exhibiting notable drops in water levels during drought periods of the late 1970s, late 1980s and early 1990s, and more recently. Similar response in groundwater levels to wet periods is also evident with particularly notable recovery in water levels in the early 1980s and mid to late 1990s. Water levels have been trending slightly downward since the early 2000s, although they have remained relatively stable over the last decade since 2015. A decline in the groundwater level of about nine feet occurred between 2020 and 2022 followed by a recovery of the same amount between 2022 and 2023. Although the well had multiple groundwater level exceedances during the early

implementation period, recent groundwater levels are similar to conditions during the late 1970s and significantly higher than in the late 1950s.

RMS 07N02E15E001M is an Alluvial/Upper Tehama zone well that is 160 feet deep and is located east of Dixon. Groundwater levels at the well have been below the MT during 2023, 2024, and 2025. The well was not monitored in 2022 because it was removed from DWR's monitoring program in 2021. The Subbasin successfully re-recruited the well for monitoring and commenced monitoring of the well in Fall 2023. Groundwater level data extends back to the late 1970s for the well with historical groundwater levels at that time approximately 35 feet lower than recent conditions. Groundwater levels in the well rose in the early 1980s before stabilizing for about 30 years from the mid -1980s until the early 2010s. A notable decline in groundwater level occurred during 2014 and 2015 and although a complete recovery of spring groundwater levels was evident after the 2014-2015 drought and extended through 2020, seasonal low groundwater levels did not exhibit the same recovery with both spring and fall groundwater levels dropping below the MT since Fall 2024.

RMS 07N02E33D002M is a 260-foot deep well in the Alluvial/Upper Tehama zone and is located southeast of Dixon. The well has had groundwater levels below the MT in 2021, 2022, 2024, and 2025 during the implementation period. The period of record for water levels for the well extends back to the early 1950s and shows a period of historically low groundwater level conditions during the 1960s and 1970s before levels rose in the early 1980s. Conditions remaining relatively stable from the early 1980s until 2020; groundwater levels dropped in 2020 and have not yet recovered to the levels exhibited over most of the period since the 1980s, although recent groundwater levels are still 30 to 50 feet above levels from the 1960s and 1970s. The well was historically monitored by DWR twice a year (March and October), but the frequency of monitoring was increased to monthly in late 2018. The increased frequency of monitoring highlighted the occurrence of seasonal low water levels earlier than the typical October fall measurement time period. This difference in frequency in monitoring over the GSP base period may have resulted in setting a somewhat higher MT for the well than is warranted when comparing the seasonal low groundwater levels that are being measured earlier in the fall during the period since 2018. During the implementation period, all water level measurements below the MT occurred between July and September, except in Fall 2022, when the October measurement fell slightly below the MT. This observation suggests that the historical record did not fully capture seasonal water level trends and that periods of lowest water levels may occur earlier in the year than previously understood.

RMS 08N01W26A002M is an Alluvial/Upper Tehama well that is 265 deep and located in the northwestern region of the Subbasin near Putah Creek and near the City of Winters. Historical groundwater level data for the well go back to the late 1970s and indicate relatively stable conditions until around 2010. Since 2010 groundwater level conditions have exhibited an overall decline of about 10 to 15 feet with short periods of lowered levels occurring in response to dry conditions from 2012 through 2016 and again in 2020 and 2021. Meanwhile groundwater levels in the well over the recent years have also exhibited periods of substantial recovering during wet periods including directly after wet years of 2017, 2019, and 2023. Groundwater levels in the well dipped below the MT during two years in 2021, 2022 and 2023 resulting in one MT exceedance; however, levels recovered substantially in 2024 and 2025 and the most recent data suggest water levels are three or four feet about the MT level.

Evaluation of Spring Groundwater Level Conditions

Groundwater level trends in the Subbasin are strongly influenced by precipitation; therefore, both season (spring versus fall), and WY type are key considerations when evaluating groundwater level changes. The Subbasin experienced the full range of WY types over the last ten years, including exceptionally wet conditions in WY 2017 and WY 2023, exceptionally dry conditions during WY 2021, and approximately average precipitation years in 2022, 2024, and 2025 (**Figure 3-5**); precipitation in 2026 was slightly below average. WY 2021 had the lowest recorded precipitation since 1960 as measured at the Davis station. Annual static groundwater levels observed during spring were used to calculate changes in seasonal high groundwater levels over a range of time periods in both the Alluvial/Upper Tehama and Basal Tehama zones of the groundwater systems. The section below discusses observed differences in groundwater levels over discrete time periods based on measurements in wells included in the GSP monitoring network as summarized in **Table 3-4** and illustrated in **Figures 3-6 through 3-9**.

Table 3-4 Changes in Seasonal High Groundwater Levels							
Period	Well Count	Significant Decrease (>10 ft)	Moderate Decrease (2-10 ft)	No Significant Change (±2 ft)	Moderate Increase (2-10 ft)	Significant Increase (>10 ft)	Median Change (ft)
Quaternary Alluvium/Upper Tehama							
1-Year Change: Spring 2026 compared to Spring 2025	81	10%	27%	47%	9%	7%	-0.8
4-Year Change: Spring 2026 compared to Spring 2023	74	15%	35%	30%	15%	5%	-2.25
6-Year Change : Spring 2026 compared to Spring 2021	53	4%	26%	45%	17%	8%	0.5
9-Year Change: Spring 2026 compared to Spring 2018	66	36%	32%	27%	3%	2%	-6.85
11-Year Change: Spring 2026 compared to Spring 2016	66	27%	38%	20%	12%	3%	-4.125
Basal Tehama							
1-Year Change: Spring 2026 compared to Spring 2025	11	0%	0%	91%	9%	0%	0.84

Table 3-4 Changes in Seasonal High Groundwater Levels

Period	Well Count	Significant Decrease (>10 ft)	Moderate Decrease (2-10 ft)	No Significant Change (±2 ft)	Moderate Increase (2-10 ft)	Significant Increase (>10 ft)	Median Change (ft)
4-Year Change: Spring 2026 compared to Spring 2023	11	0%	9%	18%	73%	0%	3.50
6-Year Change : Spring 2026 compared to Spring 2021	11	73%	27%	0%	0%	0%	-12.5
9-Year Change: Spring 2026 compared to Spring 2018	11	27%	64%	0%	0%	9%	-9
11-Year Change: Spring 2026 compared to Spring 2016	12	25%	58%	0%	0%	17%	-8.92

1. WY 2025 is classified as Normal (below average) WY type; WY 2026 is forecast to also be classified as Normal (below average)
2. WY 2023 was classified as a Wet WY type, which came after two Critical Dry WYs and one Dry WY in 2020, 2021, and 2022
2. WY 2021 was classified as a Critical Dry WY type, which came after one Critical Dry WYs and one Dry WY in 2020, 2021, and 2022

The winter of 2025-2026 (WY 2026) was classified as below normal with slightly below average precipitation occurring in the Subbasin. In WY 2026 almost half of precipitation was observed in the first three months of the WY leading to growers having to start irrigating earlier in the spring than is typical. Seasonal high water levels collected in March 2026 may be influenced from pumping factors caused by the onset of an earlier irrigation season. Of all the wells in the Alluvial/Upper Tehama zone and Basal Tehama zone measured in both Spring 2025 and Spring 2026, most wells exhibited very small changes in levels during this one-year period and the median change in level was also very small (**Table 3-4, Figure 3-6**). In the Alluvial/Upper Tehama zone almost 50% of wells had a change in level of less than two feet with a median change of -0.8 feet. The map of groundwater level changes by well during the Spring 2025-Spring 2026 period suggests that the larger negative changes in levels occurred in wells located in the northern Subbasin in areas that are more groundwater dependent and outside of the SID service area where surface water supplies are more readily available. Basal Tehama wells generally indicate very small changes in water levels over the Spring 2025-Spring 2026 period. Furthermore, because of the high degree of confinement in the Basal Tehama zone, the same change in groundwater level in the Basal Tehama translates to a much smaller change in groundwater volume than in the Alluvial/Upper Tehama zone.

Groundwater level changes over the period Spring 2023 to Spring 2026 indicate greater declines overall in wells in the Alluvial/Upper Tehama zone when compared with the Spring 2025-Spring 2026 period with a median change in level of -2.25 feet. On the other hand, wells in the Basal Tehama exhibited increasing groundwater levels in most locations and a median change in level of plus 3.5 feet (**Table 3-4**). As noted above, the need for early irrigation in Spring 2026 may influence the comparison of spring groundwater; groundwater levels in Spring 2023 also reflect conditions at the end of the very wet winter of 2022-2023. The negative change in levels in the Alluvial/Upper Tehama over the Spring 2023-Spring 2026 period may in part be a reflection of the relatively high conditions that existed in Spring 2023 combined with the early pumping demands in Spring 2026. The trend is somewhat different in the Basal Tehama which is a confined zone and more hydraulically disconnected from effects from conditions at the surface; although weather may change trends in water demand that can effect groundwater pumping from the Basal Tehama, the response of groundwater conditions to increases in recharge from precipitation likely occurs at a much longer time scale. The spatial pattern in changes in levels in the Alluvial/Upper Tehama zone over this three-year period is similar to the Spring 2025-Spring 2026 period although the magnitude of changes are slightly greater (**Figure 3-7**).

Groundwater level changes over the five-year period from Spring 2021 to Spring 2026 suggest only small changes in levels in the Alluvial/Upper Tehama zone with most wells indicating changes of less than two feet and approximately equal numbers of wells with increasing and decreasing levels (**Table 3-4**). All of the Basal Tehama zone wells with measurements during both Spring 2021 and Spring 2026 indicated greater declines in levels with the median change in level of -12.5 feet. As noted above, because of the confined conditions in the Basal Tehama zone, relatively larger changes in levels in the Basal Tehama are generally associated with small changes in groundwater volume. During this five-year period there is no strong spatial pattern in groundwater level changes in wells in the Alluvial/Upper Tehama zone with a mix of wells with increasing and decreasing groundwater levels across the Subbasin, although wells in the southern Subbasin appear to more consistently indicate increasing groundwater level conditions. Wells in the Basal Tehama more consistently exhibit declining groundwater level conditions (**Figure 3-8**).

Changes in groundwater levels over longer recent periods from Spring 2016 and Spring 2018 to Spring 2026 are negative in most wells measured during these time periods (**Table 3-4**). The last 10 years in the Subbasin include notably dry years in 2018, 2020, and 2021 with wet years in 2017, 2019 and 2023. About two thirds of the Alluvial/Upper Tehama wells monitored had declines in levels of greater than 2 feet over both periods and more than 80 percent of wells in the Basal Tehama zone had declines of greater than 2 feet over both periods. The relatively higher number of wells with declining groundwater levels over the period Spring 2016 to Spring 2026 and their spatial distribution across the Subbasin is presented in **Figure 3-9**. The area around and to the east of Dixon has the highest concentrations of wells exhibiting negative changes in groundwater levels over the period. The comparisons of water levels over these longer periods capture conditions over about five years prior to GSP development and conditions over the first five years of GSP implementation. Groundwater level conditions have been relatively stable since GSP implementation started.

Appendix B displays the hydrographs for wells monitored in the Subbasin. Groundwater levels trends in the Subbasin show that there has been a general decline in water levels post-2000, with a sharper decline noted after the 2015 drought. Groundwater levels generally rose after the exceptionally wet water years in 2017 and 2019 but began declining again in response to drought years in 2020 and 2021. A wet year in 2023 and subsequent approximately average precipitation years have slowed groundwater declines, and

in some cases resulted in considerable recovery of levels, but hotter weather has also affected water demands during recent years. WY 2025 and 2024 had the highest number of days with a maximum temperature over 90 degrees; these high temperatures typically translate to increased water use to satisfy evaporation and transpiration demands in the Subbasin.

Impact on Beneficial Users

No undesirable results related to groundwater levels occurred during the first five years of GSP implementation and no significant impacts on beneficial uses resulting from groundwater level conditions were observed or reported. The chronic lowering of groundwater levels would have negative impacts on all uses and users of groundwater, including agriculture, public supply municipalities, self-supplied users, and a wide variety of environmental beneficial users. TFT characterized GDE health in Solano Subbasin focusing on vegetation greenness utilizing remote sensing and vegetation rooting depth in comparison in groundwater levels (**Appendix D**). TFT found that GDE health is overall good while noting a disconnect between groundwater levels and rooting depth. They concluded further study maybe warranted to understand the disconnect.

The established MTs are in place to monitor conditions and prevent lowered groundwater levels from impacting beneficial users. While some groundwater level MT exceedances have occurred during the first five years of the GSP implementation period, especially in response to critically dry years, these conditions do not represent conditions across a large area of the Subbasin and have also improved in the most recent years. Long-term monitoring of spring groundwater levels show a relatively large fraction of the wells in the GSP monitoring network have experienced groundwater level declines, the monitoring network is strongly focused on areas of the Subbasin with heavy reliance on groundwater and the Subbasin as a whole had an average decline in groundwater levels of less than half a foot over a ten-year period. Overall groundwater level conditions in the Subbasin have been relatively stable over the implementation period to date, suggesting that beneficial uses and users have not been affected.

Summary of Groundwater Level Conditions

Examination of groundwater level response appeared to vary more consistently with well depth and geographic location. Spatial differences within the Subbasin further suggest that local hydrogeologic and hydrologic conditions influence groundwater level response. Overall, groundwater levels in the Subbasin exhibit relative stability. Seasonal high groundwater levels have increased by approximately two feet from 2021 to 2026, while seasonal low groundwater levels measured at RMS rose by approximately half a foot from 2021 to 2025 for the Alluvium/Upper Tehama Zone. Fall minimum groundwater levels have improved following the exceptionally dry conditions of WYs 2020 and 2021, and more RMS have recorded groundwater levels at or above the MOs in the last few years **Figure 3-10 and Figure 3-11**. Although groundwater level MT exceedances have occurred at some RMS, the frequency and distribution of these exceedances remained well below the level required to trigger an undesirable result. Long-term springtime groundwater level observations suggest overall groundwater level stability. Collectively, these findings support progress toward the sustainability goals established for the chronic lowering of groundwater levels sustainability indicator.

3.2. Reduction in Groundwater Storage

The groundwater storage sustainability indicator is evaluated separately for each of the two principal water bearing zones, Alluvium/Upper Tehama zone and the Basal Tehama zone. Neither zone has historically experienced significant long-term reduction in groundwater storage due to excess pumping or other chronic imbalance in the water budget. Projected model simulations (see **Section 5**) also suggest that future long-term decreases in groundwater storage in either aquifer are not anticipated to occur during the GSP implementation horizon.

In the Solano Subbasin groundwater levels are used as a proxy to monitor for changes in groundwater storage. Groundwater levels were chosen to be used as a proxy because the total volume of groundwater in storage in the Subbasin is considerable and a reduced volume of groundwater storage is not a meaningful metric for detecting significant and unreasonable impacts from reduction of storage. The selected methodology of using groundwater levels as a proxy involves field measurement of groundwater levels in the RMS monitoring network. Groundwater levels are a sufficient proxy as there is a direct relationship between groundwater storage and groundwater levels in the Alluvial/Upper Tehama zone. In the Basal Tehama zone, where groundwater is confined and under pressure, changes in groundwater levels are not reflective of changes in saturated volumes. Rather they are indicative of the potentiometric surface (i.e., the elevation groundwater level will rise to under normal atmospheric pressure). As a result, changes in groundwater levels reflected in the Basal Tehama Zone are associated with very small changes in storage. However, groundwater levels are still a direct proxy to detect and evaluate changes in storage.

3.2.1. Description of Sustainable Management Criteria

The definition of URs for reduction in groundwater storage is excessive regional groundwater pumping that causes a significant and unreasonable decrease in groundwater storage over an extended period of time. Chronic lowering of groundwater level SMCs are set in a manner consistent with URs that may result from reduction of groundwater storage in the Subbasin. Therefore, URs for groundwater levels in the Subbasin are being used as a proxy for URs for reduction of groundwater storage. An UR is defined to occur when there is an exceedance of the water level MT for two consecutive years at 30 percent of water level RMS locations. The definition of a UR for reduction in groundwater storage is consistent with the sustainable yield of the Subbasin. Sustainable yield is the total volume of groundwater that can be withdrawn on an average annual basis without leading to a long-term reduction in useable groundwater storage or interfering with other sustainability indicators.

The MT for reduction of storage is the same as the MT for groundwater levels defined as the minimum static groundwater elevation during the GSP base period for the Alluvial/Upper Tehama zone and fifty feet below the recent five-year average minimum annual static groundwater elevation for the Basal Tehama zone. To the extent that groundwater levels are collectively maintained above MTs, groundwater storage is considered not to exceed the MT. Additionally, as a proxy, groundwater elevation contours are used to calculate the annual change in groundwater storage within each zone of the groundwater system. Groundwater elevation contour maps are compared between water years to quantify changes in groundwater levels, and the resulting volumetric change in storage is estimated using spatially-varying storage coefficient values specific to each aquifer zone. Trigger levels that will initiate additional review

of conditions in the areas around RMS hitting any such values, are the same as for the chronic lowering of groundwater levels SI.

The MOs and IMs for reduction in groundwater storage are based on the MOs and IMs for chronic lowering of groundwater levels. Accordingly, the refinements made to MOs for groundwater levels in this PE, as described in **Section 3.1.2**, will also apply to the reduction of groundwater storage SI.

3.2.2. Current Conditions Relative to Sustainable Management Criteria

As summarized in **Section 3.1.3** MT exceedances did occur for chronic lowering of groundwater levels during the first five years of the GSP implementation period, but no UR occurred. Accordingly, because groundwater level conditions are used as a proxy for groundwater storage conditions in the GSP, this means that the same MT exceedances occurred for the reduction in groundwater storage SI, although no UR occurred.

Change in groundwater storage for each aquifer zone is estimated annually through comparing groundwater levels across the Subbasin. Change in groundwater storage for each aquifer zone is calculated by multiplying changes in groundwater levels for each period of comparison by the storage coefficient of the respective aquifer zone. For the Alluvial/Upper Tehama zone, a spatially varying dataset of specific yield values representing thickness-weighted average values for layers 1 through 3 in Solano IHM was used in the analysis and multiplied by spatially varying data for the change in groundwater level to estimate change in storage. For the Basal Tehama zone, a single uniform storage coefficient derived from available aquifer test data is used in the model to represent Basal Tehama aquifer properties and was also used to calculate change in storage by multiplying by the change in groundwater levels. Groundwater in the Alluvial/Upper Tehama zone is considered to be unconfined and therefore changes in groundwater elevation translate to greater storage changes due to application of a specific yield value. In the Basal Tehama, where confined conditions exist, changes in groundwater levels translate to substantially smaller changes in groundwater storage due to the smaller overall area and application of a storage coefficient value in these areas.

Tables 3-5 and 3-6 summarize the calculated annual change in groundwater storage volumes for each year from 2015 to 2026 for both the Alluvial/Upper Tehama zone and Basal Tehama zone based on comparison of spring groundwater elevation contours. Negative change in storage values indicate depletion of groundwater storage, whereas positive change in storage values represent accretion of groundwater in storage. **Figures 3-12 and 3-13** present maps of the change in groundwater levels within the Alluvial/Upper Tehama zone and the Basal Tehama over the most recent year between Spring 2025 and 2026. **Figures 3-14 and 3-15** present the spatial distribution of the corresponding change in groundwater storage for the same period. The analysis of change in storage between Spring 2025 and 2026 suggests that groundwater in storage decreased by about 20,000 AF in the Alluvial/Upper Tehama zone. The decrease in groundwater storage in the Alluvial/Upper Tehama zone estimated between Spring 2025 and Spring 2026 may be partly a function of precipitation trends and lack of any precipitation in March 2026 when the Subbasin typically receives almost 3 inches. The change in storage in the Alluvial/Upper Tehama zone estimated for other years since 2015 ranges from increases in storage up to 47,000 between Spring 2022 and Spring 2023 to a decrease in storage of about 117,000 AF between Spring 2019 and 2020. It is notable that there is a range of uncertainty associated with the estimated annual change in storage

values because of varying point control available for creating groundwater elevation contours for different time periods. A refined method for estimating change in storage has been applied in recent years that only utilizes monitoring sites with data for both measurement times when making these comparisons in an effort to reduce bias introduced by differences in monitoring data locations and density. In the Basal Tehama zone, the analysis of change in storage between Spring 2025 and 2026 suggests that groundwater in storage decreased by about 60 AF and annual estimates in change in groundwater storage in the Basal Tehama zone since 2015 generally fluctuate by less than 100 AF.

Table 3-5. Change in Groundwater Storage in the Alluvial/Upper Tehama Zone in the Solano Subbasin

Analysis Period (spring to spring)	Average Specific Yield	Average Groundwater Elevation Change ¹ (ft)	Average Groundwater Storage Change ¹ (AF/ac)	Analysis Area ² (acres)	Delta Area Without Data ³ (acres)	Other Areas Without Data ⁴ (acres)	Annual Subbasin Groundwater Storage ⁵ Change (AF)
2015-2016	0.0418	1.20	0.05	241,627	83,618	29,427	14,000
2016-2017	0.0418	3.38	0.17	214,269	83,618	56,786	46,000
2017-2018	0.0418	-2.89	-0.15	214,269	83,618	56,786	-42,000
2018-2019	0.0418	1.64	0.06	305,173	19,155	30,346	21,000
2019-2020	0.0418	-7.22	-0.35	305,173	19,155	30,346	-120,000
2020-2021	0.0418	-6.22	-0.28	354,673	--	--	-99,000
2021-2022	0.0418	0.78	0.12	354,673	--	--	43,000
2022-2023	0.0418	2.72	0.13	354,673	--	--	47,000
2023-2024	0.0418	-0.57	-0.02	354,673	--	--	-8,200
2024-2025	0.0418	-1.77	-0.06	354,673	--	--	-23,000
2025-2026	0.0418	-1.65	-0.0556	354,673	--	--	-20,000

1. Groundwater level measurement accuracy is typically to hundredth decimal place, change in groundwater levels in rounded to the hundredth decimal place and applied to change in groundwater levels and change in groundwater storage
2. Only areas within the Solano Subbasin with sufficient groundwater level data were contoured. Because Spring 2016, 2017 and Spring 2019 had limited data control, the analyses of change in elevation and change in storage did not cover the entire Subbasin and was limited to the "analysis area" where sufficient groundwater level data exist.
3. Very little groundwater pumping occurs in the Delta region of the Subbasin; therefore, for years and locations in the Delta region without groundwater elevation data, it is assumed that these areas have no change in groundwater storage.

Table 3-5. Change in Groundwater Storage in the Alluvial/Upper Tehama Zone in the Solano Subbasin

Analysis Period (spring to spring)	Average Specific Yield	Average Groundwater Elevation Change ¹ (ft)	Average Groundwater Storage Change ¹ (AF/ac)	Analysis Area ² (acres)	Delta Area Without Data ³ (acres)	Other Areas Without Data ⁴ (acres)	Annual Subbasin Groundwater Storage ⁵ Change (AF)
------------------------------------	------------------------	--	---	------------------------------------	--	---	--

4. Change in storage for areas outside of the Delta region with insufficient groundwater level data were estimated by applying the average change in storage per acre from areas with data (within the analysis area) to these areas without groundwater level data.

5. Rounded to two significant digits

Table 3-6 Change in Groundwater Storage in the Basal Tehama Zone in the Solano Subbasin

Analysis Period (spring to spring)	Average Storativity	Average Groundwater Elevation Change (ft)	Average Groundwater Storage Change (AF/ac)	Analysis Area (acres)	Annual Groundwater Storage Change (AF)
2015-2016	2.2E-04	-4.51	-9.71E-04	53,353	-52
2016-2017	2.2E-04	4.69	1.01E-03	53,353	54
2017-2018	2.2E-04	-2.20	-4.73E-04	53,353	-25
2018-2019	2.2E-04	1.33	2.86E-04	53,353	15
2019-2020	2.2E-04	1.00	2.15E-04	53,353	11
2020-2021	2.2E-04	-2.60	-5.58E-04	53,353	-30
2021-2022	2.2E-04	-7.13	-1.53E-03	53,353	-82
2022-2023	2.2E-04	4.63	9.95E-04	53,353	53
2023-2024	2.2E-04	-0.04	-8.85E-06	53,353	0
2024-2025	2.2E-04	3.22	6.93E-04	53,353	37
2025-2026	2.2E-04	-5.49	-1.18E-03	53,353	-63

Change in Storage

In the GSP it was estimated that the sustainable yield for the Subbasin is 180,000 AF/year for the Alluvial Aquifer/Upper Tehama zone and 8,300 AF/year for the Basal Tehama zone. These estimates were developed through application and simulations using the Solano IHM. Considerable refinements and updates to the Solano IHM were conducted during the first five years of the GSP implementation period, and **Section 5** provides more details on these model refinements. The model refinements and updates do not currently suggest any adjustments to the sustainable yield estimate are warranted at this time. **Figure 3-16** is a chart presenting the annual groundwater extractions together with the change in groundwater

storage in the Solano Subbasin for WYs 2015 to 2026². Change in groundwater storage presented in **Figure 3-16** is estimated based on an annual comparison of spring groundwater elevations, although groundwater extractions represent the groundwater pumping by water year as simulated in Solano IHM. The overlapping reporting periods used for groundwater extraction and change in groundwater storage are illustrated in **Figure 3-17**. As illustrated in **Figure 3-17**, changes in groundwater storage based on comparisons of spring to spring groundwater level changes reflect the effects of periods spanning two water years and can reflect the influences from groundwater extraction in the prior water year together with the precipitation of the current water year. Total annual groundwater extraction typically decreases in wet years and increases in dry years, although the timing of the precipitation and other climatic influences such as temperature patterns can also play a large role in the amount of groundwater extraction during a water year. The annual change in groundwater storage trends opposite of groundwater extractions with the largest increases in groundwater storage occurring during or shortly after wet years resulting from the combined influence of increased groundwater recharge and decreased groundwater extraction. Historical groundwater extractions and changes in groundwater storage for the Subbasin for all water years since 1991, as estimated using the Solano IHM, are also included in **Appendix E**.

Impact on Beneficial Users

The MTs for groundwater storage reduction are based on groundwater levels being measured for the groundwater level MT methodology. The representative wells use the groundwater level MTs for avoidance of reduction in groundwater storage. Groundwater levels are on average found to be above MTs, resulting in groundwater storage to be considered not to exceed its MT of no long-term reduction in groundwater storage. No undesirable results related to groundwater levels occurred during the first five years of GSP implementation and no significant impacts on beneficial uses resulting from groundwater level conditions were observed or reported. Furthermore, the Solano Subbasin does not pump more groundwater than what is sustainable and there has been no impact to beneficial users related to reduction of groundwater storage.

3.3. Land Subsidence

Land subsidence is the sinking or settling of the land surface. Land subsidence resulting from groundwater pumping or storage depletion is an important issue in parts of California and the Central Valley and has the potential to cause adverse impacts to infrastructure at the land surface. Historical land subsidence caused by decomposition of peat soils has been documented in the southern parts of the Subbasin, especially in the Delta islands. There are two general types of land subsidence: elastic and inelastic. Elastic subsidence is a reversible condition that can occur as a result of short- or long-term groundwater level declines. Inelastic subsidence is permanent subsidence that is not reversible. Inelastic subsidence caused by groundwater level declines results from the compaction of fine-grained materials (e.g., clay layers) in the groundwater system as the water held in these materials is released. Inelastic subsidence caused by groundwater depletion typically occurs after a period of chronic groundwater level declines that persist for many years during which fine-grained materials remain unsaturated (or at reduced piezometric head) for a prolonged period. There is no documented inelastic subsidence in the Solano Subbasin that is the

² Groundwater pumping data for WY2026 was unavailable as of the date of this report.

result of groundwater extractions and there is very little historical land subsidence in areas of the Subbasin outside of where peat decomposition is known to occur and believed to be the driver. Seasonal or shorter-term declines in groundwater levels do not typically cause inelastic subsidence. GSP regulations define land subsidence resulting from groundwater pumping that has significant and unreasonable adverse impacts on surface infrastructure as an undesirable result and must be avoided.

Land subsidence in Solano Subbasin is monitored at CGPS stations and using remote sensing measurements from InSAR. These systems measure land displacement over time, with negative displacement indicating land subsidence and positive displacement indicating vertical uplift. The observed rates of historical subsidence are very small, and it has not been determined whether the subsidence is elastic or inelastic. However, available subsidence monitoring data suggest that the Subbasin has elasticity with generally negative vertical displacement occurring during drier years and positive displacement occurring during wetter years.

The small amounts of subsidence that have been recorded in parts of the Subbasin have not resulted in any reported adverse impacts to infrastructure or conditions at the land surface. The magnitude of historical annual land subsidence rates is considerably less than the magnitude of annual seasonal elastic fluctuations that occur as a result of the seasonal draining and recharge of the groundwater system.

3.3.1. Description of Sustainable Management Criteria

The SMC metric for land subsidence is the annual rate of vertical displacement, reported by CPGS within the Subbasin. The definition of URs for land subsidence is excessive regional groundwater pumping that leads to inelastic subsidence that results in significant and unreasonable damage to public infrastructure critical for public health and safety (i.e., levees, flood control channels, roadways, railways, water supply canals or pipelines). Locally-defined significant and unreasonable conditions were based on discussion with GSA staff and technical representatives, input received from interested stakeholders and the public through community meetings and other input mechanisms, and through individual stakeholder input to various GSA representatives.

An UR would occur if subsidence at a subsidence RMS exceeds the MT for three consecutive years, indicating a persistent trend in subsidence at a rate above the MT. Groundwater pumping and groundwater levels would be evaluated to further understand the occurrence of an UR.

The MT as defined in the GSP is set equal to the historical annual seasonal fluctuations in vertical displacement based on monitoring data at the CGPS sites within the Subbasin (**Table 3-7**). The GSP described the Trigger Levels as a MT exceedance at any location, which would initiate a review of factors related to negative displacement rates. The MOs for subsidence are based on average historical rates of subsidence, which are a fraction of the total annual fluctuations.

Table 3-7 Land Subsidence Minimum Thresholds and Measurable Objectives						
Station ID	Water Year	October to October Annual Subsidence	Measurable Objective	Minimum Threshold	Cumulative Subsidence 2020 - 2025	Cumulative Minimum Threshold
DIXN	2020-2021	-0.052	-0.0086	-0.0957	-0.104	-0.35
	2021-2022	-0.001				
	2022-2023	0.015				
	2023-2024	-0.036				
	2024-2025	-0.030				
VCVL	2020-2021	0.008	-0.0043	-0.0786	-0.059	-0.3
	2021-2022	0.006				
	2022-2023	-0.034				
	2023-2024	-0.014				
	2024-2025	-0.024				
P266	2020-2021	-0.005	-0.0053	-0.0677	-0.033	-0.25
	2021-2022	0.022				
	2022-2023	-0.010				
	2023-2024	-0.009				
	2024-2025	-0.031				
P267	2020-2021	-0.034	-0.0108	-0.0651	-0.063	-0.25
	2021-2022	0.008				
	2022-2023	-0.009				
	2023-2024	-0.004				
	2024-2025	-0.023				
Meets MO						
Between MO and MT						
Exceeds MT						

3.3.2. Response to Recommended Corrective Actions

In response to one of DWR's recommended corrective actions provided in the review and approval of the original GSP, critical infrastructure in the Subbasin were inventoried and assessed for susceptibility to land subsidence, the land subsidence network was expanded to improve monitoring near critical infrastructure, and SMC was reviewed and modified to reflect and incorporate the results from the inventory and assessment of critical infrastructure.

Critical Infrastructure

The GSAs conducted an inventory and assessment of critical infrastructure in the Subbasin, including outreach to operators of key infrastructure components to map locations and evaluate the tolerance of infrastructure to subsidence. Details related to the inventory of critical infrastructure are provided in

Appendix H. Critical infrastructure identified in the Subbasin that may be sensitive to land subsidence includes canals, pipelines, and other water conveyance infrastructure; oil and gas pipelines; railroads; roads and highways; bridges; culverts; levees; and wells (**Figure 3-18**). During communications with operators of key critical infrastructure components, little guidance was available on the amount of subsidence that could be tolerated before impacts to operations of the infrastructure would occur. Operators communicated that no thresholds for subsidence had been defined for use in the management of infrastructure. They also indicated that no impacts to infrastructure from subsidence had occurred historically. Because no impacts to critical infrastructure have been reported historically as a result of subsidence caused by groundwater extraction (historical subsidence in the Delta caused by peat decomposition unrelated to groundwater extraction has been documented for many decades), a minimum amount and rate of subsidence that infrastructure is likely able to tolerate without experiencing significant impacts was determined by considering historical subsidence conditions in the Subbasin.

Updates to Subsidence Monitoring Approach and SMC Refinement

To better track subsidence in relation to critical infrastructure across the Subbasin, the network of subsidence monitoring RMS is being expanded from the four original CGPS sites to include 16 additional InSAR monitoring sites at key locations near critical infrastructure (**Figure 3-18** and **Table 3-8**). The focus of the additional subsidence RMS is on areas outside the extent of documented historical subsidence caused by peat decomposition, which also is an area with little groundwater use. The critical infrastructure within each site's corresponding monitoring area is shown in **Figure 3-18**. Minimum thresholds were defined based on historically observed subsidence at each of the monitoring sites; the historical subsidence values are very small and below minimum threshold values defined in GSPs for other Subbasins. Consistent with the original GSP, annual MTs at all RMS were derived from the average annual (seasonal) fluctuations in land surface elevations experienced historically. It was determined that InSAR captures about 60% of the total fluctuation compared to CGPS due to the lower temporal resolution of InSAR data, so the annual land surface elevation fluctuations derived from InSAR data were adjusted by a corrective factor. MOs were also derived for each InSAR RMS location with the methodology from the GSP and based on the average historical rate of subsidence. The average rate of subsidence at each site was determined by calculating the slope of a line through the last 10 years of monthly InSAR observations at each location.

An additional cumulative component is also being added to capture longer-term trends in land subsidence that have the potential to impact infrastructure. This involves incorporation of a 5-year cumulative subsidence MT in addition to the annual subsidence MT. The cumulative MT for the subsidence monitoring sites is equivalent to 75% of the site's annual MT extended over five years. The cumulative MT is protective of a condition of more prolonged subsidence with minimal rebound that may not exceed the annual MT, but cumulatively represents an increase in subsidence relative to the historical average. **Table 3-9** presents the subsidence monitoring network with the annual and cumulative MT, and MO for all RMS. The defined subsidence MTs range from 0.05 to 0.19 feet annually from 0.2 to 0.7 feet cumulatively over five years.

Annual subsidence at the 16 additional InSAR monitoring sites was evaluated and compared to the MTs derived from each site's local InSAR fluctuations. All 16 sites have stayed within the average annual fluctuations, indicating that annual subsidence has not exceeded historical land surface movement (**Figure**

3-19). All 16 InSAR monitoring sites also have cumulative subsidence less than the corresponding MT for the entire data record (**Figure 3-20**). **Appendix I** presents historical InSAR and CGPS data for the first implementation period.

Table 3-8 Subsidence Monitoring Network

Subsidence Monitoring Network ID	Monitoring Type	Collocated with:	Nearby Groundwater Level Monitoring Wells	Critical Infrastructure
SMN01	CGPS	CGPS - DIXN	RMS - 07N01E14J001M, 07N01E11M001M, SCWA-Dixon MW-2212, SID DD-5 Supplemental - SID DW-8, 11, 21, 60, SCWA-Dixon MW-1200, 2370, Dixon Well 01-03, 05-01, 06-01, 09, 08-01, City of Dixon Well 48 School Well, 06N01E24L003M, 07N02E06N001M, 07N02E06N003M, 07N01E10E001M	I-80, State Rd 113 Union Pacific Railroad Federal Gas Transmission Line Irrigation Ditches Highway Bridges
SMN02	CGPS	CGPS - VCVL	RMS - 07N01W33J002M, MW-14, MW-15-1815ft, MW-15-188ft, MW-98A Supplemental - City of Vacaville Well 14, 15, 16, MW-15-508ft, MW-16-117, 1166, 1430ft, MW-98B, 06N01W01B001M	I-505, I-80 Putah South Canal Federal Gas Transmission Line Highway Bridges
SMN03	CGPS	CGPS - P267	RMS - SCWA-MainePrairie MW-2170, 06N01E12M001M Supplemental - SCWA-MainePrairie MW-840, SCWA-MainePrairie MW-1960, 06N01E02B001M, 06N01E12M003M, 06N01E24L003M	State Rd 113 Federal Gas Transmission Line Irrigation Ditches
SMN04	CGPS	CGPS - P266	RMS - 04N01E02E001M Supplemental - SSGSP-06, 04N01E02G001M	State Rd 113 Federal Gas Transmission Line Irrigation Ditches
SMN05	InSAR	08N01W26A002M	RMS - 08N01W26A002M, 08N01W33B002M, 08N01W35R001M, SSGSA-01a,b / 02a,b / 03a,b Supplemental - SSGSP-08, 09, 08N01W32E500M, 08N01E30G002M, 08N01W22P001M, 08N01W25A002M, 08N01W26D005M, 08N01W28J001M, 08N01W36H001M	State Rd 113, State Hwy 12 Sacramento Northern Railroad Denver Creek Pipeline Federal Gas Transmission Line Highway Bridges
SMN06	InSAR	Near 08N01E24Q001M	RMS - 08N01E24Q001M, SSGSA-05a, SSGSA-05b Supplemental - SSGSP-05, 08N02E24N001M, 08N02E32N001M, 08N02E32R001M, 08N02E27Q002M	I-505 Putah South Canal, UCD-Solano Pipeline Federal Gas Transmission Line Highway Bridges
SMN07	InSAR	08N02E27C002M	RMS - 08N02E27C002M Supplemental - SSGSP-05, 08N02E24N001M, 08N02E32N001M, 08N02E32R001M, 08N02E27Q002M	I-80 UCD-Solano Pipeline
SMN08	InSAR	SID DW-35	RMS - 07N01E04P003M, 08N01E32E001M, 08N01E33H001M Supplemental - SSGSP-07, 07N02E04M004M, 07N02E02F002M	I-80 Union Pacific Railroad Federal Gas Transmission Line Irrigation Ditches Highway Bridges
SMN09	InSAR	07N02E02F002M	RMS - 07N02E15E001M, 08N03E31N001M Supplemental - n/a	UCD-Solano Pipeline
SMN10	InSAR	SCWA-Allendale MW-1235	RMS - SCWA-Allendale MW-1235, 07N01W04C002M, 07N01W05R001M, 07N01W13H001M Supplemental - SCWA-Allendale MW-1345, 1925, RNVWD MW-446, 594, 862, 1389ft, 07N01W01E003M, 07N01W06E001M, 07N01W15L001M, 07N01W14P003M, 08N01W32N500M, 4810012-001	Federal Gas Transmission Line Irrigation Ditches

Table 3-8 Subsidence Monitoring Network

Subsidence Monitoring Network ID	Monitoring Type	Collocated with:	Nearby Groundwater Level Monitoring Wells	Critical Infrastructure
SMN11	InSAR	MW-98C	RMS - MW-98C, 07N01E29P001M Supplemental - SID DW-27, 4810008-025, DeMello MW-95ft, 06N01E05A001M, 07N01E30M001M, 07N01E33R001M	I-505 Putah South Canal, UCD-Solano Pipeline Federal Gas Transmission Line Highway Bridges
SMN12	InSAR	Near SID DW-15	RMS - SID DW-22, 07N01E21H003M Supplemental - SID DW-15, 29, 49, 51, 53, 58, Dixon-Well 02-01, 07-01, City of Dixon-Well 52, 54, 07N01E26Q002M, 07N01E27M004M, 07N01E33A001M, 07N02E19E001M	I-80 Union Pacific Railroad Federal Gas Transmission Line Highway Bridges
SMN13	InSAR	07N02E35D002M	RMS - 07N02E35D002M, 07N02E33D002M Supplemental - 06N02E02M003M, 07N02E21F003M, 07N02E26Q003M, 07N02E35D001M, 07N02E35D003M, 07N03E30Q002M	State Rd 113 Union Pacific Railroad Federal Gas Transmission Line Irrigation Ditches, Channelized Stream for Flood Control
SMN14	InSAR	CITY OF VACAVILLE-Well 02	RMS - n/a Supplemental - City of Vacaville-Well 01, 02, 05, 06, 07, 08, 09, 13, 06N01W24N001M, 06N01W24N002M, 4810011-001	Federal Gas Transmission Line Irrigation Ditches, Channelized Stream for Flood Control, Drainage Ditch
SMN15	InSAR	Near 06N02E19J001M	RMS - 06N02E19J001M Supplemental - n/a	I-80 Putah South Canal Federal Gas Transmission Line Highway Bridges
SMN16	InSAR	SCWA-Meridian MW-1680	RMS - SCWA-Meridian MW-1680, 06N01E17M001M, 06N01W36C004M Supplemental - SCWA-Meridian MW-400, 825, 06N01E18N001M, 06N01W13R001M	Sacramento River Deep Water Ship Canal Wineman 1-22 Pipeline Federal Gas Transmission Line Irrigation Ditches, Drainage Ditches
SMN17	InSAR	Near 06N01E33L001M	RMS - 06N01E33L001M Supplemental - n/a	Union Pacific Railroad North Bay Aqueduct Federal Gas Transmission Line
SMN18	InSAR	05N02E19M001M	RMS - SSGSA-06a, SSGSA-06b Supplemental - 05N02E07R002M, 05N02E19M001M	State Rd 113 Sacramento Northern Railroad North Bay Aqueduct Federal Gas Transmission Line Irrigation Ditches Highway Bridges
SMN19	InSAR	City of Rio Vista-Well 15	RMS - 4810004-015, 04N02E09A001M Supplemental - 04N02E22P001M	State Rd 113 Sacramento Northern Railroad North Bay Aqueduct Denver Creek Pipeline, Vesta Oil & Gas Federal Gas Transmission Line Highway Bridges
SMN20	InSAR	City of Rio Vista-Well 10	RMS - City of Rio Vista-Well 10 Supplemental - n/a	California Resources Production Corporation Pipeline Federal Gas Transmission Line Highway Bridges

Table 3-9 Subsidence Monitoring Network SMC					
Subsidence Monitoring Network ID	Monitoring Type	Collocated with:	Annual MT (ft/yr)	5-year Cumulative MT (ft)	MO (ft/yr)
SMN01	CGPS	CGPS - DIXN	0.10	0.35	0.0086
SMN02	CGPS	CGPS - VCVL	0.08	0.30	0.0043
SMN03	CGPS	CGPS - P267	0.07	0.25	0.0108
SMN04	CGPS	CGPS - P266	0.07	0.25	0.0053
SMN05	InSAR	08N01W26A002M	0.07	0.25	0.009
SMN06	InSAR	Near 08N01E24Q001M	0.06	0.25	0.014
SMN07	InSAR	08N02E27C002M	0.07	0.25	0.026
SMN08	InSAR	SID DW-35	0.05	0.20	0.008
SMN09	InSAR	07N02E02F002M	0.06	0.25	0.013
SMN10	InSAR	SCWA-Allendale MW-1235	0.11	0.40	0.009
SMN11	InSAR	MW-98C	0.06	0.20	0.007
SMN12	InSAR	Near SID DW-15	0.06	0.20	0.017
SMN13	InSAR	07N02E35D002M	0.19	0.70	0.021
SMN14	InSAR	CITY OF VACAVILLE-Well 02	0.06	0.20	0.003
SMN15	InSAR	Near 06N02E19J001M	0.15	0.60	0.045
SMN16	InSAR	SCWA-Meridian MW-1680	0.07	0.25	0.004
SMN17	InSAR	Near 06N01E33L001M	0.14	0.55	0.013
SMN18	InSAR	05N02E19M001M	0.07	0.25	0.011
SMN19	InSAR	City of Rio Vista-Well 15	0.06	0.25	0.003
SMN20	InSAR	City of Rio Vista-Well 10	0.10	0.40	0.006

As discussed in the previous sections, the subsidence RMS network and associated MTs and MOs have been updated to improve the tracking of subsidence conditions in relation to potential impacts on critical

infrastructure. Additionally, the Subbasin intends to continue efforts to ensure that groundwater extraction does not result in any future subsidence impacts to infrastructure.

An UR results occurs regardless of any MT exceedances if reports by local agencies indicate infrastructure impacts as a result of subsidence. A trigger occurs with a MT exceedance by either Annual or cumulative at any RMS location, which prompts evaluation of factors related to groundwater declines. The evaluation will include more in-depth analysis of historical and recent land subsidence in the area of the issue, review of groundwater levels at the nearby water level monitoring network wells, and review of recent changes in land or water use (including recent well construction) in the area to assess whether groundwater extractions or declines in water level caused the reported impact or MT exceedance. If there is an MT exceedance without any reported impacts to infrastructure, there will also be follow up correspondence with operators of critical infrastructure in the associate network area to determine if impacts have been observed. A UR occurs if the evaluation concludes the subsidence is a result of groundwater extraction. Exceedances are not evaluated in areas near the Delta within the extent of the documented occurrence of subsidence caused by peat oxidation and where little groundwater extraction occurs (**Figure 3-18**). If MT exceedances occur without documented impacts to infrastructure, the Subbasin will consider whether the definitions for MTs are appropriate or whether revisions are warranted.

3.3.3. Current Conditions Relative to Sustainable Management Criteria

During the first implementation period there were no MT exceedances (**Table 3-7**). The MO goal was met at least twice at each CGPS station with P267 meeting the MO goal three times. The Subbasin-wide InSAR October-October cumulative annual subsidence during implementation period also indicate conditions that do not significantly differ from the historical normal. Annual rates of subsidence at the newly added InSAR sites have not exceeded their observed fluctuations over the 10-year InSAR record.

Data from the CGPS station located at the SCWA nested monitoring well site in Dixon (DIXN) (SMN01) exhibit an annual vertical displacement (change in elevation) behavior marked by a generally sinusoidal pattern with lower land surface elevations in summer and fall compared to winter and spring (**Figure 3-20a**). This seasonal fluctuation pattern is typical of alluvial groundwater basins under natural and developed conditions as a result of the seasonal cycles of draining and replenishment of the groundwater system during different seasons. The land surface elevation at the DIXN site has historically been relatively stable, although an increased amount of negative vertical displacement (subsidence) is apparent at this site during water year 2021. The vertical displacement at the DIXN site has been very minimal since water year 2021. Over the period of record from 2012 through 2025, the vertical displacement has generally been slightly negative at an average rate of only -0.0122 feet per year (ft/yr) or -0.15 inch per year (in/yr) with only minimal total subsidence (-0.1629 feet or -2.0 inches) over the period of record for water year 2013 to 2025. The DIXN station achieved its measurable objective for WYs 2022 and 2023 and recorded a slight amount of uplift at the site during WY 2023.

Data from the CGPS station at the City of Vacaville MW-16 site (VCVL) (SMN02) indicate stable conditions over its historical record since June 2012, with very small seasonal fluctuations in land surface elevations throughout the year. The VCVL station has exhibited only a very slight downward trend in vertical displacement (-0.0064 ft/yr or -0.08 in/yr) and minimal total subsidence (-0.085 feet or -1.02 inches) from 2012 through 2025. Over water years 2015 through 2025, the vertical displacement at the VCVL site has

continued at a very small rate of subsidence (-0.0057 ft/yr or -0.068 in/yr). The VCVL station achieved its measurable objective and recorded marginal uplift during WYs 2021 and 2022.

P267 (SMN03), located south of Dixon in the central part of the Subbasin, exhibits a similar historical trend in vertical displacement as the DIXN station, although the period of record extends back to 2005. The historical rate of vertical displacement at P267 is -0.013 ft/yr (-0.2701 feet or about 3 inches in total), with only very limited negative vertical displacement since 2022. The site achieved its measurable objective for WYs 2022-2024 and recorded marginal uplift in WY 2022.

Station P266 (SMN04) is in the western part of the Subbasin near the Montezuma Hills and has recorded only very little vertical displacement of -0.1149 feet (-0.0056 ft/yr) since 2005, with almost no long-term vertical displacement since 2019. The site achieved its measurable objective for WYs 2021 and 2022 and recorded marginal uplift in WY 2022.

The CGPS stations show that the land surface elevation fluctuates seasonally by 0.0688 to 0.0957 feet in areas of the Subbasin, with the higher fluctuations occurring in the central areas around Dixon. At the four CGPS stations within the Subbasin the average annual rate of displacement is considerably less than typical season fluctuations. There is currently insufficient information to indicate whether the vertical displacement observed at the stations is reflective of inelastic or elastic conditions. Additional data after recovery from the prolonged drier-than-average period since 1999 and more extreme drought periods ending in 2016 is necessary to determine the nature of any subsidence observed in the Subbasin. The seasonal fluctuations indicate the magnitude of elasticity that can occur as a function of seasonal variability in conditions.

InSAR mapping of land subsidence is particularly useful for observing and tracking spatial patterns in vertical displacement over an area. InSAR data spanning the period from June 2015 to June 2025 suggest that vertical displacement of the land surface across much of the Solano Subbasin and Solano County is slightly negative at amounts between -0.025 and -0.1 feet, with some areas of slightly greater negative values. Areas exhibiting the most negative vertical displacement are located south of the Solano Subbasin near Montezuma Hills, in the Delta regions, and south of Dixon and Davis in the Northern parts of the Solano Subbasin. The largest negative vertical displacements of 0.35 feet (4.2 inches) are observed in an isolated area southeast of Davis.

Annual InSAR maps of October-to-October land surface displacement for water years 2021-2025 show significant variability in annual subsidence rates (**Appendix H**). From October 2020 to 2021, most of the western portion of the Subbasin showed uplift, with increasing rates to the northeast approaching 0.1 feet of negative displacement south of Davis. From 2021 to 2022 the uplift region pushed west to mostly within Vacaville. Negative displacement increased to the northeast and south from Vacaville, approaching 0.1 feet near P266 and Davis. The P266 network indicates uplift over this period which may be the result of the different sampling frequencies and timing. From 2022 to 2023 Dixon and the surrounding area exhibited moderate uplift along with the region between P266 and P267. Vacaville and the surrounding area experienced land surface declines less than 0.005 over this period. Some minimal declines less than 0.05 feet were recorded in the Delta region. From 2023 to 2024 most of the Subbasin with data coverage experienced decline between 0.025 and 0.05 feet with only a small region in east Vacaville approaching 0.1 feet. Some uplift was recorded along Putah Creek. From 2024 to 2025 data coverage spanned most of

the Subbasin and indicated moderate (>0.01 feet) uplift in the region around P266, within Vacaville, east of DIXN and P267, and near Putah Creek. Outside of the Delta region, only the area around Dixon saw declines above 0.025 feet, with a small region south of Davis approaching 0.1 feet. No significant land surface declines were observed in annual InSAR maps for the last 5 WYs, and many years and areas exhibited uplift recently.

InSAR data are additionally utilized at the 16 additional RMS locations near critical infrastructure. Observed InSAR annual rates of subsidence at the sites over the past 10 years ranged from 0.114 feet of decline in 2017 to 0.06 feet of uplift in 2025, both at SMN15. Average rates at all sites vary from 0.005 feet of decline at SMN14 to 0.036 feet of decline at SMN15. The average rate over all sites is 0.015 feet of decline per year, similar to average rates observed at the DIXN and P267 CGPS stations. No annual subsidence exceeded the MT set by the observed seasonal variations at each site (**Figure 3-19b**). Rates are highly variable at most sites, but in all cases of a subsidence observation significantly above the median, a “rebound” is experienced the following year. All sites except SMN13 experienced 2 or more years of uplift, and 33 of the 160 total annual InSAR observations were positive vertical displacements.

5-year cumulative rates of subsidence were also evaluated at the InSAR RMS locations (**Figure 3-19b**). Cumulative rates ranged from a decline of 0.29 feet at SMN15 to an uplift of 0.007 feet at SMN14. Although the largest cumulative decline was observed at SMN15, it has recently rebounded with less than 0.1 feet of cumulative decline over the most recent 5-year period. The average 5-year cumulative rate of decline for all sites is 0.08 feet. The most recent average cumulative rate for all InSAR sites from 2021-2025 is slightly smaller at 0.055 feet, which is nearly identical to the 2021-2025 average rate of 0.065 for the 4 CGPS stations, indicating the methods are generally in agreement with long-term rates. Cumulative rates are low at all InSAR sites, with less variability compared to the annual rates. Many sites have recently indicated a steady decrease in cumulative rates, while none indicate a worsening trend. Recent data at all InSAR sites do not indicate any exceedances or concern for impacts due to rapid or cumulative subsidence.

Impact on Beneficial Users

Solano Subbasin has not experienced any MT exceedances related to subsidence nor have any impacts on critical infrastructure from land subsidence been detected or reported. Historical subsidence data indicate very minimal and gradual amounts of subsidence. Because the magnitude of subsidence is so small, it is difficult to determine whether there is a relationship between the historical subsidence and groundwater extractions. The SMCs for subsidence are based on not exceeding historical subsidence and planned revisions to the SMC now include a larger network of RMS providing broader spatial coverage near critical infrastructure and incorporation of refined MTs to detect significant subsidence on annual and longer-term time scales. Critical infrastructure and one or more nearby groundwater level monitoring wells have been identified in the vicinity of each subsidence RMS, so any subsidence MT exceedance can be compared to local groundwater conditions and nearby infrastructure to evaluate the underlying causes of subsidence and whether infrastructure has been impacted. The modified subsidence monitoring network provides robust protection to critical infrastructure by increasing coverage, adding additional MT requirements, and associating all monitoring sites with nearby groundwater wells to facilitate the evaluation of conditions related to any MT exceedances.

3.4. Degraded Water Quality

Overall groundwater quality conditions in the Subbasin are satisfactory for the different beneficial uses and users identified in the Subbasin. Drinking water is the primary beneficial use with potential to be impacted by degraded water quality. The GSP identifies five constituents of interest for groundwater sustainability including arsenic (As), chloride (Cl), chromium-6 (Cr6), nitrate (NO₃N), and total dissolved solids (TDS). Because of natural hydrogeologic conditions, some groundwater in the Subbasin has areas of historically and naturally occurring high concentrations of arsenic and chromium-6. Chloride concentrations in the Subbasin are generally low apart from the areas to the northwest of the Montezuma Hills, where some higher TDS concentrations exist, likely naturally occurring due to the depositional environment of the sediments. Elevated chloride concentrations in the southwestern corner of the Subbasin (Sherman Island) are also elevated because of the proximity to brackish Delta waterways. Elevated nitrate concentrations occur in the northern parts of the Subbasin, especially near Dixon. Elevated nitrate concentrations are commonly believed to be a result of non-point source activities associated with historical agricultural practices. More localized areas of water quality degradation also with historical point-source contamination where nitrate concentrations can be elevated along with other water quality constituents. Some of these sites are active regulated facilities overseen by the Central Valley Regional Water Quality Control Board. Non-point source impacts on groundwater quality related to irrigated agricultural practices are also regulated by the Central Valley Regional Water Quality Control Board (RWQCB) through the Irrigated Lands Regulatory Program (ILRP). The GSP is not responsible for managing all groundwater quality issues in the Subbasin, but it is responsible for ensuring that groundwater management activities, including the completion of PMAs to maintain sustainability and also groundwater extraction activities, do not exacerbate existing groundwater quality degradation to the extent they adversely impact beneficial users.

3.4.1. Description of Sustainable Management Criteria

In the GSP, a UR for groundwater quality degradation is limited to water quality conditions caused by implementation of GSP PMAs. Management and oversight of groundwater quality issues has historically been and is currently under the purview of other State agencies or programs (e.g., ILRP [typically for nitrate and TDS], RWQCB [for various environmental site contaminants including fuel hydrocarbons, solvents, and others], and Department of Toxic Substances Control [for various environmental site contaminants]). Significant and unreasonable degradation of water quality occurs when beneficial uses and users for groundwater are adversely impacted by constituent concentrations increasing to levels above the drinking water maximum contaminant level (MCL) for one of the key constituents of interest at wells in the RMS water quality monitoring network due to implementation of a GSP PMA or due to groundwater extraction. The MT for degradation of water quality is exceeding drinking water MCLs or the existing constituent concentration plus 20 percent, whichever is greater for each of constituent of interest. A UR occurs when the average concentration of a key constituent over a three-year period exceeds the MT at more than 25 percent of RMS wells.

For constituents with an established drinking water MCL, trigger Levels are also defined at 75% of the MCL. If a key constituent of interest has a three-year average concentration at a RMS well that is above the trigger concentration, the Subbasin will evaluate factors related to increasing constituent concentrations at the well and, if appropriate and determined to be a result of groundwater management

activities, will implement actions to help address the increasing concentrations. The MOs for water quality are defined at levels equal to the recent average concentration determined from baseline sampling for each of the key constituents at each RMS.

3.4.2. SMC Refinement

In DWR's review and determination letter for the Solano Subbasin GSP, DWR included a recommended corrective action relating to how URs are defined in the GSP. DWR recommended that the Subbasin revise the definition of URs to include specific language regarding the effects of groundwater pumping on water quality. The Subbasin proposes the following revision to the definition of URs for water quality in the GSP, a change which is also reflected in the discussion of SMC throughout this PE:

An UR for groundwater quality degradation would be limited to water quality conditions caused by groundwater extraction or implementation of GSP PMAs because management of groundwater quality issues has historically been and is currently under the purview of other agencies or programs (e.g., Irrigated Lands Regulatory Program [typically for nitrate and TDS], RWQCB [for various environmental site contaminants including fuel hydrocarbons, solvents, and others], and DTSC [for various environmental site contaminants]).

Additionally at the time of GSP development, levels for wells with concentrations greater than the MCL were not identified. Since the preparation of the GSP, the GSAs determined that a more inclusive approach for tracking overall groundwater conditions would be to set the trigger for these well as baseline concentrations plus 10%.

3.4.3. Current Conditions Relative to Sustainable Management Criteria

The average three-year groundwater quality concentrations in relation to SMC for the five key constituents of interest during the first five years of the GSP implementation period are summarized in **Table 3-10**. **Figures 3-21 through 3-25** present maps of water quality MT exceedances during the GSP implementation period to date for each of the key constituents of interest and **Figures 3-26 to 3-30** display water quality concentrations relative to the established MOs. **Appendix F and G** summarize results and present time series water quality concentration data for all wells in the GSP monitoring network. The GSP identifies 27 RMS wells in water quality monitoring network; however, since the GSP submittal two wells have been removed and replaced in the network because of access or other issues reported by the monitoring entity. **Section 6** of this PE provides more detail on the GSP water quality monitoring network.

There have been five MT exceedances for water quality during the GSP implementation period to date: one for arsenic, four for chromium-6. Water quality was not consistently monitored in the RMS wells designated in the GSP during the initial five years of the GSP implementation period. The GSP water quality monitoring program relies heavily on local monitoring entities to conduct water quality sampling and report laboratory analysis results from these efforts. This has led to incomplete monitoring of water quality conditions in RMS wells, a topic which is further discussed in **Section 6** of this PE. There are ongoing efforts occurring to address challenges related to achieving complete and consistent monitoring of RMS in the GSP water quality monitoring network for key constituents of interest.

Table 3-10 Water Quality Sampling Results during Implementation Period (2021-2025)

Well Id	Current Status in Monitoring Network	Aquifer	Water Year 2021					Water Year 2022					Water Year 2023					Water Year 2024					Water Year 2025				
			As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS
SVWQC00011	In Original Network	Alluvial/Upper Tehama				6.3			120		5.93	930		120		5.3667	930		120		5.1	930				4.55	
SVWQC00012	In Original Network	Alluvial/Upper Tehama		29		10.267	660		25		8.77	680		25		7.5333	680		25		5.8333	680				5.5	
07N01E08N002M	In Original Network	Alluvial/Upper Tehama																									
07N01E14J001M	Removed from Monitoring Network	Alluvial/Upper Tehama	0	22		11.407	540	0	22		11.757	540	0	22		12.5	540										
07N01E14N003M	Added to Network	Alluvial/Upper Tehama																									
08N01E32N001M	Removed from Monitoring Network	Alluvial/Upper Tehama																									
08N01E36Q002M	Added to Network	Alluvial/Upper Tehama																									
08N01E35K001M	In Original Network	Alluvial/Upper Tehama	2.5	11		2.7	320	1.25	12		4.4	350	0	13		6.1	380	0	12.5		4.95	345	0.9	12	12	3.325	317.5
4810008-025	In Original Network	Alluvial/Upper Tehama	0	6.9	0	0	280	0	6.9	0	0	280															
4810009-003	In Original Network	Alluvial/Upper Tehama	2.3	12	15	3.35	320	2.3	12	15	3.4167	320	2.3	12	15	4.18	320	0	11	15	4.25	350	0	11	17	4.4	350
4810008-007	In Original Network	Basal Tehama	2.7	17	8.6	1.53	400	2.7	17	8.6	1.4	400	2	16	8.6	1.4	360	2	16	9.1	1.43	360	2	16	8.9667	1.4	360
4810008-030	In Original Network	Basal Tehama	7.29	7.9	22	0.28	310	7.28	7.9	22	0.29	310	6.94	8.3	30	0.40	300	6.89	8.3	27.5	0.38	300	6.61	8.3	26	0.38	300
4810013-001	In Original Network	Basal Tehama	5.56	9.1	4.1	0.81	350	6.08	9	3.8	0.79	380	5.91	9	3.8	0.85	380	5.44	9	3.8	0.92	380	5.03			0.91	
3400122-001	In Original Network	Unknown	5.3			0.87		5.3			0.87		4.05			0.86		4.05	7.9		0.89	180	4.05	7.9		0.90	180
3400192-001	In Original Network	Unknown		11		0	150	4.05	11		0	170	4.05	11		0	170	4.05	11		0	170	3.3	5	0	0	290
3400420-001	In Original Network	Unknown	63.67			0.67		59.08			0.43		64.66			0.43		72.83			0		74.333			0	
3400444-001	In Original Network	Unknown				0					0					0					0					0	
3400455-001	In Original Network	Unknown				0					0					0					0					0	

Table 3-10 Water Quality Sampling Results during Implementation Period (2021-2025)																											
Well Id	Current Status in Monitoring Network	Aquifer	Water Year 2021					Water Year 2022					Water Year 2023					Water Year 2024					Water Year 2025				
			As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS	As	Cl	Cr ⁶	NO3-N	TDS
3410047-001	In Original Network	Unknown	14.56	5.8	0	0	130	14.75	5.8	0	0	130	14.583	5.35	0	0	113	15.667	5.5	0	0	118	16.028	5.8333	0	0	146
3410302-002	In Original Network	Unknown				0					0					0					0					0	
4800612-001	In Original Network	Unknown				0					0					0					0		9			0	
4800709-001	In Original Network	Unknown				0.3										0.3					0.3					0.3	
4800786-001	In Original Network	Unknown				1.00					0.99					0.96					0.96					0.96	
4810004-003	In Original Network	Alluvial/Upper Tehama	7.99	112		0.9	459.17	8.01	112		1.37	463.33	7.93	159		1.45	468.75	7.78			1.9	430					
4810004-004	In Original Network	Alluvial/Upper Tehama	13.60	35		0	416.89	14.074	40		0	428.06	14.556	40		0	433.33	15.093	40	0	0	436.67	15.481		0	0	429.17
4810011-001	In Original Network	Unknown	0	18	2	2.2	380	0	18	2	1.8	380				2.5667		0	18	1.8	2.7	530	0	22.5	1.9	2.73	530
4810020-001	In Original Network	Unknown	2.4		14	3.55		0			4.4111		0			6.7194		0			7.1528		0		10.067	7.13	
4810023-001	In Original Network	Unknown				0					0					0					0					0	
4810801-002	In Original Network	Unknown	7.2			0.40		7.2			0.36		5.6			0.2633		5.6			0.28		5.6		0.43	0.27	
MT Exceedances			0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	2	0	0
Achieved IM			11	7	4	19	6	10	9	0	19	5	11	5	3	18	4	13	8	5	18	5	11	6	5	17	4

Arsenic

Arsenic concentrations are generally below the MO for the RMS network. Many of the water quality RMS wells were not sampled for arsenic during the implementation period to date. Three-year average arsenic concentrations measured in water quality RMS wells during the implementation period are presented in **Table 3-10**. Of the RMS wells sampled during this period, 70% of the wells meet the MO for arsenic. The one well with an MT exceedance for arsenic (Well 3410047-001) is located in the Delta region of the Subbasin where elevated concentrations of arsenic have been documented historically. While the arsenic concentrations measured in the well during the implementation period do exceed the MT, they are within the range of historical values and do not appear to be associated with groundwater extraction or other GSP management activity. There is very limited groundwater extraction in the area beyond the use of groundwater for domestic and public water systems. The elevated arsenic concentrations exhibited in the well and in the Subbasin are thought to be a result of naturally low dissolved oxygen concentrations in groundwater produce reducing geochemical conditions that increase the solubility of arsenic (Bennett et al., 2011) and mobilize arsenic found in natural mineral deposits within aquifer sediments. Historical arsenic concentrations at this well have generally been above the MCL which is why a MT of 16 µg/L (above the MCL of 10 µg/L) was calculated for this RMS well; however, concentrations have been generally stable through the implementation period to date, with most concentrations between the MO and the MT level for the well.

Chloride

There have not been any MT exceedances for chloride in the RMS network and generally concentrations are below 20 mg/L, considerably below the MT and the MCL of 250 mg/L. Three-year average chloride concentrations measured in water quality RMS wells during the implementation period are presented in **Table 3-10**. Chloride concentrations are of particular interest in the southern Subbasin where they are used to detect any potential influence on groundwater quality from induced migration of brackish water from Delta waterways.

Chromium-6

Chromium-6 is a key constituent of interest because of its common natural occurrence in the Subbasin at concentrations that sometimes exceed the drinking water MCL. Three-year average concentrations of chromium-6 as measured in water quality RMS wells during the implementation period are presented in **Table 3-10**. There have been four MT exceedances for chromium-6 during the implementation period to date including one in WY 2023 and WY 2024 and two in WY 2025. Well 4810008-030 has historical chromium-6 concentrations above the MCL of 10 µg/L, and as outlined in the GSP, the MT concentration for the well is set at 25 µg/L. Since the MT exceedance in WY 2023 concentrations at Well 4810008-030 have been above the MT Well 4810009-003 was sampled for chromium-6 three times in the implementation period, concentrations have decreased since WY 2023. Well 08N01E35K001M has not historically monitored for Cr6 after successfully recruitment monitoring for chromium-6 began in 2025. Concentrations are above the MCL after sufficient monitoring has occurred the MT may be revised to account for baseline conditions. These wells are located in a region of the Subbasin where chromium-6 is elevated as a result of the natural geochemistry not a result of anthropogenic influences or the actions or inaction of the GSAs during GSP implementation.

Nitrate

Nitrate is one of most consistently sampled water quality constituent in the Subbasin and during the implementation period. It is of the most common groundwater quality contaminant in irrigated areas across the State and it is commonly sampled in domestic and public water system wells to ensure levels are below the drinking water MCL. It is also commonly sampled in irrigation wells because of interests related to how much supplemental nitrogen is needed for agricultural crops. Three-year average nitrate concentrations measured in water quality RMS wells during the implementation period are presented in **Table 3-10**. Most nitrate concentrations at RMS were above the MO (77%). In WY 2023 it was noted that concentrations of Nitrate increased in wells sampled for the ILRP Drinking Water Well Monitoring program (DWWMP). In reviewing nitrate concentration data within the Subbasin in 2023, a surprisingly high number of wells sampled as part of the ILRP DWWMP had very low nitrate concentrations in 2022, with large spikes in concentrations in 2023. Whether this spike in nitrate is real or a result of a systematic data reporting error is still part of an ongoing investigation, including through coordination with the SWRCB, which is responsible for receiving and hosting these data. Results from any subsequent sampling conducted on wells with somewhat anomalously high concentrations in 2023 may also be reviewed or follow-up sampling of wells may be conducted to evaluate whether the high concentrations were an anomaly. If persistently elevated nitrate concentrations continue to occur in wells after the jump in 2023, additional evaluation of the potential causes will be conducted; however, because no significant GSP PMAs had been implemented in the Subbasin prior to 2023 and no notable changes in groundwater extraction had occurred, the increase in nitrate concentration is unlikely to be a result of groundwater management activities.

TDS

TDS concentrations in groundwater in the Subbasin is generally good and all of the RMS wells in the Subbasin have recent historical TDS concentrations below the secondary upper MCL of 1,000 mg/L, and many of the wells have concentrations below the recommended MCL of 500 mg/L. Three-year average TDS concentrations measured in water quality RMS wells during the implementation period are presented in **Table 3-10** and illustrate this pattern. Since the start of the GSP implementation period, there was no water quality exceedance for TDS.. To date there are no indications that TDS concentrations in RMS well have been significantly affected by GSP-related groundwater management activities in the Subbasin.

Impact on Beneficial Users

There have been no URs related to groundwater quality and no impact to beneficial users in the Subbasin resulting from exacerbation of groundwater quality degradation caused by PMAs or other groundwater management activities during the GSP implementation period. While there was one well with a MT exceedance for Chromium-6 this is not a result of actions or inactions from the GSAs management of the Subbasin. Municipal and domestic supplies are the most restrictive beneficial uses for groundwater quality with water quality objectives equal to drinking water MCLs. Setting the groundwater quality MTs for key constituent concentrations at respective drinking water MCLs, or within historical concentrations when existing or historical concentrations already exceed the MCL, is intended to limit degradation of groundwater quality caused by GSP-related PMAs and other groundwater management activities and

protect municipal and domestic drinking water beneficial uses. Protection of municipal and domestic drinking water beneficial uses is also protective of other groundwater beneficial uses.

3.5. Depletion of Interconnected Surface Water

Major surface water features in the Subbasin include Putah Creek, Sweeney Creek, Ulatis Creek, Cache Slough, Steamboat Slough, Sacramento River, Mokelumne River, and the San Joaquin River. Many smaller waterways also exist in the Subbasin. Multiple streamflow and stage monitoring sites exist in the Subbasin and surrounding areas providing a long history of surface water conditions. Surface water monitoring sites include stations monitored by DWR, USGS, and SCWA. Many of these stations are located in the Delta area with additional sites throughout the Subbasin to monitor conditions on Putah Creek, Alamo Creek, Sweeney Creek, Ulatis Creek, and water conveyance canals. The GSP provides an evaluation of surface water and groundwater interactions and characterization of surface water features and their potential for interconnectedness with groundwater. Since the completion of the GSP, the Subbasin has also completed a more in-depth assessment of likely (GDEs), as described in **Section 2**. This assessment was completed by The Freshwater Trust and is presented in **Appendix D**.

3.5.1. Description of Sustainable Management Criteria

The definition of a UR for depletion of interconnected surface water is excessive regional groundwater pumping that results in reductions in flow or stage of major surface water features that are hydrologically connected to groundwater in the Subbasin, and which cause significant and unreasonable impacts to beneficial uses and users of surface water (e.g., surface water rights holders, environmental users/GDEs). The GSP defines SMC metrics for URs with respect to streamflows along Putah Creek with groundwater levels used as a proxy in other parts of the Subbasin. The GSP defined a UR for depletion of interconnected surface water as a condition when either the flow requirements and other conditions stipulated in the Putah Creek Accord are not met or maintained or 30 percent of ISW RMS wells experience water levels below the MT for two consecutive years as a result of groundwater pumping occurring within the Subbasin. Use of the Putah Creek Accord and 30 percent criterion for RMS MT exceedances constituting a UR provides an appropriate balance between recognizing the potential occurrence of localized conditions versus conditions representative of a more significant fraction of the Subbasin. The occurrence of any UR would be evaluated with respect to the causes for such conditions and the relationship to sustainable management activities occurring within the Subbasin.

Putah Creek is regulated to ensure that there is adequate water to serve the various ecological functions of the Creek. The Putah Creek Accord (Accord) summarizes the flows required to be maintained in the Creek based on a settlement agreement and the Solano Project operators are required to release sufficient surface water stored in Lake Berryessa to maintain these flows. The required flow conditions specified in the Accord serve as MTs for depletion of interconnected surface water along Putah Creek. Groundwater levels are also used as a proxy to measure interconnected surface waters, since groundwater levels are the key driver related to depletion of interconnected surface water. The MT groundwater levels assigned to RMS wells designed as proxy sites are based on the minimum observed static groundwater elevation during the base period prior to 2015. It was determined that because the magnitude of flows in the Delta are so large and groundwater levels are so shallow in this area of the Subbasin with very limited groundwater pumping, that any depletions of surface water in Delta waterways

resulting from groundwater pumping within the Subbasin are not insignificant and no RMS or MTs are needed in this area- of the Subbasin at this time. Triggers level were defined as any MT exceedance, which initiates evaluation of factors related to groundwater declines and associated stream depletion.

3.5.2. SMC Refinement

The MOs and IMs are based on the compliance with the Putah Creek Accord for Putah Creek. The MOs and IMs for ISW are based on the MOs and IMs for chronic lowering of groundwater levels. Accordingly, the refinements made to MOs for groundwater levels in this PE, as described in **Section 3.1.2**, will also apply to the ISW SI

3.5.3. Response to Corrective Actions

In DWR's review and determination letter for the Solano Subbasin GSP, DWR included a recommended corrective action relating to the ISW. The recommended corrective action included three aspects:

- 1) fill data gaps through continued monitoring and data collection and complete additional characterization of locations and timing of interconnectivity
- 2) collaborate and coordinate with local, state, and federal agencies to fully understand surface water beneficial users with potential to be impacted by streamflow depletion
- 3) consider ISW guidance from DWR, when available, in establishing and refining.

Although guidance on addressing ISW in GSPs has yet to be released by DWR, the Subbasin has undertaken a variety of activities since submittal of the GSP to fill data gaps, improve characterization of ISW, identify surface water beneficial users, and evaluate potential changes to SMC based on additional information collected during the first five years of the GSP implementation period and ISW technical papers released by DWR.

ISW Monitoring Enhancements

In Fall 2024, the Subbasin installed an additional stage monitoring gage along Putah Creek near Stevensons Bridge Road and outfitted the gage with an automated monitoring pressure transducer. Three wells were also added to the GSP monitoring network in the vicinity of this gage to support the understanding of interconnectivity between groundwater and surface water in this area. In Winter 2026 an additional shallow groundwater monitoring well site was installed near Putah Creek near the Pedrick Road crossing. The monitoring site includes two nested monitoring wells screened at two different depths within the shallow part of the groundwater system and was equipped with pressure transducers. Data developed through the monitoring conducted at these sites, together with monitoring of shallow groundwater conditions at four other sites adjacent to Putah Creek and one site adjacent to Lindsay Slough, will enhance the characterization of ISW in the Subbasin. Additionally, there is ongoing coordination with SCWA to evaluate the needs and benefits related to additional surface water monitoring gages in parts of the Subbasin and to complete elevation surveying of the existing surface water monitoring sites along Putah Creek to facilitate comparison of groundwater and surface water elevations and flow gradients. The Subbasin is currently conducting outreach to tribal communities to ensure that GSP ISW monitoring is sufficient to detect changes in conditions in any culturally significant areas.

Refined Hydrogeologic Conceptualization and Characterization of ISW

In the GSP cross sections developed for Putah Creek, including one that followed the stream channel for the entirety of the Subbasin and then multiple smaller ones that transected the creek. During the implementation period several new cross sections were proposed to also transect Putah Creek. These cross sections were developed using local well lithology and AEM data provided by DWR. A technical document presenting the cross sections is planned for completion in Spring 2027.

Evaluation of Surface Water Beneficial Users

To improve characterization of groundwater beneficial users and the location of surface water diversions and deliveries the Subbasin completed an inventory of wells and surface water diversions in the Subbasin. The updated datasets were utilized in the updated water budget to improve groundwater pumping volumes estimate and spatial distribution which allows for better assessments of unmet water demand, ultimately refining calculations of groundwater reliance. The Subbasin also conducted a GDE health assessment as summarized in **Section 2.8**.

Additionally, The Subbasin has reviewed the technical papers related to ISW that were released by DWR in 2024 and the content in these papers is being incorporated into the GSP monitoring and evaluation of ISW conditions in the Subbasin. At the time of this PE, DWR had not released GSP guidance on addressing ISW conditions. The Subbasin will review and consider ISW guidance provided by DWR when it becomes available and at that time will evaluate if changes to the ISW SMC are warranted for future updates to the GSP.

Hydrologic Modeling Refinements and Analysis

Substantial refinements to the Solano IHM were completed during the GSP implementation period to date, including refinements to stream channel geometry and streamflow rating curves. Model simulations were used to estimate stream seepage and stream depletion during select stream reaches **Section 5.3 and 5.4** provide more details on model refinements.

3.5.4. Current Conditions Relative to Sustainable Management Criteria

No URs related to ISW occurred in the Subbasin during the first five years of the GSP implementation period. During the implementation period one ISW RMS well experienced groundwater levels below the MT during three consecutive years from WY 2023 through WY 2025 resulting in an MT exceedance for ISW. A UR occurs when more than 30% of ISW RMS wells experience an MT exceedance. **Table 3-11** summarizes data for all of the ISW RMS wells over the implementation. Additional evaluation of groundwater level data and conditions relating to the one ISW MT exceedance is summarized in the discussion of groundwater level conditions in **Section 3.2.2**. Two ISW RMS wells were removed from the GSP monitoring network because the wells were dropped from DWR's monitoring program and efforts by the GSAs to resume monitoring of these wells have been unsuccessful. **Table 3-12** provides a summary of measured flows in Putah Creek at each ISW RMS gage site during the implementation period relative to MTs defined in the GSP, which are aligned with flow requirements specified in the Putah Creek Accord. Streamflow conditions in Putah Creek during the implementation period were above the MTs defined in the GSP with all mean daily passing flows in Putah Creek above the required flow values with many months

experiencing flow values in Putah Creek that were two or three times those required by the Putah Creek Accord.

DRAFT

Table 3-10 ISW Monitoring Network SMC Summary												
Well Name	Aquifer Designation	Current Status in GWL Monitoring Network	RPE	Minimum Threshold (ft, NAVD88)	Measurable Objective (ft, NAVD88)	Fall Minimum Groundwater Elevation (ft, NAVD88)					Count of MT exceedances	Count of achieving MO
						WY 2021	WY 2022	WY 2023	WY 2024	WY 2025		
06N01E12M001M ¹	Alluvial/Upper Tehama	In Original Network	42.55	25.7	30.4			10.8	21.7	20.5	3	0
MW-15-188ft	Alluvial/Upper Tehama	In Original Network	95.40	63.3	73.2	76.40	76.40	77.40	76.40	76.90	0	5
05N02E25K001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	3.55	-8.4	-1.4	-0.75					0	1
06N01E17M001M ⁴	Alluvial/Upper Tehama	In Original Network	66.27	48.1	55.3	56.2	54.89	54.77	55.37	55.47	0	2
06N02E19J001M	Alluvial/Upper Tehama	In Original Network	26.02	10.8	17.7	15.92	14.52	16.41	17.99	17.32	0	1
07N01W13H001M ³	Alluvial/Upper Tehama	Removed from Monitoring Network	108.60	88.0	92.9							
SSGSA-01a ⁷	Alluvial/Upper Tehama	Added to Network	115.75	77.0	86.2			76.96	80.02	82.57	0	0
SSGSA-01b ⁷	Alluvial/Upper Tehama	Added to Network	115.82	55.6	74.1		55.58	77.03	80.09	82.64	0	3
SSGSA-02a ⁷	Alluvial/Upper Tehama	Added to Network	107.57	48.6	57.4		48.59	51.79	58.41	64.55	0	2
SSGSA-02b ⁷	Alluvial/Upper Tehama	Added to Network	107.45	16.5	42.8		16.50	38.31	43.41	43.36	0	2
SSGSA-03a ⁷	Alluvial/Upper Tehama	Added to Network	95.77	70.1	73.3		71.79	70.09	72.53	72.91	0	0
SSGSA-03b ⁷	Alluvial/Upper Tehama	Added to Network	95.75	10.4	38.9		10.41	30.78	39.94	35.86	0	1
SSGSA-05a ⁷	Alluvial/Upper Tehama	Added to Network	100.81	52.5	55.6		52.48	53.19	56.11	56.45	0	2
SSGSA-05b ⁷	Alluvial/Upper Tehama	Added to Network	100.64	51.6	55.1		51.55	52.71	55.84	55.73	0	2
SSGSA-06a ⁷	Alluvial/Upper Tehama	Added to Network	10.46	0.1	1.2		1.10	0.06	1.38	1.14	0	1
SSGSA-06b ⁷	Alluvial/Upper Tehama	Added to Network	10.32	3.3	3.5		3.25	3.39	3.39	3.26	0	4
SSGSP-11 ⁸	Alluvial/Upper Tehama	Added to Network	74.11	--	--							
SSGSP-12 ⁸	Alluvial/Upper Tehama	Added to Network	74.883	--	--							

Table 3-10 ISW Monitoring Network SMC Summary												
Well Name	Aquifer Designation	Current Status in GWL Monitoring Network	RPE	Minimum Threshold (ft, NAVD88)	Measurable Objective (ft, NAVD88)	Fall Minimum Groundwater Elevation (ft, NAVD88)					Count of MT exceedances	Count of achieving MO
						WY 2021	WY 2022	WY 2023	WY 2024	WY 2025		
SSGSP-15 ⁸	Alluvial/Upper Tehama	Added to Network	23	--	--							
MT Exceedances						8	10	5	5	5		
MO Achieved						5	2	5	12	11		

Notes:

- 1- Successfully re-recruited, monitoring resuming Spring 2024
- 2- Well Destroyed Spring 2026
- 3- No Access, ongoing efforts to re-recruit unsuccessful
- 4- MT is set 5 feet below deepest depth to water over the base period to allow for operational flexibility
- 5- MT and MO have been updated. Recent investigation has revealed that multiple agencies were monitoring, MT and MO have been updated to reflect changes
- 6- MT and MO is based on SMC outlined in GSP
- 7- MT and MO is based recent available data
- 8- Monitoring began in 2026 MT and MO will be set after sufficient monitoring

Meets MO
Within two ft of meeting MO
Within two ft exceeding MT
Exceeds MT

Table 3-11 Summary of Putah Creek Accord												
	October	November	December	January	February	March	April	May	June	July	August	September
Specified Rearing Flow Requirements (cfs)												
Required Mean Daily Flows in Lower Putah Creek (cfs)	5	10	10	15	15	25	30	20	15	15	10	5
Required Mean Daily Flows in Lower Putah Creek (cfs)												
WY 2021	10.5	30.9	25.5	24.6	26	27.8	Data not available					
WY 2022	23	44	41	23	22	36	51	33	24	20	12	12
WY 2023	23	44	41	23	22	36	51	33	24	20	12	12
WY 2024	35.3	29.4	27	65.8	110	133	40.7	34.3	51.2	50.9	25.6	35.3
WY 2025	41.6	40	30.4	28.4	60.6	--	71.7	50.1	41.2	37.7	28.5	24.1
Supplemental Flows												

Table 3-11 Summary of Putah Creek Accord											
October	November	December	January	February	March	April	May	June	July	August	September
1) Between November 1st and December 15th mean daily flows at the point Lower Putah Creek discharges into the Toe Drain needs to be at least 5 cfs with an instant read of 2 cfs.											
2) For 5 consecutive days between November 15th and December 15th mean daily flow at Putah Diversion Dam needs to be at least 50 cfs with an instantaneous flow of 45 cfs.											

Impact on Beneficial Users

No URs relating to ISW occurred in the Subbasin during the implementation period and no significant adverse impacts to surface water beneficial users have been documented in the Subbasin during the period. The MTs defined in the GSP for ISW will help protect beneficial uses/users that are dependent on streamflow, which may include potential GDEs along particular reaches of some creeks. While there have been no URs related to ISW to date, the MTs defined in the GSP could lead to the need for reduced groundwater pumping in areas of the Subbasin in close proximity to surface water bodies if MT exceedances occur or if the magnitude of stream depletion caused by pumping make achieving the MTs related to streamflow in the Putah Creek not possible.

3.6. Seawater Intrusion

The Solano Subbasin is not located adjacent to the Pacific Ocean. As such, seawater intrusion is not directly applicable to the Solano Subbasin. Although the Subbasin is not adjacent to the Pacific Ocean, the Delta consists of numerous surface water sloughs interconnected with the Sacramento and/or San Joaquin Rivers, which flow into San Pablo Bay, then into San Francisco Bay, and through the Golden Gate to the Pacific Ocean, a distance of more than 50 miles. The salinity of the Delta has been variable during most of its history due to variations in freshwater flow within the watershed and from tidal fluctuations but has been relatively stable since the late 1940s. Very little groundwater pumping occurs in the Delta area of the Subbasin and the potential impact of the intrusion of surface water salinity from the Delta into groundwater is addressed through SMC defined to manage groundwater quality in the Subbasin as described in **Section 3.4**.

3.7. Response to Corrective Actions

On January 18th, 2024 DWR issued an approval of the Solano Subbasin GSP. The GSP approval letter from DWR recommends three corrective actions to address in future GSP updates. The following section summarizes DWR's recommended GSP corrective actions and the status of Subbasin efforts undertaken to address each. Greater detailed discussion of how the Subbasin has addressed each recommended corrective action and proposed modifications to GSP SMCs based on recommended corrective actions is provided in above sections about the SI each recommended corrective action relates to.

3.7.1. Recommended Corrective Action 1

The language in DWR's Recommended Corrective Action 1 is below.

Revise the definition of undesirable results for degraded groundwater quality so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSAs have implemented pumping regulations or not, are considered in the assessment of undesirable results in the Subbasin. Under SGMA, GSAs are responsible for monitoring and managing potential water quality degradation caused by groundwater extractions in the Basin.

The SMC for groundwater quality in the Subbasin, including the definition of an undesirable result and the incorporation of causes related to groundwater extraction, has been updated. **Section 3.1** outlines proposed modifications to the groundwater quality SMC to address this recommended corrective action.

3.7.2. Recommended Corrective Action 2

The language in DWR's Recommended Corrective Action 2 is below.

Revise the proposed sustainable management criteria for land subsidence as follows:

- a. Identify critical infrastructure susceptible to land subsidence and describe what constitutes significant and unreasonable effects. Define the rate (vertical displacement over time) and extent (lateral extent and total vertical displacement) of land subsidence considered to cause these significant and unreasonable impacts.*
- b. Describe how minimum thresholds and the quantitative identification of undesirable results defined for the land subsidence monitoring network are protective of the rate and extent of land subsidence considered significant and unreasonable.*
- c. Revise or expand the land subsidence monitoring network to be able to sufficiently detect land subsidence throughout the Subbasin. Department staff understand that portions of the Subbasin near the Delta may experience land subsidence due to the decomposition of peat, which is unrelated to groundwater extractions. The GSP may develop an evaluation process where groundwater level data is used in conjunction with land subsidence data to disregard this type of land subsidence, if detected.*

Since the submittal of the GSP, the Subbasin has continued to review and track land subsidence conditions using CGPS and InSAR data and has completed an inventory of critical infrastructure susceptible to subsidence, including outreach to operators of critical infrastructure in an effort to determine the tolerance of infrastructure to land subsidence for use in updating SMCs. The results of these efforts are presented above in **Section 3.3** of this PE, including proposed refinements to the land subsidence monitoring network and SMC with consideration of the additional information on land subsidence and critical infrastructure in the Subbasin.

3.7.3. Recommended Corrective Action 3

The language in DWR's Recommended Corrective Action 3 is below.

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, Subbasin-wide 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 update:

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.

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

At the time of this PE, DWR has not publicly released guidance on establishing SMC for ISW. Nevertheless, the Subbasin has been working to continue and expand ISW monitoring in the Subbasin to improve the characterization of conditions related to ISW. These efforts are described in greater detail in **Section 3.5** of this PE and include the following activities:

- Enhancements to ISW monitoring - addition of ISW monitoring sites, surveying stream stage sites to relate surface water and nearby groundwater elevations
- Refined hydrogeologic conceptualization and ISW characterization – enhanced geologic cross sections near ISW monitoring sites, assessment of gaining and losing conditions along stream reaches based on stream gage data
- Hydrologic model refinements and analysis – refinements to stream geometry and rating curves represented in the model, use of model to evaluate ISW conditions and stream depletion along select stream reaches
- Evaluation of surface water beneficial users – completion of surface water diversion inventory, refined GDE assessment
- Review of DWR ISW technical resources - reviewed DWR's ISW technical papers and incorporated content into monitoring and evaluation of ISW conditions, will review ISW guidance when available and evaluate if changes to the ISW SMC are warranted

3.8. Summary of Existing and Refined SMC

The Solano Subbasin sustainability goal is supported by SMC, including measurable objectives, minimum thresholds, and interim milestones that allow quantitative assessment of sustainable groundwater management in the context of avoiding undesirable results. Additionally, triggers enable the Subbasin to proactively prevent an undesirable result by defining prompt analyses and initial responses. The SMC, including triggers and response actions, are summarized in **Table 3-13**. The Subbasin continues to work with local agency to coordination on monitoring for RMS for the SI monitoring networks. Despite favorable relationships between landowners/growers and GSA Staff/Consultants coordination has been slow at

times. Monitoring the various constituents of interest has proven difficult. During the next implementation period the Subbasin will continue to evaluate wells for inclusion or removal in the monitoring network.

DRAFT

Table 3-13 Summary of MTs, MOs, URs, Trigger Levels and Selection Rationale

Sustainability Indicator	SMC Selection Considerations/Rationale	SMC Metric	Representative Monitoring Used	Minimum Threshold (MT)	Measurable Objective (MO)	Undesirable Result (URs)	Trigger Levels
Chronic Lowering of Groundwater Levels (GWL)	Locations based on groundwater use and historical groundwater conditions, density of domestic wells, disadvantaged communities reliant on GW, GDEs.	Fall groundwater elevation	Separate RMS wells for Alluvial Aquifer/Upper Tehama and Basal Tehama Zones	<u>Alluvial Aquifer/Upper Tehama Zone:</u> - Minimum static groundwater elevation in the base period (Water Year 1991 prior to January 2015), with consideration for operational flexibility. <u>Basal Tehama Zone:</u> - Fifty feet below the recent five year average static groundwater elevation (prior to January 2015)	Average static groundwater elevation in the base period (prior to January 2015)	30 percent of RMS wells below MTs for two consecutive years	Trigger level is any MT exceedance. Trigger levels initiate evaluation of factors related to groundwater declines.
Reduction of Groundwater Storage	Currently the Subbasin is pumping at or below the Sustainable Yield, GWL will be used as a proxy to determine overall changes	Fall groundwater elevation	Groundwater contours elevation	<u>Alluvial Aquifer/Upper Tehama Zone:</u> - Minimum static groundwater elevation in the base period (prior to January 2015) <u>Basal Tehama Zone:</u> - Fifty feet beyond the recent five year average static groundwater elevation (prior to January 2015)	Average static groundwater elevation in the base period (prior to January 2015)	30 percent of wells below MTs for two consecutive years	Trigger levels are the same as chronic lowering of groundwater levels.
Seawater Intrusion	Not Applicable – The Subbasin is not located along the Pacific Ocean, however potential for impacts from ancient conditions or future acute instances will be monitored via chloride concentrations, as part of the degraded water quality sustainability indicator	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 3-13 Summary of MTs, MOs, URs, Trigger Levels and Selection Rationale

Sustainability Indicator	SMC Selection Considerations/Rationale	SMC Metric	Representative Monitoring Used	Minimum Threshold (MT)	Measurable Objective (MO)	Undesirable Result (URs)	Trigger Levels
Land Subsidence	The Subbasin does not have documented inelastic subsidence or impacts to surface infrastructure. SMCs consider historical rates of displacement, seasonal fluctuations in displacement.	Annual rate of vertical displacement	Existing subsidence monitoring stations	Annual subsidence rate exceeding the historical average range of the yearly fluctuation in vertical displacement	Rate of vertical displacement equal to average historical rate of vertical displacement	A RMS location exceeding MT for three consecutive years	Trigger Level is a MT exceedance at any location. Trigger levels would initiate a review of factors related to negative displacement rates
Degraded Water Quality	The MT accounts for applicable state and federal water quality standards. Constituents of Concerns were based on communication with water suppliers and historical elevated water quality results.	Concentrations for nitrate, TDS, arsenic, chloride, Cr6	RMS wells monitored by GSAs and for other programs	Drinking water MCLs or existing concentration plus 20%, whichever is greater.	Current concentrations of nitrate, arsenic, chloride, TDS, Cr6.	Greater than 25 percent of wells above the MT for the same constituent, based on average of most recent three-year period.	For constituents with Primary MCL MT, Trigger Level set at 75% of MCL. Trigger initiates evaluation of factors related to increasing constituent concentrations.
Depletion of Interconnected Surface Water	- Putah Creek has a long standing historical guidance for flows. - GDE distribution/viability and reduction in surface water availability were considered. Smaller streams are confounded by management and are not sufficient indicators of stream depletions WLs are used as a proxy - Flows in the Delta are so large, and GW is so shallow that depletions are not significant	Putah Creek streamflow; WLs as proxy elsewhere	Existing Putah Creek Accord compliance flow stations and select WL RMS wells	- Minimum Flows for Putah Creek outlined in the Putah Creek Accord. - Minimum static groundwater elevation in the base period (prior to 2015) for wells located in close proximity to groundwater connected waterways	- Compliance with the Putah Creek Accord for Putah Creek. - Average static groundwater elevation in the base period	- Non-compliance with the Putah Creek Accord flow requirements along Putah Creek. 30 percent of wells below MTs for two consecutive years	Trigger level is any MT exceedance. Trigger levels initiate evaluation of factors related to groundwater declines.

4. PROJECTS AND MANAGEMENT ACTIONS

GSP Regulation § 356.4 (b)

A description of the implementation of any projects or management actions, and the effect on groundwater conditions resulting from those projects or management actions.

4.1. Overview

In accordance with GSP regulations §356.4, this section describes the PMAs identified in the GSP and the status of their implementation to date. Because Solano Subbasin was determined to be sustainable at the time of the GSP and no URs occurred during the first five years of the GSP implementation period, PMAs have been identified as an optional element of the GSP implementation. Nevertheless, a range of potential PMAs were identified in the GSP that could be implemented as part of proactive groundwater management efforts and in the event that conditions change in a way that was not anticipated and action is needed to maintain sustainability.

4.2. Policies and Ordinances Developed

The GSP identified policies and ordinances that could be implemented if the Subbasin was no longer meeting the sustainability goal. The policies included a well permitting ordinance and ordinances to regulate groundwater use and regulate illegal diversions of surface water. The Subbasin has maintained sustainability during the implementation and the policies were not executed. The Subbasin continues to explore a variety of policies to promote and incentivize actions by landowners and water users to build watershed resilience, including actions within the Subbasin to conserve water, enhance recharge, and reduce stormwater runoff.

4.3. PMAs Identified in 2022 Solano Subbasin GSP

During development of the GSP, analyses of historical, current, and future water budget suggested the Subbasin was anticipated to remain sustainable with minimal to no additional intervention by the GSAs and the PMAs identified were determined not to be necessary to maintain sustainability throughout the Solano Subbasin. **Table 4-1** presents the potential PMAs outlined in the GSP to be pursued or considered during GSP implementation and the status of implementation of the PMAs.

Table 4-1. Ongoing, Planned and Potential Projects and Management Actions in the Solano Subbasin		
Name	Brief Description	Status
Ongoing PMAs		
Municipal & Industrial Water Use Efficiency Outreach & Implementation	Develop outreach materials and incentives for municipal and industrial water users to increase water use efficiency.	Activities related to achieving water use efficiency within the municipal and industrial water use sectors have been occurring during the early implementation period and continued efforts are planned.
PMAs Developed for Implementation		
City of Vacaville Recycled Water	Develop City's Recycled Water Program as recommended in the 2020 Recycled Water Master Plan Feasibility Study, including construction and installation of recycled water treatment, storage and conveyance facilities; development of a recycled water use ordinance; updating permits; and identifying customers and executing supply contracts.	The City of Vacaville has been evaluating existing and potential future opportunities for recycled water use to support the City's water supply portfolio and help support sustainable groundwater management in the Solano Subbasin. The City has prepared a report identifying opportunities and presenting potential next steps for the City on recycled water planning.
Westside Streams Stormwater Capture Project	Develop an implementation schedule for potential projects in the Northwest Focus Area to enhance groundwater recharge and support local groundwater sustainability.	With support through a GSP implementation grant the Subbasin has been evaluating opportunities to capture stormwater flows to enhance groundwater recharge, including coordinating and communicating with local property owners and water management entities. The Subbasin has completed several pilot projects/studies to assess feasibility of recharging excess stormwater using existing artificial and natural water conveyance infrastructure and topographic features. As part of GSP implementation grant efforts, the Subbasin is preparing a technical document that identifies recharge opportunities and the scalability of these opportunities across the Subbasin. This document will be completed in Spring 2027 and will support future Subbasin efforts

Table 4-1. Ongoing, Planned and Potential Projects and Management Actions in the Solano Subbasin		
Name	Brief Description	Status
		related to implementing stormwater capture projects.
Rainfall Managed Aquifer Recharge Demonstration Project	Evaluate the use of specific managed aquifer recharge activities on local farms to generate multiple benefits for groundwater sustainability and stormwater management.	With support through a GSP implementation grant, the Subbasin has been conducting efforts to evaluate the potential for implementation of on-farm activities to enhance groundwater recharge. Based on outreach and communications with Subbasin stakeholders, the Subbasin identified several approaches to managed aquifer recharge to evaluate with pilot projects to assess the feasibility of broader implementation. Four pilot recharge projects have been implemented in the Subbasin to date. The results from these pilot projects and an assessment of the scalability of these activities are being integrated into a technical document to be completed in Spring 2027, which will support future Subbasin efforts related to implementing managed aquifer recharge in the Subbasin.
Potential PMAs		
Other Groundwater Recharge Opportunities	Several conceptual recharge projects have been identified along Ulatis Creek to support ongoing groundwater sustainability in the Solano Subbasin. The Nature Conservancy has provided GSAs with guidelines to implement on-farm, multi-benefit groundwater recharge efforts that would also be applicable in the Solano Subbasin.	Evaluating opportunities; with support through a GSP implementation grant the Subbasin has initiated discussion and evaluation of other recharge project concepts through outreach with landowners and with consideration of potential incentives to promote activities to enhance recharge.
Grower Education Related to On-Farm Practices for Sustainable Groundwater Management	Use of Solano Agricultural Scenario Planning System (SASPS), a web-based application that GSAs and other local agencies can use to design voluntary programs to engage agricultural producers in on-	Ongoing and for future consideration

Table 4-1. Ongoing, Planned and Potential Projects and Management Actions in the Solano Subbasin		
Name	Brief Description	Status
	farm sustainable groundwater management projects.	
Demand Management	Develop a program that would incentivize and encourage voluntary participants to reduce water consumption.	Ongoing consideration, additional efforts planned with funding through SGMA Implementation grant
Groundwater Trading Institution	Monitor Solano Subbasin conditions and consider a groundwater trading market to increase flexibility (options) to respond to potential demand management programs.	For future consideration
Education and Collaboration	The Solano Resource Conservation District (SRCD), The Freshwater Trust, Local Government Commission (LGC), and RD 2068 all provide groundwater and water conservation education to classrooms and growers within the Solano Subbasin.	Occurring; grower Groundwater Workshops held in January 2022, 2023, 2024, and 2025 focusing on groundwater conditions and management practices to enhance recharge, additional efforts planned with funding through SGMA Implementation grant
Well Owner Outreach and Education	Develop and implement education and outreach about private domestic well monitoring.	Occurring to through general Subbasin outreach activities, interactive web map and other information presented on the GSP website, coordinated ILRP-related efforts and grower workshops, focused outreach to domestic well monitoring volunteers
Participation in Other Water Resources Management Programs	Implement other groundwater management strategies including further use of recycled water, expanded conjunctive water management, changes to well regulations, inventory of active wells, and other actions.	Occurring and in planning

4.3.1. Projects Implemented

Although projects described in **Section 4.3** were not necessary to maintain sustainability in the Subbasin, the GSAs maintain an interest in exploring potential opportunities for implementing projects aimed at enhancing groundwater recharge. Most of the work related to implementing projects in the Subbasin have been funded through a DWR Proposition 68 GSP Implementation Grant awarded to the Subbasin in 2023. The grant supports a variety of GSP implementation tasks being conducted by different GSAs and collaborating entities as summarized in **Table 4-2**.

Table 4-2. Summary of Implementation Activities in the Solano Subbasin	
Brief Description	Lead Agency and Partners
Projects	
Multi-benefit solutions working group and assessment of recharge concept possibilities	Solano Collaborative, Dixon RCD, Solano RCD
Olmo Lane pilot project: former irrigation tailwater pond repurposed for stormwater detention and groundwater recharge.	Solano Subbasin GSA, landowners, Dixon RCD, Solano RCD, RD 2068
Pedrick Road pilot project: former irrigation tailwater pond repurposed for stormwater detention and groundwater recharge.	Solano Subbasin GSA, landowners, Dixon RCD, Solano RCD, RD 2068
Wolfskill Road pilot project: enhanced existing topographic swale to improve stormwater infiltration and for potential recharge of Putah Creek floodwater and/or surplus Solano Project water.	Solano Subbasin GSA, landowners, Dixon RCD, Solano RCD, RD 2068
Pippo Lane pilot project: bioswale/pond establishment and enhancement to increase groundwater recharge.	Solano Subbasin GSA, landowners, Dixon RCD, Solano RCD, RD 2068
Row crop cover cropping pilot study	Solano Subbasin GSA, Dixon RCD, Solano RCD
tTEM surveys along canals, drains, and ditches to evaluate recharge potential	Solano Subbasin GSA, SID, Dixon RCD, Solano RCD
Putah Creek floodplain recharge project concept exploration	Solano Subbasin GSA
Multi-benefit solutions working group webmap for supporting recharge concept development	Solano Collaborative
Recycled water planning opportunities assessment	City of Vacaville
Water supply planning to address new chromium-6 MCL – well and water system upgrades	City of Vacaville
Collect field level data on groundwater use in coordination with Irrigated Lands Regulatory Program annual reporting for GSA ground truthing	Dixon RCD
Installation of two stormwater surface flow gage stations in Upper Tremont 3 Watershed to quantify stormflow to support groundwater management planning efforts	Solano Subbasin GSA and Dixon RCD
Management Actions	

Table 4-2. Summary of Implementation Activities in the Solano Subbasin	
Brief Description	Lead Agency and Partners
Photo documentation and grower estimates of winter vegetation on cropped acres	Dixon RCD
Exploration of policies and incentives to support sustainable groundwater management	Solano Collaborative, Dixon RCD, Solano RCD
Water conservation actions support	Dixon and Solano RCD, Solano GSA

Recharge Project Implementation

Building on work completed during the preparation of the GSP, the Solano Subbasin GSAs have continued review of conditions and characteristics in the Subbasin for the purpose of evaluating the potential for implementing recharge projects in different areas of the Subbasin. The assessments have included a review of data on land uses and cropping, parcel characteristics (e.g., size, shape), groundwater levels, soil characteristics, subsurface lithology, existing water infrastructure, historical flooding and drainage issues, and other considerations.

Because of the Subbasin’s proximity to major surface water features in the Delta and westside tributary streams with periodic availability of stormflow water, including from surface water in Putah Creek and stored in Lake Berryessa, the Subbasin likely has access to considerable available surface water for use in enhancing recharge. Detailed assessment of surface water available for enhanced recharge projects in the Subbasin has not been conducted, although analyses of recharge projects conducted as part of the GSP development estimated available stormwater for the purpose of simulating the effects and benefits of implementing such activities. Additional analysis of surface water supplies and necessary infrastructure will occur as part of the study and design process for any recharge projects developed in the Subbasin.

Planning of multi-benefit projects to improve stormwater management and reduce local flooding while providing benefits to groundwater through enhanced recharge, especially in the Northwest Focus Area, is of strong interest in the Subbasin. Solano County has recently initiated a One Water Framework planning process intended to provide a coordinated approach to water management across the County, and the objectives of the One Water Framework planning activities are closely aligned with GSP implementation objectives. A One Water Framework Steering Committee comprised of representatives from water management entities across the entire County was formed, and six Steering Committee meetings were held in 2024 to provide input in the development of a One Water Master Plan and a draft document was released for public review and comment in March 2026.

A workgroup focused on multi-benefit solutions in the Subbasin and consisting of representatives from the Solano Subbasin GSA, Dixon RCD, Solano RCD, and technical consultants has been conducting bi-weekly planning and coordination meetings to continue advancing the implementation of multi-benefit projects to enhance recharge and reduce stormwater runoff in the Subbasin. During outreach meetings and communications with local landowners in the Subbasin, there were significant concerns expressed by landowners about flooding of agricultural fields and potential impacts this would have on farming activities including access to agricultural lands in advance of planting in the spring and also effects on soil health resulting anaerobic conditions caused by sustained inundation. This feedback guided the

Subbasin's planning efforts related to enhancing recharge, recognizing the need for broad adoption of actions by landowners in the Subbasin that could enhance recharge and reduce stormwater runoff to achieve substantial long-term benefits in the Subbasin. To support the planning efforts of the multi-benefit solutions workgroup, key datasets relating to land use and ownership, water distribution and drainage infrastructure, historical flooding conditions, and hydrogeologic characteristics were compiled in an internal interactive web map for use in exploring project concepts.

The use of cover crops in the Subbasin varies by landowner and cropping practices. Expanded use of cover cropping was identified by stakeholders as a potentially low-cost and low-risk action to achieve multiple benefits related to water resources management. To better assess the benefits and challenges from use of cover cropping in the local environmental conditions of the Solano Subbasin, pilot studies were completed during 2023, 2024, and 2025 to assess effects of cover cropping on stormwater runoff, soil moisture, and groundwater recharge. The findings from these cover cropping pilot studies are being integrated into a technical document to be completed in Spring 2027.

In 2025, four pilot project sites were selected as part of evaluation of the feasibility of concepts involving the use of existing natural and artificial landscape features to enhance groundwater recharge and reduce stormwater runoff. The locations of the four pilot project sites are shown on **Figure 2-1** and the sites are described below.

- Olmo Lane Site - A historical pond originally created to capture irrigation tailwater and stormwater runoff from fields and provide habitat for perch. The pond ultimately proved unsuitable for perch because of the high infiltration rate of soils in the area, and minor modifications to pond and the culvert connecting the pond to an adjacent drainage ditch were completed in Fall 2025 to enhance the capture of stormwater runoff leading to mitigation of flooding issues in the Subbasin and increasing groundwater recharge.
- Pedrick Road Site- A historical and inactive irrigation tailwater pond that had become overgrown with vegetation because of lack of use due to implementation of irrigation efficiency improvements in adjacent agricultural fields. As part of the pilot project, drainage ditches adjacent to the pond were reconfigured in Fall 2025 to direct drainage water into the pond. The project is intended to achieve multiple benefits by reducing localized flooding caused by runoff during storm events while enhancing recharge to groundwater. A prescribed burn was conducted at the site in coordination with the City of Dixon Fire Department in 2026 to remove considerable biomass that had accumulated on the bottom of the pond and remove non-native vegetation in the pond.
- Wolfskill Road Site - A natural swale within a former almond orchard that has since been removed and is planned for conversion to natural habitat. Drainage from nearby lands accumulates in the swale during storm events, which prevents the landowner from accessing some areas of the property. The pilot project includes construction of a crossing with a culvert completed in Fall 2026 to improve management of the drainage water that occurs naturally in the swale. Because of the location of the site in close proximity and down gradient from the Putah South Canal, the project will also enable use of the swale as a recharge site for excess flood water from Putah Creek or excess Solano Project surface water. In coordination with grant funding provided through

programs supporting healthy soils initiative, native trees, shrubs, grasses, and forbs were planted around the site in Winter 2025 to enhance infiltration and habitat benefits.

- Pippo Lane Site – A small existing swale and pond on a rural residential property. The project is a demonstration project and the swale and pond were scraped and shaped, followed by seeding perennial native grasses, in Winter 2025. The work at the site is being completed in coordination with activities related to an existing healthy soils program grant with an interest in enhancing the infiltration of water at the site. The Pippo Lane site was intended as a demonstration for what could be achieved through small recharge projects on rural residential properties in the NW Focus Area of the Subbasin.

At the Olmo Lane, Pedrick Road, and Wolfskill Road pilot project sites, initial infiltration tests were conducted and monitoring equipment was installed prior to the winter of 2025-2026, including staff gauges, automated pressure transducer to measure water levels and track water infiltration. A rain gauge was also installed at the Pedrick Road site; the Olmo Lane site is near to the Pedrick Road site and the Wolfskill Road site is near an existing SCWA rain gauge at the Putah South Canal diversion structure. The Pippo Lane site was instrumented with a staff plate and game camera to monitor pond levels during the storm season. Continued and expanded monitoring of conditions at all four sites is planned in the future.

As part of the ongoing planning of multi-benefit projects to enhance groundwater recharge, a recharge test was conducted in Dry Arroyo, an ephemeral water feature in the NWF Area that crosses the Putah South Canal and which could potentially be used to recharge Putah Creek floodwater and excess Solano Project water, when available. Testing was completed in 2026 and the results will be integrated into a technical document to be completed in Spring 2027 outlining a planned approach to implementing projects and management actions across the Subbasin.

Coordination and planning efforts have also been occurring between the Solano Subbasin GSA (and affiliates), UCD, and a private landowner to conduct a pilot study within the floodplain of Putah Creek in the NWF Area. Through these efforts, a conceptual project design has been developed, with an outline for a proposed initial project monitoring plan utilizing a combination of new dedicated monitoring wells and existing wells in the area. Although plans were being developed to begin the pilot project in Summer 2025, the natural flooding of the site beginning in February 2025 postponed these plans as monitoring data for the period prior to, during, and after the flooding are evaluated to assess potential benefits of the project and whether additional testing at the site is warranted.

SID has been continuing planning efforts related to a project to improve the reliability of water supply for drinking water and fire protection needs in the Quail Canyon Improvement District (QCID) community. SID recently secured \$2.82 million in federal funding for design and construction of a new well and associated distribution system components for QCID. The existing QCID Public Water System Well is in the far northwestern part of the Solano Subbasin and is the sole source of supply for the community. Water levels in the well have been declining over recent years despite reductions in demand from water conservation efforts. The production capacity of the well has declined from 140 gallons per minute (gpm) to 40 gpm. The greatly reduced well production capacity cannot meet domestic or fire needs, as was demonstrated in the 2020 LNU Complex fire when production from the well was insufficient to fill tanker trucks needed for firefighting. There are also properties nearby that have requested service because of declining production and water levels in private wells. QCID is located several miles from the nearest

domestic water system; therefore, interconnection is not feasible. The project will include constructing a new well at a nearby site with more favorable aquifer characteristics to provide drought and fire resiliency for QCID. Approximately 3,500 linear feet of conveyance pipeline will be installed to deliver water from the new well to serve current and future customers.

The Solano RCD in partnership with the Solano County Farm Bureau and Fibershed, received funding from the California Department of Food and Agriculture Healthy Soils Program to implement practices that improve infiltration of water on agricultural lands. The grant has supported Solano RCD in coordinating and designing projects that promote health soils. These efforts have been conducted in coordination with work related to implementing GSP projects that enhance groundwater recharge. Between 2024 and 2025, approximately 1,500 acres of land was modified to improve infiltration through the planting of annuals/perennials, hedgerows, riparian forest, range planting, forage planting and the application of compost and mulch.

Domestic Well Vulnerability

Through funding provided by the SGMA implementation grant, the GSAs intend to evaluate the need and opportunity for developing greater resilience of drinking water supplies in the far northwest part of the Subbasin. This evaluation will include consideration of domestic well vulnerability and opportunities to bolster drought and climate change resilience involving water system consolidation, localized enhanced recharge, and other more. Initial stages of characterizing the locations of wells and water quality conditions in the vicinity of groundwater drinking water users is underway and involves a well inventory.

5. UPDATES TO BASIN SETTING

This section describes and evaluates refinements to the basin setting for the Solano Subbasin completed during the evaluation period. During the first five years of GSP implementation, the Subbasin has undertaken efforts to fill data gaps related to the hydrogeologic conditions and beneficial users of groundwater in the Subbasin. This work has improved the hydrogeologic conceptual model and representation of the physical characteristics of the Subbasin in the Solano IHM. The updates have also been integrated in the evaluation of GSP monitoring networks and SMC. Key updates to the basin setting completed during the implementation period to date are summarized below.

5.1. Hydrogeological Conceptual Model

The HCM for the Solano Subbasin presented in the GSP described the physical properties of the aquifer system and key processes that influence water availability and groundwater flow. The GSP did not identify data gaps in the HCM because the conceptualization of the hydrogeology in the Subbasin is relatively well understood and documented through existing hydrogeologic studies for the Subbasin; however, the GSP did identify aspects of the HCM that would benefit from further review. These include the following elements:

- Recharge sources and rates, aquifer storage and conductivity characteristics in the northwestern area of the Subbasin, and influences from groundwater development within the Subbasin and outside of the Subbasin to the west and north.

- Hydrogeologic characterization of the Montezuma Hills and the southwestern area of the Subbasin.
- Additional evaluation of any trends or patterns in new wells being completed in the Middle or Basal Tehama and any indications of increased groundwater development of these parts of the groundwater system.

5.1.1. Northwest Area of the Subbasin

During the implementation period considerable efforts were conducted to further understand the northwest area of the Subbasin. These efforts included completion of a well and surface water diversion inventory involving characterizing groundwater quality in areas of high domestic well density and evaluating domestic well vulnerability to existing and changing groundwater conditions. This task emphasized inventorying of active wells in the northern part of the Subbasin, although the inventory covered the entire Subbasin. A technical document describing the well and surface water diversion inventory is planned for completion in Spring 2027.

Significant expansions to the GSP monitoring network were made in the northern Subbasin including installation of ten shallow nested monitoring wells at five sites and outfitting of pressure transducers at select monitoring locations. Additional details related to GSP monitoring network expansions are included in **Sections 3 and 6**; data from these monitoring enhancements are incorporated into analyses and graphics presented in **Section 3**.

As part of the preliminary assessments of recharge feasibility at planned recharge pilot sites, infiltration testing was completed at three sites in the NWF Area in Fall 2025 to measure baseline infiltration rates. The infiltration testing was conducted using a double-ring infiltrometer and results from the testing will be compared with infiltration rates measured during operation of the pilot projects to assess the effectiveness of the approach in estimating actual site infiltration rates. Additionally, follow-up infiltration measurements using the double-ring infiltrometer may be conducted to assess changes in infiltration rates after operation of the pilot projects to understand potential effects of clogging on infiltration rates in recharge basins. The new data collected during the implementation period have been critical in aiding the Subbasin understanding of conditions in the NWF Area.

5.1.2. Montezuma Hills and Southern Subbasin

Limited information on groundwater conditions in some of the southern parts of the Subbasin was available at the time of the GSP. Several new wells have been added to the GSP monitoring network in this part of the Subbasin during the first five years of the implementation period. Using Technical Support Services provided by DWR, the Subbasin worked to have two shallow nested monitoring wells constructed at a site in the area and two additional wells were recruited into the monitoring network. **Sections 3 and 6** provide additional details on these network improvements; data from the sites have supported the interpretation of groundwater conditions in these areas, including providing valuable information to assist with analyses of trends and patterns in groundwater conditions and groundwater storage change. As part of the well and surface water diversion inventory noted above, in addition to inventorying active wells across the Subbasin, the task focused on refining available data related to surface water points or diversion and place of use, primarily in the more southern parts of the Subbasin. Data from the well and

surface water diversion inventory were incorporated in refinements made to the Solano IHM. A technical document describing the well and surface water diversion inventory is planned for completion in Spring 2027.

5.1.3. Middle and Basal Tehama Formation Uses

Using the results for the new well inventory, the Subbasin completed an evaluation of trends in agricultural well construction to assess whether new agricultural wells were being constructed in deeper parts of the groundwater system, especially within the Basal Tehama zone. During the development of the GSP, one recently constructed agricultural well was noted to have been screened within the Basal Tehama zone. Historically, public water system wells were believed to be the primary users of groundwater from the Basal Tehama zone. If there was an increasing number of agricultural wells using groundwater from the Basal Tehama zone, this could affect groundwater conditions and sustainability within this part of the groundwater system. Results from this analysis suggest that there is no increasing trend for agricultural use of groundwater from the Basal or Middle Tehama formations. The results from this investigation will be presented as part of the technical document describing the well and surface water diversion inventory planned for completion in Spring 2027.

5.2. Groundwater Conditions

Groundwater conditions within the Subbasin have remained relatively stable over the implementations period to date. **Section 3** provides more in-depth discussion of groundwater conditions in the Subbasin related to each SI. New data on groundwater conditions collected through the expansion of the GSP monitoring program, including through addition of monitoring sites and improved temporal resolution of monitoring, have supported improved understanding of basin conditions.

5.3. Water Use Changes and Associated Water Budgets

No significant changes to water supply and use occurred in the Subbasin since the submittal of the GSP. Water supply and use in the Solano Subbasin are quantified through the Solano IHM. As a result of refinements and updates to Solano IHM completed during the implementation period, some components of the overall water budget have changed; however, the overall use and supplies of water have not changed significantly. **Table 5-1 and Figure 5-1 through 5-3** present updated water budgets estimated for historical, current, and future land use conditions based on results from the latest version of Solano IHM. A discussion of specific refinements and updates to the Solano IHM completed since the GSP submittal is provided in **Section 5.4**. Additional information on model updates and water budgets simulated with Solano IHM is presented in the model documentation included as **Appendix J**.

5.3.1. Updated Water Budgets

Updated water budgets were developed as a result of the refinements to the Subbasin groundwater model (Solano IHM, see **Section “Model Updates”**). Updates to the Subbasin water budgets during this Periodic Evaluation cycle are compared to historical, current, and projected water budgets in the 2022 GSP. While individual water budget components may have changed, the overall water budget has remained relatively consistent and the Subbasin continues to be on track towards maintaining

sustainability. Detailed descriptions of model refinements and water budget results are presented in the updated model documentation included in **Appendix J**.

Water budget results are rounded to two significant digits consistent with the typical uncertainty associated with the methods and sources used in the analysis. Water budget component results presented in the tables below may not sum to the totals presented because of rounding.

The water budgets reported in this section include the:

- **Historical Water Budget:** Representing historical land use, surface water supplies, hydrology, and groundwater conditions in the Subbasin. Results are summarized for the WY 1991 through WY 2025 period.
- **Current Water Budget:** Representing current (or “now”) land use as of WY 2025, and long-term average surface water supplies and hydrology simulated through WY 2072 (based on data from WY 1991 through WY 2025, with adjustment as appropriate for anticipated changes in future conditions).
- **Projected Water Budget:** Representing projected (or “future”) changes in land use WY 2072, and long-term average surface water supplies and hydrology simulated through WY 2072 (based on data from WY 1991 through WY 2025, with adjustment as appropriate for anticipated changes in future conditions).

Historical Water Budget

The historical water budget is calculated over the period from WY 1991 through WY 2025. This period was selected in order to evaluate water budgets over a representative hydrologic period. The water budget results presented here reflect the updated modeling conducted as part of the 2027 Periodic Evaluation model update. Results presented in **Table 5-1** for the historical water budget are presented as the average annual volume over the historical water budget period from WY 1991-2025.

Table 5-1. Historical Water Budget for the Solano Subbasin (acre-feet per year)	
Water Budget Component	Historical WY 1991-2025)
Net Stream Seepage	-130,000
Deep Percolation	270,000
Total Groundwater Extractions	-170,000
Total Net Subsurface Flows	28,000
Annual Change in Groundwater Storage	2,700

The updated historical water budget is consistent overall with the previous version of this water budget. The average annual change in storage remains relatively unchanged. Changes in individual components of the water budgets reflect the refinements made to Solano IHM. In particular, net stream seepage has become an outflow to the groundwater system, rather than an inflow. This is due to refinements of the

texture model and aquifer parameters, particularly within the uppermost shallow model layers resulting from incorporation of AEM data. Net subsurface inflows have also increased in the updated water budget due to model refinements.

Current Water Budget

The current water budget is meant to evaluate current or “now” conditions (in this case, WY 2025) over a long-term average hydrology period. For this scenario, WY 2025 land use was held constant and simulated with the projected future hydrology (described in **Appendix J** of this 2025 Periodic Evaluation). Results presented in **Table 5-2** for the current water budget are presented as the average annual volume over the period from WY 2026-2072.

Table 5-2. Current Water Budget for the Solano Subbasin (acre-feet per year)	
Water Budget Component	Projected (Current Land Use) (WY 2026-2072)
Net Stream Seepage	-170,000
Deep Percolation	310,000
Total Groundwater Extractions	-150,000
Total Net Subsurface Flows	19,000
Annual Change in Groundwater Storage	2,100

The current water budget is consistent overall with the previous version of this water budget. The average annual change in storage remains relatively unchanged, indicating the Subbasin remains on track towards sustainability. No changes to the Subbasin sustainable yield are necessary at this time based on these water budget results.

Projected Water Budget

The projected water budget is meant to evaluate projected future conditions over a long-term average hydrology period. For this scenario, anticipated land use changes were simulated together with the projected future hydrology (described in **Appendix J** of this 2025 Periodic Evaluation). Results presented in **Table 5-3** for the projected water budget are presented as the average annual volume over the period from WY 2026-2072.

Table 5-3. Projected Water Budget for the Solano Subbasin (acre-feet per year)	
Water Budget Component	Projected (Future Land Use) (WY 2026-2072)
Net Stream Seepage	-180,000
Deep Percolation	310,000
Total Groundwater Extractions	-140,000
Total Net Subsurface Flows	17,000
Annual Change in Groundwater Storage	2,300

The projected water budget is consistent overall with the previous version of this water budget. The average annual change in storage remains relatively unchanged, indicating the Subbasin remains on track towards sustainability. No changes to the Subbasin sustainable yield are necessary at this time based on these water budget results.

5.4. Model Updates

The Solano IHM is a gridded numerical groundwater model that characterizes surface water and groundwater uses in elements representing land across the Solano Subbasin and surrounding areas in Solano, Sacramento, and Yolo Counties. The Solano IHM model was created to support GSP development through the adaptation of the Sacramento Valley Groundwater-Surface Water Simulation Model (SVSim). The model was originally calibrated to the historical period from 1991-2015, with annual updates to some inputs in the model to support GSP annual report preparation. As described in this 2027 Periodic Evaluation, extensive work has been completed during the implementation period to update and refine Solano IHM. The updated Solano IHM provided a means for evaluating the water budget for the Subbasin and was used to prepare updated water budgets (see also **Section 5.3**).

Documentation of the updated Solano IHM and its refinements is provided in **Appendix J**.

5.4.1. Updates to the Groundwater System

The groundwater system inputs in the Solano IHM include information on the physical characteristics of the Subbasin, including model layering, aquifer properties, and groundwater wells and pumping. Refinements to the groundwater system within Solano IHM completed during the implementation period include the following key elements.

- Representation of refinements to the HCM in the Subbasin, including updating of the three-dimensional sediment texture model used to estimate aquifer properties in the model. The updates to the texture model were conducted through incorporation of new lithologic data from monitoring wells and sediment texture data derived from geophysical Airborne Electromagnetic (AEM) surveys completed by DWR and made available in 2023 (DWR May 2023).
- Through extensive recalibration of the model using observed groundwater levels and streamflows, aquifer and streambed characteristics in the model were refined.

Additional information on updates completed to the groundwater system component of the Solano IHM is provided in **Appendix J**.

5.4.2. Updates to the Surface Water System Simulation

The surface water system (SWS) in the Solano IHM accounting for the total balance of inflows, outflows, and changes in storage in the Subbasin's surface layer³. The primary inflows to the SWS water budget

³ The vertical boundaries of the subbasin surface water system are the land surface (upper boundary) and the bottom of plant root zone, within the lateral boundaries of the Subbasin. The plant root zone is defined as "the upper portion of the soil where water extraction by plant roots occurs." The depth to the bottom of the root zone varies by crop, but typically ranges from 2-7 feet (ASCE, 2016).

generally include surface water inflows (stream inflows, diversions, etc.), precipitation, groundwater extraction, and groundwater discharge. The primary outflows from each SWS water budget generally include evapotranspiration (ET), surface water outflows (stream outflows, spillage at the Subbasin boundary, etc.), infiltration (deep percolation) of irrigation water and precipitation, and infiltration (seepage) of surface water. Updates to the surface water system simulation in Solano IHM during the implementation period included the items described below.

- “Historical” scenario input updates (adding WY 2018 through WY 2025 to the historical scenario used in the 2022 initial Solano GSP development, in addition to the calibration described above).
- “Projected (Current Land Use)” scenario updates (revising the projected (current land use) simulation used in 2022 initial Solano GSP development to simulate surface water system conditions – including land use – to be representative of current conditions as of WY 2025).
- “Projected (Future Land Use)” scenario updates (updating the projected (future land use) simulation inputs with updated historical data through WY 2025, and revising inputs according to the updated projected hydrologic sequence through WY 2072).

The projected simulations were also evaluated with consideration of climate change adjustment factors. See **Appendix J** of this PE for information about the projected simulations and climate change adjustments.

Key updates to Solano IHM inputs pertinent to the surface water system include:

- Updating of crop coefficients, including addition of crop coefficients for newly defined land use/crop categories. Crop coefficients were refined using local remote sensing data from OpenET spanning a wider time period than was available at the time of the original GSP development. ET inputs in the model were revised for the entire historical period and updated through WY 2025 using the new crop coefficients. The updated crop coefficients were also used in all projected future scenarios, including in applying adjustments to evaluate effects of climate change.
- Refinements to the simulation of specific land use types, including addition of select crops and managed wetlands and differentiation of irrigated and non-irrigated pasture. Managed wetlands were added as a simulated land use (for the period since 2019) to capture this water use sector. Irrigated and non-irrigated pasture were delineated using cropping and water use data available through coordination with the ILRP program, crop mapping data, and spatial measured ET data to better represent where and how much irrigation water is being applied.
- Updates to stream channel characteristics and rating curves in key reaches of the stream network using recent LiDAR data in conjunction with stream gage data.
- Updated surface water diversion delivery destinations based on results from surface water diversion inventory. Incorporated additional information on irrigation water sources assembled from grower surveys completed through a coordinated effort with the Dixon RCD and Sacramento Valley Water Quality Coalition who administer the ILRP in the Subbasin.
- Precipitation inputs updated through WY 2025 using information from the Parameter-elevation Regressions on Independent Slopes Model (PRISM) and projected through WY 2072 with

appropriate mapping to the updated long-term average projected hydrologic sequence and appropriate climate change adjustments.

- Historical and current land use inputs updated using the most recent and reliable spatial land use data in the region, including:
 - Statewide crop mapping, available from the California Department of Water Resources (DWR) (DWR, 2025d)
 - CropScape Cropland Data Layer coverage, available from the United States Department of Agriculture (USDA, 2025).
- Updated projected land use inputs, starting from the 2025 current baseline land use condition and updating to simulate projected land use changes through 2072. These updates included incorporation of projected urban growth and agricultural cropping pattern changes. There are several notable urban developments or other planning efforts currently being contemplated in the Subbasin at the time of this PE that could affect groundwater demands. However, because of the high uncertainty around the details of these plans and whether they will be approved and implemented, they were not directly incorporated into the projected model scenarios for evaluation as part of this PE. The projected model scenarios will be updated as part of future PE efforts to reflect appropriate and reasonable projections of future land use changes at that time.
- Stream inflows and historical diversions updated through WY 2025 with available historical data, and projected through WY 2072 with appropriate mapping to the updated long-term average projected hydrologic sequence and appropriate climate change adjustments.

Additional information on these updates, and other refinements made to Solano IHM, is provided in Appendix X of this 2027 Periodic Evaluation.

6. MONITORING NETWORKS

GSP Regulation § 356.4 (e)

A description of the monitoring network within the basin, including whether data gaps exist, or any areas within the basin are represented by data that does not satisfy the requirements of Sections 352.4 and 354.34(c). The description shall include the following:

- (1) An assessment of monitoring network function with an analysis of data collected to date, identification of data gaps, and the actions necessary to improve the monitoring network, consistent with the requirements of Section 354.38.*
- (2) If the Agency identifies data gaps, the Plan shall describe a program for the acquisition of additional data sources, including an estimate of the timing of that acquisition, and for incorporation of newly obtained information into the Plan.*
- (3) The Plan shall prioritize the installation of new data collection facilities and analysis of new data based on the needs of the basin.*

The GSP established monitoring networks to observe groundwater and related conditions within the Solano Subbasin and track maintaining the Solano Subbasins sustainability goal. These monitoring networks have been evaluated over the evaluation period. This section presents a summary of refinements made to each monitoring network since GSP submittal, including changes made to each monitoring network and an assessment of functionality. Data gaps identified in the GSP or discussed in recent Annual Reports are analyzed and actions to fill remaining data gaps are proposed. All changes to the GSP monitoring program will be incorporated into a GSP amendment at a future date. The changes to the monitoring networks and refinements to SMC described in this PE are not substantial enough to warrant completion of a GSP amendment at this time.

Monitoring data for each SI monitoring network is collected from the following entities:

- Groundwater Levels/Groundwater Storage
 - DWR
 - SCWA
 - CAL Water-Dixon
 - City of Vacaville
 - City of Rio Vista
 - City of Dixon
 - Sacramento County
 - Solano Irrigation District (SID)
 - State Water Resources Control Board (SWRCB) GeoTracker
 - Rural North Vacaville Water District (RNVWD)
 - United States Bureau of Reclamation (USBR)
- Groundwater Quality (selected constituents)
 - CAL Water-Dixon
 - DWR
 - U.S. Geological Survey (USGS)
 - SID
 - SWRCB Division of Drinking Water (DDW)
 - SWRCB GeoTracker
- Land Subsidence
 - SCWA
 - EarthScope Consortium (previously known as UNAVCO ⁴ Plate Boundary Observatory [PBO]) stations
 - DWR (InSAR)
- Interconnected Surface Water
 - SCWA

⁴ EarthScope Consortium formed from the merger between UNAVCO and Incorporated Research Institutions for Seismology in January 2023 and is “a non-profit university-governed consortium, facilitate(ing) geoscience research and education using geodesy”. (<https://www.unavco.org/>)

6.1. Groundwater Levels

The GSP outlined RMS a groundwater level monitoring network of 41 wells consisting of 33 wells screened in the Alluvial/Upper Thema Zone and 8 screened in the Basal Tehama (**Figure 6-1a**). A further 132 wells were included in the Supplemental monitoring network which includes wells of unknown construction as well as known. The representative monitoring wells were selected based on consideration of the following criteria:

- Exhibits long-term, regional trends in conditions (good historical record).
- Dedicated monitoring wells are a priority.
- Known well construction features (construction date, well depth, perforation depths).
- Currently monitored regularly or ability to be monitored regularly.
- Supports need for horizontal and vertical spatial distribution of monitoring.
- Increased density of monitoring in areas of greater groundwater pumping and greater reliance on groundwater (i.e., representative of conditions in vicinity of high municipal and agricultural pumpage).
- Include areas of domestic wells and disadvantaged communities.

A relatively greater proportion of wells with groundwater level data occur in the northern portion of the Solano Subbasin, near Vacaville, Dixon, and south of Winters and Davis. There is much less coverage in the southern half of the Solano Subbasin, in part because this is an area of lesser reliance on groundwater. The original GSP monitoring network well density is within the range of recommended monitoring network density values noted in the DWR BMP. The monitoring network was further strengthened over the evaluation period through increased spatial coverage through newly installed nested monitoring wells and successful recruitment of additional wells through outreach efforts with landowners. Additionally, the installation of automated continuous water level monitoring equipment in select monitoring network wells enhances the temporal resolution of data.

6.1.1. Changes to Monitoring Network

A total of 16 wells were added and seven wells were removed from the RMS groundwater level monitoring network over the implementation period to date; there are now a total of 50 groundwater level RMS wells in the GSP monitoring network (**Table 6-1 and Figure 6-1a and 6-1b**). Additional significant changes to the supplemental groundwater level monitoring network were also made including removing 41 supplemental network wells and addition of 56 wells. Many of the removed wells were withdrawn from the DWR monitoring program because available well construction information was inadequate to support their continued use for monitoring purposes. Wells added to the groundwater level monitoring network are distributed across the Subbasin.

To better characterize temporal changes in groundwater levels, considerable temporal monitoring enhancements have been made during the implementation period through the installation of additional automated pressure transducers in key wells in the GSP monitoring network. The number of wells in the

monitoring network with automated groundwater level monitoring now totals 65, providing both broad spatial coverage across the Subbasin and representation across multiple aquifer zones.

All updates to the monitoring network have been entered into the SGMA Monitoring Network Module and data for all RMS wells will continue to be updated on a semi-annual basis.

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
SSGSA-05A	Alluvial/Upper Tehama	RMS	Installed Post-GSP	75	105	3/30/2022	5
SSGSA-05B	Alluvial/Upper Tehama	RMS	Installed Post-GSP	100	90-95	3/30/2022	5
SSGSA-03A	Alluvial/Upper Tehama	RMS	Installed Post-GSP	36	26-31	3/30/2022	5
SSGSA-03B	Alluvial/Upper Tehama	RMS	Installed Post-GSP	95	80-90	3/30/2022	5
SSGSA-02A	Alluvial/Upper Tehama	RMS	Installed Post-GSP	60	50-55	3/30/2022	5
SSGSA-02B	Alluvial/Upper Tehama	RMS	Installed Post-GSP	109	99-104	3/30/2022	5
SSGSA-01A	Alluvial/Upper Tehama	RMS	Installed Post-GSP	56	41-51	4/5/2022	5
SSGSA-01B	Alluvial/Upper Tehama	RMS	Installed Post-GSP	90	75-85	4/5/2022	5
SSGSA-06A	Alluvial/Upper Tehama	RMS	Installed Post-GSP	25	15-25	3/23/2022	5
07N01E14J001M	Alluvial/Upper Tehama	RMS	In Original Network	600	156-366, 384-576	1/1/1988	39
MW-15-188ft	Alluvial/Upper Tehama	RMS	In Original Network	188	158-178	10/31/2000	26
04N01E02E001M	Alluvial/Upper Tehama	RMS	In Original Network	74		4/9/1980	47

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
04N02E09A001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	285	174-285	5/4/1949	72
05N02E25K001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	100	76-100	4/4/1974	48
06N01E12M001M	Alluvial/Upper Tehama	RMS	In Original Network	109		11/21/1962	64
06N01E17M001M	Alluvial/Upper Tehama	RMS	In Original Network	120	70-80, 100-120	10/3/1975	51
06N01E33L001M	Alluvial/Upper Tehama	RMS	In Original Network	120		12/8/1960	66
06N01W36C004M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	150	70-150	7/30/1975	47
06N02E19J001M	Alluvial/Upper Tehama	RMS	In Original Network	182	120-140, 160-180	2/27/1974	53
07N01E04P003M	Alluvial/Upper Tehama	RMS	In Original Network	222		11/10/1949	77
07N01E11M001M	Alluvial/Upper Tehama	RMS	In Original Network	150		11/25/1931	95
07N01E21H003M	Alluvial/Upper Tehama	RMS	In Original Network	312	268-286	10/3/1979	47
07N01E29P001M	Alluvial/Upper Tehama	RMS	In Original Network	450	280-450	11/12/1948	78
07N01W04C002M	Alluvial/Upper Tehama	RMS	In Original Network	109		7/23/1931	95
07N01W05R001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	286	66-193	8/16/1948	69

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
07N01W13H001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	158	54-158	10/1/1957	62
07N01W33J002M	Alluvial/Upper Tehama	RMS	In Original Network	160	104-152	7/17/1975	51
07N02E15E001M	Alluvial/Upper Tehama	RMS	In Original Network	160		10/5/1976	50
07N02E33D002M	Alluvial/Upper Tehama	RMS	In Original Network	260	80-260	11/19/1951	74
07N02E35D002M	Alluvial/Upper Tehama	RMS	In Original Network	243	218-238	2/8/2005	22
08N01E24Q001M	Alluvial/Upper Tehama	RMS	In Original Network	630		10/5/1948	78
08N01E32E001M	Alluvial/Upper Tehama	RMS	In Original Network	132		9/9/1948	78
08N01E33H001M	Alluvial/Upper Tehama	RMS	In Original Network	216		9/27/1948	78
08N01W26A002M	Alluvial/Upper Tehama	RMS	In Original Network	265	70-82, 154-206, 206-262	3/10/1976	51
08N01W33A001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	200	20-200	10/2/1957	63
08N01W33B002M	Alluvial/Upper Tehama	RMS	Added to Network	228	107-121, 148-178, 199-228	10/20/1938	88
08N02E27C002M	Alluvial/Upper Tehama	RMS	In Original Network	288	120-136, 164-172, 230-238, 252-288	10/21/1968	58

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
08N03E31N001M	Alluvial/Upper Tehama	RMS	In Original Network	98		1/15/1945	82
5340	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	80	55-65	4/29/2015	12
03N03E07N001M	Alluvial/Upper Tehama	RMS	In Original Network	416	303-313, 386-416	4/29/2015	11
07N01E16B002M	Alluvial/Upper Tehama	RMS	In Original Network	395	15-30, 194-199, 215-240, 265-270	5/21/1980	46
07N01E25M001M	Alluvial/Upper Tehama	RMS	In Original Network	305	130-155, 270-305	4/2/1991	36
08N01W35R001M	Alluvial/Upper Tehama	RMS	In Original Network	600	105-270, 470-600	3/15/1985	42
SSGSA-06b	Alluvial/Upper Tehama	RMS	Added to Network	71	61-71	3/23/2022	5
4810004-004	Alluvial/Upper Tehama	RMS	Added to Network	520	230-500	7/1/2014	12
4810004-015	Alluvial/Upper Tehama	RMS	Added to Network	550	250-280, 350-430, 520-540	7/1/2014	12
SSGSP-11	Alluvial/Upper Tehama	RMS	Installed Post-GSP	79	69-79		
SSGSP-12	Alluvial/Upper Tehama	RMS	Installed Post-GSP	110	95-105		
SSGSP-15	Alluvial/Upper Tehama	RMS	Added to Network				

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
MW-14	Basal Tehama	RMS	In Original Network	1655	1100-1650	3/25/1999	27
MW-15-1815ft	Basal Tehama	RMS	In Original Network	1815	1207-1227, 1252-1262, 1338-1348, 1414-1444, 1546-1566, 1582-1602, 1673-1693, 1765-1785	1/6/1999	28
MW-98A	Basal Tehama	RMS	In Original Network	1850	1727-1745, 1790-1830	11/16/1998	28
MW-98C	Basal Tehama	RMS	In Original Network	2326	2152-2192, 2234-2264, 2285-2305	1/29/1998	29
07N01W15A001M	Basal Tehama	RMS	In Original Network	1235	1205-1225	3/27/2008	18
07N01E11G002M	Basal Tehama	RMS	In Original Network	2212	2182-2202	11/13/2009	16
06N01E10J004M	Basal Tehama	RMS	In Original Network	2170	2140-2160	4/29/2008	18
06N01E30N003M	Basal Tehama	RMS	In Original Network	1680	1650-1670	6/4/2008	18
SSGSP-02	Alluvial/Upper Tehama	Supplemental	Added to Network	201	150-160, 180-200	10/30/2023	3
SSGSP-01	Alluvial/Upper Tehama	Supplemental	Added to Network	350		3/2/2023	4
SSGSP-03	Alluvial/Upper Tehama	Supplemental	Added to Network	860	240-280, 300-380, 570-610, 660-760	7/15/2025	1

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
SSGSP-04	Alluvial/Upper Tehama	Supplemental	Added to Network	520	260-320, 450-470, 490-520	7/15/2025	1
SSGSP-05	Alluvial/Upper Tehama	Supplemental	Added to Network	200	140-200	10/17/2025	1
SSGSP-06	Alluvial/Upper Tehama	Supplemental	Added to Network				
SSGSP-07	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	220			
SSGSP-08	Alluvial/Upper Tehama	Supplemental	Added to Network	210	110-130, 150-170, 190-210	12/6/2024	1
SSGSP-09	Alluvial/Upper Tehama	Supplemental	Added to Network			12/6/2024	1
07N01E23A004M	Alluvial/Upper Tehama	Supplemental	In Original Network	538	317-324, 465-484, 498-503	1/1/1988	39
07N01E24C002M	Alluvial/Upper Tehama	Supplemental	In Original Network	578	185-218, 495-503	1/1/1988	39
07N01E14G002M	Alluvial/Upper Tehama	Supplemental	In Original Network	650	330-630	1/1/1988	39
07N01E14N003M	Alluvial/Upper Tehama	Supplemental	In Original Network	540	235-385, 410-520	1/1/1988	39
07N01E23D002M	Alluvial/Upper Tehama	Supplemental	In Original Network	822	420-800	1/1/1988	39
07N01E14J002M	Alluvial/Upper Tehama	Supplemental	In Original Network	1410	460-510, 726-804, 1008-1020, 1125-1138, 1308-1395	5/1/2012	15

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
07N01E13M001M	Alluvial/Upper Tehama	Supplemental	In Original Network	860	400-850	1/1/1988	39
4810009-003	Alluvial/Upper Tehama	Supplemental	In Original Network	1430	315-335, 405-427, 565-581, 656-678, 706-766, 840-850, 875-887, 1035-1042, 1068-1075, 1250-1260, 1395-1407	7/1/2018	8
4810008-025	Alluvial/Upper Tehama	Supplemental	In Original Network	582	372-572	5/6/2002	24
DeMello MW-95ft	Alluvial/Upper Tehama	Supplemental	In Original Network	95	65-85	1/27/2000	27
MW-15-508ft	Alluvial/Upper Tehama	Supplemental	In Original Network	508	438-498	10/31/2000	26
MW-16-117ft	Alluvial/Upper Tehama	Supplemental	In Original Network	117	97-107	5/6/2002	24
04N02E22P001M	Alluvial/Upper Tehama	Supplemental	Discontinued	130	116-130	7/16/1975	43
05N02E36N001M	Alluvial/Upper Tehama	Supplemental	Discontinued	100		10/15/1947	74
06N01E02B001M	Alluvial/Upper Tehama	Supplemental	In Original Network	889	240-889	11/21/1962	64
06N01E05A001M	Alluvial/Upper Tehama	Supplemental	In Original Network	101	81-101	7/24/1975	51
06N02E02M003M	Alluvial/Upper Tehama	Supplemental	Discontinued	108	76-108	3/19/1959	61

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
07N01E26Q002M	Alluvial/Upper Tehama	Supplemental	In Original Network	541	205-229, 277-325, 349-373, 397-541	4/22/1958	68
07N01E30M001M	Alluvial/Upper Tehama	Supplemental	Discontinued	172	156-168	3/15/1966	56
07N01E33A001M	Alluvial/Upper Tehama	Supplemental	Discontinued	1030		3/12/1963	58
07N01W01E003M	Alluvial/Upper Tehama	Supplemental	In Original Network	480		1/11/1962	65
07N01W06E001M	Alluvial/Upper Tehama	Supplemental	In Original Network	400		11/27/1931	93
07N01W15L001M	Alluvial/Upper Tehama	Supplemental	In Original Network	180	80-180	3/22/1984	42
07N02E17E002M	Alluvial/Upper Tehama	Supplemental	In Original Network	180	132-180	3/1/1977	50
07N02E35D001M	Alluvial/Upper Tehama	Supplemental	In Original Network	43	28-38	2/8/2005	22
07N02E35D003M	Alluvial/Upper Tehama	Supplemental	In Original Network	445	430-440	2/8/2005	22
07N03E30Q002M	Alluvial/Upper Tehama	Supplemental	In Original Network	140	110-136	10/15/1987	39
08N01E25N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	464	227-464	3/20/1984	42
08N01E28G001M	Alluvial/Upper Tehama	Supplemental	In Original Network	202		9/21/1948	78
08N01E30G002M	Alluvial/Upper Tehama	Supplemental	In Original Network	185		10/8/1957	69

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
08N01E33Q002M	Alluvial/Upper Tehama	Supplemental	In Original Network	76		5/25/1948	78
08N01W26D005M	Alluvial/Upper Tehama	Supplemental	In Original Network	200	20-200	10/2/1957	69
08N01W28J001M	Alluvial/Upper Tehama	Supplemental	In Original Network	207		4/12/1933	94
08N01W36H001M	Alluvial/Upper Tehama	Supplemental	Discontinued	286		9/7/1948	74
04N04E15G002M	Alluvial/Upper Tehama	Supplemental	In Original Network	20	10-20	4/25/2014	13
04N04E22L001M	Alluvial/Upper Tehama	Supplemental	In Original Network	20		4/25/2014	13
04N04E27B001M	Alluvial/Upper Tehama	Supplemental	In Original Network	25		4/25/2014	9
04N04E33N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	25		4/25/2014	9
05N03E09L001M	Alluvial/Upper Tehama	Supplemental	Discontinued	43	27-37	10/4/2011	6
05N03E09L002M	Alluvial/Upper Tehama	Supplemental	Discontinued	82	67-77	10/4/2011	6
05N03E16B001M	Alluvial/Upper Tehama	Supplemental	Discontinued	31	16-26	10/4/2011	6
05N03E16B002M	Alluvial/Upper Tehama	Supplemental	Discontinued	61	45-55	10/4/2011	6
05N03E16H001M	Alluvial/Upper Tehama	Supplemental	Discontinued	27	12-22	10/4/2011	6

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
05N03E16H002M	Alluvial/Upper Tehama	Supplemental	Discontinued	62	46-56	10/4/2011	6
05N03E16R002M	Alluvial/Upper Tehama	Supplemental	Discontinued	27	11-21	10/7/2011	6
05N03E16R003M	Alluvial/Upper Tehama	Supplemental	Discontinued	61	46-56	10/7/2011	6
05N03E20B001M	Alluvial/Upper Tehama	Supplemental	Discontinued	27	11-21	10/4/2011	6
05N03E20B002M	Alluvial/Upper Tehama	Supplemental	Discontinued	57	42-52	10/4/2011	6
05N03E20B003M	Alluvial/Upper Tehama	Supplemental	Discontinued	99	84-94	12/20/2011	6
05N03E21G001M	Alluvial/Upper Tehama	Supplemental	Discontinued	26	10-20	10/7/2011	6
05N03E21G002M	Alluvial/Upper Tehama	Supplemental	Discontinued	61	45-55	10/7/2011	6
05N03E21L001M	Alluvial/Upper Tehama	Supplemental	Discontinued	33	17-27	10/7/2011	6
05N03E21L002M	Alluvial/Upper Tehama	Supplemental	Discontinued	60	45-55	10/7/2011	6
05N03E29C001M	Alluvial/Upper Tehama	Supplemental	Discontinued	23	8-18	10/7/2011	6
05N03E29C002M	Alluvial/Upper Tehama	Supplemental	Discontinued	64	49-59	10/7/2011	6
06N01E12M003M	Alluvial/Upper Tehama	Supplemental	In Original Network	270		3/10/1960	66

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
06N01E18N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	254		7/8/1948	78
06N01E24L003M	Alluvial/Upper Tehama	Supplemental	Discontinued	179	108-179	9/28/1965	53
06N01W01B001M	Alluvial/Upper Tehama	Supplemental	In Original Network	150		9/21/1931	95
06N01W13R001M	Alluvial/Upper Tehama	Supplemental	Discontinued	60		12/20/1929	83
06N01W24N001M	Alluvial/Upper Tehama	Supplemental	Discontinued	198		1/31/1949	69
07N01E33R001M	Alluvial/Upper Tehama	Supplemental	Discontinued	86	38-86	12/21/1945	72
07N01W14P003M	Alluvial/Upper Tehama	Supplemental	Discontinued	160	50-60, 130-160	9/13/2005	16
07N02E02F002M	Alluvial/Upper Tehama	Supplemental	Discontinued	264	164-260	10/2/1975	43
07N02E06N001M	Alluvial/Upper Tehama	Supplemental	Discontinued	385	355-380	1/4/2006	12
07N02E06N003M	Alluvial/Upper Tehama	Supplemental	Discontinued-Access Issues	980		10/29/1984	34
07N02E19E001M	Alluvial/Upper Tehama	Supplemental	Discontinued-Oil in Well	282		10/20/1947	71
08N01W32N500M	Alluvial/Upper Tehama	Supplemental	In Original Network	260	180-260	10/26/2012	13

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
08N02E32N001M	Alluvial/Upper Tehama	Supplemental	Discontinued-Access Issues	391	163-191, 194-210, 230-238, 258-262, 278-294, 302-310, 330-342, 354-390	3/5/1976	41
07N01E11G001M	Alluvial/Upper Tehama	Supplemental	In Original Network	1200	1180-1190	11/13/2009	15
05N03E21G003M	Alluvial/Upper Tehama	Supplemental	Discontinued	98	83-93	10/7/2011	6
03N04E05M001M	Alluvial/Upper Tehama	Supplemental	In Original Network	20		5/21/2014	12
04N01E02G001M	Alluvial/Upper Tehama	Supplemental	Discontinued	420		5/6/1949	69
04N04E02B001M	Alluvial/Upper Tehama	Supplemental	In Original Network	20		4/25/2014	13
06N01E10J002M	Alluvial/Upper Tehama	Supplemental	In Original Network	840	811-831	4/30/2008	17
06N01E30N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	400	360-370, 380-390	6/4/2008	17
06N01E30N002M	Alluvial/Upper Tehama	Supplemental	In Original Network	824	794-814	6/3/2008	17
08N01E35K001M	Alluvial/Upper Tehama	Supplemental	In Original Network	815		11/3/1937	89
07N01E04R001M	Alluvial/Upper Tehama	Supplemental	In Original Network	204		10/23/1987	39
07N01E03D001M	Alluvial/Upper Tehama	Supplemental	In Original Network	406		5/3/1991	35

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
07N01E25J001M	Alluvial/Upper Tehama	Supplemental	In Original Network	730	360-395, 620-660, 710-725	4/2/1991	36
07N01E10L001M	Alluvial/Upper Tehama	Supplemental	In Original Network	216	181-189, 204-216	4/12/1980	46
07N01E21Q001M	Alluvial/Upper Tehama	Supplemental	In Original Network	780	280-300, 475-500, 750-780	6/14/1980	46
07N01E26G001M	Alluvial/Upper Tehama	Supplemental	In Original Network	600		4/3/1991	36
07N01E07M001M	Alluvial/Upper Tehama	Supplemental	In Original Network	915		8/4/2000	25
07N01E25K001M	Alluvial/Upper Tehama	Supplemental	In Original Network	1230		7/2/2003	22
07N01E26N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	880	260-340, 500-860	1/8/2008	18
07N01E35C002M	Alluvial/Upper Tehama	Supplemental	In Original Network	950		3/1/2010	16
08N01E36Q002M	Alluvial/Upper Tehama	Supplemental	In Original Network	1000		4/2/2010	16
07N01E03K003M	Alluvial/Upper Tehama	Supplemental	In Original Network	705		7/6/2012	13
07N01E12G001M	Alluvial/Upper Tehama	Supplemental	In Original Network	105	36-46, 85-105	4/2/1991	36
08N01E32N001M	Alluvial/Upper Tehama	Supplemental	In Original Network	600	120-600	1/31/1980	47

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
07N01E27B001M	Alluvial/Upper Tehama	Supplemental	In Original Network	825	200-205, 220-225, 485-500, 520-530, 555-570, 760-825	4/2/1991	36
CD-1-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
CD-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
CD-3-45ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	45	35-45		
CD-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
WH-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		
WH-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
WH-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-5-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
WP-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
WP-2-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-5-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
WP-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		
SP-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
SP-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-5-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
4810009-007	Alluvial/Upper Tehama	Supplemental	Added to Network	1480	290-310, 350-370, 440-530, 620-660, 930-950, 1020-1210, 1330-1460	7/1/2018	8

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
4810009-009	Alluvial/Upper Tehama	Supplemental	Added to Network	1470	430-450, 470-610, 670-710, 735-770, 850-890, 920-940, 1110-1140, 1180-1230, 1245-1255, 1300-1305, 1410-1450	7/1/2018	8
Alamo MW-427	Alluvial/Upper Tehama	Supplemental	Added to Network	427	412-422	3/22/2023	3
Alamo MW-525	Alluvial/Upper Tehama	Supplemental	Added to Network	525	510-520	3/22/2023	3
Alamo MW-677	Alluvial/Upper Tehama	Supplemental	Added to Network	677	662-672	3/22/2023	3
CITY OF VACAVILLE-Well 17	Alluvial/Upper Tehama	Supplemental	Added to Network	493	413-483	10/27/2025	1
DE Plant MW-195	Alluvial/Upper Tehama	Supplemental	Added to Network	195	170-190	3/16/2026	1
DE Plant MW-305	Alluvial/Upper Tehama	Supplemental	Added to Network	300	280-300	3/16/2026	1
DE Plant MW-390	Alluvial/Upper Tehama	Supplemental	Added to Network	390	360-380	3/16/2026	1
Farm Site MW-390ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	1290	375-385	9/3/2018	8
Farm Site MW-525ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	1290	510-520	9/3/2018	8
Green Tree MW-1390	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	1390	1335-1345, 1375-1385	3/16/2026	1

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
Green Tree MW-1470	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	1470	1425-1435, 1455-1465	3/16/2026	1
Green Tree MW-1565	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	1565	1510-1520, 1550-1560	3/16/2026	1
MW 2-355ft	Alluvial/Upper Tehama	Supplemental	Added to Network	355		3/4/2022	5
MW 2-497ft	Alluvial/Upper Tehama	Supplemental	Added to Network	497		3/4/2022	5
MW 2-695ft	Alluvial/Upper Tehama	Supplemental	Added to Network	695		3/4/2022	5
Roberts Ranch MW-285ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	900	270-285	8/13/2018	8
Roberts Ranch MW-371ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	900	356-366	8/13/2018	8
Roberts Ranch MW-554ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	900	539-549	8/13/2018	8
SSGSP-10	Alluvial/Upper Tehama	Supplemental	Added to Network	244	204-244	10/27/2025	1
SSGSP-13	Alluvial/Upper Tehama	Supplemental	Added to Network				
SSGSP-14	Alluvial/Upper Tehama	Supplemental	Added to Network				
RNVWD MW-446ft	Middle Tehama	Supplemental	In Original Network	446	426-436	11/27/2001	24
RNVWD MW-594ft	Middle Tehama	Supplemental	In Original Network	594	564-584	11/27/2001	24

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
06N01W22F002M	Markley	Supplemental	In Original Network	482	53-459	1/29/1973	54
06N01W23L003M	Basal Tehama	Supplemental	In Original Network	818	588-798	10/17/1980	46
4810008-007	Basal Tehama	Supplemental	In Original Network	966	750-930	6/30/1973	53
06N01W23J002M	Basal Tehama	Supplemental	In Original Network	1204	952-1000, 1048-1192	3/4/1975	51
06N01W14R001M	Basal Tehama	Supplemental	In Original Network	1450	1100-1160, 1260-1430	8/31/1989	37
06N01W23L004M	Basal Tehama	Supplemental	In Original Network	870	560-720, 770-840	10/30/1990	35
4810008-012	Basal Tehama	Supplemental	In Original Network	1681	1108-1663	2/1/1996	30
4810008-024	Basal Tehama	Supplemental	In Original Network	1831	1206-1266, 1306-1446, 1546-1606, 1666-1696, 1756-1816	1/4/2002	25
4810008-030	Basal Tehama	Supplemental	In Original Network	1635	1165-1195, 1256-1317, 1341-1381, 1466-1516, 1540-1610	4/13/2007	19
06N01W22H001M	Basal Tehama	Supplemental	In Original Network	734	335-527, 623-710	4/26/1984	34
06N01W23J003M	Basal Tehama	Supplemental	In Original Network	1014	832-862, 886-916, 964-1004	1/29/1973	49
MW-16-1166ft	Basal Tehama	Supplemental	In Original Network	1166	1136-1162	5/6/2002	24

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
MW-16-1430ft	Basal Tehama	Supplemental	In Original Network	1430	1264-1374	2/4/2003	24
MW-98B	Basal Tehama	Supplemental	In Original Network	1819	1559-1579, 1700-1710, 1720-1730, 1778-1798	1/13/1999	28
RNVWD MW-862ft	Basal Tehama	Supplemental	In Original Network	862	832-852	11/27/2001	24
RNVWD MW-1389ft	Basal Tehama	Supplemental	In Original Network	1389	1042-1082, 1230-1253, 1303-1323, 1349-1369	4/22/2004	21
06N01W24N002M	Basal Tehama	Supplemental	Discontinued	1464	420-440,560-600,660-720,780-800,880-1050,1080-1160,1180-1200,1200-1460	11/1/1963	54
07N01W15A002M	Basal Tehama	Supplemental	In Original Network	1345	1315-1335	3/25/2008	17
07N01W15A003M	Basal Tehama	Supplemental	In Original Network	1925	1877-1917	3/26/2008	17
07N01E11G003M	Basal Tehama	Supplemental	In Original Network	2370	2340-2360	11/13/2009	15
06N01E10J003M	Basal Tehama	Supplemental	In Original Network	1960	1930-1950	4/29/2008	17
CITY OF VACAVILLE-Well 03	Basal Tehama	Supplemental	Added to Network	645	420-645	3/31/1980	46
Farm Site MW-1275ft	Basal Tehama	Supplemental	Installed Post-GSP	1290	1260-1270	9/3/2018	8

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
08N01W32E500M	Unknown	Supplemental	In Original Network	270	140-230	10/6/2012	14
07N01E27M004M	Unknown	Supplemental	Discontinued			3/16/1981	39
07N02E04M004M	Unknown	Supplemental	Discontinued			10/21/1992	28
07N02E21F003M	Unknown	Supplemental	In Original Network			3/26/1975	51
07N02E26Q003M	Unknown	Supplemental	Discontinued			10/19/1989	32
08N01W22P001M	Unknown	Supplemental	In Original Network			9/24/1931	95
08N01W25A002M	Unknown	Supplemental	In Original Network			10/6/1964	62
08N02E24N001M	Unknown	Supplemental	Discontinued			3/21/1960	64
05N02E07R002M	Unknown	Supplemental	In Original Network			3/4/1959	68
05N02E19M001M	Unknown	Supplemental	In Original Network			5/6/1949	77
07N01E10E001M	Unknown	Supplemental	Discontinued			8/26/1931	87
08N02E32R001M	Unknown	Supplemental	In Original Network			10/2/1979	47
08N01E35K004M	Unknown	Supplemental	In Original Network	400		9/9/1957	69
08N02E27Q002M	Unknown	Supplemental	In Original Network			3/11/1963	64
4810011-001	Unknown	Supplemental	In Original Network			5/12/1994	30

Table 6-1 Changes to Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
4810012-001	Unknown	Supplemental	In Original Network			1/8/1997	28

6.1.2. Data Gaps

The GSP identified data gaps in three areas for the Alluvial/Upper Tehama: 1) along Putah Creek, 2) in the center of the Subbasin, and 3) in the Montezuma Hills (**Figure 6-1a**). Additions to the monitoring network over the evaluation period have expanded data collection and frequency in the areas specified in the GSP as lacking coverage, though some areas still lack sufficient monitoring, most notably in the center of the Subbasin and south of Montezuma Hills. The Subbasin will make continued efforts to contact private well owners in these areas to increase spatial density, though the monitoring network continues to meet DWR's spatial density recommendations.

6.2. Groundwater Storage

As summarized in **Section 3**, groundwater level conditions are used as a proxy for monitoring changes in groundwater storage. The groundwater monitoring network for changes in groundwater storage will be two monitoring networks: 1) Alluvial Aquifer and Upper Tehama Zone 2) the Basal Tehama Zone. Spring seasonal highs in groundwater levels at these sites are used to demonstrate the annual and cumulative change in the volume of groundwater in storage. Groundwater level monitoring networks for supplemental and RMS wells will be utilized for the groundwater storage supplemental and RMS monitoring networks. **Figures 6-1a and 6-1b** show the location of wells and **Table 6-1** summarizes relevant information.

6.2.1. Changes to Monitoring Network

Changes to the groundwater storage monitoring network made during the GSP implementation period to date include expansion of the well network to address spatial data gaps and installation of automated monitoring equipment to provide enhanced temporal resolution of monitoring data. All changes made to the GSP monitoring network for groundwater storage are described in the groundwater levels section since water levels are used as a proxy for groundwater storage.

6.2.2. Data Gaps

Groundwater storage monitoring data gaps are the same as are described in the groundwater levels section and include several notable spatial data gaps in the center of the Subbasin and south of Montezuma Hills (**Figure 6-1a**).

6.3. Land Subsidence

The land subsidence monitoring network defined in the GSP includes four CGPS stations (DIXN, VCVL, P266, P267) located within the Subbasin (**Figure 6-2**) and providing high-accuracy and high-temporal resolution monitoring of ground surface elevations. Eleven CGPS stations (P248, P256, P261, P262, P264, P265, P268, P271, P273, P274, and UCD1) located outside the Subbasin are part of a supplemental monitoring work to identify any land subsidence changes occurring in the vicinity of the Subbasin (**Figure 6-2**). P248, P261, and P264 are located in mountainous topography outside the Subbasin where geologic materials are unlikely to exhibit compaction from groundwater level declines, but are sensitive to tectonic movements; these sites are intended to provide context to any vertical displacement that is occurring in and around the Subbasin and to help in evaluation of whether these movements are a result of

compaction or more regional tectonic shifts. P256 and 262 are nearer to the Delta area and are sensitive to subsidence from peat oxidation. P265 and UCD1 are located immediately outside of the Subbasin in Winters and Davis.

As discussed in **Section 3**, InSAR data are also used to monitor land surface elevation changes across the Subbasin. InSAR data do not provide the same measurement accuracy or temporal resolution of monitoring as do the CGPS data; however, they do provide more complete spatial coverage of vertical displacement in the Subbasin.

6.3.1. Changes to Monitoring Network

As discussed in **Section 3**, an inventory and assessment of critical infrastructure in the Subbasin led to the expansion of the subsidence RMS network to include 16 additional monitoring sites to be tracked using InSAR data. The additional subsidence RMS provide monitoring in areas of critical infrastructure to track potential impacts from land subsidence resulting from groundwater extractions. Each of these new subsidence RMS is collocated with or nearby groundwater monitoring wells (**Figure 6-2 and Table 6-2**) to support in the evaluation of the relationship between land subsidence and groundwater levels. At three CGPS monitoring was discontinued and were removed from the supplemental monitoring network, P256, P273 and P274. The full updated subsidence monitoring network and associated MTs, groundwater monitoring wells, and critical infrastructure is presented in **Table 3-8**.

Table 6-2 Subsidence Monitoring Network

Subsidence RMS ID	Monitoring Type	Collocated with:	Start of Record	Period of Record (years)
Representative Monitoring Sites				
SMN01	CGPS	DIXN	6/9/2012	14
SMN02	CGPS	VCVL	6/8/2012	14
SMN03	CGPS	P267	6/8/2012	14
SMN04	CGPS	P266	6/8/2012	14
SMN05	InSAR	08N01W26A002M	6/13/2015	11
SMN06	InSAR	Near 08N01E24Q001M	6/13/2015	11
SMN07	InSAR	08N02E27C002M	6/13/2015	11
SMN08	InSAR	SID DW-35	6/13/2015	11
SMN09	InSAR	07N02E02F002M	6/13/2015	11
SMN10	InSAR	SCWA-Allendale MW-1235	6/13/2015	11
SMN11	InSAR	MW-98C	6/13/2015	11
SMN12	InSAR	Near SID DW-15	6/13/2015	11
SMN13	InSAR	07N02E35D002M	6/13/2015	11

Table 6-2 Subsidence Monitoring Network

Subsidence RMS ID	Monitoring Type	Collocated with:	Start of Record	Period of Record (years)
SMN14	InSAR	CITY OF VACAVILLE-Well 02	6/13/2015	11
SMN15	InSAR	Near 06N02E19J001M	6/13/2015	11
SMN16	InSAR	SCWA-Meridian MW-1680	6/13/2015	11
SMN17	InSAR	Near 06N01E33L001M	6/13/2015	11
SMN18	InSAR	05N02E19M001M	6/13/2015	11
SMN19	InSAR	City of Rio Vista-Well 15	6/13/2015	11
SMN20	InSAR	City of Rio Vista-Well 10	6/13/2015	11
Supplemental Monitoring Network Sites				
Supplemental	CGPS	P248	9/21/2007	19
Supplemental	CGPS	P256	10/28/2005	Ended 2024
Supplemental	CGPS	P261	6/4/2004	22
Supplemental	CGPS	P262	3/30/2005	21
Supplemental	CGPS	P264	5/13/2005	21
Supplemental	CGPS	P265	8/27/2005	21
Supplemental	CGPS	P268	4/11/2005	21
Supplemental	CGPS	P271	6/8/2004	22
Supplemental	CGPS	P273	10/27/2005	Ended 2021
Supplemental	CGPS	P274	10/28/2005	Ended 2024
Supplemental	CGPS	UCD1	5/19/1996	30

6.3.2. Data Gaps

No subsidence data gaps are noted in the Subbasin at this time. The Subbasin will continue to monitor land subsidence to evaluate the elasticity of the historical subsidence and the association of vertical displacement with groundwater levels, tectonic activity, and peat oxidation.

6.4. Groundwater Quality

The GSP groundwater quality monitoring network is used to monitor for potential degraded water quality conditions resulting from groundwater management activities in the Subbasin. The network is intended to detect water quality trends and changes from both natural and anthropological mechanisms, although changes in groundwater quality unrelated to groundwater extraction or other groundwater management

activities (including PMAs) are not considered to be a UR in the GSP. Key groundwater quality constituents of interest for GSP monitoring include arsenic, chromium-6, chloride, nitrate, and TDS. The selected RMS and supplemental network sites for groundwater quality are listed in **Table 6-3** and shown on **Figure 6-3**. Most of the groundwater quality monitoring in the Subbasin is through coordination with existing monitoring programs including utilization of data from SID's agricultural well monitoring, DWR's Water Data Library, USGS/SWRCB Groundwater Ambient Monitoring Assessment (GAMA) Priority Basin Project, and SWRCB Division of Drinking Water (DDW) and GeoTracker database. Agricultural well monitoring conducted by SID helps track groundwater quality conditions in agriculturally dominated parts of the Subbasin and public water system water supply well monitoring data from DDW also represents a large component of the GSP water quality monitoring. Two wells monitored regularly as part of the ILRP Groundwater Quality Trend Monitoring program also provide helpful data.

The GSP identifies 27 RMS wells for including in the RMS network and 225 wells for including in the supplemental monitoring network.

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
07N01E14J001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	600	156-366, 384-576	9/2/2003	18	17	28	32	231	16
4810009-003	Alluvial/Upper Tehama	RMS	In Original Network	1430	315-335, 405-427, 565-581, 656-678, 706-766,840-850,875-887,1035-1042,1068-1075,1250-1260,1395-1407	1/9/2024	2	20	20	53	54	20
4810008-025	Alluvial/Upper Tehama	RMS	In Original Network	582	372-572	1/9/2020	0	7	7	12	12	7
08N01E35K001M	Alluvial/Upper Tehama	RMS	In Original Network	815		7/15/2025	0	12	12	1	11	12
08N01E32N001M	Alluvial/Upper Tehama	RMS	In Original Network	600	120-600	6/24/2010	0	3	3	0	3	3
4810004-003	Alluvial/Upper Tehama	RMS	In Original Network	800	230-780 316-337 357-398 418-460 480-500 520-560 600-660 700-780	3/1/2021	2	207	10	14	33	55
4810004-004	Alluvial/Upper Tehama	RMS	In Original Network	520	230-500	12/21/2022	3	207	14	16	48	58
SVWQC00011	Alluvial/Upper Tehama	RMS	In Original Network	120	70-80	7/25/2019	3	0	2	0	2	2
SVWQC00012	Alluvial/Upper Tehama	RMS	In Original Network	165	115-165	7/31/2019	3	0	3	0	2	3
07N01E14N003M	Alluvial/Upper Tehama	RMS	Added to Monitoring Network	540	235-385, 410-520	5/17/1976	49	94	18	11	76	77
4810008-007	Basal Tehama	RMS	In Original Network	966	750-930	1/7/2020	5	11	14	26	30	14
4810008-030	Basal Tehama	RMS	In Original Network	1635	1165-1195, 1256-1317, 1341-1381, 1466-1516, 1540-1610	1/9/2020	6	116	10	37	23	17

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
4810013-001	Basal Tehama	RMS	In Original Network	1371	1017-1047, 1169-1189, 1245-1261, 1271-1291, 1351-1361	2/22/2005	21	97	7	19	25	7
4810011-001	Unknown	RMS	In Original Network			7/15/2025	0	19	19	31	35	19
3410302-002	Unknown	RMS	In Original Network			9/17/2012	13	3	3	2	20	3
3410047-001	Unknown	RMS	In Original Network			3/4/2024	1	75	15	17	56	17
4800709-001	Unknown	RMS	In Original Network			7/13/2006	17	1	1	1	28	1
4810801-002	Unknown	RMS	In Original Network			7/6/1993	32	10	5	12	20	5
3400122-001	Unknown	RMS	In Original Network			1/24/2024	0	10	6	8	36	6
3400455-001	Unknown	RMS	In Original Network			11/14/2024	0	0	0	0	8	0
4800612-001	Unknown	RMS	In Original Network			6/24/2025	0	2	0	0	21	0
4810020-001	Unknown	RMS	In Original Network	60		8/22/2006	19	11	5	20	37	5
4800786-001	Unknown	RMS	In Original Network			6/8/1999	26	1	1	1	29	1
4810023-001	Unknown	RMS	In Original Network			4/5/1999	26	1	1	1	25	1
3400420-001	Unknown	RMS	In Original Network		20	3/6/2025	1	58	0	0	29	0
3400444-001	Unknown	RMS	In Original Network			12/17/2024	0	0	0	0	18	0
3400192-001	Unknown	RMS	In Original Network			6/10/2019	6	11	7	9	32	7
07N01E08N002M	Unknown	RMS	In Original Network	141	101-141	8/23/1972	17	0	9	0	4	2
07N01E23A004M	Alluvial/Upper Tehama	Supplemental	In Original Network	538	317-324, 465-484, 498-503	12/8/2003	22	21	27	140	136	14
07N01E23D002M	Alluvial/Upper Tehama	Supplemental	In Original Network	822	420-800	12/10/2001	24	22	24	169	153	13

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
07N01E14J002M	Alluvial/Upper Tehama	Supplemental	In Original Network	1410	460-510, 726-804, 1008-1020, 1125-1138, 1308-1395	10/4/2010	15	7	7	121	66	7
4810004-005	Alluvial/Upper Tehama	Supplemental	In Original Network	370	205-275, 320-350	6/26/2024	1	165	23	15	52	71
4810004-007	Alluvial/Upper Tehama	Supplemental	In Original Network	385	140-170, 190-210, 220-280, 345-365	6/26/2024	1	223	7	7	21	63
4810004-014	Alluvial/Upper Tehama	Supplemental	In Original Network	485	140-150, 195-300, 355-385, 440-465	12/19/2022	3	150	7	3	8	2
4810004-015	Alluvial/Upper Tehama	Supplemental	In Original Network	550	250-280, 350-430, 520-540	6/3/2024	1	158	11	4	9	3
4810004-016	Alluvial/Upper Tehama	Supplemental	In Original Network			12/19/2022	1	80	2	11	3	3
4800767-001	Alluvial/Upper Tehama	Supplemental	In Original Network	600	180-600	7/15/2025	0	53	29	29	52	29
4810701-008	Alluvial/Upper Tehama	Supplemental	In Original Network	905	352-382, 388-408, 599-619, 665-700, 800-819, 825-905	3/24/2015	10	8	7	14	24	7
4810701-009	Alluvial/Upper Tehama	Supplemental	In Original Network	1023	323-360, 380-510, 530-547, 573-627, 683-727, 840-890, 963-1010	3/29/2006	19	5	4	10	13	4
10978	Alluvial/Upper Tehama	Supplemental	In Original Network			11/22/2022	0	8	21	0	0	21
10979	Alluvial/Upper Tehama	Supplemental	In Original Network			11/19/2024	1	11	22	1	0	22
10980	Alluvial/Upper Tehama	Supplemental	In Original Network			11/19/2024	1	11	22	1	0	22
10981	Alluvial/Upper Tehama	Supplemental	In Original Network			11/18/2024	1	9	24	1	0	24
10982	Alluvial/Upper Tehama	Supplemental	In Original Network			11/18/2024	1	10	22	1	0	22
10983	Alluvial/Upper Tehama	Supplemental	In Original Network			12/4/2024	0	10	26	1	0	26
10984	Alluvial/Upper Tehama	Supplemental	In Original Network			12/3/2024	0	9	24	1	0	25

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
10985	Alluvial/Upper Tehama	Supplemental	In Original Network			11/18/2024	1	11	21	1	0	21
10986	Alluvial/Upper Tehama	Supplemental	In Original Network			12/3/2024	0	11	22	1	0	22
10987	Alluvial/Upper Tehama	Supplemental	In Original Network			11/19/2024	1	10	20	1	0	20
11043	Alluvial/Upper Tehama	Supplemental	In Original Network			10/22/2024	1	18	26	13	78	84
11050	Alluvial/Upper Tehama	Supplemental	In Original Network			10/23/2024	0	24	27	24	27	27
11051	Alluvial/Upper Tehama	Supplemental	In Original Network			8/27/2021	0	30	33	10	11	33
11052	Alluvial/Upper Tehama	Supplemental	In Original Network			10/20/2005	20	2	5	0	3	5
11053	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			6/6/2011	8	11	12	0	3	13
11054	Alluvial/Upper Tehama	Supplemental	In Original Network			10/24/2024	0	20	30	11	23	32
11055	Alluvial/Upper Tehama	Supplemental	In Original Network	27		6/8/2011	12	6	8	0	2	8
11056	Alluvial/Upper Tehama	Supplemental	In Original Network	35	25	5/19/2016	9	20	23	3	13	29
11057	Alluvial/Upper Tehama	Supplemental	In Original Network	75	55	10/24/2024	0	23	27	8	12	28
11058	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			10/31/2019	0	24	26	6	5	26
11059	Alluvial/Upper Tehama	Supplemental	In Original Network			10/21/2020	1	26	29	7	7	29
11061	Alluvial/Upper Tehama	Supplemental	In Original Network			10/27/2021	0	28	34	9	22	41
11062	Alluvial/Upper Tehama	Supplemental	In Original Network			10/23/2024	0	47	50	28	35	52
11063	Alluvial/Upper Tehama	Supplemental	In Original Network			10/23/2024	0	31	41	11	18	41

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
11065	Alluvial/Upper Tehama	Supplemental	In Original Network			10/11/2023	0	42	47	23	36	54
11066	Alluvial/Upper Tehama	Supplemental	In Original Network			10/22/2020	0	26	30	7	18	37
11071	Alluvial/Upper Tehama	Supplemental	In Original Network			10/27/2021	0	28	33	9	20	39
11074	Alluvial/Upper Tehama	Supplemental	In Original Network			10/27/2021	0	25	30	9	21	37
12935	Alluvial/Upper Tehama	Supplemental	In Original Network		10-20	10/27/2021	0	19	24	8	19	31
12632	Alluvial/Upper Tehama	Supplemental	In Original Network		8-18	1/11/2022	0	33	33	21	30	40
11080	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		15-25	4/3/2019	0	6	6	6	19	17
11085	Alluvial/Upper Tehama	Supplemental	In Original Network		15-25	10/10/2023	2	22	32	10	29	32
11087	Alluvial/Upper Tehama	Supplemental	In Original Network			10/27/2021	0	26	31	8	11	31
11088	Alluvial/Upper Tehama	Supplemental	In Original Network			10/23/2024	1	8	15	8	15	15
11092	Alluvial/Upper Tehama	Supplemental	In Original Network			12/11/2024	0	30	38	12	27	47
11097	Alluvial/Upper Tehama	Supplemental	In Original Network			7/19/2022	0	18	18	18	18	18
11098	Alluvial/Upper Tehama	Supplemental	In Original Network			10/22/2024	1	28	36	10	15	36
11103	Alluvial/Upper Tehama	Supplemental	In Original Network			6/13/2022	0	3	12	5	0	12
11127	Alluvial/Upper Tehama	Supplemental	In Original Network		33.7-43.7	6/15/2022	0	4	12	5	0	12
11129	Alluvial/Upper Tehama	Supplemental	In Original Network		46-55	6/14/2022	0	3	12	5	0	12
11131	Alluvial/Upper Tehama	Supplemental	In Original Network		48.8-68.8	6/14/2022	0	3	12	5	0	12
11132	Alluvial/Upper Tehama	Supplemental	In Original Network		11.6-21.6	6/14/2022	1	4	27	5	0	27

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
11133	Alluvial/Upper Tehama	Supplemental	In Original Network		17-26	6/13/2022	1	4	28	5	0	28
11135	Alluvial/Upper Tehama	Supplemental	In Original Network		22.9-32.9	6/14/2022	1	3	26	5	0	26
11137	Alluvial/Upper Tehama	Supplemental	In Original Network		32.8-41.8	6/14/2022	0	3	12	5	0	12
11141	Alluvial/Upper Tehama	Supplemental	In Original Network		54.9-64.9	6/14/2022	0	3	12	5	0	12
11146	Alluvial/Upper Tehama	Supplemental	In Original Network		27.9-37.9	6/13/2022	1	3	26	5	0	26
11149	Alluvial/Upper Tehama	Supplemental	In Original Network		41.3-51.3	6/15/2022	0	3	12	5	0	12
11153	Alluvial/Upper Tehama	Supplemental	In Original Network		18.3-27.3	6/7/2017	6	2	13	3	0	13
11154	Alluvial/Upper Tehama	Supplemental	In Original Network		46.7-56.7	6/15/2022	0	3	12	5	0	12
11155	Alluvial/Upper Tehama	Supplemental	In Original Network		19.4-28.4	6/14/2022	0	3	12	5	0	12
11157	Alluvial/Upper Tehama	Supplemental	In Original Network		28.5-33.5	6/12/2012	9	1	9	1	0	9
11158	Alluvial/Upper Tehama	Supplemental	In Original Network		40.6-50.6	6/14/2022	0	3	12	5	0	12
11159	Alluvial/Upper Tehama	Supplemental	In Original Network		54.3-59.3	6/16/2022	0	4	13	6	0	13
11161	Alluvial/Upper Tehama	Supplemental	In Original Network		50.3-60.3	6/15/2022	0	4	14	7	0	14
11162	Alluvial/Upper Tehama	Supplemental	In Original Network		50.2-55.2	6/15/2022	0	3	13	5	0	13
11163	Alluvial/Upper Tehama	Supplemental	In Original Network		20-29	6/14/2022	1	3	24	5	0	24
11164	Alluvial/Upper Tehama	Supplemental	In Original Network		21.7-31.7	6/14/2022	1	3	24	5	0	24
11165	Alluvial/Upper Tehama	Supplemental	In Original Network		23-38	6/15/2022	1	3	25	5	0	25
11166	Alluvial/Upper Tehama	Supplemental	In Original Network		53.1-58.1	6/16/2022	1	3	27	5	0	27

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
11167	Alluvial/Upper Tehama	Supplemental	In Original Network		76.3-87.2	6/16/2022	0	3	12	5	0	12
11168	Alluvial/Upper Tehama	Supplemental	In Original Network		9.5-19.5	6/14/2022	1	4	25	5	0	25
11169	Alluvial/Upper Tehama	Supplemental	In Original Network		21.7-31.7	6/14/2022	0	3	13	5	0	13
11170	Alluvial/Upper Tehama	Supplemental	In Original Network		21.6-31.6	6/13/2022	1	3	19	5	0	19
11172	Alluvial/Upper Tehama	Supplemental	In Original Network		16-26	6/16/2022	0	3	12	5	0	12
11175	Alluvial/Upper Tehama	Supplemental	In Original Network		33.9-43.9	6/16/2022	0	3	12	5	0	12
11176	Alluvial/Upper Tehama	Supplemental	In Original Network		21.9-31.9	6/16/2022	0	3	12	5	0	12
11177	Alluvial/Upper Tehama	Supplemental	In Original Network		16.4-26.4	6/13/2022	0	3	12	5	0	12
11178	Alluvial/Upper Tehama	Supplemental	In Original Network		27.4-37.4	6/13/2022	0	3	15	5	0	15
11179	Alluvial/Upper Tehama	Supplemental	In Original Network		17.5-27.5	6/13/2022	0	3	12	5	0	12
11309	Alluvial/Upper Tehama	Supplemental	In Original Network		55-75	1/28/2025	0	0	0	0	34	0
11310	Alluvial/Upper Tehama	Supplemental	In Original Network		56-76	1/27/2025	0	0	0	0	24	0
11311	Alluvial/Upper Tehama	Supplemental	In Original Network		51.5-71.5	1/27/2025	0	0	0	0	18	0
11312	Alluvial/Upper Tehama	Supplemental	In Original Network		50-70	1/28/2025	0	0	0	0	32	0
11313	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		25-45	8/27/2019	0	0	0	0	12	0
11314	Alluvial/Upper Tehama	Supplemental	In Original Network		25-45	8/17/2021	0	0	0	0	17	0
11315	Alluvial/Upper Tehama	Supplemental	In Original Network		56-76	1/27/2025	0	0	0	0	34	0
11316	Alluvial/Upper Tehama	Supplemental	In Original Network		30-50	2/8/2021	0	0	0	0	21	0

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
11317	Alluvial/Upper Tehama	Supplemental	In Original Network		60-75	7/21/2025	0	0	0	0	29	0
11318	Alluvial/Upper Tehama	Supplemental	In Original Network		30-50	2/8/2021	0	0	0	0	27	0
11319	Alluvial/Upper Tehama	Supplemental	In Original Network		60-80	7/21/2025	0	0	0	0	43	0
11320	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		30-50	2/4/2020	0	0	0	0	16	0
11321	Alluvial/Upper Tehama	Supplemental	In Original Network		59-79	7/21/2025	0	0	0	0	36	0
11322	Alluvial/Upper Tehama	Supplemental	In Original Network		30-50	8/17/2021	0	0	0	0	18	0
11323	Alluvial/Upper Tehama	Supplemental	In Original Network		55-75	1/27/2025	0	0	0	0	32	0
11752	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		42-52	6/17/2019	0	0	0	0	5	0
11756	Alluvial/Upper Tehama	Supplemental	In Original Network		57-67	6/4/2019	2	3	0	3	2	0
11757	Alluvial/Upper Tehama	Supplemental	In Original Network		74-84	6/4/2019	2	3	0	3	2	0
11759	Alluvial/Upper Tehama	Supplemental	In Original Network		57-67	6/4/2019	2	3	0	3	2	0
11760	Alluvial/Upper Tehama	Supplemental	In Original Network		73.6-83.6	6/4/2019	2	3	0	3	2	0
12793	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		0-15	2/28/2019	0	12	12	14	12	0
12795	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			2/28/2019	0	8	8	10	8	0
12796	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		30.49-45.49	2/28/2019	0	7	7	9	12	0

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
12798	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			3/17/2020	0	8	8	10	8	0
12799	Alluvial/Upper Tehama	Supplemental	In Original Network			3/17/2020	1	8	8	17	7	0
12800	Alluvial/Upper Tehama	Supplemental	In Original Network			2/28/2019	2	9	9	20	8	0
12802	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		30.06-45.06	2/28/2019	0	17	17	19	22	0
12803	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		29.1-44.1	2/28/2019	0	14	14	16	14	0
12804	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		0-15	2/28/2019	0	18	18	20	18	0
12805	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		29.32-44.32	2/28/2019	0	11	11	12	15	0
12807	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network		29.74-44.74	2/28/2019	0	6	6	8	6	0
12810	Alluvial/Upper Tehama	Supplemental	In Original Network		35.5-50.5	3/17/2020	1	22	22	28	21	0
12843	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			4/15/2019	0	0	0	0	1	0
12844	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			4/15/2019	0	0	0	0	1	0
12845	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			4/15/2019	0	0	0	0	1	0
12846	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			4/15/2019	0	0	0	0	1	0

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
12856	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			10/14/2019	0	0	0	0	3	0
12857	Alluvial/Upper Tehama	Supplemental	Removed from Monitoring Network			10/14/2019	0	0	0	0	3	0
06N01W22F002M	Markley	Supplemental	In Original Network	482	53-459	1/7/2020	3	13	13	26	29	12
06N01W23L003M	Basal Tehama	Supplemental	In Original Network	818	588-798	1/7/2020	5	13	15	28	37	15
06N01W23J002M	Basal Tehama	Supplemental	In Original Network	1204	952-1000, 1048-1192	2/18/2021	4	12	15	37	34	15
06N01W14R001M	Basal Tehama	Supplemental	In Original Network	1450	1100-1160, 1260-1430	1/9/2020	5	17	14	44	39	14
06N01W23L004M	Basal Tehama	Supplemental	In Original Network	870	560-720, 770-840	1/7/2020	5	10	14	25	30	16
4810008-012	Basal Tehama	Supplemental	In Original Network	1681	1108-1663	1/9/2020	6	13	14	44	34	14
4810008-024	Basal Tehama	Supplemental	In Original Network	1831	1206-1266, 1306-1446, 1546-1606, 1666-1696, 1756-1816	4/30/2020	5	10	10	36	24	10
4810013-002	Basal Tehama	Supplemental	In Original Network	1254	1071-1099, 1210-1240	12/20/2016	9	88	8	15	19	9
4810009-001	Unknown	Supplemental	In Original Network	917	317-917	1/9/2024	2	19	19	54	72	19
4810009-002	Unknown	Supplemental	In Original Network	872	234-246, 515-525, 760-781, 817-837, 852-860	5/17/2005	20	18	19	49	147	19
4810012-001	Unknown	Supplemental	In Original Network			7/15/2025	0	20	19	33	37	19
4810009-007	Unknown	Supplemental	In Original Network	1480	290-310, 350-370, 440-530, 620-660, 930-950, 1020-1210, 1330-1460	5/20/2025	0	10	10	30	88	10

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
4810009-009	Unknown	Supplemental	In Original Network	1470	430-450, 470-610, 670-710, 735-770, 850-890, 920-940, 1110-1140, 1180-1230, 1245-1255, 1300-1305, 1410-1450	1/9/2024	2	7	7	25	29	7
2600538-001	Unknown	Supplemental	In Original Network		240	7/5/2023	0	4	4	3	8	4
3400380-001	Unknown	Supplemental	In Original Network			2/10/2025	0	0	0	0	27	0
3400206-001	Unknown	Supplemental	In Original Network			8/12/2025	0	0	0	0	27	0
3410012-004	Unknown	Supplemental	In Original Network			3/5/2024	2	710	9	16	36	10
3410047-003	Unknown	Supplemental	In Original Network			3/5/2024	2	717	11	15	44	12
4800727-001	Unknown	Supplemental	In Original Network			6/7/2012	13	10	6	25	65	6
3400418-001	Unknown	Supplemental	In Original Network			5/12/2025	0	0	0	0	22	0
3400114-001	Unknown	Supplemental	In Original Network			6/23/2011	10	1	0	1	27	0
3400377-001	Unknown	Supplemental	In Original Network			7/12/2007	18	5	1	2	34	1
3400461-001	Unknown	Supplemental	In Original Network			5/12/2025	0	0	0	0	15	0
3400394-001	Unknown	Supplemental	In Original Network			8/15/2007	18	39	1	7	36	1
4800732-001	Unknown	Supplemental	In Original Network			10/12/1999	26	0	1	0	151	1
4800780-003	Unknown	Supplemental	In Original Network			4/22/2008	12	0	0	0	2	1
4800804-002	Unknown	Supplemental	In Original Network			7/7/2021	4	5	0	15	15	0
3400374-001	Unknown	Supplemental	In Original Network			3/13/2025	0	0	0	1	32	0

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
3400106-007	Unknown	Supplemental	In Original Network			5/6/2024	1	6	5	10	17	5
3400106-001	Unknown	Supplemental	In Original Network			5/1/2023	2	168	8	14	40	9
3400119-001	Unknown	Supplemental	In Original Network			5/28/2025	0	0	0	0	34	0
4810034-001	Unknown	Supplemental	In Original Network			4/5/2006	19	1	0	1	91	0
3400224-001	Unknown	Supplemental	In Original Network			4/13/2021	0	0	0	0	29	0
3400128-001	Unknown	Supplemental	In Original Network			5/8/2023	2	51	5	6	34	5
4810030-001	Unknown	Supplemental	In Original Network			7/26/2016	9	8	4	13	57	4
4810033-001	Unknown	Supplemental	In Original Network			10/21/2008	17	7	2	17	65	2
3400133-001	Unknown	Supplemental	In Original Network			3/31/2025	0	0	0	0	32	0
3400135-001	Unknown	Supplemental	In Original Network			8/11/2025	0	53	7	8	27	7
4800651-002	Unknown	Supplemental	In Original Network			6/3/2025	0	0	0	0	15	0
4800651-004	Unknown	Supplemental	In Original Network			6/3/2025	0	0	0	0	27	0
3410035-003	Unknown	Supplemental	In Original Network			2/10/2025	0	36	0	0	8	0
4800595-001	Unknown	Supplemental	In Original Network			6/22/2004	21	9	3	16	25	2
4800595-004	Unknown	Supplemental	In Original Network			6/22/2004	21	8	1	16	24	1
4800755-001	Unknown	Supplemental	In Original Network			2/3/2025	0	0	0	0	25	0
4800801-001	Unknown	Supplemental	In Original Network			5/11/1999	26	7	1	9	72	1
4800801-002	Unknown	Supplemental	In Original Network			8/12/2015	10	8	3	11	30	3

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
3400144-001	Unknown	Supplemental	In Original Network			5/17/2022	0	0	0	0	31	0
4800818-001	Unknown	Supplemental	In Original Network			1/25/1999	27	0	1	0	36	0
3400408-001	Unknown	Supplemental	In Original Network			3/31/2025	0	0	0	0	33	0
4800773-003	Unknown	Supplemental	In Original Network			8/8/2017	8	0	1	0	9	1
3400149-001	Unknown	Supplemental	In Original Network			5/14/2024	1	74	5	7	28	5
3400141-001	Unknown	Supplemental	In Original Network			8/16/2021	2	0	1	0	27	0
3400151-006	Unknown	Supplemental	In Original Network		126	5/2/2024	0	0	0	0	15	0
3400448-002	Unknown	Supplemental	In Original Network			1/23/2008	17	0	1	0	20	1
3400448-001	Unknown	Supplemental	In Original Network			1/23/2008	17	0	1	0	22	1
4810019-001	Unknown	Supplemental	In Original Network			11/20/2002	23	6	1	12	19	1
4800807-001	Unknown	Supplemental	In Original Network			6/21/2022	3	0	1	0	39	1
4800561-002	Unknown	Supplemental	In Original Network			11/4/2019	5	58	12	10	25	12
4800561-004	Unknown	Supplemental	In Original Network			11/4/2019	6	66	11	8	22	11
3400169-001	Unknown	Supplemental	In Original Network			5/13/2019	6	54	6	8	38	6
4800615-003	Unknown	Supplemental	In Original Network			6/12/2001	24	6	3	10	94	3
4800615-002	Unknown	Supplemental	In Original Network			6/12/2001	24	6	2	9	49	2
4810701-019	Unknown	Supplemental	In Original Network			3/24/2015	10	8	7	16	8	7
3400172-002	Unknown	Supplemental	In Original Network			6/13/2019	6	7	5	5	25	5

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
4810701-005	Unknown	Supplemental	In Original Network			3/29/2006	17	11	6	16	19	6
4800826-005	Unknown	Supplemental	In Original Network			5/2/2007	18	7	1	11	18	1
4800809-001	Unknown	Supplemental	In Original Network			11/2/1999	26	1	1	0	235	1
3400164-002	Unknown	Supplemental	In Original Network			3/10/2022	3	57	4	6	23	4
4800753-001	Unknown	Supplemental	In Original Network			5/14/2024	1	7	6	8	28	6
3400268-001	Unknown	Supplemental	In Original Network			4/14/2008	17	22	1	7	32	1
3400166-001	Unknown	Supplemental	In Original Network			7/28/2006	19	1	0	1	36	0
3400167-001	Unknown	Supplemental	In Original Network			8/16/2006	19	50	2	1	37	2
61531	Unknown	Supplemental	In Original Network			11/18/2024	1	20	22	1	0	22
16798	Unknown	Supplemental	In Original Network		28	4/10/2025	0	12	24	25	24	23
16799	Unknown	Supplemental	In Original Network		24	4/14/2025	0	13	27	28	26	27
16800	Unknown	Supplemental	In Original Network		25	4/15/2025	0	12	29	26	23	28
61532	Unknown	Supplemental	In Original Network	31	22-28	10/24/2024	0	7	18	7	29	18
61533	Unknown	Supplemental	In Original Network	14	6-11	4/3/2019	4	0	1	0	2	1
61534	Unknown	Supplemental	In Original Network	26	17-23	10/24/2024	0	21	23	20	30	24
61535	Unknown	Supplemental	In Original Network	14	6-11	10/10/2023	2	5	12	5	22	12
61536	Unknown	Supplemental	In Original Network	26	17-23	10/24/2024	0	21	24	21	32	25
61537	Unknown	Supplemental	In Original Network	15	6-11	10/24/2024	0	5	13	5	22	13

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
61538	Unknown	Supplemental	In Original Network	41	33-38	10/23/2024	0	8	21	8	70	22
61539	Unknown	Supplemental	In Original Network	28	20-25	10/23/2024	1	5	13	5	57	21
61540	Unknown	Supplemental	In Original Network	46	33-43	8/27/2021	0	9	12	9	14	13
61541	Unknown	Supplemental	Removed from Monitoring Network		14-29	10/12/2017	1	1	1	1	20	20
61542	Unknown	Supplemental	Removed from Monitoring Network		15-20	10/12/2017	1	1	1	1	19	19
61543	Unknown	Supplemental	In Original Network	25	14-22	10/22/2024	1	5	8	5	60	60
61544	Unknown	Supplemental	In Original Network	55	42-52	10/22/2024	1	4	6	4	67	65
61545	Unknown	Supplemental	In Original Network	69	60-65	10/22/2024	1	5	8	5	69	68
61546	Unknown	Supplemental	In Original Network	53	45-50	10/22/2024	1	4	6	4	63	63
61547	Unknown	Supplemental	In Original Network	36	27-32	10/23/2024	1	4	6	4	61	61
61548	Unknown	Supplemental	In Original Network	59	51-56	10/23/2024	1	4	6	4	62	62
61549	Unknown	Supplemental	Removed from Monitoring Network		25.6-34.6	5/23/2012	2	1	8	1	0	8
61550	Unknown	Supplemental	Removed from Monitoring Network		21.3-29.3	5/29/2012	2	1	4	1	0	4
61551	Unknown	Supplemental	Removed from Monitoring Network	25		5/21/2019	0	0	0	0	3	0
61552	Unknown	Supplemental	Removed from Monitoring Network	25		5/21/2019	0	0	0	0	1	0

Table 6-3 Changes to Monitoring Network During Implementation Period												
Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)	Number of Historical Measurements				
								As	Cl	Cr6	NO3	TDS
61553	Unknown	Supplemental	Removed from Monitoring Network	15		5/21/2019	0	0	0	0	1	0
61554	Unknown	Supplemental	In Original Network		65-80	6/1/2011	14	4	3	36	29	3
61555	Unknown	Supplemental	In Original Network		84.5-104.5	10/13/2008	16	1	1	13	19	1
61556	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	4	1	0
61557	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	5	1	0
61558	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	5	1	0
61559	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	4	1	0
61560	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	5	1	0
61561	Unknown	Supplemental	In Original Network	40		3/17/2020	1	2	2	5	1	0

6.4.1. Changes to Monitoring Network

Only very minor changes to the GSP groundwater quality RMS network are planned at this time. In response to communication with a local water quality monitoring entity, one RMS well was replaced with a different well in the same area to provide more complete and representative monitoring. This was only change to the RMS network. Planned changes to the supplemental monitoring network include removal of 28 wells due to discontinuing of monitoring through a SWRCB monitoring program (**Table 6-3 and Figure 6-3**).

6.4.2. Data Gaps

Historically the Subbasin has had sufficient spatial coverage of groundwater quality monitoring in the Alluvial Aquifer/Upper Tehama, but groundwater quality in the Subbasin is primarily limited to water supply wells and GeoTracker wells. However, data gaps were identified in three areas: 1) in the center of the Subbasin to the east, 2) in the area surrounding Cache Slough and 3) Montezuma Hills (**Figure 6-3**). More limited availability of data relating to the concentrations of key water quality constituents of interest does exist in some areas of the Subbasin, particularly in relation to arsenic and chromium-6. To further characterize domestic well water quality, particularly in relation to key drinking water constituents, as part of the well inventory work completed during the GSP implementation period, a subset additional domestic wells have been sampled in Fall 2026 with continuing efforts to expand this sampling pending well owner interest and access. The results from the recent domestic well sampling will be presented as part of a technical document to be completed in Spring 2027 and will also be included in the WY 2026 GSP Annual Report.

The GSP notes that the groundwater quality monitoring network may be expanded if any of the following occurs: changes to groundwater quality restricting beneficial use, increase in groundwater development and/or shifts in pumping patterns, or if there is a change in groundwater management actions or projects. At this time, the existing water quality monitoring is sufficient. As PMAs are more broadly implemented, it is anticipated that network refinements will occur to ensure detection of any impacts on groundwater quality resulting from PMAs.

6.5. Seawater Intrusion

Seawater intrusion is not an applicable SI in the Subbasin, but the current monitoring of chloride concentrations as part of the groundwater quality monitoring program is sufficient to detect potential effects on groundwater quality from intrusion of higher salinity water in the Delta. If seawater intrusion is determined to be of concern for the Subbasin in the future, refinements to the GSP monitoring programs will be performed.

6.6. Interconnected Surface Water

The Monitoring Networks and Identification of Data Gaps BMP (DWR, 2016) states that an interconnected surface water and groundwater network should include stream gages and groundwater level monitoring in areas where there is a known surface water groundwater connection to estimate depletions.

The GSP includes a network ISW RMS consisting of stream gages and monitoring wells to track ISW conditions and potential effects of groundwater extraction and levels on ISW. Conditions in the Subbasin related to ISW are presented in **Section 3**.

6.6.1. Changes to Monitoring Network

Figure 6-4 and **Table 6-4** outlines the sites included in the GSP ISW monitoring network. No changes are proposed to any of the stream gages monitored as part of the ISW RMS network; however, several changes are proposed to the network of RMS wells monitored for ISW. During the implementation period two wells were removed after being withdrawn from the DWR monitoring program and five wells were added. The changes result in a net increase of three in the ISW RMS well network, which now totals nine wells, and provide enhanced spatial coverage of groundwater conditions near surface water features. Three wells were removed from the supplemental ISW monitoring network because they are no longer monitored by other agencies due to missing well construction details or access issues. By comparison, a large number of wells (32) were added to the ISW supplemental monitoring network during the implementation period. The Subbasin will continue to evaluate the ISW monitoring network and make adjustments as determined appropriate. This includes consideration of DWR's guidance on ISW, when it becomes available.

Table 6-4 Changes to ISW Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
MW-15-188ft	Alluvial/Upper Tehama	RMS	In Original Network	188	158-178	10/31/2000	26
05N02E25K001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	100	76-100	4/4/1974	48
06N01E12M001M	Alluvial/Upper Tehama	RMS	In Original Network	109		11/21/1962	64
06N01E17M001M	Alluvial/Upper Tehama	RMS	In Original Network	120	70-80, 100-120	10/3/1975	51
06N02E19J001M	Alluvial/Upper Tehama	RMS	In Original Network	182	120-140, 160-180	2/27/1974	53
07N01W13H001M	Alluvial/Upper Tehama	RMS	Removed from Monitoring Network	158	54-158	10/1/1957	62
SSGSP-11	Alluvial/Upper Tehama	RMS	Installed Post-GSP	79	69-79		
SSGSP-12	Alluvial/Upper Tehama	RMS	Installed Post-GSP	110	95-105		
SSGSP-15	Alluvial/Upper Tehama	RMS	Added to Network				
SSGSA-05A	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	75	105	3/30/2022	5
SSGSA-05B	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	100	90-95	3/30/2022	5
SSGSA-03A	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	36	26-31	3/30/2022	5

Table 6-4 Changes to ISW Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
SSGSA-03B	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	95	80-90	3/30/2022	5
SSGSA-02A	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	50-55	3/30/2022	5
SSGSA-02B	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	109	99-104	3/30/2022	5
SSGSA-01A	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	56	41-51	4/5/2022	5
SSGSA-01B	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	90	75-85	4/5/2022	5
SSGSA-06A	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25	3/23/2022	5
05N02E36N001M	Alluvial/Upper Tehama	Supplemental	Discontinued	100		10/15/1947	74
SSGSA-06b	Alluvial/Upper Tehama	Supplemental	Added to Network	71	61-71	3/23/2022	5
06N02E02M003M	Alluvial/Upper Tehama	Supplemental	Discontinued	108	76-108	3/19/1959	61
07N01W15L001M	Alluvial/Upper Tehama	Supplemental	In Original Network	180	80-180	3/22/1984	42
05N03E21G003M	Alluvial/Upper Tehama	Supplemental	Discontinued	98	83-93	10/7/2011	6
CD-1-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
CD-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		

Table 6-4 Changes to ISW Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
CD-3-45ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	45	35-45		
CD-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
WH-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		
WH-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
WH-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-5-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WH-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	30-60		
WP-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		
WP-2-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
WP-5-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		

Table 6-4 Changes to ISW Monitoring Network During Implementation Period

Well Name	Aquifer Designation	Monitoring Site Type	Status Since GSP Adoption	Well Depth (ft bgs)	Screen Interval (ft bgs)	Start of Record	Period of Record (yrs)
WP-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-1-15ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	15	5-15		
SP-2-25ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	25	15-25		
SP-3-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-4-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-5-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		
SP-6-60ft	Alluvial/Upper Tehama	Supplemental	Installed Post-GSP	60	40-60		

6.6.2. Data Gaps

No significant monitoring data gaps related to ISW remain in the Subbasin at this time. It was noted in the GSP that a data gap related to ISW conditions exists along Putah Creek and in the central portion of the Subbasin near the Delta. A total of 12 new monitoring wells were constructed at six different nested well sites to address these data gaps. Most of these new monitoring wells are adjacent to Putah Creek. Although the period of record of monitoring at these sites is still somewhat limited, continued monitoring of these wells will provide greater understanding of ISW conditions in the Subbasin. The GSP also identified that it would be beneficial to have the key surface water stages monitored by SCWA surveyed and expanded to include flow monitoring, if feasible. Elevation surveys of the surface water gages monitored by SCWA were completed in 2026 and it was determined that developing rating curves at some of the current stage recorder sites is not feasible because of the characteristics of the channels and presence of vegetation. Ongoing characterization of the relationship between groundwater and surface water elevations will continue at these sites. Once DWR's ISW guidance is available, the Subbasin will consider if data gaps remain.

7. GSA AUTHORITY AND ENFORCEMENT ACTIONS

GSP Regulation § 356.4 (g)

A description of relevant actions taken by the Agency, including a summary of regulations or ordinances related to the Plan.

7.1. Description of Relevant Actions Taken by GSAs

Since its formation in 2016, the work of the Solano Collaborative and GSAs in the Subbasin during development and implementation of the GSP has been funded through a combination of GSA-provided funding and multiple DWR grants⁵ (for a total of approximately \$6.3 million). Recognizing the need to establish a stable and dedicated source of funding to support GSP implementation, the GSAs in the Subbasin agreed to method of distributing costs of SGMA compliance and GSP implementation among the GSAs in proportion to the amount of groundwater pumping within the boundaries of each GSA.

Solano Subbasin GSA, with the support of technical consultants, prepared a comprehensive Fee Study for the implementation of the GSP. The fees adopted by the Solano Subbasin GSA Board of Directors were a flat fee based on acres of land. The current fees expire in 2027 and the GSA is reviewing options for extending or updating the fee. Sacramento County and NDGSA also implemented similar fees and will be

⁵ Funding contribution of \$1,000,000 from DWR under the Sustainable Groundwater Planning Grant Program (SGWP), using funds authorized by the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1). The Solano Subbasin received an additional \$490,000 of Proposition 1 funding through DWR for stakeholder outreach and engagement efforts within the Subbasin. The Solano Subbasin also received a grant of \$705,000 through the California Drought, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018 (Proposition 68). The Subbasin also received 4,100,000 from the Round 2 funding in Proposition 1.

review during the next implantation period. City of Vacaville a GSA and SID GSA are paying for their portion of GSP activities t from funds generated through utility rates or other services.

7.2. Description of Enforcement of Legal Actions Taken by GSAs

GSP Regulation § 356.4 (h)

Information describing any enforcement or legal actions taken by the Agency in furtherance of the sustainability goal for the basin.

None of the GSAs within the Subbasin have taken any enforcement or legal actions to support the implementation of the GSP. The Subbasin has been operating sustainably and no enforcement or legal actions have been necessary in the Subbasin.

8. OUTREACH, ENGAGEMENT, AND COORDINATION

GSP Regulation § 356.4 (j)

Where appropriate, a summary of coordination that occurred between multiple Agencies in a single basin, Agencies in hydrologically connected basins, and land use agencies.

8.1. Public Engagement

Throughout the development of the GSP, the Subbasin prioritized diverse outreach strategies to share SGMA-related information and gather input from stakeholders and interested parties. These efforts have continued during the implementation phase, ensuring ongoing engagement opportunities. Public outreach activities include District board meetings, workshops, water policy meetings, joint committee meetings, grower meetings, and technical committee meetings. Additionally, public notices have been used to distribute information to stakeholders, the list of interested persons, and the general public. SGMA-related meetings occur with mixed frequency depending on the forum, with the option for more frequent sessions as needed—providing stakeholders and the public opportunities to learn about, discuss, and offer feedback on GSP activities, sustainability goals, and SGMA compliance.

The Solano Subbasin GSP website (<https://solanogsp.com/>) maintained as part of GSP administration, remains a central resource for updated meeting schedules and agendas, District policies surrounding GSP implementation, informing landowners of opportunities to implement SGMA-related projects, revisions to the GSP and Annual Reports, and other program details. The site may be expanded with new pages as the program progresses and additional activities are implemented. The Subbasin has and will continue in efforts to develop and distribute informational materials and conduct outreach to improve water use efficiency across all sectors. Many of these activities occur through efforts conducted by partnering entities in the Subbasin with missions involving improving water conservation and management.

A description of the methods employed by the Subbasin to further public outreach and engagement is described in **Table 8-1** below.

Table 8-1. Summary of Outreach Activities in the Solano Subbasin	
Brief Description	Lead Agency
Virtual Town Hall (held yearly 2021-2025), simulcast in English and Spanish with materials and recording posted in English and Spanish	Solano Collaborative, Dixon RCD, Solano RCD, GSA Board members, and Ag Innovations
Newsletter and Website updates , including posting recordings of presentations from GSA Collaborative meetings, and Virtual Town Halls; as well as GSA Collaborative meeting notes	Solano Collaborative, Solano RCD, Ag Innovations
Solano Collaborative GSA Get Together – Annual meeting of GSA board members	Solano Collaborative
Grower Workshop (held yearly in January)	Dixon and Solano RCD, Solano Collaborative
Irrigation & Weed Management Workshop	Dixon and Solano RCD
Interbasin Coordination Meetings - Yolo and Napa Subbasin	Solano Subbasin GSA
Grower Updates - Updates on groundwater management activities included in monthly emails to 500+ landowner/grower members of the Sacramento Valley Water Quality Coalition in the Solano Subbasin	Dixon RCD
Solano Collaborative and Technical Advisory Committee Meetings (Monthly, transitioned to quarterly in 2025)	Solano Collaborative, Dixon RCD, Solano RCD, Solano County, Solano County Farm Bureau
Solano Water Advisory Commission Meetings - Monthly	Solano Subbasin GSA
Multi-Benefit Solutions Planning Workgroup Meetings - Bimonthly meetings with GSA staff and technical consultants	Dixon and Solano RCD, SCWA
Landowner recharge interest meetings	Dixon and Solano RCD
Reach out to potential Putah Creek agricultural water users and to host three “Putah Creek Pumper” meetings with growers and landowners	Solano Collaborative, Dixon RCD
Workshop in Spanish for Spanish-speaking producers to outline all technical and financial assistance programs available, including groundwater recharge practices and potential pilot projects	Solano Collaborative, Dixon RCD, and Solano RCD
Distribute State of the Subbasin and groundwater materials in Spanish and English at the Winters Salmon Festival	Ag Innovations for Solano Collaborative
Programs 101 and Emerging Commodities workshop to highlight available grant funding and services in Solano County, including those that assist with irrigation efficiency and groundwater recharge. Presentations were in English and Spanish.	Solano and Dixon RCD, UCCE Small Farms, Solano County Farm Bureau, Sustainable Conservation, Yolo Solano Air

Table 8-1. Summary of Outreach Activities in the Solano Subbasin	
Brief Description	Lead Agency
	Quality Management District, and USDA NRCS
Monitoring network enhancements outreach to well owners in key areas of Subbasin	Dixon RCD, Solano Collaborative
Coordination with Solano County drought resilience planning efforts	Solano Subbasin GSA, Dixon and Solano RCD, SID, City of Vacaville
Coordination with Solano County One Water Project water master planning	Solano Subbasin GSA, Dixon and Solano RCD, SID, City of Vacaville

8.2. Engagement with Public Agencies within the Subbasin

Solano Subbasin has engaged and collaborated with public agencies as part of GSP implementation. This coordination includes data sharing, joint planning efforts, and participation in technical and policy meetings to align strategies and resources. Solano Subbasin also collaborates with these groups to implement monitoring programs and address challenges related to groundwater management and compliance with SGMA regulations. A summary of engagement and coordination with public agencies is provided in **Table 8-1**.

8.3. Engagement with Agencies in Hydrologically Connected Subbasins

A description of engagement and coordination with agencies in hydrologically connected Subbasins and the relation between how the proposed management of the Subbasin aligns with adjacent subbasins is described in **Table 8-1**.

8.4. Summary of Comments Submitted to the GSAs Since GSP Approval

A summary of comments submitted to the GSA since the initial submission of the approved GSP (2022 GSP) is provided in **Table 8-2** below.

Table 8-2. Assessment of Public Comments Submitted on GSP	
Entity	Description
Sustainable Groundwater Management Office (SGMO)	The DWR Sustainable Groundwater Management Office provided a comment letter regarding approval of the GSP. The Subbasin considered these comments during the development of the 2027 GSP Periodic Evaluation.

Table 8-2. Assessment of Public Comments Submitted on GSP

Entity	Description
The Nature Conservatory et al.	The Group determined that the Subbasin lacked identification of GDEs, the use of native vegetation and managed wetlands in the water budget, consideration of DACs, drinking water users, and environmental users during the establishment of the sustainable management criteria, drinking water well impact mitigation program and RMS near to key beneficial users. The Subbasin has since address man of these comments. The Subbasin contracted with the Freshwater Trust to prepare a comprehensive revies of GDEs in the Subbasin (Appendix D). Managed Wetlands and Native Vegetation have since been included in water budget updates in the Annual Reports and large-scale model update was undertaken during the implementation period. Section 5.4 documents these updates. The Subbasin was determined to be operating sustainably in the GSP and has maintained sustainable conditions throughout the implementation period. A well mitigation program was identified as a potential PMA that could be implemented if the Subbasin were to become unsustainable or experience undesirable results. Additionally, the RMS network has been modified since GSP submittal to fill many data gaps identified in the GSP.
Central Valley Flood Protection Board	Informed the Subbasin that approval by the Central Valley Flood Protection Board <i>is required for all proposed work or uses, including the alteration of levees within any area for which there is an Adopted Plan of Flood Control within the Board's jurisdiction</i>. The Subbasin acknowledges this request.
Linda Katrina Meek	Requested that Subbasin consider passing an ordinance allowing for the capture of rainfall on person property to be used on site. The Subbasin acknowledges this request.
Rich Collins from The Collins Farm	Requested review of deep percolation estimates in the Model and the use of cover crops in the winter. Section 5.4 documents model updates. The Subbasin in Winter 2024 and 2025 set up multiple cover crop studies results from the study is forthcoming.
Department of Fish and Wildlife- Bay Delta Region	The Department of Fish and Wildlife provided an updated comment letter replying to GSP responses to their original comment letter during the Comment Period prior to adoption of the GSP.