KAWEAH SUBBASIN STAFF ASSESSMENT

October 2025

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Executive Summary

SGMA Background

The mission and responsibility of the State Water Resources Control Board (State Water Board or Board) is to preserve, enhance, and restore the quality of California's water resources and protect them for all current and future generations. In 2014, the state Legislature passed the historic Sustainable Groundwater Management Act (SGMA) that established a new framework for how groundwater would be managed locally at the basin scale to achieve long-term sustainability. SGMA authorizes local public agencies to form Groundwater Sustainability Agencies (GSAs) in alluvial groundwater basins and requires that basins designated as high-priority and medium-priority by the California Department of Water Resources (DWR) be managed by Groundwater Sustainability Plans (GSPs). These local agencies are responsible for the sustainable management of their groundwater basins; however, state agencies are responsible for ensuring local groundwater management achieves SGMA's goals.

Under SGMA, DWR is responsible for reviewing GSPs to determine if local actions will be adequate to achieve the sustainable use of groundwater. If DWR finds local basin management to be inadequate to remedy the unsustainable use of groundwater, DWR's inadequate determination will initiate the State Water Board's state intervention process. When a basin GSP or GSPs is determined to be inadequate, Board staff will work with the GSAs to correct the deficiencies identified in the GSAs' plan or implementation of the plan. If the State Water Board determines the GSAs adequately addressed groundwater management issues, the Board may release a subbasin from the State Water Board process and return it to DWR's jurisdiction. Otherwise, the State Water Board may, through a noticed public hearing process, designate the basin as "probationary" under SGMA and collect groundwater pumping information and fees from extractors in the basin. After one year of probationary status, the Board may develop and adopt an interim plan that directly manages pumping in the basin. State intervention is a process that could result in the State Water Board temporarily managing and protecting groundwater resources until local agencies are able and willing to do so adequately. State intervention is in addition to local management and intended to be temporary. The goal of the state intervention process is to ensure the sustainable use of groundwater and to return a basin to local management as soon as local actions are sufficient to achieve sustainability. Section 1 of this State Water Board Staff Assessment (Staff Assessment) contains more detail on the state intervention process.

Kaweah Subbasin

The Kaweah Subbasin is in the southern portion of the San Joaquin Valley, in Kings and Tulare Counties, and contains the cities of Visalia and Tulare (Appendix A, Figure 1). Since time immemorial, the following California Native American Tribes have had cultural, traditional, or ancestral connections to the Kaweah Subbasin: Big Sandy Rancheria of Western Mono Indians, Kings River Choinumni Farm Tribe, North Fork

Mono Tribe, Santa Rosa Rancheria Tachi Yokut Tribe, Tule River Indian Tribe, and Wuksache Indian Tribe/Eshom Valley Band (Native American Heritage Commission 2023, Personal Communication, May 11, 2023).

The Kaweah Subbasin is managed by three GSAs: East Kaweah GSA, Greater Kaweah GSA, and Mid-Kaweah GSA (collectively, the Kaweah GSAs or GSAs). Each GSA wrote their own GSP, East Kaweah GSP (EKGSP), Greater Kaweah GSP (GKGSP), and Mid-Kaweah GSP (MKGSP). The three GSPs are tied together by a coordination agreement. The primary use of groundwater within the subbasin is irrigated agriculture; in 2020, irrigated agriculture used more than 94 percent of the groundwater in the subbasin (2024 Coordination Agreement, Appendix 1, p. 27). The subbasin is critically overdrafted, which means that groundwater is pumped out of the subbasin faster than it is recharged by precipitation and other sources. On average, the amount pumped from the subbasin in a year is 104,000 acre-feet greater than the amount recharged (2024 GKGSP p. 1-1). Overdraft can cause the land surface to sink, potentially damaging infrastructure and reducing aquifer storage. In addition, overdraft threatens groundwater levels and drinking water quality and could have disparate impacts on communities that rely on shallower groundwater levels. Due to historic and political factors, many of these are economically disadvantaged and communities of color. As of 2022, the subbasin has an estimated population of 296,632 people with most of the population being Hispanic or Latino (60.6%) followed by white (31%) (American Community Survey, 2022). The average annual household income within the subbasin in 2022 is $71,000, which is significantly less than the state average of $91,551 (ibid.).

Issues with the 2022 Groundwater Sustainability Plans

The state intervention process for the Kaweah Subbasin was initiated in March 2023 when DWR determined the subbasin's 2022 GSPs were inadequate and identified multiple deficiencies in the GSPs (Inadequate Determination). DWR identified issues regarding the local agencies' plans for managing for the chronic lowering of groundwater levels and land subsidence (land sinking due to groundwater pumping). State Water Board staff reviewed the 2022 GSPs and determined that implementing the 2022 GSPs would result in additional groundwater level declines, water quality impacts to drinking water wells, damage to subbasin infrastructure (e.g. canals and levees) through continued land subsidence, and potential depletions of interconnected surface water.

In 2024, Board staff released the Kaweah Subbasin Probationary Hearing Draft Staff Report (Draft Staff Report). In the Draft Staff Report, Board staff agreed with DWR's Inadequate Determination and recommended the State Water Board designate the subbasin as probationary at the January 7, 2025, probationary hearing (California State Water Resources Control Board, 2024, pp. 14-21). In the Draft Staff Report, Board staff summarized the recommended actions the State Water Board could take at the probationary hearing, including designating the entire subbasin probationary, requiring meters to measure extractions from certain groundwater extractors, and reporting extractions to the State Water Board (ibid.).

2024 Groundwater Sustainability Plan Improvements

Since DWR's Inadequate Determination, Board staff met routinely with the GSAs to discuss the deficiencies identified in the Draft Staff Report and provide feedback on potential solutions. The GSAs released two rounds of amended draft GSPs for Board staff to review and for public comment, the first in June 2024 and second in October 2024. The GSAs adopted their 2024 GSPs on November 12, 2024. Staff noted significant progress in a preliminary review of these GSPs, and the Board cancelled the hearing scheduled for January 7, 2025, to allow staff time to conduct a thorough review.

Board staff evaluated the 2024 GSPs and determined that the GSAs made significant progress in their revisions. Through the 2024 GSPs, the GSAs show a greater commitment to protecting drinking water users, mitigating for declining groundwater level impacts, and improved groundwater management. Some of the improvements the GSAs made in the 2024 GSPs include:

- Setting limits for groundwater extractors through allocations to reduce pumping.
- Engaging with community members and environmental justice groups when changing groundwater management strategies.
- Establishing a mitigation program for drinking water wells and critical infrastructure adversely affected by declining groundwater levels, land subsidence, and groundwater quality degradation.
- Transitioning irrigation pumping away from the lower aquifer to eliminate active subsidence.
- Considering the vulnerability of domestic well users in both the upper and lower aquifer in mitigation plans.
- Addressing groundwater quality issues by agreeing to sample monitoring wells twice a year for an expanded list of constituents.
- Making significant progress to address impacts to interconnected surface water and to resolve data gaps.

Staff Recommendations and Next Steps

Board staff concludes that the GSAs amended their 2024 GSPs such that a probationary designation of the Kaweah Subbasin is not necessary. Board staff recommends the Board return the Kaweah Subbasin to DWR's jurisdiction for continued evaluation of local management under SGMA. Section 1.2.1 of the Staff Assessment includes more information about returning the basin to DWR's jurisdiction.

GSAs must continue to evaluate their GSPs as they continue toward achieving sustainability. The GSPs will be periodically reviewed once a basin is returned to DWR's

jurisdiction. Section 4 of the Staff Assessment includes recommendations for the GSAs to consider in future GSP revisions to improve groundwater management in the basin.

1.0 Background: The Sustainable Groundwater Management Act and State Intervention

Section 1.1 provides general background on the Sustainable Groundwater Management Act (SGMA) and the roles it defines for groundwater sustainability agencies (GSAs), the California Department of Water Resources (DWR), and the State Water Resources Control Board (State Water Board or Board). This section describes the Board's role as a backstop, protecting groundwater and those who depend on it when local efforts alone are inadequate. Section 1.2.1 provides background on the process to return a basin to DWR's jurisdiction.

1.1 The Sustainable Groundwater Management Act Background

Groundwater is one of California's greatest natural resources and makes up a significant portion of the state's water supply. Overdraft occurs when groundwater pumping removes groundwater faster than the basin can refill. Some groundwater basins in California are defined as critically overdrafted, and are experiencing significant adverse environmental, economic, and social impacts.

SGMA authorizes local public agencies overlying groundwater basins to form groundwater sustainability agencies (GSAs) and develop and implement groundwater sustainability plans (GSPs). GSAs are responsible for the long-term management of their groundwater basins that avoids "undesirable results" within 20 years of implementing their GSPs. To achieve this, GSAs address data gaps, set criteria for groundwater conditions, implement projects and management actions, monitor groundwater levels and quality, and review their plans at least every five years.

DWR is the primary agency for technical assistance and oversight in SGMA and is tasked with assessing and evaluating GSPs for regulatory compliance. The State Water Board may intervene in groundwater management when local management is deemed inadequate due to deficiencies in the GSP or with GSP implementation. When DWR, in consultation with the State Water Board, deems the GSP or GSPs in a basin inadequate (Wat. Code, § 10735.2, subd. (3)), DWR refers the basin to the State Water Board for potential state intervention (Wat. Code, § 10735 et seq.).

State intervention is a multi-step process. First, the Board must consider whether to designate the basin as probationary. If a basin is designated as probationary the Board will begin collecting data on groundwater uses and extractions, begin collecting fees, and may conduct additional investigations. GSAs may continue to revise their GSPs during the probationary period. If deficiencies identified through the probationary designation process are not remedied within one year of a probationary designation, the Board may consider the imposition of an interim plan for the basin. Importantly, the GSA

retains its authority and responsibilities during state intervention and must continue to implement the GSP regardless of the basin's probationary status.

1.2 Returning a Subbasin to DWR's Jurisdiction

State intervention can be temporary. If GSAs can demonstrate to the State Water Board that they addressed deficiencies identified by DWR as the basis for the referral and additional issues identified by Board staff during any assessment of the GSP prior to a hearing, the State Water Board may determine that it is not necessary to designate the basin as probationary and return the basin to DWR's jurisdiction. In most cases, the GSAs identify specific revisions to the GSP and describe how those revisions address the issues described in DWR's Inadequate Determination, propose a plan for implementing GSP revisions, and provide responses to issues raised by State Water Board staff in technical meetings.

After considering the GSAs' efforts, if the State Water Board determines that the deficiencies identified by DWR no longer exist then the State Water Board returns the basin to DWR's jurisdiction. DWR's jurisdiction includes DWR's periodic reviews of GSAs' GSPs, to be conducted at least every five years (Wat. Code, §§ 10733, 10733.8). The process to return a basin to DWR's jurisdiction may include notice to the public and opportunity for public comment. In the case of the Kaweah Subbasin, the State Water Board noticed the release of a draft Staff Assessment and proposal to return the basin to DWR's jurisdiction on October 13, 2025, provided an opportunity for written public comment on the draft Staff Assessment and proposal between October 13, 2025 and November 12, 2025, and expects to consider and potentially take action on the Board staff proposal at the December 2, 2025 Board meeting.

2.0 Kaweah Subbasin Background

The Kaweah Subbasin (subbasin) is in the Tulare Lake hydrologic region within California's Central Valley (Appendix A, Figure 1). DWR determined the groundwater basin is high priority and subject to critically overdrafted conditions. The three Kaweah Subbasin GSAs submitted three GSPs to DWR in 2020 (2020 GSPs). DWR determined in January 2022 that the 2020 GSPs were incomplete, and the GSAs had 180 days to revise the GSPs. The GSAs submitted revised GSPs in July 2022 (2022 GSPs). In March 2023, DWR determined that the 2022 GSPs were inadequate. DWR's Inadequate Determination of the 2022 GSPs initiated the State Water Board's role as the state backstop under SGMA pursuant to subdivision (a)(3) of Water Code section 10735.2.

DWR's Inadequate Determination concluded that the 2022 GSPs were inadequate due to deficiencies concerning sustainable management criteria for chronic lowering of groundwater levels and land subsidence. This would allow significant and unreasonable impacts to beneficial uses and users of groundwater as well as surface land uses, including infrastructure. The deficiencies identified in DWR's Inadequate Determination are briefly summarized below.

Deficiencies involving declining groundwater levels:

- The GSAs did not clearly define undesirable results for the chronic lowering of groundwater levels for the subbasin.
- The GSAs did not select minimum thresholds based on avoiding undesirable results and significant and unreasonable impacts to beneficial uses and users.
- The GSAs did not thoroughly explain the effects groundwater level minimum thresholds have on other sustainability indicators, such as groundwater storage, land subsidence, degradation of groundwater quality, and depletions of interconnected surface water.
- The 2022 Coordination Agreement's discussion of the Mitigation Program Framework lacked specific details.

Deficiencies involving land subsidence impacts:

- The 2022 GSPs did not provide reasonable justification for subsidence sustainable management criteria that involved the subbasin's water conveyance infrastructure.
- The 2022 GSPs did not adequately define the relationship between groundwater level sustainable management criteria and potential subsidence impacts.

In May 2024, Board staff released the Draft Staff Report. The Draft Staff Report affirmed the deficiencies identified in DWR's Inadequate Determination. In addition, the Draft Staff Report identified issues regarding land subsidence, groundwater quality, and interconnected surface water which are briefly summarized below:

Issues involving land subsidence impacts:

- Significant impacts to conveyance infrastructure and undesirable results were expected under projected subsidence rates without mitigation.

Issues involving degradation of groundwater quality:

- GSPs did not clearly define undesirable result conditions.
- Sustainable Management Criteria were not consistent with GSP Regulations.
- Monitoring networks were not consistent with GSP Regulations.
- Management actions were not responsive to water quality degradation.

Issues involving depletions of interconnected surface water:

- The GSAs did not adequately consider beneficial uses and users.
- Minimum thresholds were not consistent with GSP Regulations.

- The GSAs did not establish a monitoring network designed to address depletions of interconnected surface water.

Based on the discrepancies Board staff identified in the 2022 GSPs, Board staff recommended in the Draft Staff Report that the State Water Board designate the subbasin as probationary (California State Water Resources Control Board, 2024, p. 14)

In November 2024, the GSAs adopted the 2024 Second Amended GSPs (2024 GSPs), which aimed to address both the deficiencies outlined in DWR's Inadequate Determination and the Board's Draft Staff Report. Board staff determined that significant improvements were made in the 2024 GSPs, following technical meetings with Kaweah GSA staff and consultants and a preliminary review of the 2024 plans. As a result, the Board canceled the hearing scheduled for January 7, 2025, for the proposed consideration of the Kaweah Subbasin as a probationary basin to allow staff time to complete a thorough evaluation of the 2024 GSPs.

3.0 Board Staff Evaluation of the 2024 Kaweah GSPs

Board staff evaluated the 2024 GSPs to determine if the deficiencies outlined in DWR's Inadequate Determination and issues identified in the Board's Draft Staff Report were adequately addressed. Board staff finds that with the 2024 GSPs, the GSAs adequately address deficiencies identified by DWR and issues identified by Board staff. Furthermore, the plans sufficiently describe the method for implementing the GSPs to avoid significant and unreasonable impacts to beneficial uses and users. In the following sections, Board staff evaluates the GSAs' approach to managing groundwater levels, land subsidence, groundwater quality, interconnected surface water, and domestic well mitigation.

3.1 Groundwater Levels

3.1.1 Deficiency Groundwater Level (GL) - 1

The 2022 GSPs did not clearly define undesirable results for the chronic lowering of groundwater levels for the subbasin.

The 2022 GSPs identified several impacts caused by declining groundwater levels such as increased groundwater pumping costs and adverse effects on health and human safety but did not clearly explain what conditions would constitute undesirable results. Without a clear description of the specific conditions of undesirable results, Board staff could not evaluate whether the effects of declining groundwater levels would cause undesirable results.

In the 2024 GSPs, the undesirable results are generally defined as "The tipping point at which groundwater conditions across the Kaweah Subbasin cause impacts to beneficial users, uses, and property interests that cannot be sustained or mitigated" (2024 Coordination Agreement, Appendix 6, Section 6.4). The GSAs identified beneficial uses

and users pertaining to groundwater levels and storage in the Kaweah Subbasin as drinking water use (domestic, small community, municipal, and commercial wells), environmental use (groundwater dependent ecosystems, habitat conservation, and native vegetation), agricultural use (irrigation and ag-industrial users), and non-potable municipal use (golf course, parks and recreation, and environmental remediation users) (2024 Coordination Agreement, Appendix 6-1, p. 6). Among all users, domestic drinking water well users are identified as the most vulnerable since domestic wells are generally completed at shallower depths than other well types in the Kaweah Subbasin.

The GSAs define undesirable results for chronic lowering of upper aquifer groundwater levels when a combination of (1) and (2) or (3) occur:

> (1) If more than 17 upper aquifer representative monitoring site (RMS) wells in the Kaweah Subbasin exceed their minimum threshold in any given water year;
>
> AND
>
> (2) More than 30 domestic wells in the Kaweah Subbasin are impacted due to overdraft and require mitigation in any given water year. If 30 wells require mitigation for multiple years, no more than 350 wells shall be impacted cumulatively by 2040;
>
> OR
>
> (3) If a GSA is unable to meet mitigation needs (2024 Coordination Agreement, Appendix 6, Section 6.4.2).

The number of wells selected for the first part of the undesirable result spatially correlates to the maximum number of wells that any given GSA could afford to mitigate in a single year, meaning declining water levels are not allowed to drop such that impacts to wells are beyond which the GSAs budgeted to mitigate. The second part of the undesirable result is the average annual number of domestic wells that the GSAs can mitigate per year with a 50 percent safety factor for an added level of security. However, “Due to the non-uniform spatial distribution of RMS and domestic wells, it is possible that 17 or more RMS wells have MT exceedances, but fewer than 30 domestic wells are impacted” so the definition of the undesirable result includes both (1) *and* (2) (above) occurring together (ibid.).

The second part of the undesirable result definition for the upper aquifer also limits consideration of wells to those impacted “due to overdraft,” which staff finds to be too limiting in scope since there are other causes for dry wells that GSAs should address. However, the 2024 Kaweah Coordination Agreement appropriately defines other potential causes leading to undesirable results including excessive localized drawdown or drought and identifies potential impacts to beneficial users as “Any domestic unable to supply safe drinking water to a household due to the *lowering of groundwater levels*” (2024 Coordination Agreement, Appendix 6, Section 6.4.1) (emphasis added). After staff provided feedback to the GSAs regarding this concern, the Kaweah GSAs provided a letter to Board staff on October 7, 2025, stating their intention to change the undesirable result definition from “impacted due to overdraft” to “impacted due to GSA

groundwater management activities" (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025).

For the lower aquifer, the GSAs incorporate potential subsidence impacts into the definition of the undesirable result, and define undesirable results for chronic lowering of groundwater levels as:

> A single groundwater level MT is exceeded;
>
> AND
>
> The corresponding subsidence MT (cumulative OR rate) is exceeded at any RMS in the Kaweah Subbasin (ibid.).

Combining the water level sustainable management criteria with subsidence sustainable management criteria is based on avoiding subsidence which is predominantly driven by overdraft of the lower aquifer. Furthermore, the GSAs identified critical infrastructure users the most vulnerable beneficial user to chronic lowering of groundwater levels in the lower aquifer, because lowering groundwater levels is the primary driver of land subsidence and their analysis showed that no lower aquifer wells are at risk of going dry at the water levels that correspond to the land subsidence minimum thresholds (2024 Coordination agreement Appendix 6-1, p. 24).

The GSAs identified critical infrastructure within the subbasin and established criteria to quantify what is considered a significant and unreasonable impact on infrastructure (2024 Coordination Agreement, Appendix 6-3, pp. 5-19). Infrastructure that was identified by the GSAs includes:

- Domestic wells
- Friant-Kern canal
- Local canals
- Gravity pipes
- Non-drinking water supply wells
- Flood Control

The GSAs established both absolute (total) and differential subsidence (variable) undesirable results criteria for critical infrastructure. For domestic wells, any collapse is considered significant and unreasonable (ibid.). Similarly, any inelastic subsidence that leads to capacity loss along the Friant-Kern Canal is considered significant and unreasonable (ibid.). Other critical infrastructure listed above have undesirable results related to differential subsidence, such as local canal slope changing up to one foot over 1.5 miles, or if subsidence leads to canals exceeding the parameters of as-built design specifications (gravity pipes) (ibid.).

Board staff concludes that Deficiency GL-1 is resolved. The 2024 GSPs' definition of undesirable results for the chronic lowering of groundwater levels is generally

adequate to avoid significant and unreasonable impacts to beneficial uses and users of the single, upper, and lower aquifers. Staff recommends revising the undesirable result definition for the upper aquifer to better align with the potential causes of chronic lowering groundwater levels by revising “overdraft” to language that better aligns with the causes of undesirable results described in the coordination agreement in the next GSP update, which the GSAs plan to do based on their October 7, 2025, letter (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025).

3.1.2 Deficiency Groundwater Level (GL) - 2

The GSAs did not select minimum thresholds based on avoiding undesirable results and significant and unreasonable impacts to beneficial uses and users.

The 2022 GSPs did not clearly describe how minimum thresholds were selected to avoid undesirable results and significant and unreasonable impacts to beneficial uses and users. The 2022 GSPs developed three methodologies to determine the groundwater level minimum thresholds in 39 analysis zones using information from 3,353 agricultural, industrial, municipal, and domestic wells in the subbasin. The analysis zones grouped wells that would experience similar groundwater level impacts and by similar characteristics such as GSP management areas, groundwater elevations, and source aquifer. The analysis considered different categories of wells (domestic, agricultural, and municipal) to represent each analysis zone but did not consider the groundwater uses and users that would be most susceptible to declining groundwater levels. Additionally, the analysis only considered wells with completion reports available in DWR’s Online System for Well Completion Reports (OSWCR) for which completed depths, screen depths, and location data were available, and that were installed after January 1, 2002 (2022 Coordination Agreement, Appendix 6-1, p. 3). Since OSWCR lacks this information for many wells, and since only wells completed after 2002 would be considered, a significant number of wells were not considered in this analysis, meaning that these wells could be vulnerable to undesirable results.

In preparing the 2024 GSPs, the GSAs conducted a dry well susceptibility analysis to determine appropriate minimum thresholds for the single and upper aquifers (2024 Coordination Agreement, Appendix 6-1, pp. 10-16). The dry well susceptibility analysis was used to determine minimum thresholds that are protective of domestic well users (the most vulnerable beneficial users) in the single and upper aquifers, to assess the number of potentially impacted wells under multiple future groundwater elevation surface scenarios, and to estimate mitigation program costs for domestic wells (ibid.).

The analysis used domestic well data from OSWCR as well as the “USGS Well Completion Report Database” which provides additional well information that may be missing from OSWCR, such as total well depth and screened interval depths (2024 Coordination Agreement, Appendix 6-1, p. 11). The analysis used a protective threshold of 30 feet above the bottom of each domestic well. In the analysis, the GSAs first calculated the average annual rate of groundwater decline across the subbasin from 2015, baseline year for SGMA implementation, to 2022, the most recent critically dry year. This spatially variable rate served as the baseline for projecting a range of future

water level decline scenarios. Then, the number of impacted domestic wells were estimated by comparing projected groundwater levels under each scenario to the protective thresholds of individual wells. The minimum thresholds for the approximately 97 RMS in the upper and single aquifer are set to minimize the potential impacts to domestic wells under projected conditions and consider the GSAs ability to mitigate if there are impacts (2024 Coordination Agreement, Appendix 6-1, pp. 15-16).The GSAs explained in the GSPs that significant and unreasonable impacts occur if GSAs are unable to meet mitigation demands for impacts related to the GSAs' management of groundwater (2024 Coordination Agreement, Appendix 6-1, p. 16; 2024 EKGSP, p. 5-65; 2024 GKGSP, p. 5-75; 2024 MKGSP, p. 5-68).

This analysis considered specific areas where the GSAs could continue to let groundwater levels decline while allowing for operational flexibility to have less impact on domestic well users and to maintain economic stability. Board staff concludes that this approach is satisfactory because the analysis includes all wells that could reasonably be identified without a well survey (which is currently in progress). Minimum thresholds are directly related to impacts that can be mitigated, a robust well mitigation plan is already in effect, and required funds are already collected and available.

As described above, the 2024 GSAs developed groundwater level minimum thresholds for the lower aquifer that incorporated consideration of land subsidence minimum thresholds, since subsidence was identified as the most conservative undesirable result that may occur from chronic lowering of groundwater levels in the lower aquifer. Lower aquifer minimum thresholds were also evaluated to minimize impacts to domestic wells (2024 Coordination Agreement, Appendix 6-1, p. 8).

Board staff concludes that Deficiency GL-2 is resolved. The selected minimum thresholds are adequate to avoid significant and unreasonable impacts to beneficial uses and users. Board staff recognize that the GSAs allow groundwater levels to decline in some areas to provide operational flexibility as they implement projects and management actions to bring the basin into sustainability. The GSAs strategically concentrated these declines in areas where impacts to beneficial uses and users are expected to be relatively minor. In addition, GSAs developed a robust plan to mitigate impacts of declining water levels to reduce impacts to beneficial users.

3.1.3 Deficiency Groundwater Level (GL) - 3

The GSAs did not thoroughly explain the effects groundwater level minimum thresholds have on other sustainability indicators, such as groundwater storage, subsidence, degradation of groundwater quality, and depletion of interconnected surface water.

The 2022 GSPs lacked specific details on how groundwater level minimum thresholds would not cause undesirable results for other sustainability indicators. The 2022 GSPs acknowledged that setting groundwater level minimum thresholds below historical lows could mobilize depth-dependent water quality constituents, potentially adversely impacting beneficial uses and users. However, the 2022 GSPs did not clarify whether this would constitute an undesirable result. The 2022 GSPs also acknowledged

groundwater levels would continue to decline during GSP implementation and subsidence would occur; yet the GSPs did not describe how undesirable results for subsidence would be avoided.

In the 2024 GSPs, the GSAs described how groundwater level minimum thresholds relate to other sustainability indicators and how groundwater level minimum thresholds would avoid undesirable results for most of the other sustainability indicators.

For land subsidence, the GSAs used a land subsidence model, incorporating multiple one-dimensional models, to determine that subsidence impacts in the subbasin have a strong correlation with lower aquifer groundwater levels. The GSAs used the model results to calculate lower aquifer groundwater level minimum thresholds to avoid groundwater level undesirable results in the lower aquifer (2024 Coordination Agreement, Appendix 6-3, pp. 25-26).

For the reduction in groundwater storage, the GSAs demonstrated that the regional groundwater levels have a strong correlation with the modeled aquifer storage (2024 Coordination Agreement, Appendix 6-3, p. 25). Because of this strong correlation, groundwater levels are used as a proxy for groundwater storage, and groundwater level minimum thresholds are used as groundwater storage minimum thresholds, which follows SGMA regulations (Cal. Code Regs., tit. 23 § 354.28 (d)).

For degradation of groundwater quality, the GSAs evaluated pre-SGMA concentration trends and concentration trends since SGMA was adopted for constituents of concern and concluded that degradation is “predominantly due to legacy groundwater (pre-SGMA, pre-2015) groundwater conditions” (2024 EKGSP, p. 3-68; 2024 GKGSP, p. 3-17; 2024 MKGSP, p. 3-18). However, concluding that constituents of concern existed prior to SGMA does not absolve the GSAs of responsibly managing groundwater quality degradation. The GSAs are still evaluating the relationship between groundwater level minimum thresholds and impacts on groundwater quality. To better correlate groundwater level minimum thresholds with groundwater quality, the Kaweah Subbasin GSAs are expanding their groundwater quality monitoring network, especially near areas with a high density of domestic wells, community water supply systems, and wells adjacent to groundwater recharge facilities (2024 Coordination Agreement, Appendix 6-4, pp. 74-75).

For the depletion of interconnected surface water, East Kaweah GSA and Greater Kaweah GSA are actively working to fill data gaps to better understand the relationship between groundwater level minimum thresholds on interconnected surface water (2024 EKGSP, p. 5-37; 2024 GKGSP, p. 5-40). East Kaweah GSA and Greater Kaweah GSA are planning to assess the rate of surface water depletion in channels where interconnection occurs. In the interim, groundwater level data are collected near potentially interconnected streams in the East Kaweah and Greater Kaweah management areas and monitored in conjunction with the single and upper aquifers groundwater level monitoring. Mid-Kaweah GSA states and Board staff concurs that there is no interconnected surface water in the Mid-Kaweah management area (2024 MKGSP, p. 5-35).

Board staff concludes that Deficiency GL-3 is substantially resolved. The 2024 GSPs adequately describe the effects of groundwater level minimum thresholds on most of the other sustainability indicators. The GSAs made significant improvements describing the relationship between groundwater level minimum thresholds, land subsidence, and reduction in groundwater storage.

However, the GSAs did not thoroughly explain the effects groundwater level declines could have on degradation of groundwater quality and interconnected surface water should the groundwater levels reach established minimum threshold levels. Board staff is encouraged by the GSAs' effort to fill data gaps to better understand the relationship between groundwater level minimum thresholds and interconnected surface water. In addition, Board staff recognizes the GSAs' effort to expand their groundwater quality monitoring network to better understand the relationship between groundwater level minimum thresholds and degradation of groundwater quality. While additional data is needed to understand the relationships between groundwater levels and degradation of groundwater quality and interconnected surface water, the data can be collected prior to the next revision of the GSPs, and the results of the analysis can be included in future GSP revisions.

3.1.4 Deficiency Groundwater Level (GL) - 4

The Mitigation Program Framework provided in the GSPs lacked necessary detail.

The 2022 Kaweah GSPs did not include specific details on how impacts of declining groundwater levels, subsidence, and groundwater quality degradation would be addressed in the Mitigation Program Framework in the 2022 Coordination Agreement. The Mitigation Program Framework included potential mitigation options to alleviate impacts but the Mitigation Program Framework and the individual GSP mitigation plans lacked specific details on appropriate funding sources, mitigation processes, and implementation schedules. In addition, the Mitigation Program Framework proposed in the 2022 Coordination Agreement was labeled as "draft" and "for discussion purposes only," and it was unclear if the Mitigation Program Framework would be finalized and adopted by the Kaweah GSAs.

The GSAs approved the revised Kaweah Subbasin Mitigation Program in June 2024. The program identified the initiating conditions, eligibility requirements, implementation schedule, and funding sources needed to provide services for claims related to drinking water wells (2024 Coordination Agreement, Appendix 6-2, pp. 1-7). There are two tracks within the Kaweah Subbasin Mitigation Program: the drinking water well mitigation track and the technical assistance track. The drinking water well mitigation track is intended to respond to claims related to drinking water wells such as domestic wells, community wells, and multi-purpose potable wells, such as those that supply water for irrigation and domestic purposes (ibid.). The technical assistance track is intended to fund "technical assistance for qualifying claims related to non-drinking water wells and critical infrastructure" this includes any wells used for non-potable purposes (ibid.). Funding for the mitigation program comes from the GSAs' pumping fees, penalty pumping fees, and groundwater transfer fees. In addition to these fees, the GSAs state

that they will explore other state, federal, and private funding opportunities including grant programs (ibid.).

Board staff concludes that Deficiency GL-4 is resolved. The 2024 Kaweah Subbasin Mitigation Program adequately describes the initiating conditions, eligibility requirements, potential mitigation solutions, implementation schedule, and funding sources for the mitigation program. Section 3.5 describes how the mitigation plans address potential impacts to critical infrastructure due to land subsidence and degraded groundwater quality impacts from declining groundwater levels.

3.2 Land Subsidence

3.2.1 Deficiency Land Subsidence (LS) - 1

The GSPs did not provide reasonable justification for subsidence sustainable management criteria that involve the subbasin's water conveyance infrastructure.

The 2022 Coordination Agreement and East Kaweah GSP indicated that the Friant-Kern Canal and other conveyance structures are critical infrastructure within the subbasin, and that an undesirable result would occur if the capacity of the canals was significantly impacted. DWR noted in its Inadequate Determination that "…the Plan does not explain how it was determined that approximately [9.5 inches][1] or greater amount of subsidence would result in a 10 [percent] or more capacity loss in the Subbasin's conveyance infrastructure. The GSAs should explicitly describe the analysis that went into establishing the 10 [percent] capacity criteria" (2022 GSP Inadequate Determination, p. 15). There was not a clear justification provided by the GSPs that explained why 9.5 inches was correlated to a 10 percent reduction in canal capacity.

The 2024 GSP revisions address DWR's deficiency regarding canal capacity loss and associated subsidence amounts. The 2024 GSPs include a description of new sustainable management criteria along the Friant-Kern Canal and other conveyance infrastructure within the subbasin. An undesirable result is no longer based on a 10 percent canal capacity loss, and a 10 percent capacity loss is no longer associated with 9.5 inches of subsidence along the Friant-Kern Canal. A more protective undesirable result definition is established as "Any inelastic subsidence that leads to a measurable loss of canal capacity" (2024 MKGSP, Appendix 5B, p. 13). The revised minimum threshold for the Friant-Kern Canal is zero feet of subsidence. An undesirable result occurs if there is a single minimum threshold exceedance.

The 2024 GSPs also included revised sustainable management criteria regarding local conveyance canals. Significant and unreasonable impacts are now defined as "differential subsidence that changes the slope of a local canal by 1 foot over 1.5 miles" (2024 MKGSP, Appendix 5B, p. 5). This definition is based on capacity losses within Tulare Irrigation District's main canal that required repairs to increase its capacity. The

[1] DWR's 2023 Inadequate Determination uses the language "approximately 10 inches".

capacity loss due to subsidence may have resulted in increased groundwater pumping due to undelivered surface water (ibid.). Board staff recognizes that this methodology may not be universally applicable to all local canals within the subbasin, but detailed information may not be currently available for all canal conditions. The GSAs should continue to monitor other local canals to verify this method is appropriate across the subbasin. Concurrently, the 2024 GSPs included subsidence minimum thresholds to minimize or prevent local canal undesirable results from occurring.

Based on sustainable management criteria revisions submitted in the 2024 GSPs, **Board staff concludes that Deficiency LS-1 is resolved**. The GSAs should continue diligent monitoring of subsidence impacts to local canals. Board staff also notes that the GSAs demonstrated significant improvements in understanding subsidence conditions within the subbasin in the 2024 GSPs.

3.2.2 Deficiency Land Subsidence (LS) - 2

The GSPs did not adequately define the relationship between groundwater level sustainable management criteria and potential subsidence impacts.

DWR's Inadequate Determination noted, "knowing that groundwater level minimum thresholds are below historical lows and subsidence will continue to occur, the GSP has not provided an explanation of how undesirable results for subsidence will be avoided" (2022 GSP Inadequate Determination, p. 10). Both the Mid-Kaweah and Greater Kaweah 2022 GSPs included similar language indicating that chronic lowering of groundwater level sustainable management criteria would allow for additional groundwater level declines while the GSAs implemented the GSPs, and that associated additional subsidence was expected to occur. Board staff concurred with DWR's assessment that the GSPs did not adequately evaluate the potential impacts of groundwater level sustainable management criteria on subsidence rates. Board staff found that estimated subsidence amounts at associated groundwater level minimum thresholds and measurable objectives were substantially higher than subsidence minimum threshold values, with up to an estimated 18 feet of subsidence occurring by 2040 in the western portion of the subbasin (2022 MKGSP, Appendix 5E, p. 25). Since groundwater level minimum thresholds were set below historical lows and subsidence was expected to continue, it was unclear how subsidence undesirable results would be mitigated or avoided.

The 2024 GSPs include revised subsidence modeling, subsidence sustainable management criteria, and groundwater level sustainable management criteria that address this deficiency. The revised subsidence undesirable result is defined as follows: "An Undesirable Result will occur in the Subbasin if the cumulative subsidence minimum threshold is exceeded at any single RMS location" (2024 MKGSP, p. 5-49). Board staff finds the revisions to be a significant improvement over the previous subsidence sustainable management criteria definitions that required over one-third of representative monitoring sites to have minimum threshold exceedances for an undesirable result to occur.

One-dimensional subsidence models for the subbasin were used to correlate lower aquifer groundwater levels to subsidence rates, and the GSAs conclude that subsidence rates within the subbasin are primarily driven by groundwater pumping from the lower aquifer (2024 MKGSP, Appendix 5B, p. 25). The GSAs established groundwater level minimum thresholds in the 2024 GSPs at or above historical groundwater level lows for the lower aquifer to "assure that the subsidence minimum thresholds are not exceeded during the implementation period (2020 - 2040)" (2024 MKGSP, Appendix 5E, p. 22). This addition directly addresses DWR's deficiency regarding groundwater level minimum thresholds being established below historical lows (2022 GSP Inadequate Determination, p. 10).

Board staff notes that the model predictions beyond 2040 for the lower aquifer RMS wells show residual subsidence at the established groundwater level minimum thresholds exceeding the associated subsidence minimum thresholds. From the modeling presented by the GSAs, it appears that while the newly established lower aquifer groundwater level minimum thresholds are set above historical lows, residual subsidence is still expected beyond 2040. The 2024 GSPs cite Lees *et al*., 2022 and suggest that recent studies show residual subsidence within the subbasin may be ongoing for decades even if water levels are stabilized. The GSAs plan to operate the subbasin at or above the groundwater level measurable objectives in the lower aquifer after 2040 to minimize the effects of residual subsidence (2024 MKGSP, Appendix 5E, p. 22).

The GSAs made significant improvements in establishing revised subsidence sustainable management criteria in the 2024 GSPs. **Board staff concludes that Deficiency LS-2 is resolved**. Future work should continue characterizing confined conditions below the Corcoran clay and semi-confining conditions east of its extent that may exist to inform management actions within specific extraction zones that could cause subsidence minimum threshold exceedances. Board staff is encouraged that the GSAs plan to maintain groundwater levels in the lower aquifer above historical lows; however, the GSAs should determine the critical head, as discussed in DWR's Draft Land Subsidence Best Management Practices, to effectively manage groundwater levels and address ongoing subsidence. Additionally, the GSAs should continue analyzing the relationship between water levels and subsidence and adjust thresholds as needed to minimize future residual subsidence.

3.2.3 Deficiency Land Subsidence (LS) - 3

Significant impacts to conveyance infrastructure and undesirable results were expected under projected subsidence rates without mitigation.

Mitigation of critical infrastructure damage caused by subsidence was not considered under the June 2023 Draft Mitigation Program Framework and, at the same time, subsidence models suggested minimum threshold exceedances were expected along water conveyance infrastructure (2022 MKGSP, Appendix 5E, p. 33). Specifically, the Technical Approach for Developing Subsidence Sustainable Management Criteria in the Kaweah Subbasin technical memorandum (2022 MKGSP, Appendix 5E) indicated there

were multiple conveyance structures that would be significantly impacted by expected subsidence rates and stated that any subsidence damage to these structures should be included in the GSA's mitigation plans (id. at p. 40); however, mitigation for critical infrastructure, including the Friant-Kern Canal and other conveyance structures, was not required to be included by the GSA draft mitigation plans.

Board staff notes multiple revisions within the 2024 GSPs that directly or indirectly address this deficiency. The 2024 GSPs indicate that the revised subsidence model included potential impacts to conveyance structures, which the GSAs used to update minimum thresholds that will avoid subsidence impacts both to local canals and gravity pipelines. The Friant Monitoring and Action Plan (FMAP) includes "localized pumping cutbacks" among other proposed management actions to avoid subsidence impacts along the Friant-Kern Canal. The GSAs developed a management approach in conjunction with the Friant Water Authority, which is the sole agency that operates and maintains the canal. This approach marks progress towards limiting subsidence impacts to the Friant-Kern Canal in the Kaweah subbasin. Board staff communicated with the GSAs that funding should be internally driven to mitigate subsidence impacts to infrastructure if existing projects and management actions and sustainable management criteria fail to avoid them.

The 2024 Mitigation Program outlines the GSAs' plans for critical infrastructure mitigation funding. A technical assistance track is established for all GSAs, with a funding cap of $25,000, to help mitigate non-drinking water wells, industrial wells, and other conveyance critical infrastructure (2024 Coordination Agreement, Appendix 6-2, p. 5). All three GSAs made this funding available in 2025. In technical discussions with the GSAs, both Greater and Mid-Kaweah GSAs indicated they are assessing the potential mitigation requirements within their boundaries and that the funding cap may be different than $25,000 according to their findings.

The 2024 Mitigation Program indicates that critical infrastructure owners will not be eligible for complete mitigation, meaning that costs for canal replacement and pipeline repair will not be covered in full. The GSAs intend to clarify the types of technical assistance and funding awards the GSAs plan to establish in the next version of the Mitigation Program. The Mitigation Program outlines specific tasks to be completed to better identify at-risk infrastructure and to work with interested parties to find a funding mechanism for the updated technical assistance costs. Other funding mechanisms are already covering the costs of some infrastructure mitigation within the subbasin. For example, the Tulare Irrigation District, through its own operation and maintenance process, funded and completed mitigation for subsidence impacts to its main supply canal.

The GSAs made significant improvements to how land subsidence was addressed in the 2024 GSPs. The GSAs analyzed possible impacts to critical infrastructure and set discrete subsidence sustainable management criteria to avoid them. With the revisions to subsidence sustainable management criteria, Board staff concludes that potential impacts to the subbasin's conveyance infrastructure should be identified and mitigated sooner than with previous subsidence sustainable management criteria. Therefore, **Board staff concludes that Deficiency LS-3 is resolved**. The GSAs should continue

evaluating possible impacts to the subbasin's infrastructure if subsidence minimum thresholds are exceeded and to subsequently implement actions to prevent these impacts.

3.3 Groundwater Quality

DWR did not describe deficiencies for degraded groundwater quality for the 2020 or the 2022 GSPs. State Water Board staff included four deficiencies for degraded groundwater quality in its Draft Staff Report. The Kaweah GSAs made significant changes in their 2024 GSPs and Coordination Agreement. The Kaweah GSAs improved their groundwater quality undesirable result definition, sustainable management criteria, monitoring network, and projects and management actions.

3.3.1 Deficiency Groundwater Quality (GWQ) - 1

The 2022 GSPs did not clearly define the conditions that would be considered a plain-language undesirable result.

The GSAs, in their 2022 GSPs and Coordination Agreement, state that significant and unreasonable undesirable results may occur if groundwater quality is adversely impacted by groundwater pumping and recharge projects. These impacts could result in groundwater no longer being generally suitable for agricultural irrigation or domestic use (2022 Coordination Agreement, Appendix 6, pp. 15-16). The GSAs did not clearly describe how they would determine if sustainable management criteria exceedances were impacted by groundwater pumping and recharge projects as opposed to other factors. Consequently, Board staff was unable to evaluate the adequacy of the GSAs' proposed sustainable management criteria, or whether the broader quantitative definition of undesirable result would appropriately guide day-to-day basin management to avoid plain-language undesirable results.

The GSAs addressed this deficiency in their 2024 GSPs and Coordination Agreement. The GSAs clearly identified their beneficial users, uses, and property interests and, as stated above, updated their description of significant and unreasonable effects as "the tipping point at which groundwater conditions across the Kaweah Subbasin cause impacts to beneficial users, uses, and property interests that cannot be sustained or mitigated" (2024 EKGSP, p. 5-62; 2024 GKGSP, p. 5-73; 2024 MKGSP, p. 5-66). The GSAs specified that their groundwater quality responsibility under SGMA covered degradation that occurred after January 1, 2015, and degradation that was caused by groundwater management activities. Additionally, the GSAs committed to responsibly managing and mitigating groundwater quality degradation in their letter sent to State Water Board staff on August 25, 2025, highlighting forthcoming changes to the mitigation program (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025). Further discussion of these changes is below in section 3.5.

The 2024 GSPs included more description of how GSA activities could cause undesirable results associated with groundwater quality degradation, including drawdown of shallow contaminated groundwater into well screens, plume migration, and

inducing release of constituents of concern from aquifer materials (2024 Coordination Agreement, Appendix 6, p. 16). **Board staff concludes that Deficiency GWQ-1 is resolved**. The GSAs used data-driven processes to define significant and unreasonable water quality impacts, and the 2024 GSPs and Coordination Agreement explain the basis behind the new undesirable result definition and potential impacts to beneficial uses and users.

3.3.2 Deficiency Groundwater Quality (GWQ) - 2

Sustainable Management Criteria in the 2022 GSPs were not consistent with GSP Regulations.

Board staff identified multiple issues with the Kaweah GSAs' water quality sustainable management criteria in the 2022 GSPs:

- The GSAs defined a quantitative undesirable result in the 2022 GSPs as when constituent concentrations exceed minimum thresholds at one-third of RMS wells over a 10-year running average. A single minimum threshold exceedance was not considered an undesirable result; rather, an exceedance was only an undesirable result when the 10-year running average concentration surpassed the minimum threshold. This method may have allowed groundwater quality for drinking water wells to degrade substantially below drinking water standards before being considered an undesirable result and could have led to delayed actions to address water quality undesirable results. Board staff recommended that the GSAs re-evaluate and revise their undesirable result definition to account for short-term impacts of degraded water quality on beneficial users.
- The GSAs did not consider an appropriate list of constituents of concern (COCs) with identified regulatory exceedances in the Basin Setting of the 2022 GSPs. The Basin Setting should include all groundwater quality issues that may affect the supply and beneficial uses of groundwater (Cal. Code Regs § 354.16, subd. (d)). Board staff encouraged the GSAs to set sustainable management criteria for constituents in the subbasin with regulatory limits whose concentrations in groundwater can be impacted by pumping, water level fluctuations, or other groundwater management activities, or explain why criteria were not set.
- The GSAs set minimum threshold concentrations at each RMS well based on either drinking water quality standards (MCLs) or agricultural water quality objectives (WQOs), which include different constituents and different limits. The type of water quality standard applied to a well depended on most of the beneficial use in the area surrounding the RMS well. The GSAs did not explain how the 2022 minimum threshold approach protected domestic well users in areas with majority agricultural pumping. This approach would have allowed water quality to degrade below drinking water standards for drinking water wells in agricultural areas, particularly with respect to concentrations of arsenic, nitrate, 1,2,3-TCP, and other constituents with significant human health consequences.

The GSAs made significant changes to their water quality sustainable management criteria in their 2024 GSPs to address this deficiency. The GSAs revised their undesirable result definition to be the following:

> Undesirable Result #1 - Ten separate RMS wells with exceedances due to groundwater activities that occurred after January 1, 2015 (as determined by the Exceedance Policy) in a single year for any single or combination of COCs.
>
> OR
>
> Undesirable Result #2 - The GSAs cannot meet mitigation demand for domestic wells impacted by groundwater quality degradation associated with groundwater activities after January 1, 2015 (2024 Coordination Agreement, Appendix 6, p. 18; 2024 EKGSP, p. 5-64; 2024 GKGSP, p. 5-74; 2024 MKGSP, p. 5-67).

The GSAs explained in the GSPs that significant and unreasonable impacts occur if GSAs are unable to meet mitigation demands for water quality impacts related to the GSAs' management of groundwater (2024 Coordination Agreement, Appendix 6, p. 18; 2024 EKGSP, p. 5-65; 2024 GKGSP, p. 5-75; 2024 MKGSP, p. 5-68). The GSAs coordinated on the list of COCs and the minimum thresholds for each COC and added uranium and gross alpha to their COC list, which were previously excluded. In the 2024 GSPs, the GSAs set minimum thresholds at drinking water standards for all but two COCs, sodium and boron, which do not have California MCLs. Minimum threshold values were set based on the California Primary MCL, California Secondary MCL, or US EPA Secondary MCL, whichever is applicable (2024 EKGSP, p. 5-66; 2024 GKGSP, p. 5-76; 2024 MKGSP, p. 5-70). The GSAs set minimum thresholds for sodium and boron using Agriculture Water Quality Goals based on a literature review and consultation with agricultural experts in the subbasin (ibid.). The full list of COCs and sustainable management criteria thresholds for the 2022 and 2024 GSPs can be viewed in Tables A-1 and A-2 in Appendix A. **Board staff concludes that Deficiency GWQ-2 is resolved**.

3.3.3 Deficiency Groundwater Quality (GWQ) - 3

Water quality monitoring networks were not consistent with the GSP Regulations.

The GSAs did not have a plan to clearly monitor impacts to domestic drinking water wells in their 2022 GSPs, and staff identified discrepancies in the GSAs' monitoring networks and reported data. The GSAs primarily used public supply wells to represent drinking water wells in the water quality monitoring network described in the 2022 GSPs. Public supply wells are often deeper than domestic wells and are constructed to avoid groundwater containing elevated concentrations of COCs. As a result, the water quality conditions in public supply wells are likely not representative of conditions in shallow domestic wells. Board staff also identified differences in monitoring well counts and locations among the 2022 GSPs, 2022 Coordination Agreement, and Water Year 2022 Annual Report.

All three GSAs confirmed in their 2024 GSPs and Coordination Agreement that the subbasin-wide groundwater quality monitoring network is comprised of 71 wells (2024

Coordination Agreement, Appendix 2, p. 2). Existing local, state, and federal groundwater quality monitoring programs are considered supplemental to the GSAs' representative groundwater quality monitoring network, and together, all the monitoring efforts comprise the Kaweah Subbasin Groundwater Quality Monitoring Network (2024 EKGSP, p. 4-50; 2024 GKGSP, p. 4-53; 2024 MKGSP, p. 4-54). Most of the monitoring network is still comprised of public supply wells, but the depths of domestic, agricultural, and public supply wells are comparable on the eastern side (single aquifer system) of the Kaweah Subbasin.

The Kaweah GSAs used the USGS GAMA project to inform the spatial density of the representative monitoring network for groundwater quality (2024 Coordination agreement, Appendix 6-4, p. 72). This statistically consistent analytical approach provides spatially distributed grid cells of equal area throughout the subbasin. The GSAs then counted the number of domestic wells within a grid cell, and each cell was classified using the Equal Interval classification method in ArcGIS. Five classes were established to represent different well spatial densities throughout the subbasin with the fewest domestic well count classification being assigned one RMS and the most domestic well count classification being assigned five RMS. Intermediate well density classifications were assigned two, three, or four RMS based on well densities. Grid cells that are geographically located within the extent of the Corcoran Clay that were assigned one RMS were increased to two RMS to provide representation of both the upper and lower aquifer.

However, while Board staff are not concerned with the GSAs' methods for determining RMS locations and depths, upon the first round of sampling, the Kaweah GSAs were not able to access all the wells in the water quality RMS, which resulted in data gaps. Board staff recommends that the GSAs identify additional wells that are representative of shallow domestic wells and are accessible for sampling on a consistent basis. Board staff are encouraged that the Kaweah GSAs identified additional wells for the Fall 2025 well sampling effort (September-October 2025) per discussion with the Kaweah GSAs on August 7, 2025, and September 25, 2025 (Kaweah GSAs 2025, personal communication, August 7, 2025; Kaweah GSAs, personal communication September 25, 2025).

Board staff concludes that Deficiency GWQ-3 is substantially resolved. The GSAs identified specific areas in the subbasin with groundwater quality monitoring data gaps and described their plans to fill the data gaps with their new well registration program, implementation of their mitigation program, and adding new monitoring wells that are more representative of domestic well conditions (2024 EKGSP, p. 4-63; 2024 GKGSP, p. 4-66; 2024 MKGSP, pp. 4-71 to 4-72). The GSAs installed new RMS wells and began implementing their well registration and mitigation programs. The updated monitoring network and COC list were not reflected in the Water Year 2024 Annual Report due to the timing of the revisions to the monitoring network, but Board staff anticipates that the Water Year 2025 Annual Report will reflect the monitoring network and sampling described in the 2024 GSPs.

3.3.4 Deficiency Groundwater Quality (GWQ) - 4

Management actions were not responsive to water quality degradation.

The GSAs did not include management actions responsive to water quality minimum threshold exceedances in their 2022 GSPs. Specifically, the GSAs did not plan for additional sampling with minimum threshold exceedances, nor did they plan to address water quality degradation in the Mitigation Program Framework in the 2022 Coordination Agreement. Board staff noted that elevated concentrations of arsenic, nitrate, uranium, gross alpha, and other constituents can severely impact human health. If minimum threshold exceedances do not trigger additional monitoring to better characterize risks to beneficial uses and users or well mitigation to address water quality degradation, the GSAs could not demonstrate how significant and unreasonable impacts could be avoided.

The Kaweah GSAs developed a new minimum threshold exceedance policy in the 2024 GSPs and Coordination Agreement. If an RMS well exceeds the minimum threshold for any of the COCs, the GSAs will conduct additional monitoring, which may then lead to a desktop evaluation to determine the cause, subbasin-wide notification of the exceedance, and potential mitigation if the exceedance was induced by groundwater management activities after January 1, 2015 (2024 Coordination Agreement, Appendix 6, pp. 19-20; 2024 EKGSP, pp. 5-69 to 5-74; 2024 GKGSP, pp. 5-78 to 5-84; 2024 MKGSP, pp. 5-72 to 5-77). The GSAs clarified that the additional sampling in the exceedance policy does not come from the mitigation budget nor the RMS monitoring budget. The GSAs included mitigation for impacts due to degraded groundwater quality induced by pumping-related changes in groundwater levels in their Kaweah Subbasin Mitigation Program (2024 Coordination Agreement, Appendix 6-2, p. 2). Board staff recognizes other impacts to groundwater quality can result from pumping activities that don’t necessarily impact groundwater levels. Staff recommends Kaweah expand mitigation for impacts due to degraded groundwater quality to impacts from GSA pumping or from projects and management actions. The Kaweah GSAs have submitted a letter to Board staff on August 25, 2025, stating that they plan on taking this action in future mitigation plan revisions (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025).

With the management actions described above included in the 2024 GSPs and Coordination Agreement, **Board staff concludes that Deficiency GWQ-4 is substantially resolved**.

More information about the Kaweah Subbasin Mitigation Program can be found in Section 3.5 of this staff assessment.

3.4 Interconnected Surface Water

DWR identified depletions of interconnected surface water in their 2020 GSP Incomplete Determination as a deficiency; however, DWR did not include this as a

deficiency in their 2022 GSP Inadequate Determination. DWR made the following conclusion after their review of the GSPs in 2022:

> While not yet fully consistent with the requirements of the GSP Regulations, the Agencies' efforts to address this deficiency are sufficient at this time, although further efforts and revisions will be required in subsequent GSP updates to align the sustainable management criteria for interconnected surface water with the GSP Regulations and Department guidance (2022 GSP Inadequate Determination, p. 3).

State Water Board staff included three deficiencies for depletions of interconnected surface water in its Draft Staff Report. The GSAs made significant changes in their 2024 GSPs to address interconnected surface water data gaps and establish a work plan to resolve deficiencies. The GSAs gathered detailed information, engaged with interested parties, established preliminary thresholds, and began developing a monitoring network.

3.4.1 Deficiency Interconnected Surface Water (ISW) - 1

The GSPs, in setting Sustainable Management Criteria for depletions of interconnected surface water, did not adequately describe the impacts of those criteria on beneficial uses and users.

The GSAs identified limited beneficial uses and users related to interconnected surface water in the 2022 GSPs as surface water users, riparian and/or groundwater dependent ecosystems, and water rights holders. The GSPs described potential effects of depletions of interconnected surface water very generally, as increased losses in interconnected surface waterways used for surface water conveyance, reducing water supply reliability and volumes, negatively and significantly impacting the health of riparian and/or groundwater dependent ecosystems, and violating laws and doctrines governing California's surface water rights (2022 Coordination Agreement, Appendix 6, pp. 17-18).

In defining undesirable results, the GSAs narrowed the focus to loss of surface water conveyance capacity. The GSPs stated that "[d]elivery of surface water is a critically important part of sustainably managing the Kaweah Subbasin, thus impacts that reduce the ability to deliver surface water can become significant and unreasonable and ultimately lead to an undesirable result" (ibid.).

The GSAs, in their 2022 GSPs, did not adequately describe the potential effects on beneficial uses and users of groundwater and beneficial uses of surface water that may result from depletions of interconnected surface water, particularly for environmental users within the subbasin. Without a clear understanding of the potential effects on beneficial uses and users and a clear definition of what was considered "significant and unreasonable," it was difficult for Board staff to evaluate whether the minimum thresholds were appropriate for avoiding undesirable results.

The GSAs provide in the 2024 GSPs an expanded list of beneficial uses and users of groundwater and beneficial uses of surface water, which was supported by a robust

evaluation. Beneficial uses and users pertaining to interconnected surface water in the Kaweah Subbasin are identified as:

- In-stream habitat and ecosystems (this includes phreatophytes within in-stream habitats)
- Riparian habitat and ecosystems (these include phreatophytes within riparian habitats)
- Surface water rights holders
- Recreational users
- Groundwater dependent ecosystems (GDEs)
- Groundwater well users (this includes domestic/small-community, agricultural, municipal, industrial/commercial) (2024 EKGSP, p. 5-78; 2024 GKGSP, p. 5-89; 2024 MKGSP, p. 5-81).

The GSAs utilize several datasets to evaluate in-stream and riparian habitat such as:

- The Nature Conservancy's (TNC's) Natural Communities Commonly Associated with Groundwater dataset
- California Department of Fish and Wildlife's (CDFW) VegCAMP database
- TNC's rooting depth database
- US Fish and Wildlife Service's Information for Planning and Consultation web tool
- CDFW's California Natural Diversity Database (2024 EKGSP, Appendix 3H; 2024 GKGSP, Appendix 3D; 2024 MKGSP, Appendix 5H).

The GSAs also identify locations of culturally significant ecological areas near potential interconnected surface water and map surface water diversion points within the subbasin (2024 EKGSP, pp. 5-78 to 5-81; 2024 GKGSP, pp. 5-89 to 5-92; 2024 MKGSP, pp. 5-81 to 5-85).

Interested party engagement was a significant component in the GSAs' process for identifying beneficial uses and users associated with interconnected surface water and evaluating impacts depletions of interconnected surface water may have on those uses and users. The GSAs held several meetings and workshops to engage with interested parties in 2024 (2024 EKGSP, pp. 5-81 to 5-82; 2024 GKGSP, pp. 5-92 to 5-93; 2024 MKGSP, pp. 5-86 to 5-87).

Board staff concludes that Deficiency ISW-1 is resolved. After gathering detailed geospatial information and engaging with interested parties, the GSAs adequately refined their understanding of beneficial uses and users of interconnected surface water. However, additional information is needed for GSAs to better assess the impacts of surface water diversions in the subbasin. Board staff also appreciates the GSAs'

engagement efforts with interested parties representing beneficial uses and users of interconnected surface water.

3.4.2 Deficiency Interconnected Surface Water (ISW) - 2

The GSPs did not establish MTs for depletions of interconnected surface water that are consistent with GSP Regulations.

The Mid-Kaweah GSA, in its 2022 and 2024 GSPs, determined that no interconnected surface water exists within the GSA area and consequently did not develop sustainable management criteria for depletions of interconnected surface water (2022 MKGSP, p. 5-54; 2024 MKGSP, p. 5-80). Board staff concurs with the Mid-Kaweah GSA's determination.

In their 2022 GSPs, the East Kaweah and Greater Kaweah GSAs established minimum thresholds for depletions of interconnected surface water at 50 percent channel loss in their respective waterways' flows due to groundwater pumping. This threshold was solely based on limited local experience, and the GSAs stated in the 2022 GSPs that the extent of channel losses caused by groundwater pumping was not understood (2022 EKGSP, p. 3-34; 2022 GKGSP, p. 5-45).

The minimum thresholds established by the GSAs were not supported with best available information, best available science, or a model that quantified surface water depletion, as required per GSP Regulations (Cal. Code Regs., tit. 23 § 354.28, subd. (b)(1); Cal. Code Regs., tit. 23 § 354.28, subd. (c)(6)(B)). GSP Regulations also require GSAs to describe how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests; impacts of losing half of surface water flow due to groundwater pumping were not thoroughly described in the GSPs (Cal. Code Regs., tit. 23 § 354.28, subd. (b)(4)). Surface water depletion can have devastating impacts on ecological functions, surface water supply, and surface water quality. For example, pollutant concentrations in surface water can increase as surface water flows decrease which can negatively impact aquatic species and vegetation. The USGS Circular 1461 evaluated impacts that flow modifications (such as low-flow magnitude and frequency) have on streams and rivers and found that "[i]n most regions, the health of streams and rivers is increasingly impaired where flows are more severely modified" (Carlisle, et al., 2019, p. 49).

Surface water depletion can be caused by a variety of other factors in addition to groundwater pumping, such as changes in precipitation, land use, and water management. The GSAs should consider other factors that can impact surface water flows when establishing minimum thresholds for depletions of interconnected surface water. Failure to consider other factors can result in threshold values that allow for substantial losses of surface water flows prior to reaching the established minimum threshold.

In the 2024 GSPs, the GSAs set preliminary sustainable management criteria until data gaps are filled and describe a framework for establishing minimum thresholds based on

the best available information. The framework for establishing minimum thresholds for depletions of interconnected surface water is the following:

1. Identifying locations of potential interconnected surface water.
2. Identifying locations of beneficial users and uses.
3. Evaluating impacts on beneficial users from interconnected surface water depletions.
4. Establishing minimum thresholds that avoid significant and unreasonable impacts to beneficial users and uses. (2024 EKGSP, Appendix 3H, p. 23; 2024 GKGSP, Appendix 3D, p. 23; 2024 MKGSP, Appendix 5H, p. 23)

Using this framework, the GSAs define the preliminary minimum threshold as "... the amount of pumping-induced depletion that would lead to flows lower than those observed in 2022" (2024 EKGSP, Appendix 3H, p. 23; 2024 GKGSP, Appendix 3D, p. 23; 2024 MKGSP, Appendix 5H, p. 23). The GSAs evaluated impacts to beneficial uses and users during historical droughts and low flow conditions and assessed the extent of interconnected surface water depletions during those time periods (2024 EKGSP, Appendix 3H, pp. 16-22; 2024 GKGSP, Appendix 3D, pp. 16-22; 2024 MKGSP, Appendix 5H, pp. 16-22).

The GSAs evaluated historical vegetation and habitat during droughts and low flow conditions using remotely sensed normalized difference vegetation index (NDVI) and high-resolution aerial imagery (2024 EKGSP, p. 5-84; 2024 GKGSP, p. 5-96). The GSAs subsequently compared estimated interconnected surface water depletions during droughts and low flow conditions by calculating channel losses and comparing with observed groundwater levels and pumping estimates (2024 EKGSP, Appendix 3H, p. 20; 2024 GKGSP, Appendix 3D, p. 20; 2024 MKGSP, Appendix 5H, p. 20). Calculated channel losses were compared to estimated pumping and groundwater elevation changes near streams for each month from 2013-2022 and evaluated to determine if patterns exist between (1) channel losses and pumping, or (2) channel losses and groundwater elevation changes. The GSAs concluded that low flows in Water Year 2022 did not result in significant and unreasonable impacts to beneficial uses and users, and there was little to no correlation between groundwater pumping and channel losses during that time (2024 EKGSP, Appendix 3H, pp. 21-22; 2024 GKGSP, Appendix 3D, pp. 21-22; 2024 MKGSP, Appendix 5H, pp. 21-22).

To demonstrate how the GSAs would evaluate interconnected surface water, they included an example in the 2024 GSPs: the GSAs calculated a preliminary minimum threshold for a possibly interconnected portion of the Kaweah River between McKay Point and People’s Ditch for Water Year 2022 (2024 EKGSP, pp. 5-90 to 5-91; 2024 GKGSP, pp. 5-103 to 5-104).The preliminary minimum threshold would only apply if depletions led to flows lower than Water Year 2022. The GSAs will evaluate flow conditions each year to determine if the minimum threshold applies and determine whether a) interconnected surface water depletions led to flows lower than Water Year

2022, and b) significant and unreasonable impacts occurred (2024 EKGSP p. 5-91; 2024 GKGSP, p. 5-104).

The GSAs also include a new component in their ISW Data Gap Work Plan, which focusses on making enhancements to the Kaweah Subbasin Groundwater Flow Model to accurately evaluate the extent of interconnected surface water and quantify depletions due to groundwater pumping. This work plan is separated into five tasks that are discussed in detail in the GSAs' ISW and Sustainable Management Criteria Technical Memorandum (2024 EKGSP, Appendix 3H; 2024 GKGSP, Appendix 3D; 2024 MKGSP, Appendix 5H).

Both the measurable objectives and interim milestones were updated in the 2024 GSPs and are set at the same level as the minimum thresholds for the time being. The GSAs state that "MOs and IMs will be evaluated once basin-wide MTs are established in the near future", and they will update the minimum thresholds when they have gathered additional data and DWR has provided sustainable management criteria guidance for interconnected surface water (2024 EKGSP, p. 5-94; 2024 GKGSP, p. 5-107)

Board staff concludes that Deficiency ISW-2 is partially resolved. The GSAs took a conservative approach in choosing Water Year 2022 to calculate the preliminary minimum threshold, although more information is needed to understand the scope of depletions in Water Year 2022. Implementation of the Kaweah Subbasin Model Work Plan should make the Kaweah Subbasin Groundwater Flow Model more suitable for assessing depletions of interconnected surface water.

To fully address this deficiency, the GSAs will need to use a model that quantifies surface water depletion to better understand how groundwater use in the Kaweah Subbasin impacts surface water depletions and revise the MTs to meet GSP Regulations. Full implementation of the ISW Data Gap Work Plan and incorporation of DWR's forthcoming sustainable management criteria guidance document for interconnected surface water will further enhance the GSAs response to Deficiency ISW-2.

3.4.3 Deficiency Interconnected Surface Water (ISW) - 3

The GSPs did not establish a monitoring network designed to address depletions of interconnected surface water.

The Mid-Kaweah GSA, in its 2022 and 2024 GSPs, determined that no interconnected surface water exists within the GSA area and consequently did not develop a monitoring network for depletions of interconnected surface water (2022 MKGSP, p. 4-15; 2024 MKGSP, p. 4-66). Board staff concurs with the Mid-Kaweah GSA's determination.

Neither the East Kaweah nor Greater Kaweah GSAs had a monitoring network to monitor groundwater and surface water interactions in the 2022 GSP. Both GSAs planned to establish a monitoring network for depletions of interconnected surface water by June of 2024, but there was a lack of detail on monitoring site locations and monitoring frequency. Additionally, groundwater elevation and streamflow data were lacking in the 2022 East Kaweah and Greater Kaweah GSPs. Without a sufficient

monitoring network, it is not possible to accurately identify interconnected surface water, establish sustainable management criteria, and evaluate progress towards achieving sustainable groundwater management within the subbasin.

The East Kaweah and Greater Kaweah GSAs made improvements to the subbasin's interconnected surface water monitoring network in the 2024 GSPs. The GSAs include a monitoring network for depletions of interconnected surface water and identify proposed locations for future shallow groundwater level and stream gage representative monitoring sites to close data gaps (2024 EKGSP, Figure 4-5, p. 4-7; 2024 GKGSP, Figure 4-5, p. 4-9). The GSAs state that significant data gaps remain, particularly in the eastern portion of the subbasin where most of the possibly interconnected streams are located (2024 EKGSP, p. 4-56; 2024 GKGSP, p. 4-60). Phase 1 of the ISW Data Gap Work Plan specifies that the GSAs will first 1) install new monitoring sites, and 2) engage with interested parties and experts to obtain private data and information (2024 EKGSP, Appendix 3H, Attachment A, pp. 2-3; 2024 GKGSP, Appendix 3D, Attachment A, pp. 2-3; 2024 MKGSP, Appendix 5H, Attachment A, pp. 2-3).

The East Kaweah and Greater Kaweah GSAs specified in the 2024 GSPs that the frequency of monitoring at shallow groundwater representative monitoring site wells is bi-annual monitoring; once during a seasonal high period of groundwater levels in spring (February – March) and once during a seasonal low period of groundwater levels in fall (September – October) (2024 EKGSP, p 4-55; 2024 GKGSP, p. 4-59). The frequency of monitoring at stream gage representative monitoring sites is by the minute, where streamflow data is aggregated to daily, monthly, and annual periods (2024 EKGSP, p 4-55; 2024 GKGSP, p. 4-59) This is an improvement from the 2022 GSPs, which did not specify a monitoring frequency.

Board staff concludes that Deficiency ISW-3 is resolved for the level of information currently available to the GSAs. Even though the GSAs developed a monitoring network for depletions of interconnected surface water, additional work is needed to fill data gaps as specified in Phase 1 of the ISW Data Gap Work Plan. Board staff encourage the GSAs to diligently work on installing the proposed RMS as soon as possible and expedite outreach strategies to better understand depletions of interconnected surface water. Board staff conclude that full implementation of the ISW Data Gap Work Plan will address Deficiency ISW-3.

3.5 Kaweah Subbasin Mitigation Program

In the 2024 Coordination Agreement, the Kaweah GSAs established mitigation requirements for wells and critical infrastructure that are adversely affected by declining groundwater levels, land subsidence, and groundwater quality degradation associated with groundwater overdraft in the Kaweah Subbasin (2024 Coordination Agreement, Appendix 6-2, pp. 1-7). The mitigation program offers two tracks for assistance for claimants: the Drinking Water Well Mitigation track for drinking water wells and the Technical Assistance track for non-drinking water wells and critical infrastructure (ibid.).

The Drinking Water Well Mitigation track was adopted by the GSAs in Spring 2024 and provides mitigation services for claims related to drinking water wells (ibid.). The mitigation services are to help protect the human right to water for many private residences in the small communities and rural portions of the Kaweah Subbasin that rely on private wells to meet their domestic water supply needs (ibid.). Since domestic wells are typically shallower and more vulnerable to declining groundwater levels than other well types, the mitigation services are designed to ensure a water supply for domestic well owners impacted by overdraft.

Under the Drinking Water Well Mitigation track, all domestic, multi-use drinking water systems and small community well owners who have lost access to drinking water can apply for emergency bottled water supplies to be delivered within 24 hours and for an interim supply (tanked and hauled water) to be installed within 72 hours (ibid.). Additionally, well owners can file a claim with the GSAs for long-term permanent solutions (e.g., well deepening, new well installation, connection to an existing system, or installation of a water treatment system, depending on the issue and other factors). The GSAs will review the claim and determine whether the impact to the well was induced by overdraft conditions by reviewing data such as groundwater level trends and land use (ibid.). If the well impacts were caused by overdraft conditions, the GSAs will coordinate with the well owner to arrange for a long-term solution.

The GSAs partnered with Self-Help Enterprises (SHE), a local non-profit community development organization, to coordinate the implementation of the Drinking Water Well Mitigation track in the Kaweah Subbasin. SHE has existing programs to provide emergency drinking water services in Tulare County and existing processes and procedures to serve residents effectively. Residents can contact SHE directly to initiate the mitigation process and obtain emergency drinking water supplies, and the "...GSAs reimburse SHE for costs associated with program administration, groundwater quality sampling, interim drinking water supplies, and long-term mitigation measures for all drinking water well claims that qualify for Kaweah Subbasin mitigation" (2024 Coordination Agreement, Appendix 6-2, p. 3).

The Technical Assistance track offers mitigation in the form of technical assistance funding to landowners or public agencies who have impacts to their non-drinking water wells or critical infrastructure. Landowners or public agencies experiencing impacts can submit a Technical Assistance Claim Application on their respective GSA's website. The GSA will contact the claimant and review information such as localized data and groundwater level trends. If the claim meets the qualification criteria, the GSA will provide funding for technical assistance up to a maximum of $25,000 (id. at pp. 8-9). Board staff recognizes that technical assistance may be sufficient for some infrastructure mitigation within the subbasin; however, the GSAs should clarify the types of technical assistance and funding awards they plan to provide to owners of critical infrastructure impacted by subsidence in the forthcoming versions of the mitigation program.

The GSAs fund the Kaweah Subbasin Mitigation Program from multiple funding sources. The estimated annual cost to implement the Kaweah Subbasin Mitigation Program is approximately $5.54 M (2024 EKGSP, Figure 5-13, p. 5-35; 2024 MKGSP,

Figure 5-10, p. 5-33; 2024 GKGSP, Figure 5-11, p. 5-38). The GSAs will adjust funding mechanisms and budgets to accommodate changes in mitigation costs and lessons learned through implementation including changes to fee structures (2024 Coordination Agreement, Appendix 6-2, pp. 3-4). Alternatives to the current fee structure may include raising groundwater extraction fees or a property-based tax (ibid.).

Board staff finds that the mitigation program provides sufficient details on processes, funding, and eligibility requirements. The Drinking Water Well Mitigation track for drinking water wells and the Technical Assistance track for non-drinking water wells should alleviate and lessen the impact to areas affected by declining groundwater levels. However, because the Drinking Water Well Mitigation track is only available for wells impacted by overdraft conditions, Board staff requested the Kaweah GSAs to consider expanding the qualification criteria to include other situations where wells may be impacted but not explicitly due to overdraft. On August 25, 2025, the Kaweah GSAs submitted a letter to State Water Board staff stating their intention to revise qualification criteria to more closely align with the definition of the established undesirable results which are more encompassing than the narrow definition of “overdraft” or “overdraft conditions” (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025). The Kaweah GSAs said that the Kaweah Subbasin Mitigation Core Team is in the process of drafting an updated version of their mitigation plan which is independent from future GSP revisions because it is a stand-alone management action (ibid.).

3.6 Demand Management

The GSAs were proactive in developing and implementing groundwater allocations before DWR’s Inadequate Determination was released in March 2023. In Water Year 2022, Mid-Kaweah and East Kaweah GSAs began implementing allocations (2024 MKGSP, p. 6-51; 2024 EKGSP, p. 6-74), while the Greater Kaweah GSA implemented allocations in Water Year 2023 (Greater Kaweah Groundwater Sustainability Agency, 2025). Since Water Year 2023, each GSA implemented a similar allocation structure which includes a “native yield” acre-foot per acre allocation at no cost, followed by a tiered rate structure with an extraction cap. In addition, the management plans include a penalty of losing a pumper’s allocation for the following water year at a 1:1 ratio of acre-feet pumped over the extraction cap (East Kaweah Groundwater Sustainability Agency, 2025; Greater Kaweah Groundwater Sustainability Agency, 2025; Mid-Kaweah Groundwater Sustainability Agency, 2025).

The GSAs are taking an adaptive management approach whereby groundwater allocations are reviewed and reestablished annually based on predictive modeling with various inputs to refine demand management (2024 Coordination Agreement, Appendix 7, pp. 86-87, 114-117). This predictive modeling uses evapotranspiration data from both open-source and proprietary data sets, including OpenET and Land IQ, as well as others (id. at, p. 34). The GSAs then run repeated iterative simulations until no undesirable results are experienced in the lower, upper, and single aquifer, as defined by the 2024 GSPs, and until there is no long-term change in groundwater storage in the subbasin from 2040 to 2070 (id. at, pp. 114-115). The annual changes in groundwater

allocations are posted on the individual GSA websites each year (East Kaweah Groundwater Sustainability Agency, 2025; Greater Kaweah Groundwater Sustainability Agency, 2025; Mid-Kaweah Groundwater Sustainability Agency, 2025).

The GSAs have undertaken substantial, data-based efforts to manage groundwater extractions to achieve sustainable groundwater management. The GSAs' adaptive management approach for adjusting allocations appears to be appropriate for reducing pumping as needed to stay within the basin's sustainable yield.

4.0 Recommendations for GSP Improvement

Board staff determined that the 2024 GSPs are sufficient to return the subbasin to DWR's jurisdiction at this time. While reviewing the 2024 GSPs, Board staff noted several improvements that could provide more protection for drinking water beneficial users and improve sustainability goals. GSAs should continue improving the GSPs in response to monitoring results and new data to ensure progress is being made toward achieving sustainability. As DWR develops additional guidance documents and best management practices, Board staff recommends the GSAs incorporate those into future iterations of the GSP. Board staff recommends the GSAs consider the following suggestions for future revisions of the GSPs:

1. **Update the undesirable result quantitative definition for chronic lowering of groundwater to better align with the causes of undesirable results described in the coordination agreement.** The Kaweah GSAs provided a letter to Board staff on October 7, 2025, stating their intention to change the undesirable result definition from "impacted due to overdraft" to "impacted due to GSA groundwater management activities" (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025)

2. **Monitor and establish proactive actions for addressing declining groundwater levels as the GSAs bring the basin into sustainability.** The GSAs should further clarify and continue to research the relationship between lowering groundwater levels and groundwater quality degradation as groundwater levels decline. If appropriate, further develop plans now to mitigate these impacts. The GSAs should also establish proactive actions to avoid impacts to small community wells or domestic well clusters (e.g., pumping restrictions or other management actions near at-risk areas).

3. **Continue to monitor subsidence impacts on local canals to verify that the established sustainable management criteria are protective of this infrastructure.** The GSAs should also clarify the types of technical assistance and funding awards they plan to provide to owners of critical infrastructure impacted by subsidence in the forthcoming versions of the mitigation program.

4. **Continue ongoing efforts to resolve gaps in the water quality monitoring network for shallow wells including unexpected access issues for the water**

quality monitoring network. The GSAs should add additional monitoring wells to the network that are screened in intervals to capture data regarding shallow domestic wells where coverage gaps persist in the western half of the subbasin. Since some water quality representative monitoring sites were not accessible for spring 2025 sampling, the GSAs should add new RMS wells to the monitoring network that provide similar coverage and representativeness. The GSAs should maintain or increase the planned number of water quality RMS wells.

5. **Continue ongoing efforts to expand mitigation eligibility related to other PMAs not tied to overdraft conditions.** The GSAs should clarify in the next update of mitigation program documents that program eligibility includes (1) wells impacted due to groundwater level declines and (2) wells impacted by degraded groundwater quality due to any GSA-regulated pumping or projects and management actions – not restricted to wells impacted by overdraft conditions. The GSAs have indicated that the forthcoming revisions to the mitigation plan will include language changes to eligibility requirements that would satisfy this recommendation (Kaweah Subbasin Groundwater Sustainanbility Agencies, 2025).

6. **Revise sustainable management criteria for depletions of interconnected surface water to meet GSP Regulations.** The GSAs should evaluate whether groundwater pumping caused depletions for each water year, regardless of whether the flows were lower than flows in Water Year 2022, to determine if undesirable results occurred. Groundwater pumping may cause undesirable results during prolonged droughts despite flows being above Water Year 2022 levels. There may be cumulative impacts that negatively affect beneficial uses and users which could be overlooked if the GSAs add a prerequisite for evaluating minimum thresholds. Moreover, many native species rely on year-to-year natural stream variability to support ecological functions; prolonged periods of low flows may not support healthy ecosystems (Poff, et al., 1997).

The GSAs should continue improving GSPs in response to monitoring results and new data to ensure progress is being made toward achieving sustainability. Moreover, DWR released draft best management practices guidance regarding subsidence and is developing additional guidance documents for management of depletions of interconnected surface water. Once guidance documents are released by DWR, GSAs should work diligently to incorporate the guidance as appropriate for the subbasin.

5.0 Recommendations for Board Action on Kaweah Subbasin

The Kaweah Subbasin GSAs submitted their 2024 GSPs to DWR's SGMA Portal on June 18, 2025. Board staff reviewed the 2024 GSPs and determined that the revisions

made by the GSAs in the 2024 GSPs sufficiently addressed the issues identified in the DWR's Inadequate Determination and the Board's Draft Staff Report. Staff recommends that:

1. Further consideration of a probationary designation for the Kaweah Subbasin based on DWR's Inadequate Determination and the Board's Draft Staff Report is not warranted at this time.
2. The State Water Board return the Kaweah Subbasin to DWR's jurisdiction under chapter 10 of SGMA.
3. The Kaweah Subbasin GSAs continue to implement their 2024 GSPs and consider Board staff's recommended improvements listed above in preparing future GSP amendments to fill data gaps and enhance the subbasin's approach to reach sustainability.

6.0 References

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Appendix A. Figures and Tables

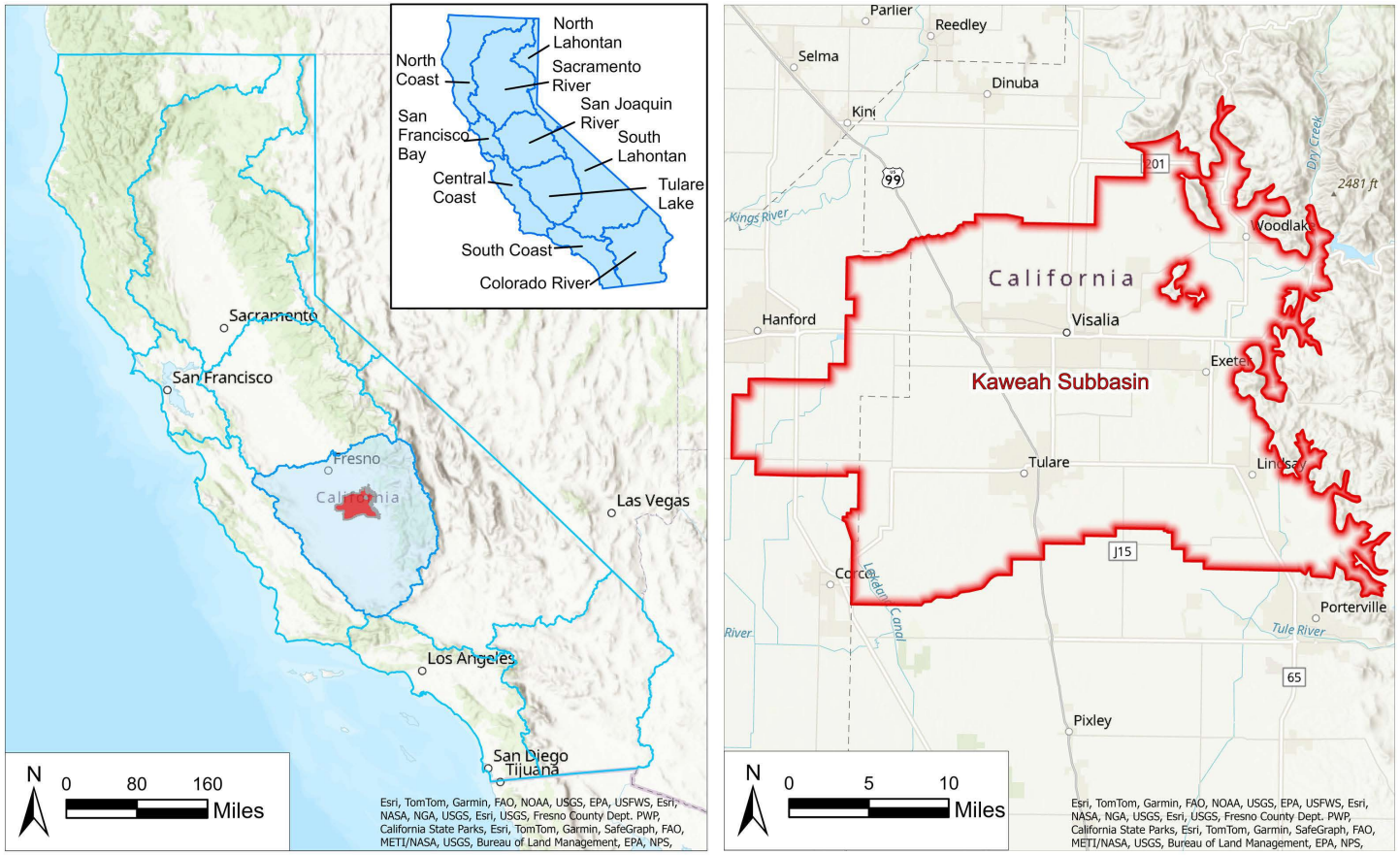

Figure 1

Overview of the Kaweah Subbasin

Kaweah Subbasin Staff Assessment
October 2025

Table A-1. 2022 Table of constituents of concern and regulatory thresholds for the Kaweah Subbasin (2022 GSPs: Table 3-7 for EKGSA, Table 5-7 for GKGSA, Table 5-3 for MKGSA)

Constituent	Threshold	MKGSA	GKGSA	EKGSA
Nitrate as N (mg/L)	MCL*	10	10	10
1,2,3 –Trichloropropane (1,2,3-TCP) (µg/L)	MCL*	0.005	0.005	0.005
Arsenic (µg/L)	MCL*	10	10	10
1,2-Dibromo-3-chloropropane (DBCP) (µg/L)	MCL*	0.2	0.2	0.2
Perchlorate (PCATE) (µg/L)	MCL*	6	6	6
Tetrachloroethene (PCE) (µg/L)	MCL*	5	5	NA
Hexavalent Chromium (Cr-VI) (µg/L)	MCL*	10	10	20
Total Dissolved Solids (TDS) (mg/L)	MCL*	1000	1000	1000
Sodium (mg/L)	MCL*	NA	NA	50
Chloride (mg/L)	MCL*	500	250	500
Arsenic (µg/L)	Ag WQO**		100	
Sodium (mg/L)	Ag WQO**	69	69	69
Chloride (mg/L)	Ag WQO**	106	106	106
TDS (mg/L)	Ag WQO**	450	450	1000
pH, upper	Ag WQO**	8.4	NA	NA
pH, lower	Ag WQO**	6.5	NA	NA
Specific Conductivity (µS/cm)	Ag WQO**	700	NA	NA
Boron (µg/L)	Ag WQO**	700	NA	NA

Notes:

MCL* = Maximum Contaminant Level (California drinking water quality standards)

Ag WQO** = Agricultural Water Quality Objective

NA = Not Applicable (minimum threshold not defined in GSP)

mg/L = milligrams per liter

µg/cm = microsiemens per centimeter

µg/L = micrograms per liter

Table A-2. 2024 Table of constituents of concern and regulatory thresholds for the Kaweah Subbasin (2024 GSPs: Table 5-13 for EKGSA, Table 5-12 for GKGSA, Table 5-13 for MKGSA)

Constituent	MCL	Type of Standard
Nitrate as N	10 mg/L	California Primary MCL (Health-Based)
1,2,3-Trichloropropane (1,2,3-TCP)	0.005 µg/L	California Primary MCL (Health-Based)
Uranium	20 pCi/L	California Primary MCL (Health-Based)
Arsenic	10 µg/L	California Primary MCL (Health-Based)
Gross Alpha	15 pCi/L	California Primary MCL (Health-Based)
1,2-Dibromo-3-chloropropane (DBCP)	0.2 µg/L	California Primary MCL (Health-Based)
Perchlorate (PCATE)	6 µg/L	California Primary MCL (Health-Based)
Tetrachloroethene (PCE)	5 µg/L	California Primary MCL (Health-Based)
Hexavalent Chromium (Cr-VI)	10 µg/L	California Primary MCL (Health-Based)
Total Dissolved Solids (TDS)	1000 mg/L	California Secondary MCL (Upper)*
Specific Conductivity	1600 µS/cm	California Secondary MCL (Upper)*
Chloride	500 mg/L	California Secondary MCL (Upper)*
Sulfate	500 mg/L	California Secondary MCL (Upper)*
pH	8.5	US EPA Secondary MCL*
Sodium	69 mg/L	Agriculture Water Quality Goal
Boron	700 µg/L	Agriculture Water Quality Goal

Notes:

* = There are no public health goals (PHGs) or maximum contaminant level goals (MCLGs) for these constituents because secondary standards are set on the basis of aesthetic concerns.

mg/L = milligrams per liter

pCi/L = picocuries per liter

µS/cm = microsiemens per centimeter

µg/L = micrograms per liter