APPENDIX B. SWRCB DETERMINATION AND FEEDBACK

Appendix B-1: State Water Resources Control Board Final Staff Report

State of California
Department of Water Resources
Sustainable Groundwater Management Office
Groundwater Sustainability Plan Assessment Staff Report

Groundwater Basin Name:	San Joaquin Valley Basin – Kern County Subbasin (No. 5-022.14)
Number of GSPs:	5 (see list below)
Number of GSAs:	11 (see list below)
Point of Contact:	Patricia Poire, Kern Groundwater Authority
Recommendation:	Incomplete
Date:	January 28, 2022

The Sustainable Groundwater Management Act (SGMA)[1] allows for any of the three following planning scenarios: a single groundwater sustainability plan (GSP) developed and implemented by a single groundwater sustainability agency (GSA); a single GSP developed and implemented by multiple GSAs; and multiple GSPs implemented by multiple GSAs and coordinated pursuant to a single coordination agreement.[2] GSAs developing GSPs are expected to comply with SGMA and substantially comply with the Department of Water Resources' (Department) GSP Regulations.[3] The Department is required to evaluate an adopted GSP within two years of its submittal date and issue a written assessment.[4]

In the Kern County Subbasin (Subbasin), multiple GSAs developed multiple GSPs for the entire Subbasin, which are coordinated pursuant to a required coordination agreement.[5] In total, five GSPs were prepared and will be implemented by 11 GSAs. The GSPs include 20 management areas and possibly 33 sub-management areas within the larger management areas.[6] The five GSPs include:

- *Kern Groundwater Authority Groundwater Sustainability Plan* (KGA GSP) – prepared by the Kern Groundwater Authority (KGA) GSA, Semitropic Water Storage District (SWSD) GSA, Cawelo Water District (CWD) GSA, City of McFarland GSA, Pioneer GSA, and West Kern Water District (WKWD) GSA.
    - Divided into 15 management areas, 22 sub-management areas.

[1] Water Code § 10720 *et seq*.
[2] Water Code § 10727.
[3] 23 CCR § 350 *et seq*.
[4] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[5] Water Code § 10733.4(b).
[6] A Total number of management areas and sub-management areas is not explicitly disclosed for the Plan; Department staff compiled these numbers from the review of all the GSPs.

- *Kern River Groundwater Sustainability Plan* (Kern River GSP) – prepared by the Kern River GS and Greenfield County Water District GSA.
    - Divided into three management areas, 11 sub-management areas.
- *Buena Vista Water Storage District GSA Groundwater Sustainability Plan* (Buena Vista GSP) – prepared by the Buena Vista Water Storage District (Buena Vista) GSA.
    - Divided into two management areas.
- *Olcese Groundwater Sustainability Agency Groundwater Sustainability Plan* (Olcese GSP) – prepared by the Olcese Water District (OWD) GSA.
- *Henry Miller Water District Groundwater Sustainability Plan* (Henry Miller GSP) – prepared by the Henry Miller Water District (HMWD) GSA.

Collectively, the five GSPs and the coordination agreement will, for evaluation and assessment purposes, be treated and referred to as the Plan for the Subbasin.

Of the five GSPs, the Kern Groundwater Authority (KGA) GSP is by far the largest in terms of both area covered and agencies involved. The KGA is made up of 16 member agencies legally bound by a joint powers agreement (JPA) which recognizes KGA as "assuming responsibility for development of a comprehensive GSP for an area which includes agricultural lands, urban and industrial development as well as oil fields."[7] Of the 16 KGA member agencies, six agencies are GSAs through the process outlined in SGMA.[8] It is, therefore, Department staff's understanding that KGA acts as the sole GSA for 10 member agencies and acts as the GSA for the purposes of developing a GSP for the remaining six member agencies that are also established GSAs. It is also Department staff's understanding that, through the JPA, the KGA GSA operates as a facilitation and administrative entity only, leaving the authorities of SGMA implementation to the individual member agencies, some of which, as noted above, are GSAs and some of which are not.[9] The KGA GSP defined 15 management areas, each with its own management area plan (MAP); seven of those management areas are divided further into additional management areas, creating sub-management areas within the KGA GSA boundary.[10] Thus, the KGA GSP acts as an "umbrella plan" for the management area plans prepared by individual member agencies engaged in the JPA.

Table 1 summarizes the GSAs and agencies associated with management areas for the Subbasin.

[7] KGA GSP, Section 1.1, p. 21; Appendix A, pp. 263-299.
[8] Water Code § 10723 *et seq.*
[9] KGA GSP, p. 31-32; KGA GSP, p. 266, 269-270, 278.
[10] KGA GSP, p. 183-184.

Table 1. Summary of Kern County Subbasin GSPs, GSAs, and Management Areas

GSP/GSAs	Management Areas (# of Sub-Management Areas)
Kern Groundwater Authority GSP	
1. Cawelo GSA 2. Kern Groundwater Authority GSA 3. McFarland GSA 4. Pioneer GSA 5. Semitropic Water Storage District (WSD) GSA 6. West Kern Water District (WD) GSA	1. Arvin-Edison WSD 2. Cawelo WD 3. Eastside Water Management Area 4. Kern Water Bank 5. Kern-Tulare WD (2) 6. North Kern WSD & Shafter-Wasco Irrigation District (3) 7. Kern County Water Agency – Pioneer 8. Rosedale-Rio Bravo WSD (2/5)* 9. Semitropic WSD (3) 10. Shafter-Wasco Irrigation District – 7th Standard Rd. 11. Southern San Joaquin Municipal Utility District (2) 12. Tejon WD (2) 13. West Kern WD (4/5)** 14. Westside District Authority 15. Wheeler Ridge-Maricopa WSD
Kern River GSP	
1. Greenfield County WD GSA 2. Kern River GSA	1. Agricultural (5) 2. Banking (3) 3. Urban (3)
Buena Vista GSP	
1. Buena Vista WSD GSA	1. Buttonwillow 2. Maples+
Henry Miller GSP	
1. Henry Miller WD GSA	N/A
Olcese GSP	
1. Olcese GSA	N/A

* Rosedale-Rio Bravo WSD identifies four separate "Monitoring Zones" with sustainable management criteria. There are no sustainable management criteria associated with the areas identified as management areas.

** West Kern WD MA-5 is not included in the KGA Umbrella Plan but is included in the West Kern WD management area plan.

Department staff have thoroughly evaluated the Plan, the Subbasin's coordination agreement, and other information provided or available and known to staff and have identified deficiencies in the Plan that staff recommends should preclude its approval.[11] In addition, consistent with the GSP Regulations, Department staff have provided corrective actions that the GSAs should review while determining how and whether to

[11] 23 CCR §355.2(e)(2).

address the deficiencies in a coordinated manner.[12] The deficiencies and corrective actions are explained in greater detail in Section 3 of this staff report and are generally related to the need to further coordinate amongst the GSAs and to define sustainable management criteria in the manner that is consistent with SGMA and the GSP Regulations.

This assessment includes four sections:

- **Section 1 – Evaluation Criteria:** Describes the legislative requirements and the Department's evaluation criteria.
- **Section 2 – Required Conditions:** Describes the submission requirements, Plan completeness, and basin coverage required for a Plan to be evaluated by the Department.
- **Section 3 – Plan Evaluation:** Provides a detailed assessment of identified deficiencies in the Plan. Consistent with the GSP Regulations, Department staff have provided corrective actions for the GSAs to address the deficiencies.
- **Section 4 – Staff Recommendation:** Provides staff's recommendation regarding the Department's determination.

[12] 23 CCR §355.2(e)(2)(B).

1 EVALUATION CRITERIA

The Department evaluates whether a Plan conforms to certain statutory requirements of SGMA [13] and is likely to achieve the basin's sustainability goal. [14] To achieve the sustainability goal, the Plan must demonstrate that implementation will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. [15] Undesirable results are required to be defined quantitatively by the GSAs overlying a basin and occur when significant and unreasonable effects for any of the applicable sustainability indicators are caused by groundwater conditions occurring throughout the basin. [16] The Department is also required to evaluate whether the Plan will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.[17]

For a Plan to be evaluated by the Department, it must first be determined that it was submitted by the statutory deadline[18] and that it is complete and covers the entire basin.[19] Additionally, for those GSAs choosing to develop multiple GSPs, the Plan submission must include a coordination agreement.[20] The coordination agreement must explain how the multiple GSPs in the basin have been developed and implemented utilizing the same data and methodologies and that the elements of the multiple GSPs are based upon consistent interpretations of the basin's setting. If these required conditions are satisfied, the Department evaluates the Plan to determine whether it complies with SGMA and substantially complies with the GSP Regulations.[21] As stated in the GSP Regulations, "[s]ubstantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal."[22]

When evaluating whether the Plan is likely to achieve the sustainability goal for the basin, Department staff review the information provided for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice. [23] The Department's review considers whether there is a reasonable relationship between the

[13] Water Code §§ 10727.2, 10727.4, 10727.6.
[14] Water Code § 10733(a).
[15] Water Code § 10721(v).
[16] 23 CCR § 354.26.
[17] Water Code § 10733(c).
[18] 23 CCR § 355.4(a)(1).
[19] 23 CCR §§ 355.4(a)(2), 355.4(a)(3).
[20] 23 CCR § 357.4.
[21] 23 CCR § 350 *et seq*.
[22] 23 CCR § 355.4(b).
[23] 23 CCR § 351(h).

information provided by the GSAs and the assumptions and conclusions presented in the Plan, including whether the interests of the beneficial uses and users of groundwater in the basin have been considered; whether sustainable management criteria and projects and management actions described in the Plan are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.[24] The Department also considers whether the GSAs have the legal authority and financial resources necessary to implement the Plan.[25]

To the extent overdraft is present in a basin, the Department evaluates whether the Plan provides a reasonable assessment of the overdraft and includes reasonable means to mitigate it.[26] When applicable, the Department will assess whether coordination agreements have been adopted by all relevant parties and satisfy the requirements of SGMA and the GSP Regulations.[27] The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.[28] Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSAs have adequately responded to the comments that raise credible technical or policy issues with the Plan.[29]

The Department is required to evaluate the Plan within two years of its submittal date and issue a written assessment.[30] The assessment is required to include a determination of the Plan's status.[31] The GSP Regulations provide three options for determining the status of a Plan: approved,[32] incomplete,[33] or inadequate.[34]

After review of the Plan, Department staff may conclude that the information provided is not sufficiently detailed, or the analyses not sufficiently thorough and reasonable, to evaluate whether it is likely to achieve the sustainability goal for the basin. If the Department determines the deficiencies precluding approval may be capable of being corrected by the GSAs in a timely manner,[35] the Department will determine the status of the Plan to be incomplete. A formerly deemed incomplete Plan may be resubmitted to the Department for reevaluation after all deficiencies have been addressed and incorporated into the Plan within 180 days after the Department makes its incomplete determination. The Department will review the revised Plan to evaluate whether the identified deficiencies were sufficiently addressed. Depending on the outcome of that evaluation,

[24] 23 CCR §§ 355.4(b)(1), (3), (4) and (5).
[25] 23 CCR § 355.4(b)(9).
[26] 23 CCR § 355.4(b)(6).
[27] 23 CCR § 355.4(b)(8).
[28] 23 CCR § 355.4(b)(2).
[29] 23 CCR § 355.4(b)(10).
[30] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[31] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[32] 23 CCR § 355.2(e)(1).
[33] 23 CCR § 355.2(e)(2).
[34] 23 CCR § 355.2(e)(3).
[35] 23 CCR § 355.2(e)(2)(B)(i).

the Department may determine the resubmitted Plan is approved. Alternatively, the Department may find a formerly deemed incomplete GSP is inadequate if, after consultation with the State Water Resources Control Board, it determines that the GSAs have not taken sufficient actions to correct any identified deficiencies.[36]

The staff assessment of the Plan involves the review of information presented by the GSAs, including models and assumptions, and an evaluation of that information based on scientific reasonableness. In conducting its assessment, the Department does not recalculate or reevaluate technical information provided in the Plan or perform its own geologic or engineering analysis of that information. The recommendation to approve a Plan does not signify that Department staff, were they to exercise the professional judgment required to develop a Plan for the basin, would make the same assumptions and interpretations as those contained in the Plan, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting GSAs are supported by adequate, credible evidence, and are scientifically reasonable.

Lastly, the Department's review and assessment of an approved Plan is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the Plan.[37] Also, GSAs have an ongoing duty to reassess their GSPs, provide annual reports to the Department, and, when necessary, update or amend their GSPs.[38] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the GSA's progress toward achieving the basin's sustainability goal and whether implementation of the Plan adversely affects the ability of GSAs in adjacent basins to achieve their sustainability goals.

[36] 23 CCR § 355.2(e)(3)(C).
[37] Water Code § 10733.8; 23 CCR § 355.6 *et seq*.
[38] Water Code §§ 10728 *et seq.*, 10728.2.

2 REQUIRED CONDITIONS

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline.[39] The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin.[40] Additionally, when multiple GSPs are developed in a basin, the submission of all GSPs must include a coordination agreement.[41] The coordination agreement must explain how the multiple GSPs in the basin have been developed and implemented utilizing the same data and methodologies and that the elements of the multiple GSPs are based upon consistent interpretations of the basin's setting. If a Plan is determined to be incomplete, Department staff may require corrective actions that address minor or potentially significant deficiencies identified in the Plan. The GSAs in a basin, whether developing a single GSP covering the basin or multiple GSPs, must sufficiently address those required corrective actions within the time provided, not to exceed 180 days, for the Plan to be reevaluated by the Department and potentially approved.

2.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority as of January 1, 2017 and that were subject to critical conditions of overdraft to submit a GSP no later than January 31, 2020.[42]

The Point of Contact representing 11 GSAs submitted the Subbasin's Plan on January 30, 2020, in compliance with the statutory deadline. The Plan consists of five GSPs and the required coordination agreement.

2.2 COMPLETENESS

GSP Regulations specify that the Department shall evaluate a Plan if that Plan is complete and includes the information required by SGMA and the GSP Regulations.[43] For those basins choosing to submit multiple GSPs, a coordination agreement is required.

The 11 GSAs submitted five adopted GSPs that cover the Subbasin. Department staff found the GSPs, and the collective Plan, to be complete and include the required information, sufficient to warrant an evaluation by the Department. The Department posted the Subbasin's five GSPs and coordination agreement to its website on February 19, 2020.

[39] Water Code § 10720.7.
[40] 23 CCR § 355.4(a)(3).
[41] Water Code § 10733.4(b); 23 CCR § 357.4.
[42] Water Code § 10720.7(a)(1).
[43] 23 CCR § 355.4(a)(2).

2.3 BASIN COVERAGE

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[44] A Plan that intends to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSAs.

The Plan intends to manage the entire Kern County Subbasin and the jurisdictional boundaries of the submitting GSAs cover the entire Subbasin.

[44] Water Code § 10727(b); 23 CCR § 355.4(a)(3).

3 PLAN EVALUATION

As stated in Section 355.4 of the GSP Regulations, a basin "shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act." The Department's assessment is based on a number of related factors[45] including whether the elements of a GSP were developed in the manner required by the GSP Regulations, [46] whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable,[47] and whether the GSP, through the implementation of clearly defined and technically feasible projects and management actions, is likely to achieve a tenable sustainability goal for the basin.[48]

Department staff have identified deficiencies in the GSPs, the most serious of which preclude staff from recommending approval of the Plan at this time. Department staff believe the GSAs may be able to correct the identified deficiencies within 180 days. Consistent with the GSP Regulations, Department staff are providing corrective actions related to the deficiencies, detailed below, including the general regulatory background, the specific deficiency identified in the Plan, and the specific actions to address the deficiency.

GENERAL BACKGROUND

SGMA allows for multiple GSPs to be implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers an entire basin.[49] The GSP Regulations and SGMA detail the requirements for a coordination agreement and the elements of the GSPs necessary to be coordinated to achieve the basin's sustainability goal.[50] The coordination agreement must provide both administrative and technical coordination and consistency between all the GSPs. The collective submittals for the basin are to be based upon consistent interpretations of the basin setting and utilize the same data and methodologies.[51] In the context of utilizing the same data and methodologies, the coordination agreement must provide the following:[52]

- a coordinated water budget for the basin, including groundwater extraction data, surface water supply, total water use, and change in groundwater in storage;
- a sustainable yield for the basin, supported by a description of the undesirable results for the basin, and an explanation of how the minimum thresholds and

[45] 23 CCR § 355.4.
[46] 23 CCR § 355.4(a)(1).
[47] 23 CCR § 355.4(b)(1).
[48] 23 CCR §§ 355.4(b)(5), 355.4(b)(6).
[49] Water Code § 10727(b)(3).
[50] Water Code §§ 10727.6, 10733.4(b)(2); 23 CCR § 357.4.
[51] 23 CCR § 357.4(a).
[52] Water Code § 10727.6 *et al;* 23 CCR §§ 357.4(b)(3)(B), 357.4(b)(3)(C), 357.4(c).

measurable objectives defined by each GSP relate to those undesirable results, based on information described in the basin setting; and

- an explanation of how the GSPs implemented together satisfy the requirements of SGMA and are in substantial compliance with the GSP Regulations.

The Department is tasked with evaluating whether the GSPs, in coordination with one another, conform with the required regulatory contents and are likely to achieve the sustainability goal for the basin.[53]

With regard to management areas, the GSP Regulations require specific information and rationale, including the reason for creating management areas and how those management areas would operate (i.e., sustainable management criteria, projects and management actions, etc.) without causing undesirable results outside of the management area itself (i.e., cause undesirable results for the Subbasin at large).[54]

EVALUATION SUMMARY

The Kern Subbasin is the largest and arguably most complicated Subbasin in terms of entities involved and demands placed on the Subbasin. To comply with SGMA and achieve sustainable groundwater management in the Kern Subbasin, a well-explained and coordinated approach is fundamental. Unfortunately, the Plan (i.e., the GSPs implemented together) that was developed for the Subbasin is, for key elements of the Plan, byzantine and fragmented. As such, Department staff have had a difficult time evaluating whether the Plan is likely to achieve the sustainability goal for the Subbasin.

Our general understanding of the Plan's approach is that individual water districts and water management entities in the Subbasin are proposing more than 180 projects and management actions that are intended to address the currently agreed upon overdraft identified in the Todd Groundwater Memorandum.[55] If implemented, the projects and management actions will address the overdraft and, as currently modeled, will keep groundwater levels above the various minimum thresholds set across the Subbasin.

To support the Plan's approach and demonstrate coordination, the GSAs worked together to develop a Subbasin-wide water budget and definitions of undesirable results. The coordinated water budget appears to set the "target" amount of overdraft that needs to be addressed through projects and management actions. The Subbasin undesirable results definitions appear to be an attempt to coordinate the individual GSPs and management areas definitions by determining an undesirable result occurs when a certain percentage of the Subbasin is exceeding the various, GSP and management area specific minimum thresholds. Thus, at a high level, the Plan appears to be coordinated.

[53] Water Code § 10733(b); 23 CCR § 355.4(b).
[54] 23 CCR § 354.20 *et seq*.
[55] Kern County Subbasin Coordination Agreement, pp. 15-296.

However, in looking closer at the individual GSPs and management area plans, and in many cases sub-management areas, the purported coordination becomes tenuous as the plans put forward individualized water budgets, sustainable yields, undesirable results, and sustainable management criteria that are based on different data and methodologies and are not easily comparable between plans. The primary issue with the byzantine and fragmented approach to the Plan is that Department staff, and other stakeholders including the general public, cannot effectively or clearly understand when and how the groundwater conditions become unreasonable causing undesirable results to occur throughout the Subbasin. In concert with that lack of clarity, the Plan does not provide readily available or comparable data and information to evaluate potential impacts, comprehensively and quantitatively, to Subbasin-wide beneficial uses and users that may occur during the implementation of the various plans.

Department staff understand that if the projects and management actions are being implemented and the water supply augmentation is being realized, there is arguably a coordinated plan to address the initial estimate of overdraft and avoid undesirable results at a Subbasin-wide level. However, the estimated 324,326 acre-feet per year of overdraft,[56] from the Todd Groundwater Memorandum, is a significant amount, and that number may even increase as the water budget data is developed and the numerical model is refined. A pragmatic outlook is that a significant amount of the 324,326 acre-feet per year will not be realized through supply augmentation only. Without the “new” water and without additional demand management, significant overdraft may continue in the Subbasin. With that, Department staff are concerned that the varied and fragmented approaches to establish individual water budgets and sustainable management criteria might allow for groundwater conditions to worsen at a greater rate or extent than otherwise would have occurred with a more coordinated Plan.

For example, there is a possibility that the Subbasin’s groundwater conditions will demonstrate the Subbasin is in overdraft, but the GSP and management area specific water budgets will not clearly show where the overdraft is occurring, thus leaving open the questions of how the overdraft will be addressed and who is responsible for it. In addition, GSPs and management area plans put forward a variety of criteria for when undesirable results are present in the individual plans. For groundwater levels, some GSPs and management areas require that minimum thresholds must be exceeded not just at a certain percentage of wells but also over a course of multiple monitoring times, seasons, or years to cause a localized undesirable result. Thus, while the GSPs often state that the minimum thresholds were coordinated and compared, there appears to be no real analysis or understanding of the effects of the groundwater conditions if the minimum thresholds are exceeded and groundwater levels continue to decline for years before an undesirable result is declared. Moreover, the way the Subbasin-wide undesirable results are structured (30 percent of the Subbasin area or 15 percent of

[56] Kern County Subbasin Coordination Agreement, p. 344.

adjacent areas experiencing undesirable results),[57] significant depletions of groundwater could occur before an undesirable result is considered to have occurred in the Subbasin.

The concern of the Department staff is that the way the undesirable results and sustainable management criteria are defined and set in the individual plans, and then defined at the Subbasin level, is that there is a real possibility of groundwater conditions being significantly worse than the established minimum thresholds in various portions of the Subbasin before the GSAs determine the Subbasin as a whole has experienced an undesirable result.

The deficiencies and corrective actions below identify issues with the Plan that, in the Department staff's opinion, should preclude approval. They are intended to address, in part, the overarching question of what groundwater conditions actually represent an undesirable result in the Kern Subbasin if the projects and management actions are not implemented or if only partly implemented. However, the key for the Kern Subbasin is for the projects and management actions to be implemented and for the water augmentation and savings to be realized. As such, Department staff considers the implementation of projects and management actions to be absolutely critical to assessing the progress toward sustainable groundwater management in the Kern Subbasin. To the extent projects and management actions are not diligently pursued, are significantly delayed, or are not likely to be implemented, Department staff do not believe the Kern Subbasin GSAs have the luxury of putting off finding another approach and still demonstrate adequate progress toward sustainability.

3.1 Deficiency 1. The GSPs do not establish undesirable results that are consistent for the entire Subbasin.

3.1.1 Background

The GSP Regulations state an undesirable result occurs when "significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin."[58] GSAs are required to describe the process and criteria relied upon to define undesirable results including describing the cause of groundwater conditions occurring throughout the basin that would lead to an undesirable result, the quantitative combination of minimum threshold exceedances that cause significant and unreasonable effects, and the potential effects on beneficial uses and users of groundwater.[59] It is therefore incumbent on the GSAs to sufficiently understand the conditions throughout the entire Subbasin so that the Subbasin's undesirable results represent conditions that are significant and unreasonable. Additionally, the Plans are

[57] Kern County Subbasin Coordination Agreement, pp. 299-300.
[58] 23 CCR § 354.26(a).
[59] 23 CCR § 354.26(b).

required to explain how the GSAs determined each minimum threshold will avoid Subbasin-wide conditions that would result in undesirable results.[60]

The GSP Regulations also require basins that prepare and implement multiple plans to describe, in the basin's coordination agreement, the undesirable results for the basin and provide "an explanation of how the minimum thresholds and measurable objectives defined by each Plan relate to those undesirable results based on information described in the basin setting."[61] For basins that establish management areas, the GSP Regulations state that management areas may establish "different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin."[62]

3.1.2 Deficiency Details

The first component of this deficiency relates to the Plan's lack of an explanation of the specific effects, occurring *throughout the Subbasin*, that, when significant and unreasonable, would be undesirable results. As described below, the Coordination Agreement includes a calculation framework for determining when a certain portion of the Subbasin experiences negative effects, which have been defined in isolation by a multitude of individual management areas. However, this calculation framework is not accompanied by any cogent description of *Subbasin-wide* effects caused by groundwater management that the entire Subbasin is attempting to avoid by implementing the Plan. For chronic lowering of groundwater levels, as an example, the Coordination Agreement's discussion of the Subbasin-wide effects is limited to the statement that it is "the point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth/elevation of water, affect the reasonable and beneficial use of, and access to, groundwater by overlying users." The Plan provides no specific information on the Subbasin-wide effects of groundwater lowering related to accessing groundwater by beneficial uses and users. (See Corrective Action 1a.)

Notwithstanding the first component of this deficiency and taking the Subbasin's area-based approach at face value, the second component of this deficiency relates to the individual GSPs' and Management Area Plan's widely varying approaches to define the management-area-specific undesirable results. Again, using groundwater levels as an example, the Coordination Agreement states that an undesirable result occurs "when the minimum threshold for groundwater levels are exceeded in at least three (3) adjacent management areas that represent at least 15% of the Subbasin or greater than 30% of the Subbasin (as measured by each management area). Minimum thresholds shall be set by each of the management areas through their respective management area plans or Groundwater Sustainability Plans."

[60] 23 CCR § 354.28(b)(2).
[61] 23 CCR § 357.4(b)(3)(C).
[62] 23 CCR § 354.20(a).

It is apparent to Department staff that the Coordination Agreement's use of the term "minimum thresholds" in the definition above does not refer to minimum thresholds as defined in the GSP Regulations. Instead, it refers to some, often byzantine, combination of several minimum threshold exceedances, at times coupled with a temporal constraint. For example, in the KGA GSP Cawelo Water District Management Area, Cawelo decided that its area would only contribute to the Coordination Agreement's 30 or 15 percent of land area undesirable result definition if 30 percent of their representative monitoring wells were below the minimum threshold for three successive spring measurements.[63] In another area, the KGA GSP Rosedale-Rio Bravo Management Area subdivides its management area into five zones and states that its land area would only contribute to the Coordination Agreement's undesirable result definition if, at any time, the average groundwater level in one of two zones exceeds the minimum thresholds or, for the three remaining zones, if the average groundwater level in two of those three were below the minimum threshold.[64]

In some areas, those conditions could be met in near-real time and would fluctuate as groundwater conditions change. Other areas, particularly those with multi-year temporal constraints, could tangibly be experiencing minimum threshold exceedances at a large number of sites for a sustained period without being observed by the Subbasin's management as being undesirable. This complexity is problematic because it allows for situations where groundwater conditions could degrade for potentially sustained periods of time in potentially significant portions of the Subbasin without triggering the Subbasin's definition of an undesirable result. Department staff do not consider this combination of disparate management area definitions a reasonable approach to achieving sustainable management and avoiding undesirable results in the Subbasin without a commitment to documenting and evaluating whether any minimum threshold exceedance, for any amount of time and in any area, is causing effects that could be significant and unreasonable. (See Corrective Action 1b.)

The final component of this deficiency is related to the Plan's incomplete descriptions of the conditions under which an undesirable result would occur, according to the Coordination Agreement's land area calculation framework and the various GSPs and Management Area Plans. By the Subbasin's definition of an undesirable result, as stated above, tracking which management area(s) have been triggered as "undesirable" (note that some GSPs or Management Area Plans refer to these management areas with "undesirable" local conditions as "watch areas" but the terminology used in the plans is inconsistent and should be standardized) is paramount to determining when an undesirable result occurs. However, as shown by the following example, the GSPs do not contain sufficient and consistent information for interested parties to track when the groundwater conditions in the management areas are "undesirable" or become "watch areas".

[63] KGA GSP, Cawelo WD MAP, p. 169.
[64] KGA GSP, Rosedale-Rio Bravo WSD MAP, p. 69.

The KGA GSP Semitropic management area, KGA GSP Rosedale-Rio Bravo management area, and the Buena Vista GSP Buttonwillow management area are adjacent and represent slightly more than 15 percent of the Subbasin area. Each of these agencies have identified different conditions representing when a localized undesirable result for chronic lowering of groundwater levels occurs, as briefly explained below:

- The KGA GSP Semitropic management area, which is further divided into three management areas,[65] describes "a management area will be considered an undesirable result watch area when 51% of the representative monitoring sites in a management area (i.e., sub-management area) violate their minimum threshold for groundwater levels."[66]
- The KGA GSP Rosedale-Rio Bravo management area plan establishes minimum thresholds for five monitoring zones and states that if the average water level in a zone exceeds the minimum threshold "it will be considered an undesirable result."[67] However, the plan further states that if either (1) two or more of the North, Central, or South of the River monitoring zones or (2) any one of either South or East monitoring zones meets the aforementioned criterion of the average level exceeding the minimum threshold then *that* would be considered an undesirable result.[68]
- The Buena Vista GSP defines minimum thresholds for its Buttonwillow Management Area but does not define the combination of minimum threshold exceedances that would cause this management area to become "undesirable".[69]

As demonstrated by the above example, the Plan, while purporting to be coordinated, presents a disparate range of definitions for what conditions in each area would be "undesirable" and could, therefore, contribute to the Coordination Agreement's defined undesirable result. Department staff found this to be true for all applicable sustainability indicators. The Plan's fragmented approach makes tracking Subbasin-wide SGMA implementation and the achievement of sustainability challenging for Department staff, interested parties, and the Subbasin's beneficial uses and users of groundwater. (See Corrective Action 1c.)

3.1.3 Corrective Action 1

a. The Plan's Coordination Agreement should be revised to explain how the undesirable results definitions are consistent with the requirements of SGMA and the GSP Regulations, which specify that undesirable results represent effects caused by groundwater conditions occurring throughout the Subbasin.[70] The

[65] KGA GSP Semitropic WSD MAP, p. 153.
[66] KGA GSP Semitropic WSD MAP, p. 162.
[67] KGA GSP Rosedale-Rio Bravo WSD MAP, p. 69.
[68] KGA GSP Rosedale-Rio Bravo WSD MAP, p. 69.
[69] Buena Vista WSD GSP, pp. 93-94, 126-128.
[70] 23 CCR §354.26(a).

discussion should include descriptions of how the Plans have utilized the same data and methodologies to define the Subbasin-wide undesirable results and how the Plan has considered the interests of beneficial uses and users of groundwater.

b. Because of the fragmented approach used in the Subbasin that could allow for substantial exceedances of locally defined minimum thresholds over sustained periods of time, the GSAs must commit to comprehensively reporting on the status of minimum threshold exceedances by area in the annual reports and describe how groundwater conditions at or below the minimum thresholds may impact beneficial uses and users prior to the occurrence of a formal undesirable result.
c. The GSAs must adopt clear and consistent terminology to ensure the various plans are comparable and reviewable by the GSAs, interested parties, and Department staff. This terminology should also adhere to the definitions of various terms in SGMA and the GSP Regulations including the understanding that undesirable results are conditions occurring throughout the Subbasin.[71] The Plan and associated coordination materials must also be revised to clearly document how all of the various undesirable results definitions and methodologies achieve the same common sustainability goal.[72] Department staff recommend the revisions should include, at minimum:
    - A map of the entire Subbasin showing each of the GSP areas, including management areas and the management areas within the management area plans, associated monitoring zones, etc. that have a locally defined "undesirable result" that can contribute to the Subbasin's undesirable result area-based definitions described in the Coordination Agreement
    - A comprehensive table or another organized form of identifying each of the areas, the land coverage – both absolutely and as a percentage – of each of those listed areas in comparison to the Subbasin in total, and a clear and concise description of the conditions that would cause that area to trigger a localized undesirable result (i.e., a watch area, etc.). These materials should demonstrate that 100 percent of the Subbasin area is being managed under the various GSPs with reasonable definitions for undesirable results.

    In addition to the graphical and tabular representation of the definition of the Subbasin-wide undesirable results, and if the GSAs elect to maintain the percentage of land area definition for undesirable results, the GSAs need to provide a comprehensive description of the groundwater conditions that would lead to localized undesirable results in the GSAs and other management areas which ultimately contribute to the 15 percent or 30 percent of land area criteria.

[71] 23 CCR § 354.26(a).
[72] 23 CCR § 357.4(a).

3.2 Deficiency 2. The Plan does not set minimum thresholds for chronic lowering of groundwater levels in a manner consistent with the requirements of SGMA and the GSP Regulations

3.2.1 Background

The GSP Regulations state the description of minimum thresholds must include the following, among other items:

- Information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The information and criteria relied upon to establish minimum thresholds for chronic lowering of groundwater levels, supported by information from the basin setting, and other data or models as appropriate.[73]
- The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the GSA has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.[74]
- A discussion of the potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring in the Subbasin.[75]

The GSP Regulations also state that minimum thresholds for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results.[76] These quantitative values should be supported by:

- The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin;[77] and
- Potential effects on other sustainability indicators.[78]

Additionally, the Department must consider "whether the assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are reasonable and supported by the best available information and best available science."[79]

[73] 23 CCR § 354.28(b)(1).
[74] 23 CCR § 354.28(b)(2).
[75] 23 CCR §§ 354.26(b)(3), 354.28(b)(4).
[76] 23 CCR § 354.28(c)(1).
[77] 23 CCR § 354.28(c)(1)(A).
[78] 23 CCR § 354.28(c)(1)(B).
[79] 23 CCR § 355.4(b)(1).

3.2.2 Deficiency Details and Corrective Action 2

As noted above, the GSP Regulations state minimum thresholds for groundwater levels are the site-specific levels that represent a depletion of supply that could cause undesirable results. Department staff have assessed the various minimum thresholds to evaluate whether they are reasonable, supported by best available science, and whether they have reasonably considered the interests of beneficial uses and users of groundwater.

Table 2 presents a brief summary, based on Department staff's review, of the variety of methods used to develop groundwater level minimum thresholds across the numerous GSPs. As documented in Table 2, the approaches used and the level of analysis to support those approaches, is disparate across the various plans. Some take an approach of limiting declines to no worse than were observed during recent 2013-2016 drought. Others allow for additional lowering of groundwater levels but include adequate explanation of the beneficial uses and users in their areas to support why that is a reasonable approach, or they propose to mitigate for impacts (e.g., to domestic well users) that may occur due to the planned lowering. Other plans offer less rigorous approaches, with some simply projecting a future rate of decline based on pre-SGMA rates of decline, with limited to no analysis of the effects of that lowering on beneficial uses and users. Department staff have included corrective actions in Table 2 where the approaches in the individual management areas are deficient. Department staff believe that addressing the following corrective actions will align the minimum thresholds for chronic lowering of groundwater levels with the requirements of SGMA and the GSP Regulations.

The GSPs also do not consistently explain how the lowering of groundwater levels minimum thresholds and measurable objectives that are set below historical lows will impact other applicable sustainability indicators specifically water quality, land subsidence, and reduction of groundwater storage. Based on the groundwater level declines allowed for by many of the minimum thresholds, the GSPs need to explain how those groundwater level declines relate to the degradation of groundwater quality sustainability indicator. The GSPs must describe, among other items, the relationship between minimum thresholds for a given sustainability indicator (in this case, chronic lowering of groundwater levels) and the other sustainability indicators, degradation of water quality in particular.[80] The GSPs generally commit to monitoring a wide range of water quality constituents, but they do not establish a consistent definition of undesirable results. Additionally, the GSPs use differing constituents and methods to establish minimum thresholds including some GSPs using groundwater levels as a proxy for degradation of water quality. Department staff recognize that a subbasin the size of the Kern County Subbasin will have a wide variety of water quality concerns requiring different management strategies; however, at this time, it is clear that the GSPs do not consider, or at least do not document, the potential for degradation to occur due to further

[80] 23 CCR § 354.28(b)(2).

lowering of groundwater levels beyond the historic lows. The GSPs should also consider and discuss the opportunities to coordinate and leverage existing programs and agencies to help understand whether implementation of the GSPs is resulting in degradation of water quality.

Table 2. Kern Subbasin groundwater level threshold summaries and corrective actions

Kern Groundwater Authority GSP
Areas Outside of Management Areas (Umbrella Document)
The KGA GSP is predominantly subdivided into management areas, each of which has its own management area plan, which are discussed below. However, a portion of the KGA area lies outside of any of the defined management areas. The KGA GSP provides little information on the characteristics of these non-management-area portions of its GSP area and does not appear to set any sustainable management criteria for these areas. The table on page 297 of the Coordination Agreement indicates that non-districted lands account for 18,013 acre-feet per year of total demand, which Department staff note is a larger volume than occurs in many of the areas covered by the management area plans. <u>Corrective Action</u> a. Provide a comprehensive discussion of areas covered by the KGA GSP, but that are not contained within the various management area plans. Among other items, provide maps of these areas, describe the uses and users of groundwater in these areas, and either set sustainable management criteria for these areas or include robust discussions justifying why sustainable management criteria are not required.
Arvin-Edison Water Storage District Management Area
The KGA GSP Arvin-Edison management area set groundwater level thresholds based on a multi-step process that first assigned an initial threshold to each groundwater level monitoring site based on the minimum of either the historical low minus a “variability correction factor” or the recent low minus a correction factor that accounted for variability and continuation of recent trends. Arvin-Edison then adjusted thresholds for sites within 1-mile of critical infrastructure to be no lower than the historical low to prevent additional subsidence. Finally, Arvin-Edison generalized the site-specific thresholds into four zones of similarity to account for the fact that wells with historical data upon which the analysis was based may not be available for future long-term monitoring. Thus, they could select another existing or new well in a particular zone to use for monitoring during implementation. Arvin- Edison examined the potential for dewatering of wells if groundwater levels declined to the minimum threshold values for domestic, production (which Department staff assume to be for agricultural production), and public supply wells. In the context of the groundwater level minimum thresholds, Arvin-Edison includes brief description of an Impacted Well Mitigation Program to remedy well impacts through actions such

as pump lowering, well deepening, well replacement, or alternative water sources, but does not set a schedule for when this program would be implemented.[81]

Corrective Action

b. As the Arvin Edison management area plan appears to rely, at least to some extent, on the Impacted Well Mitigation Program to justify its minimum thresholds, which allow for continued lowering of groundwater levels in some areas, the KGA GSP must provide specific details, including timeline for implementation, of the program. Describe the scope of the program and how users impacted by continued groundwater level decline, particularly early in implementation of the Plan, will be addressed.

Cawelo Water District Management Area

The KGA GSP Cawelo management area established minimum thresholds for chronic lowering of groundwater levels based on the conditions experienced over the past 10 years. Because groundwater levels declined 80 feet between 2007 through 2016, the minimum threshold is set to 80 feet below the low groundwater level that was experienced during that period and allowing for operational flexibility in the event that another similar extended drought period occurs during the GSP implementation. Cawelo states that most wells have been drilled deeper and undesirable results associated with drought are unlikely.

While it appears that during a meeting held in 2019 Cawelo received a presentation on the impacts to wells given various scenarios of minimum thresholds, a discussion of impacts to beneficial uses and users of the adopted minimum thresholds is not provided. [82]

Corrective Action

c. The KGA GSP must describe how the minimum thresholds in the Cawelo management area may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Eastside Water Management Area

Due to the lack of historical well data, the KGA GSP Eastside management area has established minimum thresholds at each individual well site based on the allowance of drawdown to 20% of the saturated water column height above the bottom of the well, as measured in 2015 or closest measurement to that time frame. This resulting value, the corresponding 80% of the water column, was then increased on a well-by-well basis if the water level did not provide at least 30 feet of head above the existing pump intake.

While it appears that Eastside is protective of dewatering wells, all the minimum thresholds are below historical lows and the impacts of the established minimum thresholds for chronic lowering of groundwater levels on beneficial uses and users are not discussed. Eastside is aware that there are domestic wells within the management

[81] KGA GSP Arvin Edison MAP, pp. 216-220, 234-238, 286.
[82] KGA GSP Cawelo MAP, pp. 165-169, 402-407.

area; however, "the full extent and distribution of active domestic wells within the Management Area is currently unknown."[83]

Corrective Action

d. The KGA GSP must describe how the minimum thresholds in the Eastside management area may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

Kern Water Bank Management Area

The KGA GSP Kern Water Bank management area can only recover groundwater that has previously been stored minus losses that have been applied. The Kern Water Bank states that "[a]n extensive Mitigation Monitoring and Reporting Program (MMRP) has been developed by DWR for the KWB Storage Project that reduces impacts from operations to less-than-significant, and undesirable results are not present or are not likely to occur." It is acknowledged that pumping operations can cause lowering of groundwater levels in adjacent areas and threshold water levels have been established in the Joint Operation Plan. The threshold water levels in the Joint Operation Plan are based on the DWR KWB Model and a model developed by Rosedale-Rio Bravo Water Storage District. "When the With-Project conditions are fifteen (15) or forty-five (45) feet deeper than the Without-Project conditions at any operative domestic or agricultural well, respectively, and mechanical failure or other operational problems have occurred or are reasonably likely to occur due to declining water levels, mitigation will be provided …" The 15-foot threshold is essentially the point when the projects have had a discernable influence on a domestic well. The 45-foot threshold for agricultural wells recognizes the significant economic benefits resulting from higher groundwater elevations provided by the projects through time, and that agricultural wells in the area are completed to greater depths.[84]

Corrective Action

e. While the Department understands the unique circumstances with the Kern Water Bank, compliance with SGMA and the GSP Regulations is still a requirement and while the thresholds established in the Joint Operation Plan are being utilized to meet these requirements, all parts of the GSP Regulations related to the sustainable management criteria must be addressed. The KGA GSP must provide an explanation of how the Joint Operation Plan meets the requirements of SGMA and the GSP Regulations.
f. It is also noted that the Joint Operation Plan expired on January 31, 2019. Provide an updated explanation if these thresholds have changed and the latest Joint Operation Plan if applicable.

Kern-Tulare Water District Management Area

The KGA GSP Kern-Tulare Water District management area spans both the Kern Subbasin and the Tule Subbasin. The management area plan states that chronic lowering of groundwater levels is the major cause of undesirable results for reduction in groundwater storage and land subsidence. Kern-Tulare management area plan

[83] KGS GSP Eastside MAP, pp. 94-95, 208.
[84] KGA Kern Water Bank MAP, pp. 38, 39, 175-180.

utilized historical groundwater level data from 2006 to 2018 for wells perforated in the Santa Margarita Formation and projected out the trendline to 2040. These values ranged from -120 feet to -190 feet mean sea level. The District then selected -150 feet mean sea level as the minimum threshold for each of the well sites. The lowest groundwater level the management area has experienced is -51.8 feet.

The Kern-Tulare management area plan states that "water users within the District are the predominant users of the Santa Margarita Formation" and that minimum thresholds may impact groundwater users within the management area by requiring an overall reduction in groundwater pumping to ensure the minimum threshold is met; however, no discussion is provided describing the impacts to beneficial uses and users.[85]

Corrective Action

g. The KGA GSP must provide and explanation of how minimum thresholds within the Kern-Tulare management area at the monitoring sites are consistent with the requirement to be based on a groundwater elevation indicating a significant and unreasonable depletion of supply at a given location. If the minimum thresholds were not set consistent with levels indicating an undesirable depletion of supply, the thresholds should be revised accordingly.
h. Provide a discussion identifying how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

North Kern Water Storage District/Shafter-Wasco Irrigation District Management Area

The KGA GSP North Kern/Shafter-Wasco management area plan identifies three management areas, two managed by North Kern Water Storage District and the third managed by Shafter-Wasco Irrigation District. In establishing minimum thresholds for chronic lowering of groundwater levels, the area covered by these management areas was divided into hydrogeologic zones (HZ). The management area then looked at the 2006-2016 spring water levels for each HZ, identified a trend, and projected the trend out to 2040. The result of each 2040 projection is the minimum threshold for each HZ and the monitoring sites in those HZs are assigned the correlating minimum threshold. This is to establish the worst-case scenario for the management areas. The minimum thresholds for two wells closest the Kern River GSP area within the SWID-MA-1 were raised from 20 feet above the 2040 projection at the request of Kern River so as not to cause undesirable results within the Kern River GSP area. In looking at Figure 3-2, management area NKWSD-MA-2 does not have minimum thresholds established.

A well impact analysis of the equivalent minimum threshold average values (represented as depth to water values) for each HZ was used to determine that a portion of the existing wells are impacted to varying extents. A subset of the total wells within the three management areas and the average 2040 minimum thresholds were used in the analysis. Based on results of the well impact analysis, the management area plan states that it can be assumed many wells will remain operational and that

[85] KGA GSP Kern-Tulare Water District MAP, pp. 16, 69, 70.

the water levels can drop without causing undesirable results which cannot be mitigated. It was stated that agricultural wells would be mitigated by landowners to the extent that declining groundwater levels was created by localized actions by those landowners. While the management area plan states that mitigation to domestic wells would be necessary, there is no mention of who would implement the mitigation effort.[86]

Corrective Actions

i. The KGA GSP must establish sustainable management criteria for management area NKWSD-MA-2.
j. The KGA GSP must be revised to explain how minimum thresholds within the North Kern Water Storage District/Shafter-Wasco Irrigation District management area at the monitoring sites are consistent with the requirement to be based on a groundwater elevation indicating a significant and unreasonable depletion of supply at a given location. If the minimum thresholds were not set consistent with levels indicating an undesirable depletion of supply, the thresholds should be revised accordingly.
k. Verify how the subset of wells used in the well impact analysis is representative of the wells in the management area. Provide an explanation of the mitigation plan for domestic wells.

Kern County Water Agency Pioneer GSA Management Area

The Pioneer management area minimum thresholds are "calculated for each representative well by using the difference between the historical maximum and minimum values, calculating 20 percent of that range and subtracting the 20 percent value from the historical minimum value." However, the management area provides no further information or description (e.g., details of the well and pump information) for beneficial uses and users. Based on Table 7-1, it appears the minimum threshold represents a substantial reduction in groundwater levels relative to recent (i.e., 2011-2019) levels, which, at their lowest point, appear to be just over 250 feet below ground surface. Without any further description provided in the management area plan, Department staff cannot assess whether these minimum thresholds are reasonable and substantially comply with the GSP Regulations.[87]

Corrective Action

l. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Pioneer management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels.

[86] KGA GSP North Kern Water Storage District/Shafter-Wasco Irrigation District MAP, pp. 209-225.
[87] KGA GSP Pioneer MAP, pp. 146-148.

Rosedale Rio Bravo Management Area

The Rosedale Rio Bravo management area plan explains that groundwater level decline during the 2012-2016 drought resulted in significant expense to landowners in their management area due to pump lowering, well replacement, well-head treatment, and increased energy costs. Rosedale Rio Bravo conducted an analysis of the economic impacts of continued groundwater lowering, examining the costs for each 25-foot increment of lowering (e.g., lowering an initial 25 feet would lead to $371 million in impacts across the domestic, agricultural, and municipal/public categories of wells), and concluded that any "additional reinvestment in groundwater facilities [beyond those already experienced] … would be deemed an undesirable result." Therefore, groundwater level thresholds are set at the low point of the last drought. Rosedale Rio Bravo divided its area into five monitoring zones and grouped monitoring wells in each zone to determine a zone-specific minimum threshold. The management area plan states that they will attempt to maintain at least two wells per zone and will compute the average groundwater level for each well in a zone to determine if the threshold has been exceeded during a given monitoring event. The management area plan states that they would consider an undesirable result to occur if two of either the North, Central, or South of the River zones exceed their thresholds, or if the threshold was exceeded in any one of the South or East zones. Why thresholds are allowed to be exceeded in one of the North, Central, or South of the River zones without the agency considering that to trigger an undesirable result was not adequately explained. Adequate explanation is also lacking regarding whether the triggering of an undesirable result in any one of these zones triggers the entire Rosedale Rio Bravo management area to become an undesirable result watch area, or if only the area of the triggering monitoring zone(s) would contribute to the Subbasin-wide tracking of undesirable results.[88]

Corrective Action

m. The KGA GSP must provide clarification regarding why minimum threshold exceedances are allowed to occur in one of the North, Central, or South of the River zones for this management area (i.e., why it takes two of those zones to exceed their threshold before the management area plan considers an undesirable result to have occurred). Describe any projects or management actions that may be implemented if the minimum threshold is exceeded in one of those areas and users are impacted but an undesirable result is not triggered.

Semitropic Water Storage District Management Area

The KGA GSP Semitropic Water Storage District management area plan further divides the management area into three management areas. In establishing minimum thresholds for chronic lowering of groundwater levels, the area covered by these management areas was divided into hydrogeologic zones (HZ). The management area then evaluated the 2006-2016 spring water levels for each HZ, identified a trend, and projected the trend out to 2040. The result of each 2040 projection is the minimum threshold for each HZ and the monitoring sites in those HZs are assigned the corresponding minimum threshold. This is to establish the worst-case scenario for the

[88] Rosedale Rio Bravo MAP, pp. 68-75.

management areas. In comparing the map of the monitoring well sites (Figure 3-1) and Table 3-1 which summarizes the minimum thresholds, Department staff were unable to correlate the two.

The management area plan states that there are thresholds for the upper zone wells in Appendix B-3; however, Department staff could not locate this appendix and it is not clear how these thresholds were established and the location of the monitoring sites assigned these minimum thresholds.

A well impact analysis of the equivalent minimum threshold average values (represented as depth to water values) for each HZ was used to determine that a portion of the existing wells are impacted to varying degrees. A subset of the total wells within the three management areas and the average 2040 minimum threshold values were used in the analysis. Based on results of the well impact analysis, the management area plan states that it can be assumed many wells will remain operational and that the water levels can drop without causing undesirable results which cannot be mitigated. The management area plan states that impacts to agricultural wells would be mitigated by landowners. While the management area plan states that mitigation to domestic wells would be necessary, there is no mention of who would implement the mitigation effort.[89]

Corrective Action

n. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Semitropic Water Storage District management area, including how they represent site-specific levels of depletion that could cause undesirable results and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly.
o. Reconcile Figure 3-1 and Table 3-1 to utilize the same well naming convention so that Department staff and other interested parties may correlate the two.
p. Verify how the subset of wells used in the well impact analysis is representative of the wells in the management area. Provide an explanation of the mitigation plan for domestic wells.

Shafter-Wasco Irrigation District (7th Standard Rd.) Management Area

The KGA GSP Shafter-Wasco Irrigation District management area calculates the minimum thresholds for chronic lowering of groundwater levels by "projecting a theoretical future water groundwater elevation based on the assumption that the conditions experienced over the ten-year period 2006-2016 (Spring measurements) continue from 2016 through 2040" at each of the three well sites. The management area plan claims this was done to be consistent with what is being used by surrounding management areas.

[89] KGA GSP Semitropic Water Storage District Management Area, pp. 166-173, 187, 188, 329-353.

The management area plan examined the impacts of the minimum thresholds and measurable objectives on wells within the area and determined that there they would potentially experience "excessive dewatering, [but] the impacts would not be unreasonable and would be mitigated through an Impacted Well Mitigation Program." It's unclear if all the wells in the management area were included in this impact analysis.[90]

Corrective Actions

q. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Shafter-Wasco Irrigation District management area, including how they represent site-specific levels of depletion that could cause undesirable results and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly.

Southern San Joaquin Municipal Utility District Management Area

In the KGA GSP Southern San Joaquin Municipal Utilities District management area, in establishing minimum thresholds for chronic lowering of groundwater levels, the management area was divided into hydrogeologic zones (HZ). The management area then looked at the 2006-2016 spring water levels for each HZ, identified a trend, and projected the trend out to 2040. The result of each 2040 projection is the minimum threshold for each HZ and the monitoring sites in those HZs are assigned the correlating minimum threshold. This is to establish the worst-case scenario for the management area. The minimum thresholds for two wells closest the Kern River GSP area within the SWID-MA-1 were raised from 20 feet above the 2040 projection at the request of Kern River so as not to cause undesirable results within the Kern River GSP area. In looking at Figure 3-2, management area NKWSD-MA-2 does not have minimum thresholds established.

A well impact analysis of the equivalent minimum threshold average values (represented as depth to water values) for each HZ was used to determine that a portion of the existing wells are impacted to varying extents. A subset of the total wells within management area and average 2040 minimum thresholds values were used in the analysis. Based on results of the well impact analysis, the management area plan states that it can be assumed most wells will remain operational and that the water levels can drop without causing undesirable results which cannot be mitigated. It was stated that agricultural wells would be mitigated by landowners to the extent that declining groundwater levels was created by localized actions by those landowners. While the management area plan states that mitigation to domestic wells would be necessary, there is no mention of who would implement the mitigation effort.[91]

[90] KGA GSP Shafter-Wasco Irrigation District (7th Standard Rd.) MAP, pp. 149,150,164,165.
[91] KGA GSP Southern San Joaquin Municipal Utility District MAP, pp. 163-173.

Corrective Actions

r. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Southern San Joaquin Municipal Utilities District management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly.

s. Verify how the subset of wells used in the well impact analysis is representative of the wells in the management area. Provide an explanation of the mitigation plan for domestic wells.

Tejon-Castac Water District Management Area

The minimum threshold for the KGA GSP Tejon-Castac management area is set to 50 feet above mean sea level at one well site and is based on the approximate average historical low value for wells in the neighboring Arvin-Edison Water Storage District due to the lack of historical data within the Tejon-Castac management area. The management area believes this use of the available historical low is appropriate because at such lows there have been no known problems and land subsidence typically doesn't happen unless groundwater levels fall below historical lows for a sufficient period of time. Therefore, the management area assumes this is protective of beneficial uses and users. See the summary for Arvin-Edison above regarding how their minimum thresholds were established.

The management area plan provides no further information or description (e.g., details of the well and pump information) for beneficial uses and users or evidence that groundwater level declines allowed by the threshold will not cause impacts to other sustainability indicators. It's unclear why the management area has no historical information for the management area. Without any further description provided for this management area, Department staff cannot evaluate whether the minimum threshold is reasonable and substantially compliant with the GSP Regulations.[92]

Corrective Action

t. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Tejon-Castac management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly.

[92] KGA GSP Tejon-Castac Water District MAP, p. 102.

West Kern Water District Management Area

The KGA GSP West Kern Water District management area plan describes it being divided into four management areas (Lake, North Project, South Project, and Western). Department staff note that Figure 1-2 shows an additional management area (Little Santa Maria Valley) and Appendix H consists of a draft GSP for this additional management area. Minimum thresholds for the North Project management area "were calculated by finding the maximum and minimum historical values for each well; 20 percent of the difference between these elevations was calculated, and then subtracted from the minimum historical value to obtain the numerical MT value." Because the South Project management area groundwater conditions and well use are like those in the North Project, the same calculations were used to determine MT values. No sustainable management criteria were determined for the Lake management area because the District was unable to procure the groundwater level data for the production wells in area. No sustainable management criteria were established for the Western management area because there is no groundwater usage in the area; however, earlier parts of the management area plan describe groundwater usage in this area as de minimis without further explanation of the type of de minimis users within the area. Due to the draft nature of the material provided for Little Santa Maria Valley, Department staff is unable to review the sustainable management criteria for that portion of the KGA GSP.[93]

Corrective Action

u. The KGA GSP must provide sustainable management criteria for all identified management areas.
v. The minimum thresholds must include a description of the selection of groundwater level minimum thresholds, including how they represent site-specific levels of significant and unreasonable depletion of supply that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels.

Westside District Authority Management Area

The KGA GSP Westside management area states that total groundwater demand is about 3,000 acre-feet per year due to water quality; therefore, the potential for significant lowering of groundwater levels due to pumping is believed to be minimal. In establishing the minimum thresholds, the management area first divided the area into two sentry coordination zones along the north and east boundaries of the management area (shown in Figure 30a and Figure 30b). There is one minimum threshold established for Sentry Zone #1 and three for Sentry Zone #2. These minimum thresholds values are not explained or justified. The established minimum thresholds do not apply for the majority of the management area and the rest of the management area is not being monitored for water levels. The management area plan states that minimal pumping takes place within the management area due to water

[93] KGA GSP West Kern Water District MAP, pp. 26, 27, 178-183, 353-442.

quality; however, based on Figure 28a and Figure 28b, there is subsidence appears to be occurring within the middle of the management area. For this reason, sustainable management criteria must be applied to the entirety of the management area, including the establishment of thresholds and monitoring.[94]

Corrective Action

w. The KGA GSP must explain the selection of groundwater level minimum thresholds for the Westside management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly.
x. The larger portion of the management area must establish sustainable management criteria, including the establishment of minimum thresholds and monitoring; otherwise, further evaluation and justification is needed to negate management criteria in this portion of the management area.

Wheeler Ridge-Maricopa Water Storage District Management Area

The KGA GSP Wheeler Ridge-Maricopa management area set groundwater level thresholds based on a multi-step process that first assigned an initial threshold to each groundwater level monitoring site based on the minimum of either the historical low minus a "variability correction factor" or the recent low minus a correction factor that accounted for variability and continuation of recent trends. The management area then adjusted thresholds for sites within 1-mile of critical infrastructure to be no lower than the historical low to prevent additional subsidence. Finally, the management area generalized the site-specific thresholds into three zones of similarity to account for the fact that wells with historical data upon which the analysis was based may not be available for future long-term monitoring. Thus, they could select another existing or new well in a particular zone to use for monitoring during implementation.

The management area plan examined the potential for dewatering of wells if groundwater levels declined to the minimum threshold values for domestic, production (which Department staff assume to be for agricultural production), and public supply wells. In total, the minimum thresholds will dewater 1 well in the Western Zone. In the context of the groundwater level minimum thresholds, the management area plan includes a brief description of an Impacted Well Mitigation Program to remedy well impacts through actions such as pump lowering, well deepening, well replacement, or alternative water sources but does not set a schedule for when this program would be implemented.[95]

[94] KGA GSP Westside District Authority MAP, p.141, 142, 221, 222, 226-231.
[95] KGA GSP Wheeler Ridge-Maricopa Water Storage District MAP, pp. 189-194, 207-209.

Corrective Action

y. As the KGA GSP Wheeler Ridge-Maricopa management area appears to rely, at least to some extent, on the Impacted Well Mitigation Program to justify its minimum thresholds, which allow for continued lowering of groundwater levels in some areas, provide specific details, including timeline for implementation, of the program. Describe the scope of the program and how users impacted by continued groundwater level decline, particularly early in implementation of the Plan, will be addressed.

KERN RIVER GSP

KRGSA Urban Management Area

The Kern River GSA subdivides the Urban Management Area into three subareas for the purposes of defining minimum thresholds and measurable objectives.

- For the "municipal wellfields" subarea, the GSP describes that groundwater providers, including the City of Bakersfield and California American Water (Cal Am) were significantly impacted by conditions in the 2015-2016 drought. The GSP states that, "given the economic impact, large number of municipal wells, and future risk to additional wells, the City has determined that the historic low water levels during Fall 2015 represent an undesirable result for the chronic lowering of water levels in the KRGSA Urban [management area municipal wellfields subarea]."
- For the "Northeast ENCSD Wellfield Subarea", the GSP states that the East Niles Community Services District (ENCSD) was, at the time of GSP preparation, working to consolidate several small water systems into its current system and therefore, anticipated increased pumping would be required. Thus, ENCSD requested the GSA set the minimum threshold 50 feet lower than historical lows observed in the 2013-2016 drought to account for the need to increase pumping.
- For the final area, the "Northwest Agricultural Wells", the GSA set the minimum threshold 20 feet below the historical lows observed in the 2013-2016 drought to account for the GSA's observation that wells in this area outside the municipal well fields were less sensitive to factors such as short-term lowering of water levels and increase well inefficiency.[96]

Department staff do not recommend any specific corrective actions at this time related to the KRGSA Urban Management Area definition of groundwater level minimum thresholds; however, see the corrective action for All GSPs below.

KRGSA Agricultural Management Area

The Kern River GSA subdivides the Agricultural Management Area into subareas for the purposes of defining minimum thresholds and measurable objectives.[97]

- For the "Urban Wells along the southern Urban MA Boundary" subarea, which includes portions of the management area with drinking water users near the Urban Management Area as well as the Greenfield CWD, the GSA set the

[96] Kern River GSP, pp. 276-279.
[97] Kern River GSP, pp. 279-282.

minimum threshold at the historical low water level from the 2013-2016 drought (the same approach used for municipal well areas in the KRGSA Urban Management Area).

- Similarly, for the "Small Water Systems in the Eastern Agricultural MA" subarea, which includes the Lamont PUD and Fuller Acres Mutual Water Company, the GSA also set the minimum threshold at the 2013-2016 low water level.
- Other portions of the Agricultural Management Area are predominantly used for agriculture or groundwater banking purposes, and the GSP provides reasonable descriptions for why those users require greater fluctuation in groundwater levels. The GSA sets the minimum threshold at 50 feet below the 2013-2016 low water level (Department staff note that, for some portions of this subarea, the GSA set groundwater-level-based proxies for land subsidence that were set at 20 feet below the historical low; the GSP states that the shallower groundwater levels used for subsidence will be the controlling level). The GSA also describes efforts to characterize, identify, and engage shallow well users in the agricultural subareas, and acknowledges the presence of some small water systems and domestic wells that could be impacted by groundwater management to the minimum threshold. Therefore, the GSA states that they include a management action related to identification and documentation of active wells in the management area. However, Department staff were unable to ascertain which of the management actions listed in the GSP specifically addressed this item.

Corrective Action

z. The Kern River GSP must provide clarification regarding the management action mentioned in the sustainable management criteria section of the GSP related to identification of well users, including domestic users and small water systems, in the agricultural subareas of the Agricultural Management Area.

KRGSA Banking Management Area

Kern River GSA describes that the Banking Management Area contains both groundwater banking recovery wells and municipal wells, and that the needs of both, which are at times opposed, were considered when setting the minimum thresholds. Subareas of the management area near sensitive municipal wells were assigned minimum thresholds of the low water level from the 2013-2016 drought, similar to other subareas in the GSP's management areas with municipal wells. In one area where the GSAs foresee that projects to recharge groundwater will likely protect municipal wells, the GSAs set the minimum threshold at 20 feet below the low water level from the 2013-2016 drought.

Department staff do not recommend any specific corrective actions at this time related to the KRGSA Banking Management Area definition of groundwater level minimum thresholds; however, see the corrective action for All GSPs below.[98]

[98] Kern River GSP, pp. 282-284.

BUENA VISTA GSP

Buttonwillow Management Area

The GSA started with a "worst case" (i.e., 'do nothing' or continue pre-SGMA operations) set of water levels based on an extrapolation of 2011-2018 groundwater level trends out to 2040 at each of its nine representative monitoring wells. These extrapolations resulted in water levels that ranged from 20 feet of decline, relative to 2016, to more than 350 feet of decline relative to 2016. The GSA established operational minimum thresholds by adjusting the "worst case" water levels relative to production well screen intervals (i.e., domestic, agricultural, and municipal wells), geologic conditions (i.e., confining layers and water quality), and recognition that the steeply declining "worst case" water level gradient represents conditions influenced by groundwater banking projects outside of the GSAs control. The GSA displayed each final minimum threshold on figures showing the depths of clay layers and nearby domestic well screens (as applicable), and the depth of the original "worst case" threshold. The figures indicate when specific domestic wells would be impacted if groundwater levels were to decline to the threshold level. Department staff note that, for one of the threshold wells (DMW 12b), the figures show that all three nearby domestic wells could be impacted if groundwater levels fall to the minimum threshold. The GSA acknowledges that, while the thresholds were developed to minimize loss of production from domestic and supply wells, they will also develop a mitigation plan that they state will be modeled on mitigation plans that have been approved by DWR for mitigating effects of groundwater substitution transfer pumping. The GSP further describes this Well Rehabilitation project, outlining the process by which owners of wells with diminished capacity can report a claim and, if the capacity reduction is verified to be due to groundwater level decline, measures can be enacted to rectify the situation.

Department staff do not recommend any corrective actions at this time related to the Buena Vista GSP Buttonwillow Management Area definition of groundwater level minimum thresholds; however, see the corrective action for All GSPs below.[99]

Maples Management Area

The Buena Vista GSP states that the Maples Management Area is an isolated area (relative to the rest of the Buena Vista GSP area) located within the Kern River GSA's GSP area. The Buena Vista GSP further states that the Maples Management Area "will follow the guidelines established by [the Kern River GSA] for setting [minimum thresholds] and [measurable objectives]." However, it does not appear that the Buena Vista GSP has actually set any minimum thresholds or measurable objectives for this area. The Buena Vista GSP does note that at least two wells have been routinely monitored and reported to the DWR CASGEM database, but Department staff did not find any evidence that sustainable management criteria had been developed for these wells, or any other wells in the Maples Management Area. The Kern River GSP acknowledges the "arrangement" regarding use of similar methodology with Maples Management Area but also does not contain minimum thresholds or other criteria for the Maples Management Area. This lack of any sustainable management criteria is

[99] Buena Vista GSP, pp. 126-151, 255.

problematic not only because it does not comply with the GSP Regulations, but also because the conditions under which an individual management area becomes a localized undesirable result are fundamental to the Subbasin's definition of an undesirable result occurring throughout the Subbasin. Without sustainable management criteria, it is not clear how an undesirable result could occur in the Maples Management Area.[100]

Corrective Action

aa. The Buena Vista GSP must be revised to include sustainable management criteria, including groundwater level minimum thresholds, for the Maples Management Area. Reference the specific methodologies from the Kern River GSP (of which there are several, depending on nearby beneficial uses and users, as noted herein) that guide development of the Maples Management Area's criteria and describe how those criteria are consistent with the requirements of the GSP Regulations. Department staff recommend providing similar detail regarding the hydrogeologic and beneficial user considerations as were provided for the Buttonwillow Management Area sustainable management criteria development.

HENRY MILLER GSP

Henry Miller GSP states that the minimum threshold groundwater level is 350 feet below ground surface. The GSP states "This [minimum threshold] is based on historical groundwater levels, the potential for a future decline in levels due to an extended drought period, and the well and pump information for the production wells. It is expected that if the [minimum threshold] is avoided, issues stemming from pump depth or the compaction of significant clay layers will be avoided preventing effects on other sustainability indicators." However, the GSP provides no further information or description (e.g., details of the well and pump information) for beneficial uses and users or evidence that groundwater level declines allowed by the thresholds would avoid compaction of significant clay layers. Based on figures in the GSP, it appears the minimum threshold represents a substantial reduction in groundwater levels relative to recent (i.e., 2011-2019) levels, which, at their lowest point, appear to be just over 250 feet below ground surface. Without any further description provided in the GSP, Department staff cannot evaluate whether these minimum thresholds are reasonable and substantially compliant with the GSP Regulations.[101]

Corrective Action

bb. The Henry Miller GSP must provide a sufficient description of the selection of groundwater level minimum thresholds, including how they represent site-specific levels of significant and unreasonable depletion of supply that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater

[100] Buena Vista GSP, pp. 125; Kern River GSP, p. 1173.
[101] Henry Miller GSP, pp. 155, 160.

quality and subsidence, both of which can be exacerbated by lowering groundwater levels.

OLCESE GSP

The Olcese GSP, located in the eastern extent of the Subbasin and covering just 0.2 percent of the Subbasin's land area, has identified minimum thresholds at two monitoring sites. Both are based on the elevation of the top of the respective well screens. One well is shallow and is described as the only domestic supply well in the GSP area. The other is described as the shallowest well screen in the principal Olcese Sand Aquifer. Given the size of this GSP area, setting the minimum thresholds in this manner (i.e., to protect saturation of the well screen of the single domestic supply well and the shallowest production well in the principal aquifer) appears to be a reasonable approach.[102]

Department staff do not recommend any corrective actions at this time related to the Olcese GSP definition of groundwater level minimum thresholds.

ALL GSPs

Corrective Action

cc. All the GSPs must demonstrate the relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the GSA has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.

The GSAs should address the specific corrective actions identified for the various GSPs and management area plans, as well as the corrective actions that apply to all the GSPs identified in Table 2. Where addressing those corrective actions includes modifications to the respective GSPs minimum thresholds, the GSPs should evaluate whether the Subbasin's 'with-projects' modeling scenarios still indicate that implementation of the projects and management actions would avoid minimum threshold exceedances. If not, the GSAs should modify their projects and management actions accordingly.

3.3 Deficiency 3. The Plan's land subsidence sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.

3.3.1 Background

SGMA defines undesirable results for land subsidence within the basin when significant and unreasonable subsidence is caused by groundwater conditions that substantially interferes with land uses.[103] When describing the sustainable management criteria for land subsidence, a plan must include the cause of the groundwater conditions that would

[102] Olcese GSP, pp. 142, 143.
[103] Water Code § 10721(x)(5); 23 CCR § 354.26(a).

lead or has led to the undesirable result;[104] the criteria that was used to define when and where the effects of the groundwater conditions cause undesirable results for subsidence;[105] and potential effects on the beneficial uses and users of groundwater, land uses, property interests that may occur or are occurring from undesirable results.[106]

The GSP Regulations state that minimum thresholds for land subsidence should identify the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. These quantitative values should be supported by:

- The identification of land uses or property interests potentially affected by land subsidence;
- An explanation of how impacts to those land uses or property interests were considered when establishing minimum thresholds;
- Maps or graphs showing the rates and extents of land subsidence defined by the minimum thresholds.[107]

The GSP Regulations allow the use of groundwater elevations as a proxy for land subsidence. However, GSAs must demonstrate a significant correlation between groundwater levels and land subsidence and must demonstrate that the groundwater level minimum threshold values represent a reasonable proxy for avoiding land subsidence undesirable results.[108]

Demonstration of applicability (or non-applicability) of sustainability indicators must be supported by best available information and science and should be provided in descriptions throughout the GSP (e.g., information describing basin setting, discussion of the interests of beneficial users and uses of groundwater).[109] For basins that establish management areas, undesirable results are required to be consistently defined throughout the Subbasin.[110]

3.3.2 Deficiency Details

The Coordination Agreement defines the Subbasin-wide undesirable result for land subsidence as:

> *The point at which significant and unreasonable impacts, as determined by a subsidence rate and extent in the basin, that affects the surface land uses or critical infrastructure. This is determined when subsidence results in significant and*

[104] 23 CCR § 354.26(b)(1).
[105] 23 CCR § 354.26(b)(2).
[106] 23 CCR § 354.26(b)(3).
[107] 23 CCR § 354.28(c)(5).
[108] 23 CCR § 354.28(d).
[109] 23 CCR § 354.26(d).
[110] 23 CCR § 354.20(a).

> *unreasonable impacts to critical infrastructure as indicated by monitoring points established by a basin wide coordinated GSP subsidence monitoring plan*.[111]

However, based on Department staff's review of the Plan, it is apparent that the Subbasin does not have a "basin wide coordinated GSP subsidence monitoring plan", nor any coordinated, Subbasin-wide subsidence sustainable management criteria or assessment of critical infrastructure that would be susceptible to substantial interference from future subsidence. While some of the individual GSPs and management area plans include some discussion of subsidence, there does not appear to be a Subbasin-wide approach.

The GSPs provide evidence of subsidence occurring throughout the Subbasin. For example, the KGA GSP highlights that a 2014 study states "[s]ubsidence is on-going and leading to significant impairment of the California Aqueduct and the Friant-Kern Canal."[112] The results of monitoring studies show that, from March 2015 to June 2016, there was measured subsidence between 4 to 8 inches in the north central and southern parts of the Subbasin, and "up to 12 inches of subsidence along CA [California] Aqueduct" between east of Buena Vista Pumping Plant and Wind Gap Pumping Plant from April 2014 to June 2016.[113] The KGA GSP does not address these findings within its discussion of undesirable results caused by subsidence, stating that there are "generally no significant impacts to infrastructure within the Subbasin."[114]

The KGA GSP also states that no minimum thresholds for subsidence have been established, identifying the lack of thresholds as a data gap and stating that their development will be addressed in a 2025 update to the GSP.[115] In reviewing the KGA GSP management area plans, some management areas did establish thresholds based on a rate or amount of subsidence,[116] others used groundwater levels as a proxy, [117] and some stated that subsidence didn't apply.[118] Of those that set thresholds, few provided sufficient explanation for selection of those thresholds as required by the GSP Regulations.

While Department staff do not dispute that KGA may have identified some monitoring data gaps, Department staff do not believe that it is appropriate to set aside development of sustainable management criteria for an entire sustainability indicator that, by the information presented in the GSP, appears to be applicable (i.e., it is occurring and could

[111] Kern County Subbasin Coordination Agreement, p. 300.
[112] KGA GSP, p. 150.
[113] KGA GSP, p. 150.
[114] KGA GSP, p. 192.
[115] KGA GSP, pp. 192, 196.
[116] KGA GSP Arvin-Edison WSD MAP, p. 224; KGA GSP Kern County Water Agency Pioneer MAP, p. 150; KGA GSP Rosedale-Rio Bravo WSD MAP, p. 78; KGA GSP West Kern WD MAP, p. 185; KGA GSP Wheeler-Ridge Maricopa WSD MAP, p. 201.
[117] KGA GSP Cawelo WD MAP, pp. 172-173; KGA GSP Kern-Tulare WD MAP, p. 71; KGA GSP North Kern WSD and Shafter-Wasco ID MAP, p. 226; KGA GSP Semitropic WSD MAP, pp. 173-174; KGA GSP Southern San Joaquin MUD MAP, p. 175; KGA GSP Tejon-Castac WD MAP, pp. 100, 103.
[118] KGA GSP Eastside WMA MAP, pp. 89-90; KGA GSP Kern Water Bank Authority MAP, p. 40; KGA GSP Shafter-Wasco ID 7th Standard MAP, p. 152; KGA GSP Westside District WA, p. 142.

substantially interfere with land surface uses). Lack of monitoring in some areas, or lack of identification of the specific parties whose pumping is responsible for subsidence, would not prevent the Subbasin from developing a management strategy for subsidence. For example, the GSAs could have identified that their management strategy was to avoid further land subsidence, consistent with the legislative intent of SGMA,[119] and set their measurable objective to zero additional active subsidence and their minimum thresholds commensurate with the expected residual or delayed subsidence.

In addition, the Olcese GSP does not establish sustainable management criteria for subsidence because they do not consider their conveyance canals as "critical infrastructure" and have not observed subsidence along Highway 178.[120] A robust discussion justifying the lack of sustainable management criteria is not provided for Olcese GSP.

Department staff conclude that the Plan, including the Coordination Agreement and all GSPs, should be revised to present a Subbasin-wide management approach for subsidence that includes the elements required by SGMA and the GSP Regulations. The Plan should include clearly defined undesirable and appropriate minimum thresholds and measurable objectives. Department staff note that the Department provides aerial, remotely sensed subsidence data that may be used by GSAs in their monitoring and development of sustainable management criteria.

Because the Plan lacks a coordinated, Subbasin-wide management approach for subsidence, Department staff cannot meaningfully and completely review the fragmented approaches to establish sustainable management criteria for subsidence in the various GSPs and management area plans. However, staff do note that some appear to use their minimum thresholds and measurable objectives developed for chronic lowering of groundwater levels as proxy criteria for subsidence, but do not include the required demonstration showing that the values developed for chronic lowering of groundwater levels are reasonable proxies for the amount of land subsidence that would substantially interfere with surface land uses.[121] While that required demonstration may be relatively straight forward for areas that choose to limit groundwater level lowering to no worse than historical levels, thereby limiting the likelihood of future subsidence, areas that propose to allow additional groundwater lowering, below historical lows, should thoroughly show that the allowed lowering of groundwater levels would not lead to land subsidence undesirable results.

3.3.3 Corrective Action 3

The Subbasin's GSAs should coordinate and collectively satisfy the requirements of SGMA and the GSP Regulations to develop the sustainable management criteria for land subsidence. The GSPs should document the conditions for undesirable results for which the GSAs are trying to avoid, supported by their understanding of land uses and critical infrastructure in the Subbasin and the amount of subsidence that would substantially

[119] Water Code § 10720.1(e).
[120] Olcese GSP, pp. 139, 145.
[121] 23 CCR §§ 354.28(d), 354.30(d).

interfere with those uses. The revised Plan, and component GSPs and management areas, should identify the rate and extent of subsidence corresponding with substantial interference that will serve as the minimum threshold, or should thoroughly demonstrate that another metric can serve as a proxy for that rate and extent. As described in Deficiency 1, the Coordination Agreement should be revised to clearly identify the undesirable result parameters for each of the GSPs, management areas, and management area plans so it is clear how the various plans work together at the Subbasin level.

The revised Plan should explain how implementing projects and management actions proposed in the various GSPs is consistent with avoiding subsidence minimum thresholds, sufficient to avoid substantial interference, similar to the original Plan's assessment of whether implementation would avoid undesirable results for groundwater levels.

If land subsidence is not applicable to parts of the Subbasin, the GSPs must provide supported justification of such.[122] The supporting information must be sufficiently detailed and the analyses sufficiently thorough and reasonable and must be supported by the best available information and best available science.

[122] 23 CCR §§ 354.28(e), 354.26(d).

4 STAFF RECOMMENDATION

Department staff believe that the deficiencies identified in this assessment should preclude approval of the Plan for the Kern County Subbasin. Department staff recommend that the Plan be determined incomplete.

Appendix B-2: SWRCB Resolution 2025-0007

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2025-0007

CONTINUATION OF HEARING REGARDING DESIGNATION OF THE KERN COUNTY GROUNDWATER SUBBASIN AS PROBATIONARY UNDER THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

WHEREAS:

1. Groundwater provides a significant portion of California's water supply, making up more than one-half of the water used by Californians in drought years when surface water is limited. Properly managed groundwater resources can provide for communities, farms, and the environment and help protect against prolonged dry periods and climate change, preserving water supplies for existing and potential beneficial uses. However, excessive groundwater extraction can cause long-term overdraft, failed wells, deteriorated water quality, environmental damage, and irreversible land subsidence that damages infrastructure and diminishes the capacity of aquifers to store water for the future, all of which can have substantial societal and economic impacts. Additionally, failure to manage groundwater to prevent long-term overdraft can potentially infringe on rights to or use of groundwater or interconnected surface water.

2. In 2014, the State of California enacted Assembly Bill 1739, and Senate Bills 1168 and 1319, collectively referred to as the Sustainable Groundwater Management Act (SGMA). SGMA is intended to ensure the proper and sustainable management of groundwater resources in California.

3. The State Water Resources Control Board (State Water Board or Board) recognizes that near-term SGMA implementation has the potential to result in substantial economic impacts in overdrafted basins. The State Water Board further recognizes that the goal of SGMA is sustainable groundwater management that will ensure the long-term viability of groundwater resources for future use by communities, farms, businesses, and the environment.

4. SGMA allows local public agencies overlying alluvial groundwater basins to form Groundwater Sustainability Agencies (GSAs) and prepare and implement Groundwater Sustainability Plans (GSPs) to achieve sustainable management of the basin. SGMA requires that groundwater basins determined to be high or medium priority by the Department of Water Resources (Department) must do so.

5. SGMA requires GSAs, whose planning and management actions can have broad impacts within their basins, to consider the interests of all beneficial uses and users of groundwater and to encourage the active involvement of diverse elements of the population of a groundwater basin during the development and implementation of GSPs.

6. SGMA recognizes that groundwater management is best accomplished locally; however, if local agencies in a high or medium priority groundwater basin fail to form a GSA or prepare a GSP, or the Department determines that the GSP is inadequate or not being implemented in a way that is likely to achieve SGMA's sustainability goal, SGMA authorizes the State Water Board to intervene in the basin to ensure that the basin is managed sustainably. This is called the state intervention process.

7. To implement SGMA's state intervention process, the State Water Board may designate a basin as probationary. If the State Water Board designates a basin as probationary, it must identify the deficiencies in the GSP, identify potential actions to remedy the deficiencies, and exclude from probationary status any portion of a basin for which a GSA demonstrates compliance with SGMA's sustainability goal. The State Water Board may exclude a class or category of extractions from the reporting and fee requirement that applies to probationary basins under Water Code section 5202 if those extractions are adequately managed under an applicable plan or program or are likely to have a minimal impact on basin withdrawals.

8. The deadline for GSAs in critically overdrafted high- and medium-priority basins to adopt and submit GSPs for review by the Department was January 31, 2020.

9. The Kern County Subbasin is a critically overdrafted high-priority basin.

10. As of the date of this resolution, the Department recognizes the following GSAs for the Kern County Subbasin: Arvin Groundwater Sustainability Agency, Buena Vista Water Storage District Groundwater Sustainability Agency, Cawelo Water District Groundwater Sustainability Agency, Greenfield County Water District Groundwater Sustainability Agency, Henry Miller Water District Groundwater Sustainability Agency, Kern Groundwater Authority Groundwater Sustainability Agency, Kern River Groundwater Sustainability Agency, Kern Water Bank Groundwater Sustainability Agency, Kern-Tulare Water District Groundwater Sustainability Agency - Kern County, North Kern Water Storage District Groundwater Sustainability Agency, Olcese Water District Groundwater Sustainability Agency, Pioneer Groundwater

Sustainability Agency, Rosedale-Rio Bravo Water Storage District Groundwater Sustainability Agency, Semitropic Water Storage District Groundwater Sustainability Agency, Shafter-Wasco Irrigation District Groundwater Sustainability Agency, Southern San Joaquin Municipal Utility District Groundwater Sustainability Agency, Tejon-Castac Water District Groundwater Sustainability Agency, West Kern Water District Groundwater Sustainability Agency, Westside District Water Authority Groundwater Sustainability Agency, Wheeler Ridge-Maricopa Groundwater Sustainability Agency (collectively, the Kern County Subbasin GSAs[1]).

11. The Kern County Subbasin GSAs submitted the Kern County Subbasin 2020 GSPs to the Department for review between January 22 and 30, 2020.

12. On January 28, 2022, the Department issued a determination that the Kern County Subbasin 2020 GSPs were incomplete and provided the Kern County Subbasin GSAs with 180 days to address the deficiencies identified in the incomplete determination.

13. The Kern County Subbasin GSAs submitted Revised Kern County Subbasin GSPs to the Department for review on July 27, 2022.

14. The Department evaluated the Revised Kern County Subbasin GSPs and on March 2, 2023, issued its "Inadequate Determination of the Revised 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kern County Subbasin" which is available on the Department's online SGMA portal.

15. The State Water Board reviewed the Kern County Subbasin 2022 GSPs and the Department's determination of inadequacy, and Board staff prepared a draft staff report that described the GSPs' deficiencies, recommended potential actions that GSAs could take to remedy the deficiencies, and supported designating the Kern County Subbasin as a probationary basin under SGMA.

[1] The number of GSAs in the Kern County Subbasin has changed at different times between the initial submission of GSPs to the Department in January 2020 and the most recent submission of GSPs to the State Water Board in December 2024. The 2024 Kern County Subbasin GSPs identify Kern Non-Districted Lands Authority Groundwater Sustainability Agency to replace Kern Groundwater Authority Groundwater Sustainability Agency.

16. On May 29, 2024 the Kern County Subbasin GSAs submitted the 2024 Draft GSPs to the State Water Board for review.

17. On July 25, 2024, the State Water Board made the draft staff report available to the public and issued notice of public staff workshops, opportunities to comment on the draft staff report, and the date of the board hearing for the proposed designation of the Kern County Subbasin as a probationary basin.

18. When issuing the notice, the State Water Board posted the notice on its website and sent the notice by electronic mail to its SGMA email listserv, to the Department, to each city and county within which any part of the Kern County Subbasin is situated, and to the points of contact for each of the Kern County Subbasin GSAs.

19. On July 26, 2024, the State Water Board mailed the notice to all persons known to the Board who extract or who propose to extract water from the basin.

20. The public comment period for the probationary hearing notice and draft staff report ran from July 26, 2024, to September 23, 2024.

21. The State Water Board staff held informational workshops on August 26, 2024, and August 29, 2024, to explain the draft staff report, share more about how to participate in the State Water Board's state intervention process, and accept verbal public comments regarding the draft staff report.

22. The Kern County Subbasin GSAs submitted the 2024 Final GSPs, which were adopted by all 20 GSAs, to the State Water Board for review on December 16, 2024.

23. State Water Board staff, after reviewing and considering comments made at the workshops and submitted during the public comment period, and reviewing the 2024 Draft GSPs and 2024 Final GSPs, revised and finalized the staff report, which supports the staff recommendation that the State Water Board designate the Kern County Subbasin as a probationary basin under SGMA.

24. The State Water Board reviewed and considered the draft staff report, final staff report, and comments received during the public comment period and at the probationary hearing.

25. The State Water Board acknowledges and appreciates the efforts of the - Subbasin GSPs, including continued constructive engagement with State Water Board staff on technical information and approaches to remedy deficiencies, but these efforts have not yet been sufficient to rectify deficiencies in the GSPs. Based on this review and consideration, the State Water Board is continuing the hearing regarding designating the Kern County Subbasin as a probationary basin under SGMA.

26. The State Water Board, in balancing the need for state intervention in the basin, potential harm to beneficial users and uses, and the likelihood that the Kern County Subbasin GSAs are capable of promptly rectifying the remaining deficiencies, is requesting that the Kern County GSAs submit revised GSPs to the State Water Board by a date certain. This is to serve the dual purposes of ensuring the GSAs maintain progress in correcting identified deficiencies in their GSPs, with the appropriate urgency for implementing plans that will achieve sustainable groundwater management in the subbasin on the statutory timeline and providing time for adequate Board review of updated submittals in advance of further Board consideration of a potential probationary designation at the continued hearing.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Finds that the Kern County Subbasin is subject to Water Code section 10720.7, subdivision (a)(1), and that the Department, in consultation with the State Water Board, has determined that the groundwater sustainability plans for the Kern County Subbasin are inadequate.

2. Requires that the Kern County Subbasin GSAs provide revised draft GSPs, if any, to State Water Board staff by June 20, 2025, in order to allow time for State Water Board members and staff to evaluate and consider those revised draft GSPs in advance of the continued hearing.

3. Continues the hearing to September 17, 2025, at 9:00 a.m. in the California Environmental Protection Agency Headquarters Building, 1001 I Street, 2nd Floor, Sacramento, California 95814.

4. As a condition of granting this continuance,

    a. expects the GSAs to enhance community outreach and engagement so that impacted communities, including customers of drinking water systems within the Kern County Subbasin, receive information about the GSPs' impact on their systems;

    b. expects that the GSAs will work with local community groups to create and to implement a plan for additional community outreach in making and adopting revisions to the GSPs; and

    c. expects the GSAs to provide, no later than one month from the date of adoption of this resolution, Board staff with plans for community outreach in amending their GSPs, and to include in any submittals to the Board by June 20, 2025, a description of the GSAs' actions in furtherance of this resolved paragraph.

5. Directs staff to provide notice and opportunity for public comment on any revised or newly submitted GSPs as soon as practicable after receipt, and at least 30 days before September 17, 2025.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 20, 2025.

AYE:	Chair E. Joaquin Esquivel Board Member Sean Maguire Board Member Laurel Firestone Board Member Nichole Morgan
NAY:	None
ABSENT:	Vice Chair Dorene D'Adamo
ABSTAIN:	None

Courtney Tyler
Clerk to the Board

Appendix B-3: 2024 Crosswalk Summary of Subbasin Meetings with SWRCB Staff and Plan Additions

Crosswalk Summary of Kern Subbasin Meetings with SWRCB Staff and Plan Additions

Meeting Date	Topic	Summary / Outcome	Plan Section
3/30/2023	DWR – SWRCB Handoff	Kern Subbasin GSAs sought clarification on the SWRCB intervention process and timeline for probationary hearing. *SWRCB staff expressed their intention to focus on the DWR deficiencies. Staff encouraged technical meetings throughout the process to support the Kern Subbasin to exit the SWRCB process.*	*N/A*
5/17/2023	Plan Manager Introduction and Kern Subbasin GSA Questions	Kern Subbasin GSAs introduced the Plan Manager and TWG, asked questions on GSP format, potential for additional deficiencies, and requirements for a Periodic Evaluation. *SWRCB staff emphasized that consolidation of GSPs would facilitate a comprehensive and coordinated Subbasin-wide approach and indicated a preference for demand management actions to meet the sustainability goal.* In response, GSAs reconsidered Plan structure, striving for the majority of the Kern Subbasin to be included under one plan. GSAs initiated plans to expand demand reduction P/MAs.	Section 5 Section 14
6/23/2023	Technical Meeting #1 – Chronic Lowering of Groundwater Levels SMCs	The TWG presented background on the Basin, banking programs, chronic lowering of groundwater level minimum thresholds (MTs), well inventory and well impacts, and P/MAas. *SWRCB staff continued to emphasize their preference for a single, Subbasin-wide plan. Staff stressed that MTs at levels lower than 2015 would require justification, requested analyses of additional wells, and voiced skepticism regarding the availability of "new water" sources as Projects to meet the sustainability goal.* In response, GSAs initiated a well inventory update to improve identification of beneficial users and revised the UR definition to include dewatered drinking water wells.	Section 1.3.1 Section 5.6.1 Section 11.1 Section 13.1.1.1 Section 13.1.1.4
10/4/2023	Technical Meeting #2 – Chronic Lowering of Groundwater Levels SMCs	The TWG presented the revised chronic lowering of groundwater levels SMCs to address DWR deficiencies #1 and #2, including undesirable results (URs) definition, MTs, and measurable objectives (MOs). *SWRCB staff's feedback was generally positive on methodologies, noted the much-improved coordination; however, requested additional analyses and justification on the relationship between MTs and URs definition.* In response, GSAs expanded the justification for Chronic Lowering of Groundwater Levels SMCs to include a suite of five separate drinking water well impacts analyses and a "depletion of supply" calculation.	Section 13.1.1.4 Section 13.1.2.4
11/1/2023	Technical Meeting #3 - Chronic Lowering of Groundwater Levels SMCs	The TWG presented follow up justification on chronic lowering of groundwater levels proposed MTs and URs definition including an expanded analysis of drinking water well and "depletion of supply" impacts. *SWRCB staff feedback was generally positive and appreciative of the detailed work to evaluate multiple MT methodologies, refine the UR definition, and to assess potential well and water supply impacts. SWRCB staff acknowledged that the existing DWR well database has limitations and agreed with the Kern Subbasin's ongoing efforts to reconcile with other datasets and sustainability indicators.*	Section 13.1.2.2 Section 13.3.2.2 Section 13.5.2.2

Meeting Date	Topic	Summary / Outcome	Plan Section
		In response, GSAs initiated an analysis to assess Chronic Lowering of Groundwater Level SMCs inter-relationship with Land Subsidence and Degraded Water Quality SMCs.	
12/13/2023	Technical Meeting #4 – Land Subsidence SMCs	The TWG presented land subsidence SMCs proposed approach to address DWR deficiency #3. *SWRCB staff requested clarification on the "SGMA" and "non-SGMA" nomenclature used to identify subsidence causes within and outside of the GSAs authority to address (now referred to as GSA-related and non-GSA causes), and that GSAs consider establishing SMCs for the entire Kern Subbasin, not just along critical infrastructure.* In response, GSAs clarified definitions for the potential causes of subsidence with the GSAs authority and outside the GSAs authority to manage and established Land Subsidence SMCs across the entire Kern Subbasin.	Section 8.5.2 Section 13.5 Section 13.5.2.1
1/24/2024	Technical Meeting #5 – Degraded Water Quality SMCs	The TWG presented degraded water quality SMCs proposed approach. *SWRCB staff expressed their preference for a more robust representative monitoring network, indicated their preference that SMCs be established for all identified constituents included in their November 2022 letter, and requested additional detail on potential subsidence and P/MAs impacts on water quality.* In response, GSAs expanded the representative monitoring network for water quality, expanded constituents with SMCs to include 1,2,3-TCP, nitrite, and uranium, and examined the potential relationship between arsenic concentrations and land subsidence.	Section 8.4 Section 13.1.1.4 Section 13.3.2.2. Section 13.5.2.2 Section 15.2.4
3/6/2024	Technical Meeting #6 – Well Inventory & Well Mitigation Program	The TWG presented the process and results of the well inventory which identifies beneficial users of groundwater and the structure of the Kern Subbasin Well Mitigation Program. *SWRCB staff stated that they would not recommend a subbasin to exit the probationary process until GSAs had a funded and operational Mitigation Program.* In response, GSAs expedited the timeframe for developing a Well Mitigation Program framework, to be operational by January 2025.	Section 14.2.3 Appendices
4/3/2024	Technical Meeting #7 – Monitoring Networks and SMCs Approach	The TWG presented the SGMA monitoring networks and the revised SMCs approaches for applicable Sustainability Indicators and outlined how these revisions addressed DWR deficiencies and incorporated SWRCB staff feedback. *SWRCB staff suggested a plan for filling potential monitoring data gaps, acknowledged the significant improvement to the revised Subbasin-wide UR definitions, and recommended that analysis of Depletions of Interconnected Surface Waters be made more robust even though it was not identified by DWR as a deficiency and DWR has not issued complete guidance documents.* In response, GSAs expanded the representative monitoring network and identified data gaps, increased water quality sampling frequency to semi-annual, revised the UR definition for Degraded Water Quality, and expanded Depletions of Interconnected Surface Waters description to include ICONS dataset.	Section 8.6 Section 11.1 Section 13.3.1 Section 15.2.1 Section 15.2.4 Section 15.5.1 Appendices

Meeting Date	Topic	Summary / Outcome	Plan Section
4/23/2024	Technical Meeting #8 – Water Budgets, P/MAs, and Water Banking Approach	The TWG presented the water budget approach to estimate projected future conditions, P/MAs and how estimated benefits exceed the projected deficit, and three example water banking approaches within the Kern Subbasin. Kern Subbasin GSA representatives also sought clarification from SWRCB staff as to whether an entity could still apply for a "good actor" exception if they were part of a single GSP. *SWRCB staff asked numerous questions regarding water banking operations and accounting and requested additional considerations of extreme climate change and recent SWRCB policies affecting delta in-stream flows be included in the projected water budget and expressed concerns with having both a Subbasin-wide P/MAs section and 20 individual GSA-specific P/MAs sections within the 2024 Plan. The SWRCB stated that a management area within a GSP could apply for the good actor exemption.* In response, GSAs summarized all planned P/MAs and expected benefits by category on the Subbasin-wide level and moved GSA-specific details on P/MAs as supporting appendices.	Section 14 Appendices
5/29/2024	Technical Meeting #9 – 2024 Plan Overview	The TWG presented an overview of the highly coordinated 2024 Plan.	*N/A*
9/26/2024	Technical Meeting #10 – Basin Setting, HCM, and Monitoring Network	The TWG presented information and refined analysis related to 1) Kern Subbasin basin setting and HCM Areas, 2) understanding of unconfined and confined zones, 3) groundwater level monitoring network, and 4) well inventory.	Sections 6-8 Section 10 Section 15
10/01/2024	Technical Meeting #11 – Well Inventory	The TWG presented information related to the development of the Kern Subbasin well inventory, including DWR recommendations, initial record review and parsing, record cleanup, and data gap filling process and well registry.	Section 13
10/31/2024	Technical Meeting #12 – Groundwater Level SMCs and Monitoring Network	The TWG presented information and additional analysis related to 1) groundwater level monitoring network and 2) groundwater level SMCs. An overview of the proposed Kern Subbasin Exceedance Policy and Well Mitigation Program were provided for discussion.	Section 5 Section 13 Section 15 Appendices
11/05/2024	Technical Meeting #13 – ISWs and Groundwater Quality SMCs	The TWG presented information and additional analysis related to 1) interconnected surface waters and 2) groundwater quality SMCs.	Section 5 Section 8 Section 13 Section 15
11/07/2024	Technical Meeting #14 - Subsidence	The TWG presented information and additional analysis related to 1) nexus between Kern Subbasin HCM Areas and subsidence, 2) revisions to the subsidence SMC approach, 3) understanding of InSAR data and methodology.	Section 5 Section 13

Meeting Date	Topic	Summary / Outcome	Plan Section
11/21/2024	Technical Meeting #15 – Mitigation Program, Monitoring Network, and Groundwater Level SMCs	The TWG presented the Kern Subbasin's proposed Well Mitigation Program, including a program overview, application process, appeals process, funding mechanism and budget, and public outreach. The TWG also presented refined information and analysis related to the Kern Subbasin's proposed groundwater level monitoring network and groundwater level SMCs.	Section 5 Section 13 Section 15
12/09/2024	Technical Meeting #16 – Water Banking	The TWG presented information related to 1) water banking fundamentals and 2) Kern Subbasin banking project examples.	Section 9 Section 14 Appendices

Appendix B-4: 2024 Crosswalk Summary of Major Plan Updates in Response to DWR Corrective Actions

TABLE OF CONTENTS

Tables

B-4 DOCUMENTATION OF 2024 PLAN REVISIONS

Reader note: This document was prepared for an earlier version of the Kern County Subbasin Groundwater Sustainability Plan (GSP) and may not reflect the data or information presented in the 2025 Final Plan. It is provided here for reference.

B-4.1 Background

Pursuant to the SGMA Regulations, five Groundwater Sustainability Plans coordinated through the Kern County Subbasin Coordination Agreement dated January 20, 2020, were submitted to the Department of Water Resources (DWR) for the Kern Subbasin by the January 2020 deadline (referred to herein as the "2020 GSPs"). DWR responded with an *Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kern County Subbasin"* (January 28, 2022) (referred to herein as "*Incomplete Determination*"), listing the following deficiencies:

1. The 2020 GSPs do not establish undesirable results that are consistent for the entire Subbasin.
2. The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Emergency Regulations.
3. The Kern Subbasin's land subsidence sustainable management criteria do not satisfy the requirements of SGMA and the GSP Emergency Regulations.

As stipulated in the *Incomplete Determination* letter, the Kern Subbasin GSAs were directed to address the above DWR Deficiencies through recommended Corrective Actions provided in the 2020 GSPs Assessment Staff Report within 180 days, by July 27, 2022. The *Incomplete Determination* letter and 2020 GSPs Assessment Staff Report can be downloaded at https://sgma.water.ca.gov/portal/service/gspdocument/download/7785. The Kern Subbasin GSAs amended the 2020 GSPs and Kern County Subbasin Coordination Agreement and responded with six amended GSPs (referred to herein as the "2022 GSPs").

After reviewing the 2022 GSPs, DWR issued its "*Inadequate Determination of the Revised 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kern County Subbasin"* (March 2, 2023) (referred to as "*Inadequate Determination*") in March 2023. In its findings, DWR stated that "Although the [2022 GSPs] made progress toward explaining a coordinated approach to sustainable groundwater management, especially regarding the development of consistent terminology, Department staff continue to find the Plan difficult to evaluate in terms of whether or not implementation

will likely achieve the sustainability goals for the Subbasin." Because it was determined that the Kern Subbasin GSAs did not take sufficient action to correct the DWR Deficiencies, primary jurisdiction shifted from DWR to the State Water Resources Control (SWRCB). The *Inadequate Determination* letter and attached Statement of Findings can be downloaded at https://sgma.water.ca.gov/portal/service/gspdocument/download/9588.

Because it was determined that the Subbasin GSAs did not take sufficient action to correct the DWR Deficiencies, primary jurisdiction shifted from DWR to the SWRCB per California Water Code (CWC) § 10735 et seq. Under this statute, the SWRCB may designate a basin as "probationary" after holding a public hearing and making certain findings (CWC § 10735.2(a)). If the SWRCB designates a basin as probationary, it must identify specific deficiencies and potential actions to address deficiencies. The GSA(s) then has one year to remedy the SWRCB identified deficiencies that resulted in the probationary designation before the SWRCB will develop an interim plan (CWC § 10735.6).

In response to the *Inadequate Determination* letter, the Kern Subbasin GSAs reorganized and substantially revised their plans into one consolidated GSP with six supplementary GSPs, referred to as the 2024 Plan. The 2024 Plan focuses on addressing deficiencies identified in DWR's *Inadequate Determination* letter. The GSAs collectively submitted the 2024 Plan to the SWRCB in May 2024 as draft pending public review and further consultation with SWRCB staff (referred to herein as the "Draft 2024 Plan").

In July 2024, the SWRCB issued preliminary review of the Draft 2024 Plan in a *Kern County Subbasin Probationary Hearing Draft Staff Report* (referred to as "Draft Staff Report"). The Draft Staff Report provided a detailed review of the 2020 GSPs and the 2022 GSPs, and a preliminary review of the Draft 2024 Plan. The *Draft Staff Report* recommended designating the Subbasin as probationary, incorporating the DWR directives and identifying five additional deficiencies, as follows:

1. Coordination across the Kern Subbasin and GSAs
2. Chronic lowering of groundwater levels with insufficient management criteria
3. Continued land subsidence (sinking)
4. Further degradation of groundwater quality
5. Depletion of interconnected surface water

The Kern Subbasin GSAs adopted the 2024 Plan in December 2024 (referred to herein as the "Final 2024 Plan") addressing deficiencies identified by DWR and the SWRCB staff in the *Draft Staff Report*.

In response to DWR's *Inadequate Determination* and SWRCB's Draft Staff Report, and prior to the Subbasin's probationary hearing, the Subbasin GSAs (through development, adoption, and submission of the Final 2024 Plan) made substantial progress to address

the deficiencies and implement the Corrective Actions outlined by DWR and later by SWRCB.

B-4.2 Coordination

DWR and SWRCB perceived a lack of consistency and coordination among the GSPs for the Kern Subbasin. Each of the three DWR Deficiencies described in the *Incomplete Determination* fully or partially focused on this lack of consistency. In the *Inadequate Determination* letter, DWR noted that appreciable efforts and progress had been made to address each of the three DWR Deficiencies identified in the *Incomplete Determination*; however, concerns still remained regarding the cohesion and coordination of the plans. For example, DWR staff commented that: “the fragmented management area approach to groundwater management, particularly in establishing minimum thresholds and measurable objectives, undermines the GSAs ability to clearly define the Subbasin-wide significant and unreasonable effects they hope to avoid” (Deficiency # 1, Inadequate Determination, page 22); “the approaches used for developing chronic lowering of groundwater levels minimum thresholds and the level of analysis to support those approaches, is disparate across the various plans” (Deficiency #2, Inadequate Determination, page 40); “the Plan does not provide a coordinated, complete analysis of how the respective minimum thresholds could affect the conveyance operations of the California Aqueduct or Friant-Kern Canal” (Deficiency #3, Inadequate Determination, page 52); and “the Subbasin still does not have a Subbasin-wide approach for managing subsidence because of the differing data and methodologies used to establish Management Area Critical Infrastructure and corresponding sustainable management criteria” (Deficiency #3, Inadequate Determination, page 54).

B-4.2.1 Stakeholder Engagement

Four public comment letters were received on the Draft 2024 Plan. Public comment letters and responses are provided in Appendix AA of the Final 2024 Plan.

B-4.2.1.1 Consultation with SWRCB Staff

The Kern Subbasin consulted with SWRCB staff through November 2024 during the 2024 Plan development progress. As summarized in Table 1, the GSAs participated in 17 technical meetings with SWRCB staff through November 2024 to provide updates and seek input on the Kern Subbasin’s coordinated response to the DWR and SWRCB Potential Actions to Correct the Deficiencies received prior to November 2024, including technical justifications for SMCs and Kern Subbasin 2024 Plan revisions. Revisions to the Draft 2024 Plan in response to feedback received at SWRCB staff meetings are summarized below. In addition, the Plan Manager led ongoing communication efforts with SWRCB staff and Board Members seeking clarification on issues related to 2024 Plan review schedule and process, whether the “Good Actor” exclusion required

submittal of individual GSPs, and to reiterate the Kern Subbasin GSAs anticipated Final 2024 Plan submittal date. These communications requested that SWRCB staff focus their review on the Draft and Final 2024 Plans, and not previous GSP versions.

Table 1. 2024 Plan Crosswalk Summary of Kern Subbasin Meetings with SWRCB Staff and Plan Additions

Meeting Date	Topic	Summary / Outcome	Plan Section
3/30/2023	DWR – SWRCB Handoff	Kern Subbasin GSAs sought clarification on the SWRCB intervention process and timeline for probationary hearing. *SWRCB staff expressed their intention to focus on the DWR deficiencies. Staff encouraged technical meetings throughout the process to support the Kern Subbasin to exit the SWRCB process.*	*N/A*
5/17/2023	Plan Manager Introduction and Kern Subbasin GSA Questions	Kern Subbasin GSAs introduced the Plan Manager and TWG, asked questions on GSP format, potential for additional deficiencies, and requirements for a Periodic Evaluation. *SWRCB staff emphasized that consolidation of GSPs would facilitate a comprehensive and coordinated Subbasin-wide approach and indicated a preference for demand management actions to meet the sustainability goal.* • In response, GSAs reconsidered Plan structure, striving for the majority of the Kern Subbasin to be included under one plan. GSAs initiated plans to expand demand reduction P/MAs.	Section 5 Section 14
6/23/2023	Technical Meeting #1 – Chronic Lowering of Groundwater Levels SMCs	The TWG presented background on the Basin, banking programs, chronic lowering of groundwater level minimum thresholds (MTs), well inventory and well impacts, and P/MAs. *SWRCB staff continued to emphasize their preference for a single, Subbasin-wide plan. Staff stressed that MTs at levels lower than 2015 would require justification, requested analyses of additional wells, and voiced skepticism regarding the availability of "new water" sources as Projects to meet the sustainability goal.* • In response, GSAs initiated a well inventory update to improve identification of beneficial users and revised the UR definition to include dewatered drinking water wells.	Section 1.3.1 Section 5.6.1 Section 11.1 Section 13.1.1.1 Section 13.1.1.4
10/4/2023	Technical Meeting #2 – Chronic Lowering of Groundwater Levels SMCs	The TWG presented the revised chronic lowering of groundwater levels SMCs to address DWR deficiencies #1 and #2, including undesirable results (URs) definition, MTs, and measurable objectives (MOs). *SWRCB staff's feedback was generally positive on methodologies, noted the much-improved coordination; however, requested additional analyses and justification on the relationship between MTs and URs definition.* • In response, GSAs expanded the justification for Chronic Lowering of Groundwater Levels SMCs to include a suite of five separate drinking water well impacts analyses and a "depletion of supply" calculation.	Section 13.1.1.4 Section 13.1.2.4
11/1/2023	Technical Meeting #3 - Chronic Lowering of Groundwater Levels SMCs	The TWG presented follow up justification on chronic lowering of groundwater levels proposed MTs and URs definition including an expanded analysis of drinking water well and "depletion of supply" impacts. *SWRCB staff feedback was generally positive and appreciative of the detailed work to evaluate multiple MT methodologies, refine the UR definition, and to assess potential well and water supply impacts. SWRCB staff acknowledged that the existing DWR well*	Section 13.1.2.2 Section 13.3.2.2. Section 13.5.2.2

Meeting Date	Topic	Summary / Outcome	Plan Section
		database has limitations and agreed with the Kern Subbasin's ongoing efforts to reconcile with other datasets and sustainability indicators. • In response, GSAs initiated an analysis to assess Chronic Lowering of Groundwater Level SMCs inter-relationship with Land Subsidence and Degraded Water Quality SMCs.	
12/13/2023	Technical Meeting #4 – Land Subsidence SMCs	The TWG presented land subsidence SMCs proposed approach to address DWR deficiency #3. *SWRCB staff requested clarification on the "SGMA" and "non-SGMA" nomenclature used to identify subsidence causes within and outside of the GSAs authority to address (now referred to as GSA-related and non-GSA causes), and that GSAs consider establishing SMCs for the entire Kern Subbasin, not just along critical infrastructure.* • In response, GSAs clarified definitions for the potential causes of subsidence with the GSAs authority and outside the GSAs authority to manage and established Land Subsidence SMCs across the entire Kern Subbasin.	Section 8.5.2 Section 13.5 Section 13.5.2.1
1/24/2024	Technical Meeting #5 – Degraded Water Quality SMCs	The TWG presented degraded water quality SMCs proposed approach. *SWRCB staff expressed their preference for a more robust representative monitoring network, indicated their preference that SMCs be established for all identified constituents included in their November 2022 letter, and requested additional detail on potential subsidence and P/MAs impacts on water quality.* • In response, GSAs expanded the representative monitoring network for water quality, expanded constituents with SMCs to include 1,2,3-TCP, nitrite, and uranium, and examined the potential relationship between arsenic concentrations and land subsidence.	Section 8.4 Section 13.1.1.4 Section 13.3.2.2. Section 13.5.2.2 Section 15.2.4
3/6/2024	Technical Meeting #6 – Well Inventory & Well Mitigation Program	The TWG presented the process and results of the well inventory which identifies beneficial users of groundwater and the structure of the Subbasin-wideKern Subbasin Well Mitigation Program. *SWRCB staff stated that they would not recommend a Subbasin to exit the probationary process until GSAs had a funded and operational Well Mitigation Program.* • In response, GSAs expedited the timeframe for developing a Well Mitigation Program framework, to be operational by January 2025.	Section 14.2.3 Appendices
4/3/2024	Technical Meeting #7 – Monitoring Networks and SMCs Approach	The TWG presented the SGMA monitoring networks and the revised SMCs approaches for applicable Sustainability Indicators and outlined how these revisions addressed DWR deficiencies and incorporated SWRCB staff feedback. *SWRCB staff suggested a plan for filling potential monitoring data gaps, acknowledged the significant improvement to the revised Subbasin-wide UR definitions, and recommended that analysis of Depletions of Interconnected Surface Waters be made more robust even though it was not identified by DWR as a deficiency and DWR has not issued complete guidance documents.* • In response, GSAs expanded the representative monitoring network and identified data gaps, increased water quality sampling frequency to semi-annual, revised the UR definition for Degraded Water Quality, and expanded Depletions of Interconnected Surface Waters description to include ICONS dataset.	Section 8.6 Section 11.1 Section 13.3.1 Section 15.2.1 Section 15.2.4 Section 15.5.1 Appendices

Meeting Date	Topic	Summary / Outcome	Plan Section
4/23/2024	Technical Meeting #8 – Water Budgets, P/MAs, and Water Banking Approach	The TWG presented the water budget approach to estimate projected future conditions, P/MAs and how estimated benefits exceed the projected deficit, and three example water banking approaches within the Kern Subbasin. Kern Subbasin GSA representatives also sought clarification from SWRCB staff as to whether an entity could still apply for a "good actor" exception if they were part of a single GSP. *SWRCB staff asked numerous questions regarding water banking operations and accounting and requested additional considerations of extreme climate change and recent SWRCB policies affecting delta in-stream flows be included in the projected water budget and expressed concerns with having both a Subbasin-wide P/MAs section and 20 individual GSA-specific P/MAs sections within the Amended Subbasin2024 Plan. The SWRCB stated that a management area within a GSP could apply for the good actor exemption.* • In response, GSAs summarized all planned P/MAs and expected benefits by category on the Subbasin-wide level and moved GSA-specific details on P/MAs as supporting appendices.	Section 14 Appendices
5/29/2024	Technical Meeting #9 – Final GSP2024 Plan Overview	The TWG presented an overview of the highly coordinated Amended Subbasin2024 Plan.	N/A
9/26/2024	Technical Meeting #10 – Basin Setting, HCM, and Monitoring Network	The TWG presented information and refined analysis related to 1) Kern Subbasin basin setting and HCM Areas, 2) understanding of unconfined and confined zones, 3) groundwater level monitoring network, and 4) well inventory. • See discussion below for revisions included in 2024 Plan.	Sections 6-8 Section 10 Section 15
10/01/2024	Technical Meeting #11 – Well Inventory	The TWG presented information related to the development of the Kern Subbasin well inventory, including DWR recommendations, initial record review and parsing, record cleanup, and data gap filling process and well registry. • See discussion below for revisions included in 2024 Plan.	Section 13
10/31/2024	Technical Meeting #12 – Groundwater Level SMCs and Monitoring Network	The TWG presented information and additional analysis related to 1) groundwater level monitoring network and 2) groundwater level SMCs. An overview of the proposed Kern Subbasin MT Exceedance Policy and Well Mitigation Program were provided for discussion. • See discussion below for revisions included in 2024 Plan.	Section 5 Section 13 Section 15 Appendix W Appendices
11/05/2024	Technical Meeting #13 – ISWs and Groundwater Quality SMCs	The TWG presented information and additional analysis related to 1) interconnected surface waters and 2) groundwater quality SMCs. • See discussion below for revisions included in 2024 Plan.	Section 5 Section 8 Section 13 Section 15
11/07/2024	Technical Meeting #14 - Subsidence	The TWG presented information and additional analysis related to 1) nexus between Kern Subbasin HCM Areas and subsidence, 2) revisions to the subsidence SMC approach, 3) understanding of InSAR data and methodology. • See discussion below for revisions included in 2024 Plan.	Section 5 Section 13

Meeting Date	Topic	Summary / Outcome	Plan Section
11/21/2024	Technical Meeting #15 – Well Mitigation Program, Monitoring Network, and Groundwater Level SMCs	The TWG presented the Kern Subbasin's proposed Well Mitigation Program, including a program overview, application process, appeals process, funding mechanism and budget, and public outreach. The TWG also presented refined information and analysis related to the Kern Subbasin's proposed groundwater level monitoring network and groundwater level SMCs. • See discussion below for revisions included in 2024 Plan.	Section 5 Section 13 Section 15
12/09/2024	Technical Meeting #16 – Water Banking	The TWG presented information related to 1) water banking fundamentals and 2) Kern Subbasin banking project examples. • See discussion below for revisions included in 2024 Plan.	Section 9 Section 14 Appendices

Following the release of the Draft 2024 Plan, the SWRCB staff published a *Draft Staff Report* focused on the 2020 and 2022 GSPs, along with preliminary review of the Draft 2024 Plan (see Section 4.1.6, pages 191-193 of *Draft Staff Report*). Following the publication of the *Draft Staff Report*, the SWRCB held two public workshops (a virtual one on 26 August 2024 and an in-person one on 29 August 2024).

The Kern Subbasin provided written comments in response to the *Draft Staff Report* to the SWRCB in August 2024. A copy of these written comments is included as Attachment 1. In addition, between August and November 2024, the Kern Subbasin GSAs and their TWG representatives held tours with SWRCB Members and staff, and had more than six meetings with SWRCB staff to discuss their feedback on the Draft 2024 Plan (see Table 1 above).

The bullets below are direct quotations from the *Draft Staff Report*. The sub-bullets describe how the Kern Subbasin GSAs addressed the *Draft Staff Report* and subsequent feedback from SWRCB staff in the 2024 Final Plan.

- *"Board staff note that the use of regionally-averaged declining elevation trends leads to groundwater level MTs that vary dramatically across "hydrological areas" of the subbasin and may have resulted in a skewed (heavily weighted toward areas of more pumping and lower elevation) approach in setting MTs. This results in inconsistent management action triggers across plan areas, an issue previously identified by DWR across the 2022 GSP plan areas due to lack of coordination (Consistent with Coordination deficiency 1a)."*
    - The Final 2024 Plan includes a consistent data-driven approach to setting groundwater level SMCs across the Kern Subbasin in a manner that is consistent with the GSP regulations, relies on the best available data, and is protective of beneficial users. As detailed in Section 13.1.2 of the Final 2024 Plan, the MTs were further refined to: (1) reflect revisions to the representative monitoring network for water levels (RMW-WLs), (2) remove outlier trends at wells with limited historical data, and (3) cap the MTs at 61 feet below the recent historical lows. These revisions result in an increase in the MTs by an average of 33 feet across the Kern Subbasin relative to the

2022 Plans and limit well impacts to approximately 260-307 wells (under the worst-case scenario where all RMW-WLs hit the MTs).

- Significant additional analyses related to the MT values were conducted to demonstrate that trends were not overly skewed, and that the MTs resulted in reasonable gradients and were not more variable than current water level conditions and were coordinated with the SMCs for the other sustainability indicators.

- *"Groundwater level MTs were determined using the lowest of projected historical trends or historical water level ranges, rather than using thresholds focusing on protection of beneficial uses and users. This method is consistent with a method called out by DWR's 2022 inadequate determination letter, previously referred to as "trend averages" and "range dominated minus a correction" which is now referred to as "trend dominated" and "range dominated" in the 2024 Draft GSPs (2022 DWR Inadequate Letter, pp. 31-32; 2024 Draft Main GSP, ch. 7, pp. 7-10). In many cases this results in MTs that exceed historical lows and are more than one-hundred feet deeper than current groundwater levels with no justification.*

  Also, staff noted that GSAs lowered numerous MTs, several by more than 50 feet and some by more than 100 feet, compared to MTs set in the 2022 GSPs. These MTs could result in groundwater levels declining well below historic lows without triggering any management actions (Groundwater Level deficiency)."

  - As detailed in Section 13.1.2 of the Final 2024 GSP, the revised RMW-WL network was used to re-calculate HCM Area trends. A fourth step was added to the process for setting groundwater level SMCs that adjusts the MT value upwards and "caps" the MT value so that no MT is greater than 61 feet below the recent historical low. As a result, 45 RMWs, or 26 percent, had upwards adjustments of MTs compared to the 2024 Plan, and on average across the Kern Subbasin, MTs were raised by 33 feet compared to the 2022 Plans, with 20 RMW-WLs having MT values raised by over 100 feet.
  - As presented in Section 13.1.2.4 of the Final 2024 Plan, under the worst-case scenario where all RMW-WLs hit the MTs, it is anticipated that 260-307 drinking water wells may be impacted. This represents less than 1 percent depletion in drinking water supply across the Kern Subbasin and demonstrates that these MTs are protective of beneficial uses and users.

- *"Plans lack clarity on banking operations and how they impact the ability of the basin to avoid hitting MTs. This is especially true given that the GSPs' Appendix E, Kern Fan Water Banking Program, stated that, "[t]he Projects cannot cause chronic lowering of groundwater levels or a reduction in storage" (2024 Draft Main GSP, Appendix E, p. 7) (Groundwater Level deficiency)."*

- Sections 9 and 14, Appendix E, Appendix M, and Appendix N of the Final 2024 Plan have been revised to further clarify the role of the water banks in terms of supporting Kern Subbasin and state-wide sustainability.

- *"The GSAs do not demonstrate a fundamental understanding of the Kern Subbasin's settings. For example, monitoring well networks for groundwater levels and groundwater quality do not differentiate between confined and unconfined aquifers separated by the E-clay (a confining layer), or other clay layers. Most monitoring wells appear to be screened in the confined aquifer, and therefore may not be protective of all beneficial users when water levels in the unconfined aquifer are lower than that in the confined aquifer. An understanding of groundwater levels and groundwater quality in the unconfined and confined aquifers, as well as subsidence and groundwater quality, is essential for characterizing hydrogeologic conditions throughout the Kern Subbasin. Well impact analyses, monitoring plans, or mitigation strategies developed without this knowledge are insufficient and may not be protective of beneficial uses and users (Consistent with Groundwater Level and Groundwater Quality deficiencies)."*
  - Sections 6, 7, 8, and 11-13 of the Final 2024 Plan have been revised to add additional details that demonstrate the comprehensive understanding of the Kern Subbasin setting. In addition, Section 15 includes a detailed assessment of the representativeness of the Kern Subbasin's representative monitoring networks (RMNs). To the extent that data gaps have been identified, projects and management actions (P/MAs) have been identified to identify or install additional RMWs (P/MA KSB-10). Further, the well impacts analysis (Section 13.1.2.4) includes a sensitivity analysis regarding potentially impacted wells within data gap areas.

- *"The GSPs state that mitigable subsidence is not considered an undesirable result but do not propose a mitigation plan aside from an external mitigation already being implemented by FWA. The GSPs also propose that subsidence along the CA aqueduct is the result of oil and gas extraction without substantial evidence (2024 Draft Main GSP, ch. 13, p. 75 and 2024 Draft Main GSP, ch. 14, p. 17) (Land Subsidence deficiency)."*
  - As described in Section 13.5 of the Final 2024 Plan, the approach to subsidence SMCs was wholly revised to address SWRCB and other stakeholder comments. Further, clarity has been provided with respect to the existence of mitigation plans and an exceedance policy to address any subsidence MT triggers.

- *"Board staff also identified deficiencies in the 2024 Draft GSPs related to degradation of groundwater quality, similar to those observed by Board staff in the 2022 GSPs. For example, when an exceedance occurs with respect to groundwater quality MTs, GSAs will investigate if it is a result of groundwater*

management actions using statistical and/or spatial analyses between water levels and water quality (2024 Draft GSP, ch 13, p. 55). However, GSPs lack details of what the investigation would entail or potential mitigation measures if the exceedance is determined to be a result of groundwater management (Groundwater Quality deficiency)."

  - A Standard Operating Procedure (SOP) for MT Exceedance Investigation has been developed to clarify GSA actions when an MT exceedance occurs (Appendix W of the Final 2024 Plan). The Well Mitigation Program includes coverage for groundwater quality impacts (Appendix K of the Final 2024 Plan). Additionally, the UR definition for Degraded Water Quality was expanded to include criteria for new, confirmed Maximum Contaminant Level (MCL) exceedances in small community wells that are attributable to groundwater management actions (Section 13.3.1.4 of the Final 2024 Plan).

- *"GSAs do not define ISWs or propose monitor for ISWs consistent with the requirements of SGMA (Cal. Code Regs., tit. 23, § 354) (Interconnected Surface Water deficiency)."*

Additional details have been added to Sections 8.6, 11-13, and 15 of the Final 2024 Plan to describe the nature and occurrence of ISWs and associated monitoring throughout the Kern Subbasin.

B-4.2.2 Summary of Major Updates to the Final 2024 Plan

The Final 2024 Plan was revised to address deficiencies, incorporate SWRCB staff feedback, incorporate new information and update data through Water Year 2023, and utilize the best available data and science. The revised Subbasin-wide approach to establishing and justifying SMCs in Section 13 of the Final 2024 Plan directly addresses the deficiencies DWR identified in its Inadequate Determination letter. The Final 2024 Plan completely replaced all prior versions of the Kern Subbasin's GSPs.

Table 2 provides a "crosswalk" between the deficiencies and corrective actions DWR identified in its Inadequate Determination letter, a summary of major revisions that were incorporated into the Final 2024 Plan, and the section location of the revisions within the Final 2024 Plan. Additionally, the following updates were made in the Final 2024 Plan to incorporate new information, data, and the best available science:

- Updated the HCM and revised the Basin Setting sections to incorporate new information based on the Basin Study work to date (see Sections 6 and 7).
- Developed updated Subbasin-wide water budgets using the Kern Subbasin's numerical surface water-groundwater flow model, including impacts of climate change (see Section 9).

- Conducted a Subbasin-wide well impact analysis using the updated well inventory to assess impacts to beneficial users at revised groundwater level SMCs (Section 13.1.2.4).
- Identified constituents of concern (COCs) for the Kern Subbasin (Section 8.4) and established Degraded Water Quality SMCs for key COCs using common data and methodologies (see Section 13.3).
- Assessed potential impacts to surface land uses/infrastructure from differential subsidence (see Section 13.5).
- Conducted a Subbasin-wide assessment of the SGMA Monitoring Network for all Sustainability Indicators, updated the SGMA Monitoring Network, and identified areas with data gaps and a plan to fill those data gaps (see Section 15).
- Updated the P/MAs based on the updated water budget forecasts and developed a consistent methodology for tracking progress and benefits (see Section 14). Estimated the benefits from all P/MAs to ensure the Kern Subbasin GSAs will meet the targeted deficit reduction schedule to ensure sustainable groundwater management by 2040 (see Section 14).
- Established partnerships with Self-Help Enterprises and Kern Water Collaborative to assist in mitigating potential impacts to drinking water users (see Section 16.2.1.1, Appendix K and Appendix F).

Table 2. Crosswalk Summary of Major 2024 Plan Updates in Response to DWR Corrective Actions

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
Deficiency #1: The GSPs do not establish undesirable results that are consistent for the entire Kern Subbasin.	**1a)** • "Explain how the undesirable results definitions are consistent with the requirements of SGMA and the GSP Regulations." • "Include descriptions of how the Plans have utilized the same data and methodologies to define the Subbasin-wide undesirable results and how the Plan has considered the interests of beneficial uses and users of groundwater."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for each applicable Sustainability Indicator. • The approaches to develop the UR definitions are consistent with the requirements of SGMA and the GSP Regulations and reflect feedback received from SWRCB staff during our multiple meetings to date. • Completely revised the Chronic Lowering of Groundwater Levels UR definition to a two-part definition that considers direct impacts on drinking water wells (no more than 15 dewatered per year or 255 total by 2040) and a Subbasin-wide percentage of MT exceedances (25 percent) to account for the variability of beneficial users and representative monitoring wells across the Kern Subbasin. • Conducted a robust Subbasin-wide well impacts analysis using the revised MTs and the Subbasin-wide well inventory to quantify potential impacts to beneficial users at the MTs as compared to the Chronic Lowering of Groundwater Levels URs definition. Under the worst-case scenario, a total of 260-307 drinking water wells are potentially impacted if all of RMW-WLs reach the MTs. Therefore, significantly fewer would be impacted at the UR definition of 25 percent of the MTs being reached, or 15 drinking water wells going dry in any given year.	Section 11 Section 2 & 12 Sections 13.1.1, 13.2.1, 13.3.1, and 13.5.1 Section 13.1.2.4 Appendix Q
Deficiency #1: The GSPs do not establish undesirable results that are consistent for the entire Kern Subbasin.	**1b)** • "Commit to comprehensively reporting on the status of minimum threshold exceedances by area in the annual reports and describe how groundwater conditions at or below the minimum thresholds may impact beneficial uses and users prior to the occurrence of a formal undesirable result."	• Established a Subbasin-wide MT Exceedance Policy to trigger GSA action in the event of a single MT exceedance for Chronic Lowering of Groundwater Levels, Degraded Water Quality, and/or Land Subsidence. • Established an MT Exceedance Action Plan Standard Operating Procedure (SOP) with standardized steps a GSA must take upon an MT exceedance. • Updated functionality of the Kern Subbasin Data Management System (DMS) so that all GSAs are notified when an MT exceedance is uploaded. • Established a detailed Subbasin-wide Well Mitigation Program to address impacts of Chronic Lowering of Groundwater Levels and Degraded Water Quality on domestic and small community groundwater users, in partnership with Self-Help Enterprises, to be operational by January 2025.	Section 5.10.3.4 Section 2 & 12 Section 16.2.1 Sections 13.1, 13.3, and 13.5 Appendices F, H, and W

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
Deficiency #1: The GSPs do not establish undesirable results that are consistent for the entire Kern Subbasin.	**1c)** • "Adopt clear and consistent terminology to ensure the various plans are comparable and reviewable by the GSAs, interested parties, and Department staff. This terminology should also adhere to the definitions of various terms in SGMA and the GSP Regulations including the understanding that undesirable results are conditions occurring throughout the Kern Subbasin." • "Clearly document how all of the various undesirable results definitions and methodologies achieve the same common sustainability goal."	• Used common language and templates (and data and methodologies) for all 2024 Plan sections, demonstrating a high degree of coordination and collaboration. In this manner the review time by SWRCB, DWR and the public will be significantly shortened because the GSPs included in the Final 2024 Plan are essentially identical. • Used clear and consistent terminology for the Subbasin-wide definitions for URs, MTs, and MOs for each applicable Sustainability Indicator and to describe how the Kern Subbasin will be managed to achieve the Sustainability Goal. • Defined and used consistent, Subbasin-wide terminology to establish SMCs for Land Subsidence.	Section 11 Section 13 Section 5 Section 2 & 12 Section 8.5.2
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Emergency Regulations.	**2. (All GSPs)** • "Demonstrate the relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the GSA has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." • "The GSAs should address the specific corrective actions identified for the various GSPs and management area plans, as well as the corrective actions that apply to all the GSPs identified in Table 2. Where addressing those corrective actions includes modifications to the respective GSPs minimum thresholds, the GSPs should evaluate whether	• Established a Subbasin-wide methodology for setting MTs and MOs for Chronic Lowering of Groundwater Levels using an iterative process that considered more than 11 potential MT methodologies that were vetted against the Kern Subbasin UR definition, potential well impacts, and stakeholders, including SWRCB staff. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are projected to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators. • Selected RMWs in areas with a potential correlation between groundwater levels and water quality to facilitate ongoing	Sections 13.1 and 13.2 Section 8.1 Section 15.2.1 Appendix O

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
	the Kern Subbasin's 'with-projects' modeling scenarios still indicate that implementation of the projects and management actions would avoid minimum threshold exceedances. If not, the GSAs should modify their projects and management actions accordingly."	monitoring and reporting in these areas potentially affected by groundwater management activities. • Determined that groundwater level MTs are protective of URs for land subsidence through an analysis that projects the extent of subsidence that would occur under groundwater level MTs. This analysis will be refined in future Subbasin-wide modeling efforts. • Estimated the reduction of groundwater storage that would occur at MT groundwater levels and determined this decline in storage (3 to 9 percent) is not significant and unreasonable relative to the volume of total usable storage in the Kern Subbasin. • Coordinated with neighboring basins on the MOs and MTs.	
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	2. Kern Groundwater Authority GSP (Areas Outside of Management Areas): • "Provide a comprehensive discussion of areas covered by the KGA GSP, but that are not contained within the various management area plans. Among other items, provide maps of these areas, describe the uses and users of groundwater in these areas, and either set sustainable management criteria for these areas or include robust discussions justifying why sustainable management criteria are not required."	• Provided maps and descriptions of all areas covered by the 2024 Plan. • Described beneficial uses and users of groundwater across the entire Kern Subbasin. • The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for each applicable Sustainability Indicator. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Added representative monitoring sites in under-represented areas that will be monitored for groundwater level and groundwater quality with SMCs established.	Section 1.3.1 Section 5.2.1 Section 13 Section 13.1.2.4 Section 15.5.1 Appendix Q
	2. Kern Groundwater Authority GSP (Cawelo Water District Management Area; Eastside Water Management Area) • "Describe how the minimum thresholds … may affect the interests of beneficial uses and users of groundwater or land uses and property interests."	• Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040.	Section 13.1.2.4 Appendix Q

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	2. Kern Groundwater Authority GSP (Kern Water Bank Management Area) • Provide an explanation of how the Joint Operation Plan meets the requirements of SGMA and the GSP Regulations. • The Joint Operation Plan expired on January 31, 2019. Provide an updated explanation if these thresholds have changed and the latest Joint Operation Plan if applicable."	• MTs for the area covered by the Kern Water Bank GSA are no longer set using thresholds in the Joint Operation Plan, and instead use the Subbasin-wide SMC approach.	Section 13.1
	2. Kern Groundwater Authority GSP (Kern-Tulare Water District Management Area) • "Provide an explanation of how minimum thresholds within the Kern-Tulare management area at the monitoring sites are consistent with the requirement to be based on a groundwater elevation indicating a significant and unreasonable depletion of supply at a given location. • Provide a discussion identifying how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040.	Section 13.1 Section 13.1.2.4
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the	2. Kern Groundwater Authority GSP (North Kern Water Storage District / Shafter-Wasco Irrigation District Management Area) • "Establish sustainable management criteria for management area NKWSD-MA-2.	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water	Section 13.1 Section 13.1.2.4 Section 16.2.1.1 Appendix Q Appendix K

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
requirements of SGMA and the GSP Regulations.	• Explain how minimum thresholds … are consistent with the requirement to be based on a groundwater elevation indicating a significant and unreasonable depletion of supply at a given location. • Verify how the subset of wells used in the well impact analysis is representative of the wells in the management area. • Provide an explanation of the mitigation plan for domestic wells."	wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Established a detailed Subbasin-wide Well Mitigation Program to address impacts of Chronic Lowering of Groundwater Levels and Degraded Water Quality on domestic groundwater users, in partnership with Self-Help Enterprises, to be operational by January 2025.	
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	2. Kern Groundwater Authority GSP (Kern County Water Agency Pioneer GSA Management Area; Shafter-Wasco Irrigation District [7th Standard Rd] Management Area; West Kern Water District Management Area; Westside District Authority Management Area) • "Explain the selection of groundwater level minimum thresholds for the Pioneer management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators. • Selected RMWs in areas with a potential correlation between groundwater levels and water quality to facilitate ongoing monitoring and reporting in these areas potentially affected by groundwater management activities. • Determined that groundwater level MTs are protective of URs for land subsidence through an analysis that projects the extent of	Section 13.1 Section 13.1.2.4 Section 15.2 Section 16.2.1.1 Appendix Q Appendix K

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
		subsidence that would occur under groundwater level MTs. This analysis will be refined in future Subbasin-wide modeling efforts. • Estimated the reduction of groundwater storage that would occur at MT groundwater levels and determined this decline in storage (3 to 9 percent) is not significant and unreasonable relative to the volume of total usable storage in the Kern Subbasin.	
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	2. Kern Groundwater Authority GSP (Rosedale Rio Bravo Management Area) • "Provide clarification regarding why minimum threshold exceedances are allowed to occur in one of the North, Central, or South of the Rive zones for this management area (i.e., why it takes two of those zones to exceed their threshold before the management area plan considers an undesirable result to have occurred). • Describe any projects or management actions that may be implemented if the minimum threshold is exceeded in one of those areas and users are impacted but an undesirable result is not triggered."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Established a Subbasin-wide MT Exceedance Policy to trigger GSA action in the event of a single MT exceedance for Chronic Lowering of Groundwater Levels, Degraded Water Quality, and/or Land Subsidence.	Section 13.1 Section 16.2.1 Appendix W
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the	• 2. Kern Groundwater Authority GSP (Semitropic Water Storage District Management Area; Southern San Joaquin Municipal Utility District Management Area:) • "Explain the selection of groundwater level minimum thresholds … including how they represent site-specific levels of depletion that could cause undesirable results and the relationship between this	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the	Section 13.1 Section 15.2 Section 16.2.1.1 Appendix Q Appendix K

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
GSP Regulations.	sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels. If minimum thresholds were not set consistent with levels indicating a depletion of supply, the minimum thresholds should be revised accordingly. • Verify how the subset of wells used in the well impact analysis is representative of the wells in the management area. • Provide an explanation of the mitigation plan for domestic wells."	UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators. • Selected RMWs in areas with a potential correlation between groundwater levels and water quality to facilitate ongoing monitoring and reporting in these areas potentially affected by groundwater management activities. • Determined that groundwater level MTs are protective of URs for land subsidence through an analysis that projects the extent of subsidence that would occur under groundwater level MTs. This analysis will be refined in future Subbasin-wide modeling efforts. • Estimated the reduction of groundwater storage that would occur at MT groundwater levels and determined this decline in storage (3 to 9 percent) is not significant and unreasonable relative to the volume of total usable storage in the Kern Subbasin. • Established a detailed Subbasin-wide Well Mitigation Program to address impacts of Chronic Lowering of Groundwater Levels and Degraded Water Quality on domestic and small community groundwater users, in partnership with Self-Help Enterprises, to be operational by January 2025.	
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	**2. Kern River GSP** • "Provide clarification regarding the management action mentioned in the sustainable management criteria section of the GSP related to identification of well users, including domestic users and small water systems, in the agricultural subareas of the Agricultural Management Area."	• A Subbasin-wide well inventory was conducted to better understand the distribution of beneficial groundwater users in the Kern Subbasin. The inventory includes records from DWR's Online System of Well Completion Reports (OSWCR), the Kern County Environmental Health Services (KCEHS), and United States Geological Survey (USGS). Additionally, data were downloaded from California Open Data including well information from the Department of Drinking Water (DDW) and Irrigated Lands Regulatory Program.	Section 1.3

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	**2. Buena Vista GSP** • "Include sustainable management criteria, including groundwater level minimum thresholds, for the Maples Management Area." • "[Provide] similar detail regarding the hydrogeologic and beneficial user considerations as were provided for the Buttonwillow Management Area sustainable management criteria development."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators.	Section 13.1 Appendix Q
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	**2. Henry Miller GSP** • "Provide a sufficient description of the selection of groundwater level minimum thresholds, including how they represent site-specific levels of significant and unreasonable depletion of supply that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels."	• The Final 2024 Plan uses the same data and methodologies to define Subbasin-wide definitions for URs, MTs, and MOs for Chronic Lowering of Groundwater Levels that are based on a groundwater elevation indicating a significant and unreasonable depletion of supply at each RMW-WL. • Conducted a robust Subbasin-wide well impacts analysis using the Kern Subbasin well inventory, MTs and the quantitative criteria for URs to better quantify potential impacts to beneficial users. Under the worst-case scenario, a total of 260-307 drinking water wells are estimated to be dewatered, which is well within the scope and budget of the Well Mitigation Program. • Conducted a "depletion of supply" analysis to quantify the percentage of urban supply that may be impacted at MTs and the UR definition. Under the worst-case scenario, less than one percent of the total estimated urban water supply would be impacted by 2040. • Identified potential impacts of lowered groundwater levels on other Sustainability Indicators. • Selected RMWs in areas with a potential correlation between groundwater levels and water quality to facilitate ongoing	Section 13.1 Section 15.2 Appendix Q

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
		monitoring and reporting in these areas potentially affected by groundwater management activities. • Determined that groundwater level MTs are protective of URs for land subsidence through an analysis that projects the extent of HCM Area subsidence that would occur under groundwater level MTs. This analysis will be refined in future Subbasin-wide modeling efforts. • Estimated the reduction of groundwater storage that would occur at MT groundwater levels and determined this decline in storage (3 to 9 percent) is not significant and unreasonable relative to the volume of total usable storage in the Kern Subbasin.	
Deficiency #2: The Kern Subbasin's chronic lowering of groundwater levels sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	**2. South of Kern River GSP (Arvin-Edison Water Storage District Management Area; Wheeler Ridge-Maricopa Water Storage District Management Area)** • Provide specific details, including timeline for implementation, of the [Well Mitigation] program. Describe the scope of the program and how users impacted by continued groundwater level decline, particularly early in implementation of the Plan, will be addressed.	• Established a detailed Subbasin-wide Well Mitigation Program to address impacts of Chronic Lowering of Groundwater Levels and Degraded Water Quality on domestic and small community groundwater users, in partnership with Self-Help Enterprises, to be operational by January 2025. • Established a Subbasin-wide MT Exceedance Policy to trigger GSA action in the event of a single MT exceedance for Chronic Lowering of Groundwater Levels, Degraded Water Quality, and/or Land Subsidence.	Section 16.2.1 Appendix K Appendix W
	2. South of Kern River GSP (Tejon-Castac Water District Management Area) • "Explain the selection of groundwater level minimum thresholds for the Tejon-Castac management area, including how they represent site-specific levels of depletion that could cause undesirable results, how they may affect the interests of beneficial uses and users of groundwater, and the relationship between this	• Same revisions as listed above for the Henry Miller GSP.	Section 13.1 Section 15.2 Appendix Q

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
	sustainability indicator and other sustainability indicators such as degradation of groundwater quality and subsidence, both of which can be exacerbated by lowering groundwater levels."		
Deficiency #3: The Kern Subbasin's land subsidence sustainable management criteria do not satisfy the requirements of SGMA and the GSP Regulations.	**3. (Subbasin)** • "Coordinate and collectively satisfy the requirements of SGMA and the GSP Regulations to develop the sustainable management criteria for land subsidence." • "Document the conditions for undesirable results for which the GSAs are trying to avoid, supported by their understanding of land uses and critical infrastructure in the Kern Subbasin and the amount of subsidence that would substantially interfere with those uses." • "Identify the rate and extent of subsidence corresponding with substantial interference that will serve as the minimum threshold." • "Clearly identify the undesirable result parameters for each of the GSPs, management areas, and management area plans so it is clear how the various plans work together at the Subbasin-wide level." • "Explain how implementing projects and management actions proposed in the various GSPs is consistent with avoiding subsidence minimum thresholds."	• Referenced and discussed key findings from the six independent subsidence studies to fill data gaps, including the installation of a new extensometer. • Conducted extensive studies and data collection and provided and explained InSAR time series justification and methodologies to differentiate between subsidence caused by activities within and outside of the GSAs' authority to control (i.e., GSA-related vs. non-GSA-related), in coordination with State Water Project California Aqueduct Subsidence Program (CASP) and Friant Water Authority. • Developed Subbasin-wide definitions for Regional and GSA Area Critical Infrastructure. • Developed a Subbasin-wide data-driven approach to land subsidence SMCs. • The GSAs have committed to minimize GSA-related subsidence by 2040. • Established land subsidence SMCs across the entire Kern Subbasin based on a projection of the average historical subsidence rate across each HCM Area and along regional critical infrastructure. • Assessed the potential for differential subsidence using a change in slope analysis between 2024 and the MT extent to confirm minimal impacts to land surface uses and infrastructure. • Assessed potential impacts on regional critical infrastructure from future GSA-related subsidence, including impacts to canal freeboard that would cause substantial interference to conveyance capacity, and identified potential mitigation needs. • Coordinated with key beneficial users of regional critical infrastructure, including the Friant Water Authority and CASP. • Updated the Subbasin-wide Land Subsidence monitoring network.	Section 8.5 Section 13.5 Section 15.2.5

DWR Deficiency	DWR Corrective Actions	Summary of Plan Revisions	Final 2024 Plan Revision Location
	• "If land subsidence is not applicable to parts of the Kern Subbasin, provide supported justification of such."		

Attachment 1

August 22, 2024

Via electronic mail

California State Water Resources Control Board
Attn: Courtney Tyler, Clerk to the Board
P.O. Box 100
Sacramento, CA 95812-2000
SGMA-Kern@waterboards.ca.gov

Re: Comments – Kern County Subbasin

Dear Chair Esquivel and Members of the Board,

Pursuant to the State Water Resources Control Board's (SWRCB or Board) "Notice of Opportunity to Provide Feedback, Public Staff Workshops, and Public Board Hearing for the Proposed Designation of Kern County Subbasin as a Probationary Basin," the Kern County Subbasin Groundwater Sustainability Agencies (Kern GSAs) provide initial comments on the "Kern County Subbasin Probationary Hearing Draft Staff Report" (draft Staff Report), which was published on July 25, 2024. These comments are being provided by the Kern County Subbasin Plan Manager on behalf of all the Kern GSAs.

On May 28, 2024, the Kern GSAs submitted a final draft amended Kern County Subbasin Groundwater Sustainability Plan (Amended Subbasin Plan or 2024 Plan) to the Board and its staff for review.[1] We designed the submittal schedule to be responsive to SWRCB Staff's and Board Members' recommendations to submit the plan in advance of any staff report and hearing. In updating the Board on this milestone, we explained that the Amended Subbasin Plan was "the product of many months of collective and collaborative work, undertaken in coordination with SWRCB Staff, to revamp the Revised 2020/2022 Groundwater Sustainability Plans (GSP) to remedy deficiencies previously identified by the Department of Water Resources (DWR)."[2] We also reiterated prior requests that any staff report address the 2024 Plan:

> "As it is intended to be adopted to supersede the Subbasin's Revised 2020/2022 GSPs before January 2025, the Kern GSAs request again that the Board consider, and direct SWRCB Staff to evaluate, the Amended Subbasin Plan as the basis for any staff report or decision whether to hold a probationary hearing for the Subbasin" in 2025.[3]

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1 *See* letter from Kristin Pittack to SWRCB (June 7, 2024), p. 1.
2 *Id.*
3 *See id.* at 3; *see also* letter from Kristin Pittack to SWRCB (Mar. 29, 2024), p. 5.

Notwithstanding the Kern GSAs' requests for evaluation of the 2024 Plan *because that is the Plan that will be adopted and operative on the noticed hearing date*, the draft Staff Report is based almost exclusively on the Revised 2020/2022 GSPs.

The draft Staff Report allocates two pages to the 2024 Plan. In those two pages, SWRCB Staff concludes, based on its preliminary review, that the deficiencies observed in the Revised 2020/2022 GSPs also apply to the 2024 Plan:

> "Because the deficiencies identified after the preliminary review of the 2024 Draft GSPs are consistent with the deficiencies in the 2022 GSPs, GSAs can use the draft staff report as guidance to correct the deficiencies in the 2024 Draft GSPs and address the Board staff recommendation to designate the basin as probationary."[4]

However, the draft Staff Report also indicates this preliminary conclusion is subject to change based on SWRCB Staff's continued review of the 2024 Plan and feedback from interested persons.

To assist with SWRCB Staff's continued review, the Kern GSAs are providing additional explanation and technical analysis regarding the 2024 Plan, which has been prepared by the Kern Technical Working Group (TWG). The TWG's narrative responses to Staff's preliminary review are provided as Attachment A, and a matrix comparing identified deficiencies, SGMA requirements, and potential corrective actions is provided as Attachment B. These responses further explain how the 2024 Plan relies on the best available science and information, follows the requirements of the Sustainable Groundwater Management Act and GSP regulations, and is likely to achieve the Kern Subbasin's sustainability goal.

We request that SWRCB Staff consider the TWG's responses as it continues to review the 2024 Plan in greater depth. To the extent SWRCB Staff disagrees with the TWG's analysis, we request Staff share the data and analysis that are the basis for its disagreement. The TWG notes that the observed deficiencies listed in the draft Staff Report, including foundational issues such as whether the Kern GSAs' have properly characterized the confined versus unconfined aquifer in the Subbasin, were not previously raised by SWRCB Staff during the 10 consultation meetings held from March 2023 to present.[5] Additional information from Staff on these issues would be particularly helpful to the Kern GSAs' efforts to clarify or correct the alleged deficiencies.

We further request that SWRCB Staff issue a *revised* draft Staff Report that incorporates full and complete review of the 2024 Plan prior to issuing a final report. The Kern GSAs and other interested persons should have an opportunity to review and respond to SWRCB Staff's full and complete evaluation of the 2024 Plan prior to any probationary hearing.

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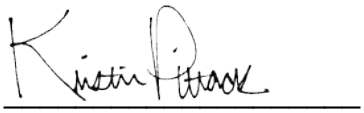
4 Draft Staff Report, p. 191.

5 *See* Attachment A, p. 1.

The Kern GSAs appreciate the Board's consideration and look forward to continued consultation with SWRCB Staff. If you have any questions regarding this letter or the 2024 Plan, please contact the Plan Manager, Kristin Pittack, MS, at (760) 223-5062 or kpittack@rinconconsultants.com.

Respectfully submitted,



Kristin Pittack, MS
Kern County Subbasin Plan Manager

cc:
E. Joaquin Esquivel, Chair, SWRCB
Dorene D'Adamo, Vice Chair, SWRCB
Laurel Firestone, Board Member, SWRCB
Sean Maguire, Board Member, SWRCB
Nichole Morgan, Board Member, SWRCB
Derek Yurosek, Arvin Edison
Michael Blaine, Wheeler Ridge-Maricopa
Mark Valpredo, Tejon-Castac
Rodney Palla, Kern Delta
Bob Smith, City of Bakersfield
Gene Lundquist, KCWA ID4
Brandon Morris, Southern San Joaquin
Randy Bloemhof, Shafter-Wasco/7th Standard
Kevin Andrew, North Kern
John Gaugel, Cawelo
Rob Goff, Westside District Water Authority
Dan Waterhouse, Semitropic
Royce Fast, Pioneer
Kim Brown, Kern Water Bank
Gary Morris, West Kern
Andrew Hart, Kern Tulare
Chad Hathaway, Eastside Water
Gary Unruh, Rosedale Rio Bravo
Jeof Wyrick, Henry Miller
Jim Nickel, Olcese
Terry Chicca, Buena Vista

Attachment A

Kern County Subbasin Technical Working Group's Comments regarding the Kern County Subbasin Probationary Hearing Draft Staff Report's preliminary review of the Subbasin's 2024 Plan

Introduction

On July 25, 2024, the State Water Resources Control Board (SWRCB) published the "Kern County Subbasin Probationary Hearing Draft Staff Report" (draft Staff Report). The Kern County Subbasin Groundwater Sustainability Agencies (Kern GSAs) tasked the Technical Working Group (TWG) with reviewing and providing initial technical comments regarding the draft Staff Report's preliminary review of the final draft amended Kern County Subbasin Groundwater Sustainability Plan (2024 Plan).

The TWG has reviewed the SWRCB Staff's observed deficiencies regarding the 2024 Plan. In addition to the specific responses provided below, the TWG believes it is important to note at the outset that the deficiencies listed in the draft Staff Report (pp. 191-193) were not raised by SWRCB Staff during the 10 consultation meetings that have occurred since March 2023. In addition, several of the foundational issues raised in the draft Staff Report, like the Subbasin's characterization of the confined versus unconfined aquifer in the Subbasin, were not previously identified by DWR during its review of the 2020/2022 GSPs. The TWG recommends that the Kern GSAs request additional information from SWRCB Staff to better understand the data and analysis it is relying upon as the basis for these newly identified issues.

For ease of reference, the TWG has organized these technical comments to respond to SWRCB Staff's observed deficiencies regarding the 2024 Plan in the order they are presented in the draft Staff Report. Black, italicized text is used for quotes excerpted from the draft Staff Report, and blue text is used for the TWG's responses.

4.1.6 *Preliminary Review of 2024 Draft Groundwater Sustainability Plans*

Staff recognize that coordination among GSAs has substantially improved, but the three fundamental deficiencies identified by DWR's inadequate determination (poor coordination, lowering of groundwater levels, and subsidence) still remain for the 2024 Draft GSPs, in addition to board identified deficiencies (groundwater quality and deletion of ISWs). The draft staff report identifies potential actions that the GSAs can incorporate to address the deficiencies identified in the 2022 GSPs. Board staff have conducted 10 consultation meetings with the Kern County Subbasin GSAs since March 2023 to provide feedback on deficiencies in 2022 GSPs and potential actions for remedying those deficiencies. A significant amount of this feedback forms the basis for the written recommendations of the draft staff report. Because the deficiencies identified after the preliminary review of the 2024 Draft GSPs are consistent with the deficiencies in the 2022 GSPs, GSAs can use the draft staff report

as guidance to correct the deficiencies in the 2024 Draft GSPs and address the Board staff recommendation to designate the basin as probationary. Board staff will continue to review the 2024 Draft GSPs in greater depth and work with the GSAs to provide feedback to resolve remaining deficiencies.

Board staff will incorporate review of the 2024 Draft GSPs into the final staff report. Staff invite interested persons to also review the 2024 Draft GSPs and to provide written comments to the Board on whether and how deficiencies and potential actions identified in the draft staff report remain applicable to the 2024 Draft GSPs.

Below are deficiencies observed by staff during the preliminary review of the 2024 Draft GSPs and the corresponding deficiencies and potential actions in this report:

- *Board staff note that the use of regionally-averaged declining elevation trends leads to groundwater level MTs that vary dramatically across "hydrological areas" of the subbasin and may have resulted in a skewed (heavily weighted toward areas of more pumping and lower elevation) approach in setting MTs. This results in inconsistent management action triggers across plan areas, an issue previously identified by DWR across the 2022 GSP plan areas due to lack of coordination (Consistent with Coordination deficiency 1a).*

The Kern County Subbasin (Subbasin) is by far the largest basin in California, covering 1.8 million acres. For perspective, 40 of the 71 basins with approved GSPs and four of the other inadequate basins could fit within the Subbasin boundaries. The stratigraphy, geology, water sources and use patterns, and type and distribution of beneficial users varies widely across the Subbasin – as do the historical and projected groundwater level trends. The fact that this is not a "one size fits all" Subbasin is something that the 2024 Plan had to directly consider as part of developing a comprehensive management plan and did so through the delineation of five hydrogeologic conceptual model areas ("HCM Areas"). As explained in Sections 5.2 and 6.2.1 of the 2024 Plan, these HCM Areas form a key organizing principal for the Plan, informing the HCM (Section 7), the Groundwater Conditions (Section 8), the Sustainable Management Criteria (Section 13), and the Representative Monitoring Network (Section 15).

The Groundwater Sustainability Plan (GSP) regulations (§ 354.28.) require that Minimum Thresholds (MTs) be developed to "avoid undesirable results" (URs) (i.e., "significant and unreasonable effects… caused by groundwater conditions occurring throughout a subbasin" [§ 354.26]) and that they describe how they "may affect the interests of beneficial uses and users of groundwater or land uses and property interests". Notably, they do not establish a rule that MTs be set above historical lows. In fact, DWR has approved ten GSPs for four subbasins within the southern San Joaquin Valley (SJV) that have MTs below the historical lows (as well as GSPs and Alternatives in other subbasins outside of the southern SJV).

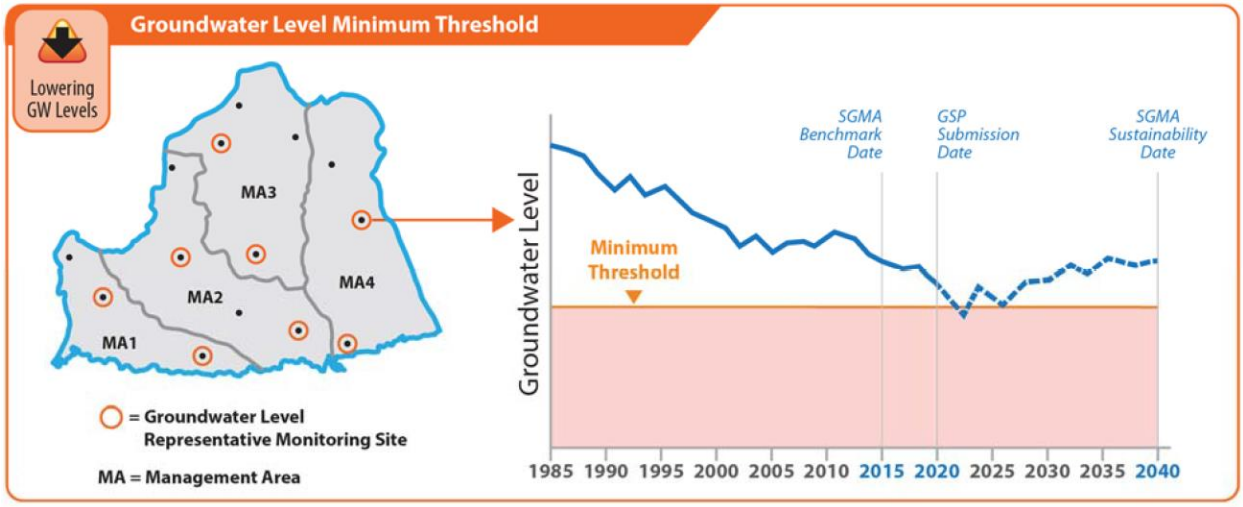
The GSP regulations (§ 354.28) further require that MTs reflect "the rate of groundwater elevation decline based on historical trends" and be "supported by information provided in the basin setting, and other data or models as appropriate". In other words, the regulations expressly require and anticipate the use of trends in the development of a MT methodology and that the trends may differ within a subbasin. The regulations further anticipate that the same methodology may result in different values at different locations in a subbasin based on the local groundwater conditions.

That is why unique MT values are anticipated at each Representative Monitoring Well (RMW) (i.e., an MT "quantif[ies] groundwater conditions for each applicable sustainability indicator at each monitoring site").

The Subbasin's Groundwater Sustainability Agencies (GSAs) developed the MTs in a fully coordinated fashion that is consistent with both the GSP regulations and the intent of SGMA (i.e., to avoid URs). The GSAs applied a consistent dataset and coordinated MT methodology across the Subbasin. The exact values used as inputs in calculating MTs for each RMW represent the unique conditions and characteristic of that portion of the Subbasin (as represented by the actual historical water level data at that RMW and the water level trends within the applicable HCM Area). Then a series of transparent, detailed and reproducible analyses were conducted to ensure that the MTs would not create URs in the Subbasin (Section 13.1.2.4) and are protective for interrelated Sustainability Indicators in the Subbasin (Section 13.1.2.2).

The MTs are therefore not "skewed"; rather the MTs appropriately reflect groundwater conditions at each of the RMWs. For example, there are portions of the Subbasin where groundwater is not pumped in significant quantities, while in other areas water levels fluctuate inter-annually as a result of conjunctive use and other management actions. It is therefore reasonable to expect that a scientifically rigorous MT methodology would reflect and represent those varied conditions in establishing the foundation to support locally-effective groundwater management.

In addition, the MTs do not result in "inconsistent management action triggers across plan areas". Rather, the MTs accurately reflect local conditions and project a realistic glide path towards sustainability at each RMW and each HCM Area, consistent with DWR's guidance in its Sustainable Management Criteria BMP (Figure 3, see excerpt below, which notably shows an MT value that is below 2015 levels).



The SWRCB Draft Staff Report states that the "groundwater level MTs … vary dramatically across 'hydrological areas' of the subbasin". As shown in the contour maps and the three transects Figure 1, Figure 2, and Figure 3 below, the MT (and MO) values in fact do not "vary dramatically" between HCM Areas. They instead appropriately reflect the localized water level conditions across the Subbasin similar to those observed in Fall 2015. Similarly, spatial interpolations of the MTs and MOs at RMWs are similar to the Fall 2015 water level spatial interpolation. It should be noted

that the transects show smooth MT and MO interpolated values, and some of the apparent discrepancy at the RMW points is related to the translation across up to a two-mile distance to the transect lines.

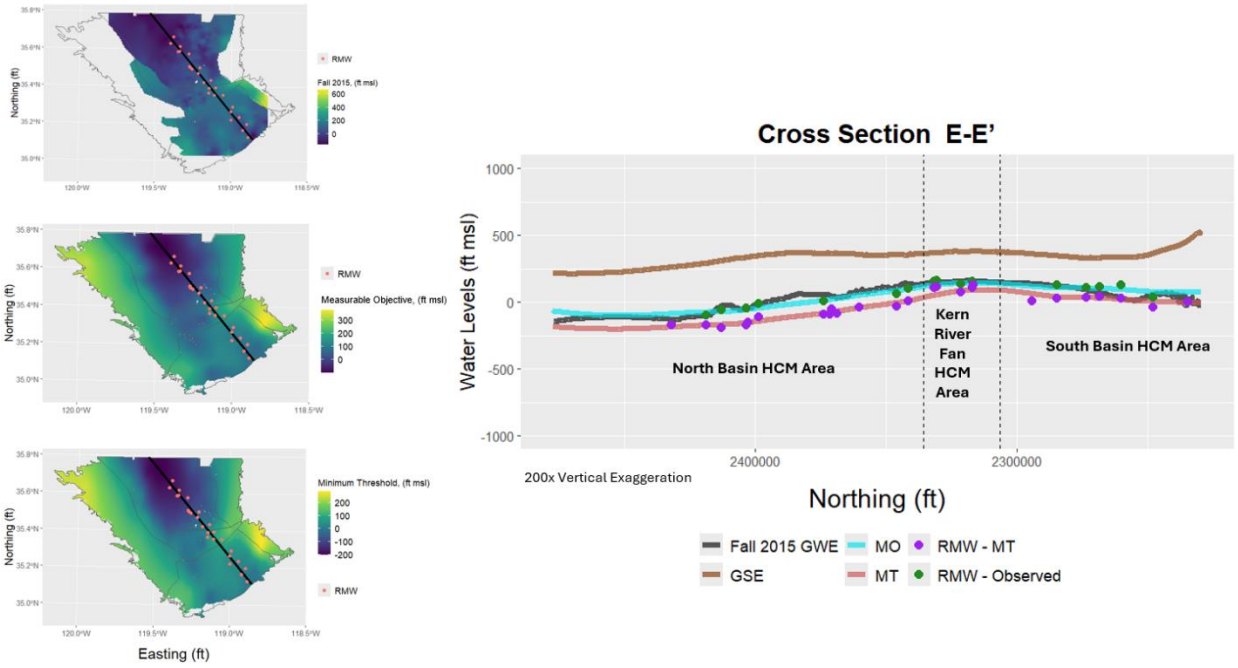


Figure 1. Water level transect along cross section E-E' comparing Fall 2015, MO, and MT groundwater elevations.

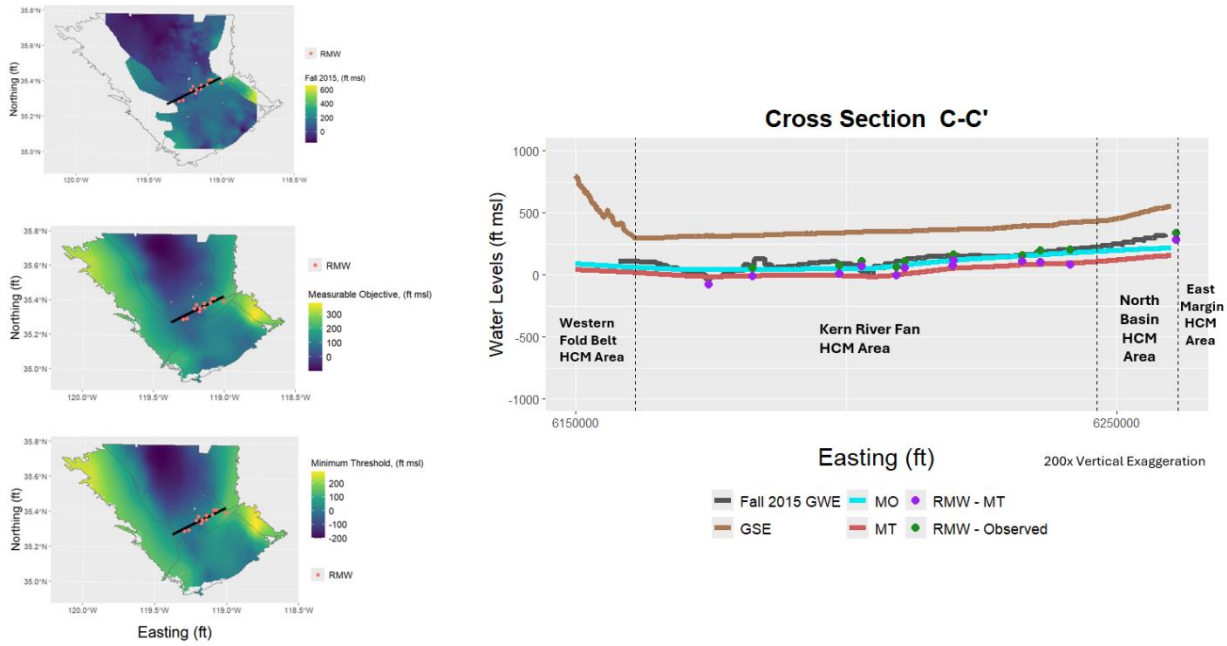


Figure 2. Water level transect along cross section C-C' comparing Fall 2015, MO, and MT groundwater elevations.

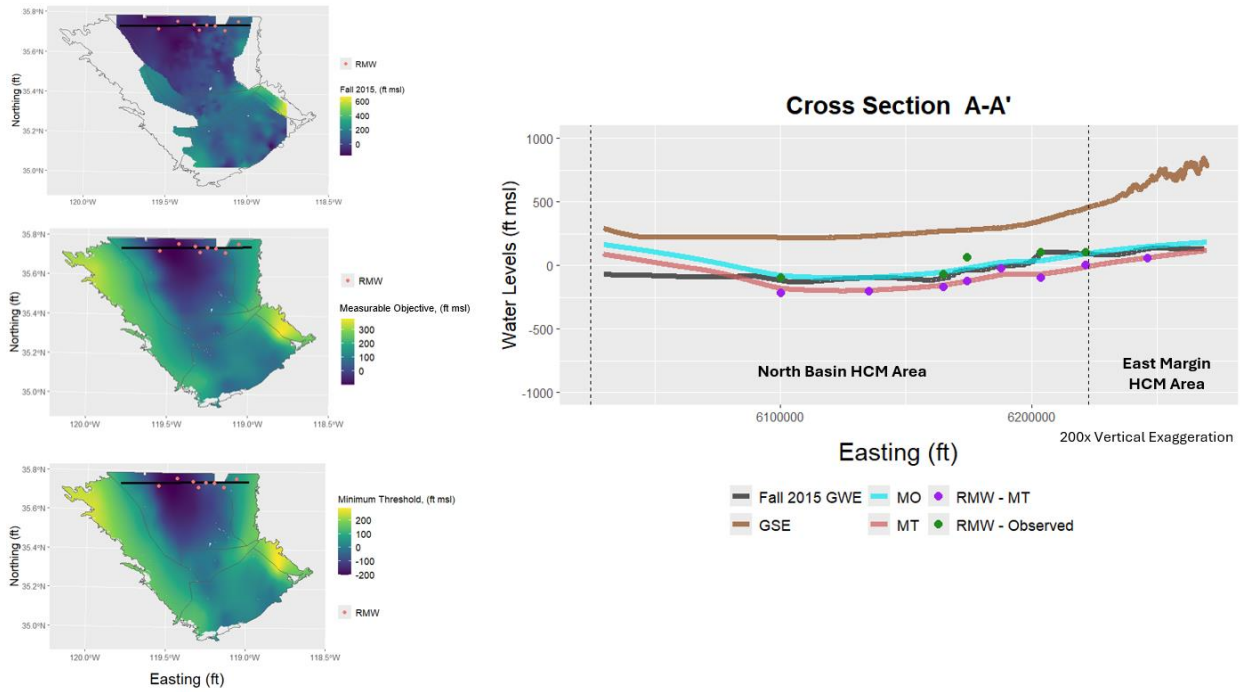


Figure 3. Water level transect along cross section A-A' comparing Fall 2015, MO, and MT groundwater elevations.

Furthermore, the MT Exceedance Policy is triggered for a single MT exceedance, requiring GSA action (Appendix W). In response to the 2023 DWR letter, the GSAs enabled Subbasin-wide notifications for when a reported seasonal groundwater level measurement exceeds the MT. This ensures that the GSAs are held accountable for investigating the MT exceedance and initiating appropriate projects, as warranted.

The SWRCB Draft Staff Report does not acknowledge both the very protective nature of the Subbasin's UR definition in the 2024 Plan (which limits the impacts to no more than 15 drinking water wells being impacted in any given year; Section 13.1.1.4), the MT Exceedance Policy (which requires GSA action in response to any MT exceedance; Section 14.2.3, P/MA KSB-3, Section 16.2.1 and Appendix W), and the planned implementation of a Well Mitigation Program (Section 14.2.3 P/MA KSB-5 and Section 16.2.1.1). Taken together, the GSAs have agreed to a coordinated and comprehensive approach based on best available information and science to: (1) manage groundwater levels sustainably across a large and complex basin, (2) protect beneficial uses, and (3) mitigate impacts caused by ineffective groundwater management.

To the extent SWRCB staff continues to find that the MT methodology is deficient and warrants a recommendation for Subbasin Probation, we request you provide detailed data or analysis demonstrating why the Subbasin's MT approach is deficient in ways that would create significant, unreasonable and unmitigable impacts.

- *Groundwater level MTs were determined using the lowest of projected historical trends or historical water level ranges, rather than using thresholds focusing on protection of beneficial uses and users. This method is consistent with a method called out by DWR's 2022 inadequate determination letter, previously referred to as "trend averages" and "range dominated minus a*

correction" which is now referred to as "trend dominated" and "range dominated" in the 2024 Draft GSPs (2022 DWR Inadequate Letter, pp. 31-32; 2024 Draft Main GSP, ch. 7, pp. 7-10). In many cases this results in MTs that exceed historical lows and are more than one-hundred feet deeper than current groundwater levels with no justification.

Also, staff noted that GSAs lowered numerous MTs, several by more than 50 feet and some by more than 100 feet, compared to MTs set in the 2022 GSPs. These MTs could result in groundwater levels declining well below historic lows without triggering any management actions (Groundwater Level deficiency).

Per the GSP regulations (§ 354.28), the MT methodology development process that was employed for the 2024 Plan directly considered the beneficial users and uses of groundwater. At the outset of the revision process (i.e., in July 2023), the GSAs determined that it would be significant and unreasonable to have more than 255 drinking water wells go dry by 2040 (or no more than 15 per year) based on an assessment of the previously impacted and successfully mitigated wells in the Subbasin since 2010, the associated costs for past mitigation efforts, and the economic feasibility of funding a Subbasin-wide Well Mitigation Program (Section 13.1.1.4). We note that 255 wells are equivalent to less than 5% of the production wells in the Subbasin. The GSAs then conceptualized more than 11 different potential MT methodologies, including some of the methods that were used in the 2022 GSPs that DWR had approved in other basins (e.g., White Wolf Subbasin and Kings Subbasin).

The Subbasin's technical experts applied each candidate MT method across the Subbasin at the RMWs and assessed the well impacts, gradients, and the margin of operational flexibility. Following this rigorous and iterative process, the GSAs selected the MT methodology which contains both trend-dominated and range-dominated calculation criteria, and has been shown (see § 354.28) to: (1) be protective of beneficial uses and users (Section 13.1.2.4), (2) result in reasonable gradients across the Subbasin and between subbasins (Section 13.1.2.3), (3) be consistent with the SMCs for the other Sustainability Indicators (Section 13.1.2.2), and (4) do not impact adjacent subbasins from achieving their Sustainability Goal (Section 13.1.2.3).

The quotation of the 2023 DWR Inadequate Letter included in the SWRCB Draft Staff Report is selective and does not convey the context or full meaning of DWR's comment. In the 2022 and 2023 letters, DWR inventoried the various MT methodologies being used at that time throughout the Subbasin – this cited quotation merely confirms that DWR understood the methodology being employed for a portion of the Subbasin. Based on review of the surrounding text, it is clear that DWR's primary concern was the various and disparate approaches for establishing MTs across the Subbasin in 2022 which resulted in inconsistent settings of groundwater level declines beyond historical lows, not with the MT methodology itself. Furthermore, it is notable that the MT methodology employed in the 2024 Plan is consistent with the MT methodology used in the adjacent White Wolf Subbasin, which was approved by DWR in January 2024 with NO corrective actions related to the water level MT methodology.

Contrary to the SWRCB Draft Staff Report statement that the MTs are presented "with no justification", the 2024 Plan provides a detailed, transparent and science-based justification for the MT methodology selection. A suite of well impacts analyses (Section 13.1.2.4) demonstrate that, if water levels were to decline to the MTs, on

average a total of between 77 and 103 drinking water wells may be impacted by 2040 (the average impacts under modeled projected future basin conditions vs application of a stochastic prediction of well impacts based on 5,000 realizations). This is equivalent to between 1.2% and 2.2% of the drinking water supply within the Subbasin. Again, this level of impact is well within the GSA's ability to mitigate under the Well Mitigation Program currently under development (Section 14.2.3, P/MA KSB-5, and Section 16.2.1.1). Additionally, modeled projected future Subbasin conditions suggest that, with P/MAs implementation, only 13 drinking water wells may be impacted by 2040. This justification was presented to SWRCB staff during the technical meetings held on 1 November 2023 and 3 April 2024, as detailed in Section 1.2.1.5.

With any change in methodology, MT values are expected to change. The 2024 Plan applies consistent data and a coordinated methodology across the Subbasin to establish the groundwater level MTs. In departing from the many methodologies used in the 2022 GSPs, most of the MTs established in those GSPs were modified. On average across the Subbasin, the MTs were raised by 20 feet compared to the 2022 GSPs. Due to the variable conditions found in the Subbasin some MTs changed substantially, including 17 RMWs where the MTs increased by more than 100 feet, while at two RMWs the MTs were lowered by more than 100 feet. Of these two wells one is representative of the lower confined aquifer on the eastern fringe of the Subbasin, an aquifer that is not used by domestic wells (RMW-044). The second is on the southern fringe of the Subbasin more than four miles away from any domestic wells (RMW-234). In the interest of consistent and coordinated basin management, it was therefore determined that the agreed upon consistent MT methodology could be employed at those sites because the well impacts analysis demonstrated that use of this methodology at these locations did not negatively impact beneficial uses and users.

The SWRCB Draft Staff Report appears to object to MTs set below historical lows. However, SGMA does not require MTs to be set at or above historical lows. Instead SGMA and implementing regulations (§ 354.28; § 354.26) require that the MTs be set to avoid "significant and unreasonable impacts". The 2024 Plan clearly demonstrates that the MTs will avoid significant and unreasonable impacts to beneficial uses and users of groundwater. We also note that DWR has approved no fewer than 12 GSPs that have MTs below historical lows, based on findings that those MTs are grounded in best scientific information and comply with SGMA's requirement to avoid URs.

SGMA requires identifying URs and mitigating impacts to beneficial users, which the 2024 Plan and associated Well Mitigation Program does. To the extent that the SWRCB staff continues to find that the MT methodology is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data or your analysis demonstrating why this approach to MT development and coordinated Subbasin management would create significant and unreasonable and unmitigable impacts.

- *Plans lack clarity on banking operations and how they impact the ability of the basin to avoid hitting MTs. This is especially true given that the GSPs' Appendix E, Kern Fan Water Banking Program, stated that, "[t]he Projects cannot cause chronic lowering of groundwater levels or a reduction in storage" (2024 Draft Main GSP, Appendix E. p. 7) (Groundwater Level deficiency).*

The statement in Appendix E is consistent with the SGMA legislation whereby "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." (California Water Code § 10721(x)).

With respect to the reference to Appendix E, the full statement reads: "*The Projects cannot cause a chronic lowering of groundwater levels or a reduction in groundwater storage* ***because operating rules require that they only recover previously stored surface water from the aquifer after appropriate losses have been applied. If these supplies are exhausted, recovery operations will cease. Importantly, the recovery of stored water in the projects provides much needed water supplies in times of drought to reduce groundwater pumping from overdrafted aquifers elsewhere in the Subbasin. The supplies also help West Kern meet their M&I needs for disadvantaged communities. Nonetheless, the Projects utilize the SMC methodology developed by the Subbasin for these sustainability indicators (see Section 13.1 and 13.2 of the Plan).***

Project operations can cause a temporary lowering of groundwater levels in adjacent areas toward the end of extended droughts. However, as described above, the Projects have developed a well mitigation program that mitigates any such impacts caused by those temporary conditions."

As discussed above, banking projects cannot cause a reduction in groundwater storage because operational constraints limit the projects to only recovering previously stored water.

With respect to banking project operations impacting the ability of the Subbasin to avoid breeching MTs, the projects providing water to participants within the Subbasin conserve surplus water supplies and later reduce the need for those entities to pump groundwater thereby helping to maintain groundwater levels above MTs. For programs storing water for entities outside the Subbasin, those programs have a leave-behind requirement that contributes to groundwater storage and higher groundwater levels.

Regarding the Kern Fan projects discussed in Appendix E, (Kern Water Bank [KWB], Pioneer, Berrenda Mesa, and West Kern), these projects are all stand-alone projects with no overlying beneficial users. The question then becomes, can the operations for these projects contribute to a chronic lowering of groundwater levels in adjoining areas? In fact, these projects cause a chronic raising of groundwater levels in these areas.

DWR conducted an in-depth analysis of KWB operations in a 2016 Environmental Impacts Report (EIR) which included modeling the potential impacts of the KWB project for the 1995-2014 period. An analysis of with project operations and without project operations documented the effects of the project on adjoining areas. These effects are most simply summarized on Figure 3.2-7 which illustrates the area outside the KWB where changes in water levels exceeded 5 feet, either up or down, as a result of project operations. As shown, groundwater levels for significant areas outside the KWB were greater than 5 feet throughout the entire period under the with project operations scenario. Groundwater levels were lower than 5 feet for some areas for limited times toward the end of significant droughts.

Following the 1995-2014 period, there were three recovery periods and three significant recharge events. The volumes of water in these later recharge events exceeded those from previous recharge events, the recovery volumes were similar to or less than the 2012-2014 recovery period, and groundwater levels responded in a manner similar to those in the 1995-2014 period. Therefore, it would be expected that these later operations would raise groundwater levels in adjoining areas to the extent shown in Figure 3.2-7 through 2023. In addition, the operations of the other Kern Fan projects (Pioneer, Berrenda Mesa, and West Kern) are analogous to KWB operations, so it follows that the same chronic raising of groundwater levels has occurred as a result of these projects. Notably, at the end 2023, the volume of water in storage in the four projects approached 2 million acre-feet.

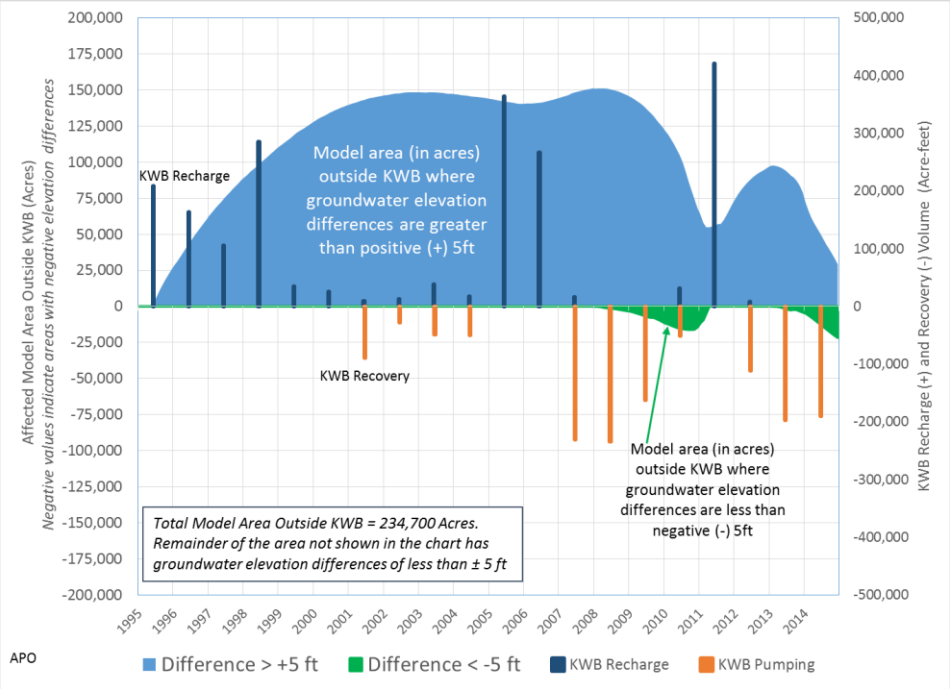


FIGURE 3.2-7. Analysis of Past Operations: Time vs. Affected Area Outside the Kern Water Bank Exceeding ± 5 Feet Differences in Groundwater Elevations ("With Kern Water Bank Operations" Minus "Without Kern Water Bank Operations"), 1995-2014

- *The GSAs do not demonstrate a fundamental understanding of the Subbasin's settings. For example, monitoring well networks for groundwater levels and groundwater quality do not differentiate between confined and unconfined aquifers separated by the E-clay (a confining layer), or other clay layers. Most monitoring wells appear to be screened in the confined aquifer, and therefore may not be protective of all beneficial users when water levels in the unconfined aquifer are lower than that in the confined aquifer. An understanding of groundwater levels and groundwater quality in the unconfined and confined aquifers, as well as subsidence and groundwater quality, is essential for characterizing hydrogeologic conditions throughout the subbasin. Well impact analyses, monitoring plans, or mitigation strategies developed without this knowledge are insufficient and may not be protective of beneficial*

uses and users (Consistent with Groundwater Level and Groundwater Quality deficiencies).

Given the managerial experience and the technical expertise specific to Kern County that were marshalled to produce the 2024 Plan, the GSAs take exception to the SWRCB Draft Staff Report statement that the "GSAs do not demonstrate a fundamental understanding" of the Subbasin because they have not defined a confined and unconfined aquifer. As mentioned above, the Subbasin is significantly larger and more hydrologically and operationally complex than the subbasins to the north where different geologic conditions may have warranted different aquifer designations (see additional discussion below). We note that this was not a deficiency identified by DWR and are interested in understanding the analyses that led to the SWRCB Draft Staff Report's statement.

The groundwater elevation maps of the Primary Alluvial Principal Aquifer presented in Figures 8-2, 8-3 and 8-4 of the 2024 Plan are consistent with well-established representations of the Subbasin published in the Kern County Water Agency (KCWA) Water Supply Reports from 1970 through 2011. KCWA has continued to provide these maps for the Subbasin Annual Reports through WY2023. The maps presented in the 2024 Plan similarly provide a single coordinated, Subbasin-wide representation of groundwater conditions for the hydraulically connected and actively pumped intervals of the Subbasin. Therefore, we consider this approach to be the appropriate mapping and aquifer designation methodology, based on a time-proven approach, that best supports the development of the groundwater level SMCs with respect to managing sustainability within this Subbasin. The implication in the SWRCB Draft Staff Report that this does not accurately represent the Subbasin appears to contradict the decades of groundwater understanding and management that has been implemented by some of the largest and most sophisticated water agencies and managers in the State, including DWR.

For the 2024 Plan, the alluvium was defined as a single principal aquifer rather than subdividing it into upper and lower principal aquifers based on the actual mapping and analysis of the extent and thickness of the E-Clay. Figure 4 illustrates the lack of E-Clay along the Kern River Fan area. Utilizing maps of the E-Clay extent from the USGS and others (Croft 1972, Page 1983, 1986; PGA 1991), it was determined that the E-Clay is absent in over 60% of the Subbasin. In another 30%, the E-Clay is either discontinuous or near the margins, where zones above and below it are hydraulically connected (see Figure 7-24 of the 2024 Plan). Thus, given the limited and discontinuous nature of the E-clay, the aquifer system functions as a single principal aquifer with some local zonation influenced by the E-Clay and other clay layers (see Sections 7.2, 7.3 and 7.4), and was appropriately defined as such.

A distinct separation in groundwater levels due to the E-Clay is observed in an area along the boundary with the Tule and Tulare Lake Subbasins, covering about 10% of the Subbasin. Here, groundwater above the E-clay flows southeastward towards regions where the E-Clay is discontinuous, merging with groundwater below. This area is designated as a conservation easement for the Kern National Wildlife Refuge, which is supported by surface water. Given the lack of groundwater use in this area, it does not qualify as a separate principal aquifer. In contrast, the Tule and Tulare Lake Subbasins define upper and lower principal aquifers due to the E-Clay forming a continuous layer over 60% and 100% of their respective areas. Furthermore, in these

other subbasins, both the upper and lower principal aquifers contribute to agricultural and municipal water supplies.

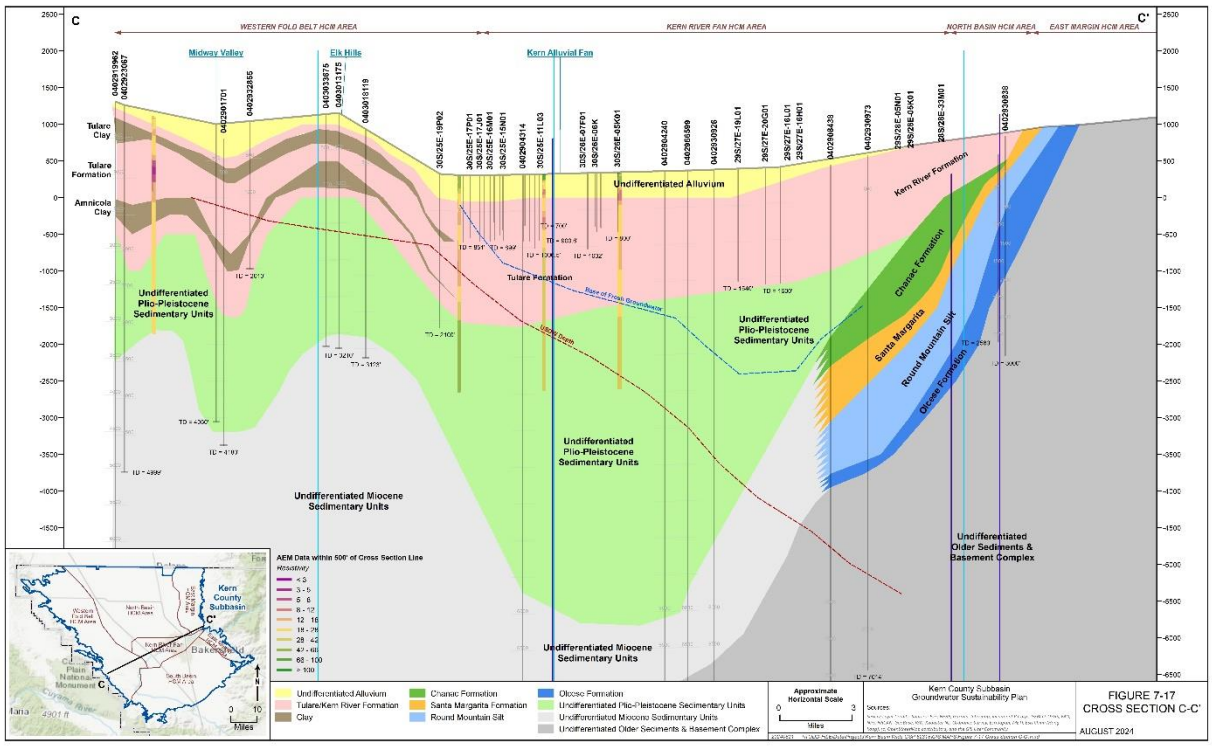


Figure 4. Cross section A-A' comparing showing distribution of clays along the Kern River Fan.

The variability of the E-Clay justifies establishing a single principal aquifer for the alluvial sediments. This is based on a fundamentally sound understanding of the Subbasin-wide hydrogeology. As an example of the hydraulic relationship along the northern fringe of the Subbasin, Figure 5 on the following page shows a series of hydrographs and land subsidence of nearby wells for four areas along Highway 99. The Delano Municipal Airport (Site A) is the furthest northern site within 2 miles of the boundary with the Tule Subbasin and shows examples of zonation among three aquifer zones at variable depth by location. The Highway 99 at Kimberlina Road (Site D) is the farthest southern location and only about 13 miles south of the Delano Airport. At the Delano Municipal Airport site, the groundwater elevations in the shallowest screened zone are higher than the lower zone at times but are nearly the same at other times. This relationship indicates the effects of local zonation as evidenced by increased subsidence at Site A compared to the other three sites that have similar groundwater elevations over the period of record. At the three more southern locations, the difference between the shallower and deeper screened intervals is minimal indicating little to no local zonation in these areas. The smaller magnitude of subsidence observed at the three southern sites compared to Site A is because the E-Clay and lesser clay layers diminish to the south (Figure 4). These wells provide an example of the observed hydraulic response observed in the Subbasin near the Friant-Kern Canal. While localized vertical head differences are present in some areas of the Subbasin, the alluvial aquifer at the Subbasin-scale is

hydraulically connected and can be managed as a single aquifer system.

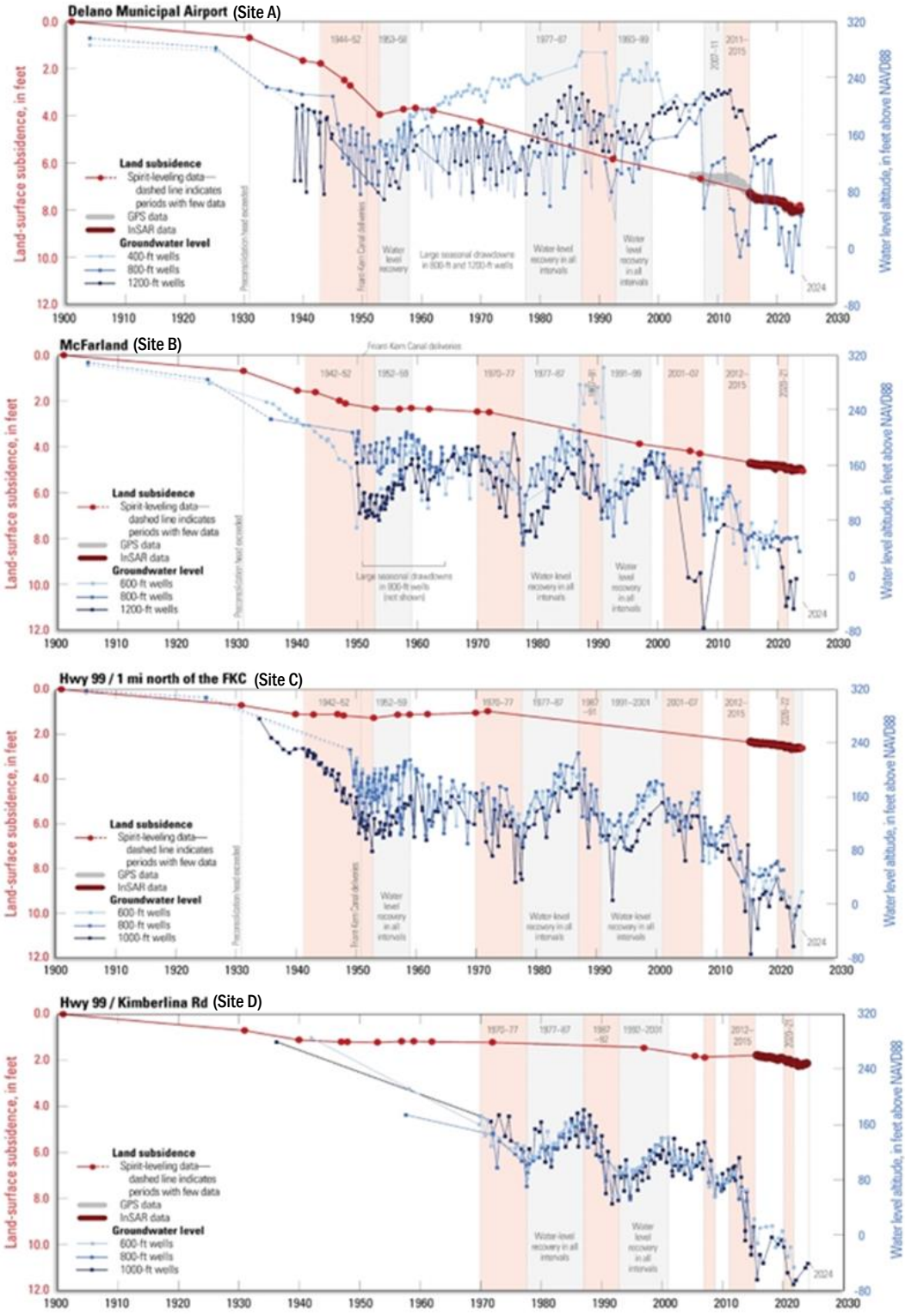


Figure 5. Long-term Groundwater Levels and Land Subsidence (Sites A through D)

Furthermore, the Subbasin did establish the confined Olcese and Santa Margarita

Principal Aquifers in the northeast region of the Subbasin as they represent Miocene sandstone aquifers that are hydraulically separate from the Primary Alluvial Principal Aquifer. The 2024 Plan identifies and includes monitoring for all principal aquifers.

In 2020, the Subbasin recognized that a more comprehensive understanding was needed. With support from a DWR grant, the Kern Subbasin initiated a Basin Study (P/MA KSB-4) in early 2023. The 2024 Plan Basin Setting is the result of in-depth research and model refinement which has provided a comprehensive understanding of the Subbasin. One example is the development of the HCM Areas used in the 2024 Plan. These five areas represent hydrogeologically distinct areas to help organize the HCM discussions to better represent the geological complexity of the Subbasin. In the 2024 Plan, each HCM area is defined in terms of regional hydrology, land use, geology and geologic structure characteristics. The HCM areas are also consistent with the structural regions defined by the USGS (Bartow, 1991) that subdivided the San Joaquin Valley into structural regions based on each regions distinct style of deformation and tectonic history. Figure 6 below shows that relationship of the HCM to the regional hydrology and structural geology.

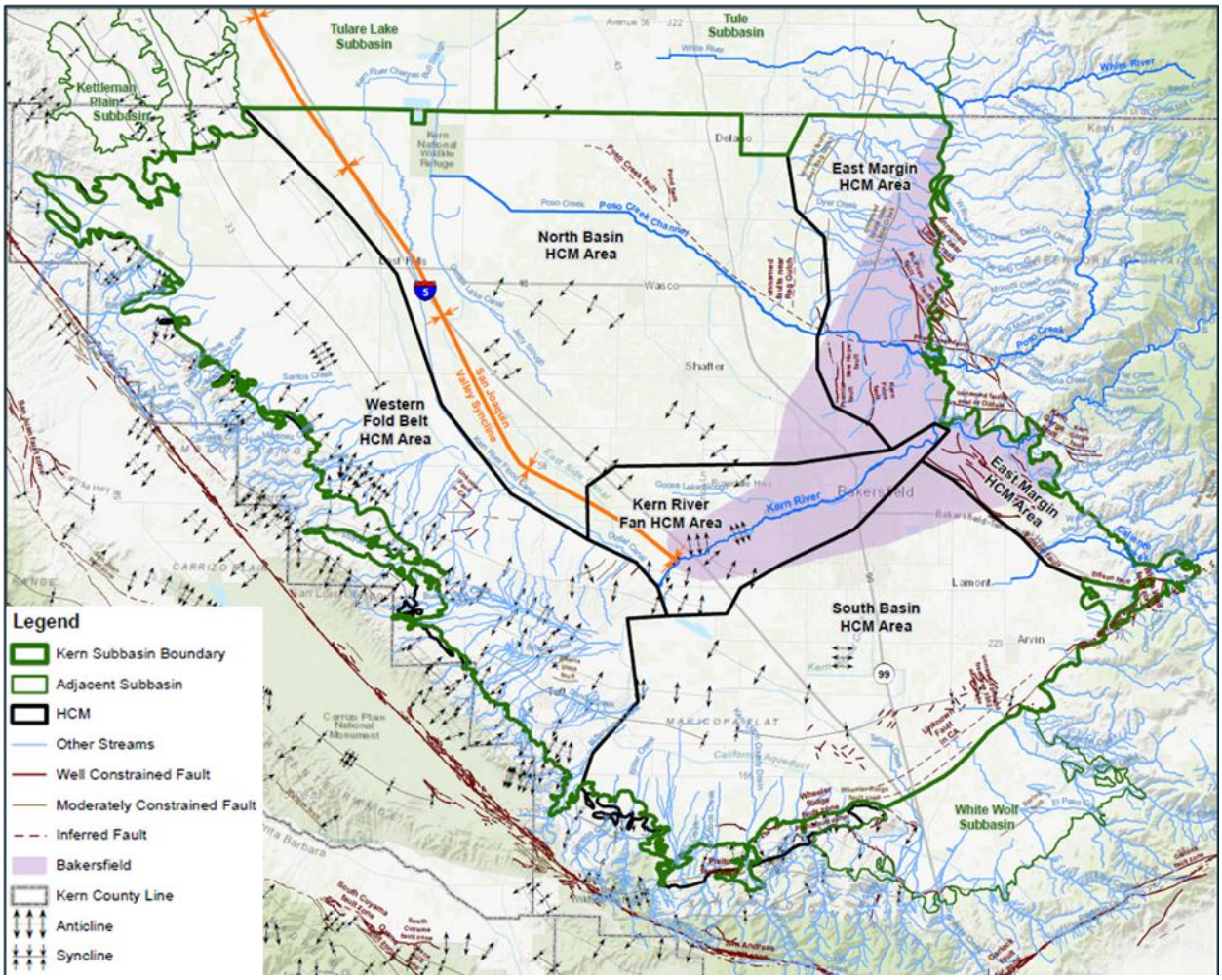


Figure 6. HCM Areas

Again, while we disagree with SWRCB Draft Staff Report's representation of our understanding for the Basin Setting, we acknowledge a data gap in Section 15.5.1 of

the 2024 Plan, where construction data for some monitoring wells is lacking. The monitoring networks were developed to provide an appropriate spatial distribution of monitoring across the Subbasin by principal aquifer following DWR Best Management Practices. While a portion of the representative wells lack construction data, the monitoring networks are representative of groundwater conditions above and below the E-clay and other clay layers and were strategically designed to represent beneficial users throughout the Subbasin. Appendix X (Monitoring Network Data Table) provides a clear description of the aquifer each well represents, the site type (i.e., landowner agricultural supply, public supply, or monitoring) as well as other regulatory programs it's used for (i.e. DDW and ILRP). The Subbasin GSAs are working to rectify the construction details data gap by collecting information for the wells with incomplete data. Completing this data collection effort will further demonstrate that the monitoring networks appropriately represent groundwater conditions and beneficial users throughout the Subbasin.

- *The GSPs state that mitigable subsidence is not considered an undesirable result but do not propose a mitigation plan aside from an external mitigation already being implemented by FWA. The GSPs also propose that subsidence along the CA aqueduct is the result of oil and gas extraction without substantial evidence (2024 Draft Main GSP, ch. 13, p. 75 and 2024 Draft Main GSP, ch. 14, p. 17) (Land Subsidence deficiency).*

As discussed with SWRCB staff, not all subsidence is GSA-related, thus some causes of subsidence are outside the control of the Subbasin. The 2024 Plan shows that the Subbasin has a plan to minimize GSA-related subsidence by 2040, which aligns with the intent of SGMA. The Subbasin proposes to stabilize water levels and minimize subsidence over the implementation period (see Section 13.5.3, Figure 13.31), while managing and mitigating for significant and unreasonable impacts experienced during the implementation period (Section 13.5.2.1.1). As per SGMA regulations, the 2024 Plan has established MTs that avoid URs, defined as "significant and unreasonable land subsidence that substantially interferes with surface land uses" (CWC § 10721(x), SGMA Regulations 354.28(b)(1))".

The 2024 Plan uses a regional, consistent, coordinated, risk-based framework for evaluating and setting subsidence SMCs (Section 13.5). While maintaining a consistent approach and utilizing the best available data/tools, this regional framework also incorporates differences in hydrogeologic conditions, anthropogenic drivers of subsidence, and potential impacts to local/critical infrastructure in different parts of the Subbasin in the final SMC determination (Section 7, Section 8.5).

The 2024 Plan analyzes potential impacts from subsidence to local and critical infrastructure (Section 13.5.2.4) and sets SMCs to avoid significant and unreasonable impacts. To this end, the MTs and MOs are set to minimize subsidence by 2040 and mitigate GSA-related impacts during the implementation period. The Subbasin aims to minimize subsidence by 2040 and limit water level declines in the same period. This is done through a combination of P/MAs having a primary objective of reducing demand for groundwater and a secondary objective of increasing the volume of surface water dedicated to groundwater recharge (Section 14). In areas where subsidence during the implementation period may lead to impacts on local and critical infrastructure, the 2024 Plan has included P/MAs to mitigate these impacts (Section 14.2.3, Appendix T).

The Friant-Kern Canal (FKC) Mitigation alternative (Section 14.2.3 and Appendix T) is coordinated with the Lower Reach Correction project that Friant Water Authority (FWA) is undertaking (See Appendix J for a Letter of Support from the FWA). However, as detailed in Section 14.2.3 and Appendix T, the cost for mitigating undesirable results will be borne by Subbasin GSAs who include several Friant contractors that rely on water supply from the FKC. Moreover, the monitoring and triggers for this mitigation alternative are also managed by the GSAs. Thus, it is not accurate for the SWRCB Draft Staff Report to characterize the mitigation plan as "external mitigation already being implemented by FWA". The GSAs are coordinating closely with the FWA to develop the necessary mitigation measures and the cost-sharing agreement to avoid any future conveyance loss due to GSA-related subsidence along the FKC.

Not all subsidence is GSA-related and thus is outside the control of the Subbasin. For example, data shows there are many places adjacent to the Aqueduct (e.g. Mile Post [MP] 195 - 215) that are caused by non-GSA conditions. The 2024 Plan includes P/MAs (including pumping reductions) to a) stabilize water levels by 2030, b) minimize any GSA-related subsidence by 2040, and c) mitigate potential impacts during the implementation period. The combination of demand reduction and recharge has been demonstrated to keep water levels and subsidence above the minimum thresholds. In addition, the SWRCB Draft Staff Report fails to note that, despite disparate technical evidence indicating GSA-related groundwater extraction is not a contributing factor for Aqueduct subsidence at MP 195 – 215 located adjacent to the Lost Hills Oilfield, the Westside District Water Authority GSA has worked in close consultation with California Aqueduct Subsidence Program (CASP) and local beneficial users to implement two management actions: (1) mandatory groundwater extraction reporting for all wells within close proximity to the CA Aqueduct (i.e., in the CASP Buffer Zone) and (2) a net-zero well drilling moratorium (in the Buffer Zone) that already address the SWRCB Draft Staff Report's potential action LS-2b.

Subbasin GSAs have been working cooperatively with CASP and DWR staff on characterizing and understanding subsidence within the Subbasin for several years. Several studies have been conducted and completed to date. This includes coordination and engagement with DWR SGMA, CASP, California Geologic Energy Management (CalGEM), United States Geological Survey (USGS), and the FWA. These studies have found that there are multiple causes of subsidence in the Subbasin, many of which are not GSA-related. Contrary to the SWRCB Draft Staff Report's comment that "the GSPs also propose that subsidence along the California Aqueduct is the result of oil and gas extraction without substantial evidence", there are multiple studies available in the public domain by various entities including DWR, and westside oil producers that have identified oil extraction and other non-GSA conditions as causes of subsidence at and proximal to the Aqueduct. The 2024 Plan provides a comprehensive description of subsidence drivers in the Subbasin and details the various causes of subsidence, including oil and gas activities and other natural causes of subsidence as supported by InSAR time series and other data. The 2024 Plan presents eight InSAR time series charts representative of different areas-of-interest across the Subbasin, which show distinct patterns associated with various subsidence drivers and can be used to differentiate subsidence as a result of agricultural pumping from oil and gas activities (see Section 8.5.3). Furthermore, this

evidence was previously presented to CASP/DWR and CalGEM on numerous occasions (as documented in Table 2 of Appendix I), and to SWRCB staff during the technical meeting held on 13 December 2023, as detailed in Section 1.2.1.5.

To the extent that the SWRCB staff continues to find that the subsidence approach is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data of your analysis demonstrating why this approach to MT development and coordinated Subbasin management is inconsistent with SGMA regulations and would create significant and unreasonable and unmitigable impacts.

- *Board staff also identified deficiencies in the 2024 Draft GSPs related to degradation of groundwater quality, similar to those observed by Board staff in the 2022 GSPs. For example, when an exceedance occurs with respect to groundwater quality MTs, GSAs will investigate if it is a result of groundwater management actions using statistical and/or spatial analyses between water levels and water quality (2024 Draft GSP, ch 13, p. 55). However, GSPs lack details of what the investigation would entail or potential mitigation measures if the exceedance is determined to be a result of groundwater management (Groundwater Quality deficiency).*

As detailed in the 2024 Plan, the Subbasin's approach to Degraded Water Quality reflects the fact that SGMA does not require GSPs to address degraded water quality URs that occurred before and have not been corrected by January 1, 2015 (CWC § 10727.2(b)(4)) and that "...s*ustainable groundwater management" means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results*." (CWC §10721(v)) (emphasis added). Consistent with these regulations, the Subbasin GSAs have defined "water management actions" as GSA actions related to groundwater recharge or extraction within the Subbasin. As such, the URs definition and associated MT methodology appropriately focus on whether water quality conditions have degraded as a result of water management actions since the enactment of SGMA on January 1, 2015 (Section 13.3.1).

The 2024 Plan establishes water quality MTs based on either the applicable health standard (i.e., MCL) or baseline concentrations. In any instance whereby a semi-annual water quality sample exceeds the MT, the Subbasin's MT Exceedance Policy would be triggered, which requires confirmation sampling and an investigation of site-specific conditions (Section 13.3.1.4, Section 16.2.1, and Appendix W). Details on the exact investigation are not provided in the 2024 Plan because local conditions at the time of a water quality MT exceedance must be taken into account to investigate the cause and possible solutions, and any investigation would be based on historical data (including water level, water quality, and local pumping), documented conditions at the time of sampling including nearby activities, and confirmation sample results. Rather than develop an uninformed process for investigating an MT exceedance, the Subbasin prepared a Standard Operating Procedure (SOP) focused on collecting data necessary to obtain representative data that provides a clear understanding of historical trends and conditions at the time grab samples are collected, which enable the technical team to devise an appropriate protocol when an investigation is needed. This SOP allows the Subbasin technical experts to review water quality data and evaluate the results in a manner consistent with other regulatory programs, which do not require a written protocol for responding to an MCL exceedance. For transparency, all GSAs are alerted

if a well exceeds the water quality MT and the Subbasin will ensure the exceedance is properly investigated.

Furthermore, the Subbasin GSAs have partnered with Kern Water Collaborative (KWC), the entity implementing the CV-SALTS Nitrate Control Program and administering the domestic well sampling program and providing replacement drinking water for residents who are impacted by nitrate above the MCL (Appendix F). The partnerships between GSAs, KWC, and Self-Help Enterprises facilitate collaborative and holistic solutions that avoid duplication of efforts in groundwater monitoring, domestic well testing, well mitigation, and the overarching objective to achieve the Human Right to Water throughout the Subbasin.

To the extent that the SWRCB staff continues to find that the water quality approach is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data of your analysis demonstrating why this approach to MT development and coordinated Subbasin management is inconsistent with SGMA regulations and would create significant and unreasonable and unmitigable impacts.

- *GSAs do not define ISWs or propose monitor for ISWs consistent with the requirements of SGMA (Cal. Code Regs., tit. 23, § 354) (Interconnected Surface Water deficiency).*

The presence or absence of interconnected surface waters (ISW) was systematically evaluated based on the best available data in accordance with the GSP regulations (§ 354.16 (f)) and available DWR Guidance (part 1 of 3). The GSAs relied on ISW mapping provided by DWR in support of SGMA including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley. The identified ISWs in these datasets were reviewed for their active connection to the principal aquifers. As documented in the 2024 Plan, the principal aquifers have limited connection with identified ISWs and do not contribute to Groundwater Dependent Ecosystems (GDEs). However, the continued monitoring of ISWs was included in management actions for several GSAs including Semitropic WSD and Olcese Water District.

DWR is still developing a multi-paper series on ISW and depletions of ISW to provide GSAs with tools to better incorporate quantitative approaches in GSPs. The Kern Subbasin GSAs plans to review and incorporate this guidance when available for inclusion in future periodic evaluations.

To the extent that the SWRCB staff continues to find that the approach to ISWs is deficient and warrants a recommendation for Subbasin probation, we request you provide detailed data or your analysis demonstrating why our approach and coordinated Subbasin management would create significant and unreasonable and unmitigable impacts.

4.2 *Exclusions from Probationary Status*

The State Water Board must exclude from probation any portions of the basin for which a GSA demonstrates compliance with the sustainability goal (Wat. Code, § 10735.2, subd. (e)). Staff believe no GSAs, or members of GSAs, in the subbasin have demonstrated compliance with the sustainability goal. All GSAs have adopted and are implementing six developed GSPs and 12 Management Area Plans, which DWR has determined to be inadequate. Based on DWR's findings and Board staff's thorough review of each GSP and Management Area Plan, Board staff find that no GSP or Management Area Plan has an adequate sustainability goal. Staff therefore recommend that the State Water Board not exclude any portions of the subbasin from the probationary designation at this time.

Given the information provided above and in the following Table, the TWG maintains that the 2024 Plan corrects all deficiencies identified by DWR and that there is no technical basis for SWRCB Staff's recommendation to designate the entire Subbasin as probationary. The TWG's opinion continues to be that the 2024 Plan is highly coordinated, compliant with the SGMA and GSP regulations, and suitable to supersede the 2022 GSPs. It establishes a comprehensive and transparent program for achieving sustainable groundwater management by 2040. Furthermore, the 2024 Plan provides a revised Sustainability Goal for the Subbasin. We therefore recommend the Kern GSAs' request that SWRCB staff conduct a full and fair review of the 2024 Plan prior to developing a recommendation on the regulatory status of the Kern Subbasin. Based on the TWG representatives' collective work and experience in this Subbasin, a probationary designation based on incomplete review of the 2024 Plan would be a disservice to all stakeholders in the Subbasin and would cause irreparable harm to the many families and communities that are dependent on the agriculture-based economy of Kern County.

Attachment B

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Coordination 1 (CRD)-1: Undesirable results and SMC are not coordinated. • **Deficiency CRD-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency CRD-1b** – Sustainable management criteria rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSAs are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, a coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). An Agency may create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the	**DWR Inadequate Determination summary:** Ultimately, the fragmented management area approach to groundwater management, particularly in establishing minimum thresholds and measurable objectives, undermines the GSAs ability to clearly define the Subbasin-wide significant and unreasonable effects they hope to avoid. It is, therefore, unclear to Department staff how or whether the sustainable groundwater management approach described in the Plan will achieve the sustainability goals included in the amended Coordination Agreement (2022 Inadequate Determination). **Board issues:** None	**Potential Action CRD-1a –** Develop consistent, clear undesirable results. **Potential Action CRD-1b –** Use consistent data and methods to develop SMC.	**Deficiency CRD-1 is already corrected within the 2024 Plan that was submitted to the SWRCB for review.** **CRD-1a –** The 2024 Plan has consistent and clear definitions of undesirable results (URs) that are Subbasin-wide. Clear plain language definitions of URs are provided, and supplemented with very specific quantitative criteria (based on impacts to beneficial users) that would trigger an UR: • Water levels: Sections 13.1.1 and 13.1.1.4 • Storage: Sections 13.2.1 and 13.2.1.4 • Water quality: Sections 13.3.1 and 13.3.1.4 • Land subsidence: Sections 13.5.1 and 13.5.1.4 Further, as shown in Table ES-3 and Table 11-1, each sustainability indicator has a consistent UR, Minimum Threshold (MT), and Measurable Objective (MO) definition across the Subbasin, all of which are demonstrated to be protective of (and avoid significant and unreasonable impacts to) beneficial uses and users. **CRD-1b –** All of the Sustainable Management Criteria (SMCs) in the 2024 Plan were developed using consistent data and methodologies across the Subbasin. For example, the Subbasin groundwater level SMCs rely on the same method using one compiled dataset of available historical well-specific data, while necessarily reflecting the differing conditions across the largest Subbasin in California that includes highly variable and complex geology and water use patterns and conditions and distribution of beneficial users. The modeling conducted by the Subbasin demonstrates that the SMCs and planned projects and management actions (P/MAs) will support the Subbasin to avoid URs and achieve the Sustainability Goal. Adoption of the Subbasin MT Exceedance Policy further demonstrates that the GSAs have a plan to proactively address any issues and impacts to beneficial users before they become an UR. Implementation of the coordinated 2024 Well

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
	basin" (Cal. Code Regs., tit. 23, § 350.20).			Mitigation Program further demonstrates that the GSAs are committed to address impacts to beneficial users.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency CRD-2: The Coordination Agreement, GSPs, and Management Area Plans lack key details necessary for coordinated implementation. • **Deficiency CRD-2a** – The Coordination Agreement is not sufficient to address disputes. • **Deficiency CRD-2b** – GSAs do not explain how the multiple plans will satisfy SGMA requirements, particularly for Management Areas.	The coordination agreement should be adopted by all relevant parties, explain how the multiple plans will satisfy SGMA requirements, should ensure that the agreement is binding on all parties and sufficient to address any disputes, and satisfies SGMA requirements (Code Regs., tit. 23, § 355.4, subd. (b)(8) and Cal. Code Regs., tit. 23, §357.4). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	**DWR Inadequate Determination summary:** None **Board issues:** GSP and Coordination agreements do not have a basin wide exceedance policy to properly demonstrate how exceedances are investigated for relevance to SGMA or addressed if driving mechanism is outside of the local management area.	**Potential Action CRD-2a –** The Coordination Agreement should include a basin-wide minimum threshold exceedance plan. **Potential Action CRD-2b –** GSAs should revise plans to demonstrate the necessity and compliance of Management Areas.	Deficiency CRD-2 **not** identified by DWR. **Deficiency CRD-2 is already corrected within the 2024 Plan.** **CRD-2a -** The Subbasin-wide MT Exceedance Policy is included as Appendix W of the Subbasin 2024 Plan. **CRD-2b -** Most Management Areas are no longer relevant. The 2024 Plan relies on GSAs to cover the entirety of the Subbasin. There are two exceptions, with two management areas defined for two GSAs under special circumstances. See Section 10 for details.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency CRD-3 – GSAs in the Subbasin have not demonstrated Basin-wide management.	Any *local agency* –a local public agency with water supply, water management, or land use responsibilities (Wat. Code, § 10721, subd. (n)) – or combination of local agencies overlying a groundwater basin may decide to become a GSA for that basin (Wat. Code, § 10723, subd. (a)). The statute allows some private and non-governmental water entities to *participate* in a GSA, but SGMA does not provide them any additional authorities (Wat. Code, § 10723.6, subd. (b)). Private entities therefore do not have authorities to manage the subbasin, so all areas of a GSA must still be covered by a local agency. GSAs are required to develop "one or more groundwater sustainability plans that will collectively serve as a groundwater sustainability plan for the entire basin" (Water Code § 10735.2, subd. (1)(B)). Portions of high- and medium-priority basins not within the management area of a GSA are considered unmanaged (Water Code § 10724.6, subd. (a)). Groundwater extractors in unmanaged areas must report extractions and pay fees to the State Water Board (Water Code § 10724.6, subd. (b)).	**DWR Inadequate Determination summary:** None **Board issues:** Board staff are concerned that the subbasin may not be able to reach sustainability because it lacks authority to manage pumping across the entire basin. Board staff are unable to properly evaluate basin management due to the complex arrangement of agencies involved and lack of clear detail demonstrating adequate coverage. Board staff note that inadequate coverage could undermine the subbasin's ability to reach sustainability, as pumping could shift to unmanaged areas where no GSA has authority to limit extractions.	**Potential Action CRD-3a –** GSAs should clearly define relationships and responsibilities consistent with SGMA requirements.	Deficiency CRD-3 **not** identified by DWR. **Deficiency CRD-3 is already corrected within the 2024 Plan.** The Subbasin is fully covered by GSAs, as shown in Figure 3-1 of the 2024 Plan. The Kern Non-Districted Land Authority (KNDLA) GSA was established in 2024, with the GSAs participating in the JPA as participating entities. This results in KNDLA GSA having the authority to limit groundwater extraction in unmanaged lands. The "white lands" areas covered by KNDLA GSA have a minimum target P/MA goal of 20,410 AFY (see Table 14-2), which will be addressed primarily through demand management. As discussed in P/MA KSB-6, the KNDLA GSA will establish white lands water budgets necessary to implement a linear demand reduction schedule of 10 percent per year, between 2030-2040. See KSB-6 details in Section 14.2.1 and Appendix D of the 2024 Plan.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Groundwater Level 1 (GL-1) – Groundwater Level undesirable results and SMC are not coordinated. • **Deficiency GL-1a** – Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency GL-1b** – SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding subsidence level deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** The Coordination Agreement requires two conditions to trigger an undesirable result: 1) an MT exceedance must occur in 40% of RMS for four consecutive measurements (at least 2 years) for a management area to contribute to an undesirable result and 2) three adjacent management areas (accounting for at least 15% of basin area) or any management areas accounting for 30% or more of the basin area must be contributing to the undesirable results. DWR found that it "may allow for situations where groundwater conditions could degrade for sustained periods of time for portions of the Subbasin without triggering an undesirable result" (2022 Inadequate Determination, p. 10). DWR also found that the SMC set by each management are, to avoid MA exceedance (40% of MTs for 2 years), were set using various methods and sources and are not easily comparable across plans. **Board issues:** None	**Potential Action GL-1a –** Develop consistent, clear undesirable results. **Potential Action GL-1b –** Use consistent data and methods to develop SMC.	**Deficiency GL-1 is already corrected within the 2024 Plan.** **GL-1a -** See response to CRD-1. As discussed with SWRCB staff, the 2024 Plan completely replaced the prior UR criteria and SMCs. The criteria for triggering URs for groundwater levels are specified based at the Subbasin-level, and have specific quantifiable metrics based on either representative groundwater monitoring or impacts to beneficial users (e.g., well dewatering). The UR criteria are extremely strict and protective of all beneficial users. For example, it would be an UR if more than 15 drinking water wells went dry in a single year across a 1.8 million acre Subbasin that pumps an average of around 1.5 million AFY from approximately 7,200 wells. **GL-1b -** All of the groundwater level SMCs were developed and calculated using the same data and methodologies (i.e., one compiled dataset of available historical well-specific data), while necessarily reflecting the differing conditions across the largest basin in California that includes highly variable and complex geology, water use patterns and conditions, and distribution of beneficial users. The groundwater level SMC values are clearly specified in Table 13-2 and visualized on Figures 13-3, 13-4, 13-12, and 13-13. These table and figures are consistent across all 2024 GSPs.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GL-2 – The GSPs and Coordination Agreement lack necessary detail about well mitigation.	Although SGMA and the GSP Regulations do not require development of a well impact mitigation plan, the State Water Board considers them to be an important component of SGMA implementation to ensure for availability of water for all beneficial uses and users in the subbasin.	**DWR Inadequate Determination summary:** The 2022 GSPs are not implementing or plan to implement a well mitigation plan. **Board issues:** There is a lack of coordination on well mitigation plans for the subbasin and when present, discussion of well mitigation does not contain sufficient detail and is not yet implemented.	**Potential Action GL-2 –** Establish accessible, comprehensive, and appropriately funded well impact mitigation programs that mitigate impacts to wells affected by lowering of groundwater levels and/or degradation of water quality with clear triggers, eligibility requirements, and funding sources.	**Deficiency GL-2 is already corrected within the 2024 Plan.** As discussed with SWRCB staff on 6 March 2024, a Subbasin-wide Well Mitigation Program is under final development. Subbasin GSAs have signed a letter of intent with Self-Help Enterprises to help develop and administer a well mitigation program, see Appendix K of the 2024 Plan. A well mitigation subcommittee is concluding work on the Subbasin well mitigation program with a target implementation date of January 2025. Water quality mitigation is under development through the Subbasin's memorandum of understanding (MOU) with the Kern Water Collaborative, which is the lead entity responsible for providing nitrate sampling and mitigation to wells owners with nitrate above the MCL (See Appendix F of the 2024 Plan) and a Letter of Intent with Self-Help Enterprises, who offers implementations services (See Appendix K of the 2024 Plan).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GL-3 – The GSPs do not describe a feasible path for halting chronic lowering of groundwater levels.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The description must include project and management actions, a summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions. The GSP must also describe the criteria that would trigger implementing or stopping a project or management action and the process for determining whether that trigger has occurred (Cal. Code Regs., tit. 23, § 354.44). More fundamentally, for basins in a condition of overdraft, the GSP "shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft" (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(2)) GSPs need to include a description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(9)). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" and "whether the projects and management actions are feasible and likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield" (Cal. Code Regs., tit. 23, § 355.4, subds. (b)(3), (5)).	**DWR Inadequate Determination summary:** The 2022 GSPs do not demonstrate feasibility of projects, but they rely heavily on projects to demonstrate future sustainability. DWR notes in its 2022 Inadequate Determination that the GSPs rely on more than 180 projects and management actions to reach sustainability and that, without these projects and management actions, "extractions would exceed the estimated sustainable yield by 25 to 34 percent" (2022 Inadequate Determination, p. 32). **Board issues:** Demand management actions in the 2022 GSP appear voluntary and therefore unlikely to provide sufficient contingency in case GSAs fail to secure new supplies or overdraft is greater than estimated.	**Potential Action GL-3a –** Evaluate the feasibility of proposed supply augmentation projects. **Potential Action GL-3b –** Develop basin-wide allocations or utilize another demand management structure to help bring the subbasin into balance and meet basin sustainability goals. **Potential Action GL-3c –** Identify key indicator wells in each aquifer, with sufficient spatial coverage to represent beneficial uses and users in each aquifer and identify groundwater levels that will trigger specific demand management.	**Deficiency GL-3 is already corrected within the 2024 Plan or not applicable.** **GL-3a –** The 2024 Plan includes 762,000 AFY of P/MAs by 2040, 80% of which are a result of demand management. Modeling conducted to represent and quantify the benefits of these P/MAs indicates that these P/MAs will be more than enough to achieve the Subbasin's Sustainability Goal, even under climate change. **GL-3b –** Several GSAs have already implemented groundwater allocations within their boundaries to address local deficits (e.g., the Semitropic WSD and Rosedale Rio Bravo WSD GSAs). Noting that in some cases these GSAs are larger than entire groundwater basins. Some other GSAs have a balanced water budget and/or conduct almost no groundwater extraction. These examples show why a basin-wide allocation is not applicable or appropriate in a Subbasin as large and complex as Kern. **GL-3c –** The Subbasin's updated Representative Monitoring Network (RMN) presented in Section 15 of the 2024 Plan coupled with the MT Exceedance Policy (see Appendix W of the 2024 Plan) achieves this objective.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Land Subsidence 1 (LS-1) – Land Subsidence undesirable results and SMC are not coordinated. • **Deficiency LS-1a** – Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency LS-1b** – SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding subsidence level deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** The DWR Inadequate Determination found that GSPs and Management Area plans did not consistently identify critical infrastructure. DWR further notes that, "[s]ome GSPs or management area plans defined Management Area Critical Infrastructure but did not develop sustainable management criteria…" (ibid, p. 38). **Board issues:** Board staff agree and further note that GSPs and Management Areas do not consistently define "significant and unreasonable," as evidenced by evidence in text and additional inconsistent definitions of the quantitative undesirable results.	**Potential Action LS-1a –** Develop consistent, clear undesirable results. **Potential Action LS-1b –** Use consistent data and methods to develop subsidence MTs.	**Deficiency LS-1 is already corrected within the 2024 Plan.** See response to CRD-1. To reiterate, the 2024 Plan submitted to the SWRCB for review completely replaced the prior UR criteria and SMCs. Per the 2024 Plan, the Kern Subbasin is using a regional, consistent, coordinated, risk-based framework for the evaluation of subsidence undesirable results and SMCs. While using best available and consistent subsidence datasets the framework also accounts for differences in sub-regional hydrogeology (Section 7), causes of subsidence (Section 8.5.2), and risk/severity of historical and future magnitude and impacts from subsidence on GSA and Regional infrastructure (Sections 8.5.1, 8.5.3 and 13.5.2.1) in the final SMC determination. See Section 13.5 of the 2024 Plan for additional details on the approach for definition of URs, MTs, MOs, and interim milestones for Land Subsidence in the Kern Subbasin. **LS-1a —** Consistent with the regulatory requirements under SGMA, Section 13.5.1 of the 2024 Plan has clearly defined actionable criteria for responding to URs from land subsidence impacts on beneficial users and regional and GSA-specific infrastructure (Section 13.5.1.1). The URs have specific quantifiable metrics (Section 13.5.1.4) based on representative land subsidence monitoring (utilizing DWR's regional InSAR dataset and other local subsidence data) that consider potential impacts to beneficial users (Section 13.5.1.2) as well as the causes of the undesirable results (Section 13.5.1.3). **LS-1b** –Consistent with the regulatory requirements under SGMA, Section 13.5.2 and 13.5.3 present a regionally coordinated and consistent approach to the development of GSA-related subsidence MTs, MOs, and interim milestones. It is important to note that the Kern Subbasin aims to stabilize water levels by 2030 and minimize subsidence by 2040

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
				(accounting for residual subsidence after water levels stabilize), which is the statutory intent of SGMA. The subsidence SMCs have been developed to avoid significant and unreasonable impacts on infrastructure and, where needed, necessary mitigation measures to address impacts during the implementation period (Section 13.5.2.1.1, 14.2.3, and Appendix T). These SMCs were coordinated with Friant Water Authority (FWA) (see Appendix J for a Letter of Support from the FWA), the California Aqueduct Subsidence Program (CASP), as well as other key stakeholders. Moreover, Sections 13.1.2.2 and 13.5.2.2. of the 2024 Plan demonstrate the consistency between water levels and subsidence SMCs. As demonstrated in these sections, subsidence associated with groundwater level declines to Chronic Lowering of Groundwater Level MTs is not projected to exceed the established Land Subsidence MTs. The approach and metrics for water level and subsidence SMCs were also presented to the SWRCB Staff during several meetings (6/23/2023, 10/4/2023, 11/1/2023, 12/1/2023, 4/3/2024).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency LS-2 – The GSPs do not provide adequate implementation details.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The description must include project management actions, summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions (Cal. Code Regs., tit. 23, § 354.44). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" and "whether the projects and management actions are feasible and likely to prevent undesirable results and ensure that the basin is operated within its sustainable yield" (Cal. Code Regs., tit. 23, § 355.4, subd. (b)(3), (5)).	**DWR Inadequate Determination summary:** None. **Board issues:** The 2022 Coordination Agreement does not provide details about projects and management actions to slow subsidence for both regional and Management Area critical infrastructure. The 2022 Coordination Agreement states that "it is apparent that key data gaps pertaining to the various causes and rates of subsidence in the [Kern County Subbasin] still remain and that further study is needed to better define realistic management objectives for the [Subbasin]." (2022 Amended Coordination Agreement, pdf, p. 356).	**Potential Action LS-2a –** Develop and implement a plan to trigger sufficient management actions when subsidence exceeds defined thresholds, especially near critical infrastructure/facilities. **Potential Action LS-2b –** Reduce pumping and do not allow new wells in areas where subsidence threatens critical infrastructure. **Potential Action LS-2c –** Develop infrastructure mitigation programs with clear triggers, eligibility requirements, metrics, and funding sources.	Deficiency **not** identified by DWR. **Deficiency LS-2 is corrected within the 2024 Plan.** **LS-2a** - Sections 13.5.1.4, 13.5.2.1.1, 14.2.4, and Appendix W of the 2024 Plan detail the MT Exceedance Policy, which includes discussion of measures and actions taken when water level, subsidence, and other MTs are exceeded in the Kern Subbasin. **LS-2b** - The 2024 Plan includes P/MAs (including pumping reductions) to a) stabilize water levels by 2030, b) minimize GSA-related subsidence by 2040, and c) mitigate potential impacts during the implementation period. The combination of demand reduction and recharge has been demonstrated to keep water levels and subsidence above the minimum thresholds. Furthermore, GSAs have already initiated P/MAs to protect Regional Critical Infrastructure. For example, WDWA GSA has a well moratorium P/MA that results in no additional wells within the 2.5-mile CASP Aqueduct Buffer Zone) and that all new replacement wells in the CASP Buffer Zone be metered. Other GSAs with Regional Critical Infrastructure within their jurisdiction continue to assess developing similar P/MAs. **LS-2c** - Section 14.2.3 and Appendix T of the 2024 Plan includes discussion of mitigation along the FKC, which is the only infrastructure currently identified within the Kern Subbasin that may have significant and unreasonable impacts from subsidence due to GSA activities during the implementation period (2015 – 2040). Work on the FKC mitigation program is under development, with collaboration and support of Friant Water Authority (See Appendices J and T of the 2024 Plan). With respect to potential actions **LS-2a – LS-2c**, it is important to note that there are multiple causes of subsidence in the Subbasin and not all subsidence can be attributed to causes in which the GSAs have the authority to control ("GSA-related"). The Subbasin has conducted several studies and

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
				worked cooperatively with DWR, CASP, CALGEM, and the FWA to identify and monitor subsidence causes and rates within the respective buffer zones for the California Aqueduct and Friant-Kern Canal. These drivers of subsidence and the implications of non-GSA related activities on future subsidence and subsidence SMCs were also presented to the SWRCB Staff during the 13 December 2023 technical meeting. These causes of subsidence with references to the historical studies are detailed in Section 8.5.2 of the 2024 Plan. The 2024 Plan lays out the various causes of subsidence in the Kern Subbasin and establishes protective MTs across the Subbasin while establishing P/MAs and mitigation measures to manage GSA-related activities and their potential impact on subsidence. For example, the Subbasin has utilized InSAR time series and other data to refine subsidence data and to help differentiate between GSA and Non-GSA related subsidence between Aqueduct Milepost (MP) 195 and 215, an area of identified subsidence and concentrated non-GSA extraction activity. To help ameliorate subsidence rates in this area of interest the WDWA GSA has proactively implemented a P/MA that requires no net increase in GSA wells in the buffer zone between MP 195 and 215 and that all replacement wells be metered among other measures. The subject P/MAs are described in Section 14.2 of the 2024 Plan.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Groundwater Quality 1 (GWQ-1) – Groundwater Quality undesirable results and SMC are not coordinated. • **Deficiency GWQ-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented. • **Deficiency GWQ-1b –** SMC rely on inconsistent datasets and methodologies.	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6 by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).	This is the corresponding groundwater quality deficiency for coordination deficiency CRD-1. **DWR Inadequate Determination summary:** Not specific to groundwater quality, see CRD - 1. **Board issues:** Board staff agree and elaborate that the fragmented approach for setting SMC would result in localized disproportional impacts in the subbasin without triggering undesirable results. The fragment approach is further exacerbated by lack of coordination between GSAs using inconsistent data and methodologies for monitoring groundwater quality throughout the subbasin.	**Potential Action GWQ-1a –** Develop consistent, clear undesirable results. **Potential Action GWQ-1b –** The GSPs should use consistent data and methods to develop groundwater level MTs.	Deficiency **not** identified by DWR. **Deficiency GWQ-1 is already corrected within the 2024 Plan.** See response to CRD-1. Additionally, the 2024 Plan includes a water quality monitoring program that is coordinated with groundwater level monitoring (refer to Section 15.3 Monitoring Protocols and Appendix Z. Water Quality Sampling SOP). The monitoring network identifies wells that will be used to evaluate the relationship between sustainability indicators (i.e. water quality, subsidence, and groundwater levels) and the monitoring protocols and SOP specify a coordinated approach to data collection.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GWQ-2 – Groundwater quality monitoring networks are not consistent with SGMA requirements. • **Deficiency GWQ-2a –** The Monitoring Networks are not protective of all beneficial uses and users in the subbasin. • **Deficiency GWQ-2b –** Data collection sampling frequencies are sometimes inadequate. • **Deficiency GWQ-2c –** It is unclear how monitoring networks are monitoring for recharge projects.	The GSP Regulations require GSPs to include a description of the monitoring network objectives for the basin including how the GSA will "monitor impacts to the beneficial uses or users of groundwater" (Cal. Code Regs., tit. 23, § 354.34, subd. (b)(2)). The monitoring network must be "capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate [GSP] implementation" (Cal. Code Regs., tit. 23, § 354.34, subd. (a)). Data collected must be of "sufficient quality, frequency, and distribution" to characterize and evaluate groundwater conditions (Cal. Code Regs., tit. 23, § 354.32). GSAs "may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin...", known as RMSs (Cal. Code Regs., tit. 23, § 354.36). GSAs identify MTs, MOs, and Interim Milestones at these sites. "The designation of [an RMS] shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area" (Cal. Code Regs., tit. 23, § 354.36, subds. (a) & (c)).	**DWR Inadequate Determination summary:** None. **Board issues:** Board staff find that the GSPs monitoring networks are not protective of beneficial uses and users and do not promote the sufficient quality and collection of data, frequency, and distribution to characterize groundwater quality conditions and evaluate changing conditions that occur throughout the implementation of the GSP.	**Potential Action GWQ-2a –** GSAs should add additional wells to monitoring well networks. **Potential Action GWQ-2b –** Revise GSPs and monitoring well networks and exercise coordination with existing regulatory programs to meet the goals of SGMA. **Potential Action GWQ-2c –** GSAs should define RMS that will be used to ensure PMAs do not impact groundwater quality in the Subbasin.	Deficiency **not** identified by DWR. **Deficiency GWQ-2 is already corrected within the 2024 Plan.** **GWQ-2a -** The Subbasin GSAs added water quality RMWs across the Subbasin with consideration (density and distribution) of beneficial users and with sufficient data collection frequency (i.e., seasonal high and seasonal low). **GWQ-2b -** The water quality monitoring network was strategically developed to include representative wells from existing water quality regulatory programs such as the Irrigated Lands Regulatory Program (ILRP) and public supply wells regulated by Division of Drinking Water (DDW). The IRLP wells have been vetted by the Central Valley Regional Board as representing first encountered groundwater quality. Additionally, the monitoring and reporting protocols state that public data from ILRP and DDW programs will be used, in addition to data collected by the GSAs, to evaluate groundwater conditions annually. The Subbasin's annual report to DWR will include a comprehensive summary of all data. **GWQ-2c -** The 2024 Plan also identifies water quality RMWs to represent the relationships between sustainability indicators (i.e. subsidence) and near key recharge facilities (i.e., P/MAs).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency GWQ-3 – Management actions are not responsive to water quality degradation. • **Deficiency GWQ-3a –** Additional sampling is not triggered when Minimum Thresholds are exceeded. • **Deficiency GWQ-3b –** Well mitigation plans don't address water quality degradation.	Each GSP is required to include a description of the projects and management actions the GSA has determined will achieve groundwater sustainability in the basin. The GSAs must include projects and management actions "that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent" (Cal. Code Regs., tit. 23, § 354.44, subd. (b)(1)). The description must include project and management actions, a summary of data used to support proposed actions, and a review of the uncertainty associated with the basin setting when developing projects or management actions (Cal. Code Regs., tit. 23, § 354.44). In reviewing GSPs, DWR must consider, among other questions, "whether sustainable management criteria and projects and management actions are commensurate with the level of understanding of the basin setting, based on the level of uncertainty, as reflected in the plan" (Cal. Code Regs., tit. 23, § 355.4, subd. (b)(3)).	**DWR Inadequate Determination summary:** None. **Board issues:** To ensure the human right to water, GSAs should develop mitigation plans for sustainability indicators impacted by basin management. Board staff note that elevated concentrations of arsenic, nitrate, uranium, gross alpha, 1,2,3,-Trichloropropane, and other constituents detected above regulatory thresholds in the Subbasin can severely impact human health (See Table 3-2). Given the potential for these exceedances to occur, GSAs do not propose PMA to mitigate for groundwater quality exceedances as a result of groundwater management activities in the Subbasin.	**Potential Action GWQ-3a –** Plan additional sampling when water quality is degraded. **Potential Action GWQ 3b** is addressed by Groundwater Level Potential Action GL-2.	Deficiency **not** identified by DWR. **Deficiency GWC-3 is already corrected within the 2024 Plan.** The 2024 Plan includes water quality SMCs and semi-annual monitoring for total dissolved solids, arsenic, nitrate and nitrite, uranium, and 1,2,3-TCP. Confirmation sampling is required if an MT exceedance occurs (refer to Section 13.3.1 and Appendix Z. Water Quality Sampling SOP).

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
Deficiency Interconnected Surface Water 1 (ISW-1) – Interconnected Surface Water undesirable results and SMC are not coordinated. • **Deficiency ISW-1a –** Undesirable results are poorly described, unworkably complex, and inconsistently implemented	SGMA requires that "Agencies intending to develop and implement multiple plans pursuant to Water Code § 10727(b)(3) shall enter into a coordination agreement to ensure that the Plans are developed and implemented utilizing the same data and methodologies…", and Regulations requires that "elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting" (Cal. Code Regs., tit. 23, § 357.4, subd. (a)). In identifying ISWs, GSP Regulations state that ISWs refer to "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted," (Cal. Code Regs., tit. 23, § 351, (o)). The GSP Regulations require GSAs to provide "Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information," (Cal. Code Regs., tit. 23, § 354.16, (f)). Where ISWs are identified, GSPs define ISW undesirable results unless they demonstrate that ISWs undesirable results are "not present and are not likely to occur…" (Cal. Code Regs., tit. 23, §354.26, (d)). In defining undesirable results, GSA are required to "describe the process and criteria relied upon do define undesirable results [that would occur when significant and unreasonable effects are caused by groundwater condition in the Subbasin]" (Cal. Code Regs., tit. 23, § 354.26, subd. (a)). The undesirable result definition should include the cause of groundwater conditions occurring throughout the Subbasin that has or may lead to an undesirable result, the criteria used to define when and where the effects of groundwater conditions cause undesirable results, and the impacts on beneficial uses and users (Cal. Code Regs., tit. 23, § 354.26 subd. (b)). In establishing SMC, GSAs must "establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26." (Cal. Code Regs. tit. 23 § 354.28). Discussion of the MTs should include among other things the "relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators." (Cal. Code Regs. tit. 23 § 354.28). Undesirable results and SMC should be consistent with key details in the Coordination Agreement. Agencies should describe how they use the same data and methodologies for assumptions described in Water Code § 10727.6	**DWR Inadequate Determination summary:** None. **Board issues:** This is the corresponding Interconnected Surface Water level deficiency for CRD-1. Deficiency CRD-1 concerns undesirable results and SMC that are poorly coordinated across the subbasin. And, Despite the fact that GSAs and Management areas claim there is no ISW and therefore no potential undesirable results, the methods used to determine that there are no potential undesirable results are inconsistent. And in some cases, the GSPs do not provide adequate technical justification to demonstrate ISW is not present in the subbasin.	**Potential Action ISW-1a –** Revise GSPs to use best available consistent Data and Methodologies to evaluate for ISW.	Deficiency ISW-1 **not** identified by DWR. **Deficiency ISW-1 is already corrected within the 2024 Plan.** The presence or absence of interconnected surface waters (ISW) was systematically evaluated based on the best available data in accordance with the GSP regulations (§ 354.16 (f)) and available DWR Guidance (part 1 of 3). The GSAs relied on ISW mapping provided by DWR in support of SGMA including the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset and ICONS: Interconnected Surface Water in the Central Valley. The identified ISWs in these datasets were reviewed for their active connection to the principal aquifers. As documented in the 2024 Plan, the principal aquifers have limited connection with identified ISWs and do not contribute to Groundwater Dependent Ecosystems (GDEs). Undesirable results from ISWs are identified as "not present and are not likely to occur…" (Cal. Code Regs., tit. 23, §354.26, (d)). However, the continued monitoring of ISWs was included in management actions for several GSAs including Semitropic WSD and Olcese Water District. DWR is still developing a multi-paper series on ISW and depletions of ISW to provide GSAs with tools to better incorporate quantitative approaches in GSPs. The Kern Subbasin GSAs plans to review and incorporate this guidance when available for inclusion in future periodic evaluations.

Comparison of Identified Deficiencies, SGMA Requirements, and Potential Corrective Actions				
Deficiency	**SGMA Requirements**	**Deficiency Summary**	**Potential Actions to Correct the Deficiency**	**Recommendation re Kern GSAs' Response**
	by including monitoring objectives, coordinated basin water budget, and sustainable yield for the basin supported by a description of an undesirable result for the basin, and an explanation of how the minimum threshold and measurable objectives relate to the undesirable result (Cal. Code Regs., tit. 23, § 357.4, subd. (b)(3)). The coordination agreement shall also explain how the Plans implemented together, satisfy the requirements of the Act (Cal. Code Regs., tit. 23, § 357.4, subd. (c)). GSP Regulations allow agencies to create "one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin" (Cal. Code Regs., tit. 23, § 350.20).			