



CALIFORNIA DEPARTMENT OF WATER RESOURCES

# SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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March 2, 2023

Mark Larsen  
Greater Kaweah Groundwater Sustainability Agency  
2975 N. Farmersville Rd  
Farmersville, CA 93223  
[mlarsen@kdwcd.com](mailto:mlarsen@kdwcd.com)

RE: Inadequate Determination of the Revised 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kaweah Subbasin

Dear Mark Larsen,

The Department of Water Resources (Department) has evaluated the three groundwater sustainability plans (GSPs) submitted for the San Joaquin Valley – Kaweah Subbasin (Subbasin), as well as the materials considered to be part of the required coordination agreement. Collectively, the three GSPs and the coordination agreement are referred to as the Plan for the Subbasin. The Department has evaluated the revised Plan for the Kaweah Subbasin in response to the Department's incomplete determination on January 28, 2022 and has determined that the actions taken to correct deficiencies identified by the Department were not sufficient (23 CCR § 355.2(e)(3)(C)).

The Department based its inadequate determination on recommendations from the Staff Report, included as an enclosure to the attached Statement of Findings, which explains why the Department believes that the Subbasin's Plan did not take sufficient actions to correct the deficiencies previously identified by the Department and, therefore, does not substantially comply with the GSP Regulations nor satisfy the objectives of the Sustainable Groundwater Management Act (SGMA).

Once the Department determines that a GSP is inadequate, primary jurisdiction shifts from the Department to the State Water Resources Control Board (State Board), which may designate the basin probationary (Water Code § 10735.2(a)). However, Department involvement does not end at that point; the Department may, at the request of the State Board, further assess a plan, including any updates, and may provide technical recommendations to remedy deficiencies to that plan. In addition, the responsibilities of the GSA do not end with an inadequate determination. Regardless of the status of a plan, a GSA remains obligated to continue collecting and submitting monitoring network data (Water Code Part 2.11; Water Code § 10727.2; 23 CCR § 353.40; 23 CCR § 354.40), submit an annual report to the Department (Water Code § 10728; 23 CCR § 356.2), conduct periodic updates to the plan at least every five years (Water Code § 10728.2; 23 CCR § 356.4), and submit this information to DWR's SGMA

Portal (23 CCR § 354.40). The Department also encourages GSAs to continue implementation efforts on project and management actions that will support the Subbasin's progress towards achieving sustainability.

Prior to this determination, the Department consulted with the State Board as required by SGMA (Water Code § 10735.2(a)(3)). Moving forward, for questions related to state intervention, please send a request to [sgma@Waterboards.ca.gov](mailto:sgma@Waterboards.ca.gov). For any questions related to assessments, the State Board will coordinate with the Department.

For any other questions, please contact Sustainable Groundwater Management staff by emailing [sgmps@water.ca.gov](mailto:sgmps@water.ca.gov).

Thank You,

*Paul Gosselin*

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Paul Gosselin  
Deputy Director  
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Inadequate Determination of the San Joaquin Valley – Kaweah Subbasin Groundwater Sustainability Plans

**STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES**

**STATEMENT OF FINDINGS REGARDING THE  
DETERMINATION OF INADEQUATE STATUS OF THE  
KAWEAH SUBBASIN  
GROUNDWATER SUSTAINABILITY PLAN**

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) If a Plan is determined to be Incomplete, the Department identifies deficiencies that preclude approval of the Plan and identifies corrective actions required to make the Plan compliant with SGMA and the GSP Regulations. The GSA has up to 180 days from the date the Department issues its assessment to make the necessary corrections and submit a revised Plan. (23 CCR § 355.2(e)(2)).

This Statement of Findings explains the Department's decision regarding the resubmitted Plan, comprised of three (3) individual GSPs and a Coordination Agreement prepared and submitted respectively, by the following three (3) GSAs: East Kaweah GSA, Greater Kaweah GSA, and Mid-Kaweah GSA (GSAs or Agencies) for the Kaweah Subbasin (Basin No. 5-022.11).

Department management has discussed the Plan with staff and has reviewed the Department Staff Report, entitled Sustainable Groundwater Management Program Groundwater Sustainability Plan Assessment Staff Report, attached as Exhibit A, recommending an inadequate determination of the Plan. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the resubmitted Plan and concurs with staff's recommendation. The Department therefore finds the revised Plan **INADEQUATE** and makes the following findings:

- A. The initial Plan for the Subbasin submitted by the GSA for the Department's evaluation satisfied the required conditions as outlined in regarding the submission deadline, completeness, coordination, and Basin coverage, as outlined in § 355.4(a) of the GSP Regulations (23 CCR § 350 et seq.), and Department Staff therefore evaluated the initial Plan.
- B. On January 28, 2022, the Department issued a Staff Report and Findings determining the initial GSP submitted by the Agencies for the basin to be

## Statement of Findings

San Joaquin Valley – Kaweah Subbasin (Basin No. 5-022.11)

March 2, 2023

incomplete, because the GSP did not satisfy the requirements of SGMA, nor did it substantially comply with the GSP Regulations. At that time, the Department provided corrective actions in the Staff Report that were intended to address the specific deficiencies that precluded approval. Consistent with the GSP Regulations, the Department provided the Agencies with up to 180 days to address the deficiencies detailed in the Staff Report. On July 27, 2022, within the 180 days provided to remedy the deficiencies identified in the Staff Report related to the Department's initial incomplete determination, the Agencies resubmitted a revised GSP to the Department for evaluation. When evaluating a revised GSP that was initially determined to be incomplete, the Department reviews the materials (e.g. revised or amended GSP) that were submitted within the 180-day deadline and does not review or rely on materials that were submitted to the Department by the GSA after the resubmission deadline. Furthermore, the Department does not conduct a full evaluation of all components of a resubmitted Plan, but rather focusses on how the Agency has addressed the previously identified deficiencies that precluded approval of the initially submitted Plan. The Department shall find a Plan previously determined to be incomplete to be inadequate if, after consultation with the State Water Resources Control Board, the Agency has not taken sufficient actions to correct the deficiencies previously identified by the Department. (23 CCR § 355.2(e)(3)(C).)

- C. The Department's initial Staff Report identified the deficiencies that precluded approval of the initially submitted Plan. After staff's thorough evaluation of the resubmitted Plan, the Department makes the following findings regarding the sufficiency of the actions taken by the Agency to correct those deficiencies:

1. Deficiency 1: The corrective action advised the Agencies to define sustainable management criteria for the chronic lowering of groundwater levels. The corrective action also advised the Agencies that if the GSPs intend to rely on mitigation actions to address impacts as a means to support the reasonableness of their sustainable management criteria then the GSPs should be revised to include specific details that will allow the Department to assess their feasibility and likely effectiveness. It is never expressly made clear what specific conditions the Plans are meant to avoid, which causes uncertainty in how the basin will be managed to achieve sustainability and precludes or impairs the Department's ability to evaluate the likelihood of the Plan to attain sustainability goals, and would prevent the Department and the public at large from monitoring progress towards any sustainability goal under that Plan. The minimum thresholds selected have not been selected based on the avoidance of undesirable results and significant and unreasonable impacts to beneficial uses and users. The Plan does not consider how minimum thresholds developed for one sustainability indicator will affect other related sustainability indicators.

## Statement of Findings

San Joaquin Valley – Kaweah Subbasin (Basin No. 5-022.11)

March 2, 2023

Also, the level of commitment to the Mitigation Framework and Mitigation Plans is unclear to the Department and the Department is unable assess the feasibility and likely effectiveness of the mitigation program(s). The Staff Report indicates that the Agencies did not take sufficient actions to correct this deficiency, which materially affects the ability of the Agencies to achieve sustainability and the ability of the Department to evaluate the likelihood of the Plan to achieve sustainability.

2. Deficiency 2: The corrective action advised the Agencies to define sustainable management criteria for the Mid-Kaweah Groundwater Sustainability Agency and Greater Kaweah Groundwater Sustainability Agency areas, and explain how minimum thresholds in the vicinity of identified critical infrastructure (i.e. the Friant Kern Canal) will not substantially interfere with the Canal's use. The Plan does not explain how it was determined that approximately 10 inches or greater amount of subsidence would result in a 10% or more capacity loss in the Subbasin's conveyance infrastructure. Department staff are still not fully able to evaluate how the management criteria for chronic lowering of groundwater levels will affect potentially localized inelastic subsidence which is a permanent condition in relation to water levels that may decline and rebound over time. The Staff Report indicates that the Agencies did not take sufficient actions to correct this deficiency, which materially affects the ability of the Agencies to achieve sustainability and the ability of the Department to evaluate the likelihood of the Plan to achieve sustainability.
3. Deficiency 3: The corrective action advised the Agencies to define sustainable management criteria for the East Kaweah Groundwater Sustainability Agency and Greater Kaweah Groundwater Sustainability Agency areas or if the GSAs do not have sufficient information at this time, they should identify depletion of interconnected surface water as a data gap and provide a plan to close the data gap as soon as possible. The resubmitted GSPs identify data gaps and propose the creation of a Work Plan culminating in the incorporation of key data into the 2025 GSP Update and set preliminary sustainable management criteria to be refined upon further research and data collection. While not yet fully consistent with the requirements of the GSP Regulations, the Agencies' efforts to address this deficiency are sufficient at this time, although further efforts and revisions will be required in subsequent GSP updates to align the sustainable management criteria for interconnected surface water with the GSP Regulations and Department guidance.

D. In addition to the grounds listed above, the Department also finds that:

## Statement of Findings

San Joaquin Valley – Kaweah Subbasin (Basin No. 5-022.11)

March 2, 2023

1. The Department developed its GSP Regulations consistent with and intending to further the state policy regarding the human right to water (Water Code § 106.3) through implementation of SGMA and the Regulations, primarily by achieving sustainable groundwater management in a basin. By ensuring substantial compliance with the GSP Regulations the Department has considered the state policy regarding the human right to water in its evaluation of the Plan. (23 CCR § 350.4(g).)
2. The California Environmental Quality Act (Public Resources Code § 21000 *et seq.*) does not apply to the Department's evaluation and assessment of the Plan.

SGMA requires basins to achieve sustainability within 20 years of Plan implementation and requires local GSAs and the Department to continually evaluate a basin's progress towards achieving its sustainability goals. SGMA also requires GSAs to encourage the active involvement of diverse social, cultural, and economic elements of the population within each basin prior to and during development and implementation of Plans. Under SGMA, the GSP is the primary document disclosing and informing the Department, local GSA boards, other local and state agencies, and interested or affected parties of the intended management program for the basin and the potential physical or regulatory impacts or changes that may occur within the basin during decades of Plan implementation. It is therefore essential that each basin begin with a Plan that adequately analyzes, discloses, and informs and that each Plan conform with certain requirements of SGMA and substantially comply with the GSP Regulations. For the reasons stated here and further discussed in the Staff Report, the revised Plan for the Kaweah Subbasin is hereby determined to be **INADEQUATE**.

Signed:



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Karla Nemeth, Director

Date: March 2, 2023

Enclosure: Groundwater Sustainability Plan Assessment Staff Report – San Joaquin Valley – Kaweah Subbasin

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

Groundwater Basin Name: San Joaquin Valley Basin – Kaweah Subbasin (No. 5-022.11)  
Number of GSPs: 3 (see list below)  
Number of GSAs: 3 (see list below)  
Submittal Type: Revised Plan in Response to Incomplete Determination  
Submittal Date: July 27, 2022  
Recommendation: Inadequate  
Date: March 2, 2023

On July 27, 2022, multiple groundwater sustainability agencies (GSAs) submitted multiple amended groundwater sustainability plans (GSPs) for the entire Kaweah Subbasin (Subbasin), which are coordinated pursuant to a required coordination agreement, to the Department of Water Resources (Department) in response to the Department's incomplete determination on January 28, 2022,<sup>1</sup> for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)<sup>2</sup> and GSP Regulations.<sup>3</sup> In total, three GSPs have been revised, adopted, and implemented by three GSAs. Collectively, all amended 2022 GSPs and the coordination agreement are, for evaluation and assessment purposes, treated and referred to as the Plan for the Subbasin. Unless specifically stated, GSPs referenced are the 2022 amended GSPs. Individually, the GSPs include the following:

- *East Kaweah Groundwater Sustainability Agency 2022 First Amended Groundwater Sustainability Plan (EKGSP)* – prepared by the East Kaweah Groundwater Sustainability Agency (EKGSA)
  - Divided into nine management areas
- *Greater Kaweah Groundwater Sustainability Agency 2022 First Amended Groundwater Sustainability Plan (GKGSP)* – prepared by the Greater Kaweah Groundwater Sustainability Agency (GKGSA)
- *Mid Kaweah GSA 2022 First Amended Groundwater Sustainability Plan (MKGSP)* – prepared by the Mid-Kaweah Groundwater Sustainability Agency (MKGSA)
  - Divided into three management areas

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<sup>1</sup> Water Code § 10733.4(b); 23 CCR § 355.4(a)(4); <https://sgma.water.ca.gov/portal/service/gspdocument/download/7778>.

<sup>2</sup> Water Code § 10720 *et seq.*

<sup>3</sup> 23 CCR § 350 *et seq.*

After evaluation and assessment, Department staff conclude the Plan has not taken sufficient actions to address some of the deficiencies identified in the Department's incomplete determination.<sup>4</sup>

- **Based on the evaluation of the Plan, Department staff recommend the Plan be inadequate.**

This assessment includes five sections:

- **Section 1 – Summary**: Provides an overview of the Department staff's assessment.
- **Section 2 – Evaluation Criteria**: Describes the legislative requirements and the Department's evaluation criteria.
- **Section 3 – Required Conditions**: Describes the submission requirements of an incomplete resubmittal to be evaluated by the Department.
- **Section 4 – Deficiency Evaluation**: Provides an assessment of whether and how the contents included in the GSP resubmittal addressed the deficiencies identified by the Department in the initial incomplete determination.
- **Section 5 – Staff Recommendation**: Includes the staff recommendation for the Plan.

## 1 SUMMARY

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Department staff recommend the Plan for the Kaweah Subbasin be determined **INADEQUATE**.

In the evaluation of the revised Plan, Department staff conclude the GSAs did not take sufficient action to correct the following deficiencies identified in the incomplete determination:

Deficiency 1 – The Plan does not set sustainable management criteria for chronic lowering of groundwater levels in the manner required by SGMA and the GSP Regulations.

Deficiency 2 – The Plan does not set sustainable management criteria for subsidence in the manner required by SGMA and the GSP Regulations.

Generally, while the GSAs have put forth a great amount of effort to respond to the Department's corrective actions identified in the incomplete determination staff report, Department staff conclude that the information provided was not sufficiently detailed and the analysis was not sufficiently thorough and reasonable to correct the deficiencies

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<sup>4</sup> 23 CCR § 355.2(e)(3)(C).



identified by the Department. These deficiencies have been found to materially affect the ability of the Department to evaluate the likelihood of the Plan to attain sustainability.

While the GSAs have made progress in addressing the corrective actions identified for Deficiency 3 related to interconnected surface water, they have not fully addressed this deficiency in a manner consistent with the GSP Regulations. Department staff conclude that with the Department's support the GSAs should take further actions to align the sustainable management criteria for interconnected surface water with the GSP Regulations.

## 2 EVALUATION CRITERIA

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The Department evaluates whether a Plan conforms to the statutory requirements of SGMA<sup>5</sup> and is likely to achieve the basin's sustainability goal,<sup>6</sup> whether evaluating a basin's first Plan,<sup>7</sup> a Plan previously determined incomplete,<sup>8</sup> an amended Plan,<sup>9</sup> or a GSA's periodic update to an approved Plan.<sup>10</sup> To achieve the sustainability goal, each version of 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.<sup>11</sup> The Department is also required to evaluate, on an ongoing basis, whether the Plan will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.<sup>12</sup>

The Plan evaluated in this Staff Report was previously determined to be incomplete. An incomplete Plan is one which had one or more deficiencies that precluded its initial approval, may not have had supporting information that was sufficiently detailed or analyses that were sufficiently thorough and reasonable, or Department staff determined it was unlikely the GSAs in the basin could achieve the sustainability goal. After a GSA has been afforded up to 180 days to address the deficiencies and based on the GSA's efforts, the Department can either approve<sup>13</sup> the Plan or determine the Plan inadequate.<sup>14</sup>

The Department's reevaluation and reassessment of a Plan previously determined to be incomplete, as presented in this Staff Report, continues to follow Article 6 of the GSP Regulations<sup>15</sup> to determine whether the Plan, with revisions or additions prepared by the

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<sup>5</sup> Water Code §§ 10727.2, 10727.4, 10727.6.

<sup>6</sup> Water Code § 10733; 23 CCR § 354.24.

<sup>7</sup> Water Code § 10720.7.

<sup>8</sup> 23 CCR § 355.2(e)(2).

<sup>9</sup> 23 CCR § 355.10.

<sup>10</sup> 23 CCR § 355.6.

<sup>11</sup> Water Code § 10721(v).

<sup>12</sup> Water Code § 10733(c).

<sup>13</sup> 23 CCR §§ 355.2(e)(1).

<sup>14</sup> 23 CCR §§ 355.2(e)(3).

<sup>15</sup> 23 CCR § 355 *et seq.*

GSA, complies with SGMA and substantially complies with the GSP Regulations.<sup>16</sup> As stated in the GSP Regulations, “substantial 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.”<sup>17</sup>

The recommendation to approve a Plan previously determined to be incomplete 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 revised Plan, but simply that Department staff have determined that the modified assumptions and interpretations relied upon by the submitting GSA(s) are supported by adequate, credible evidence, and are scientifically reasonable. The reassessment of a Plan previously determined to be incomplete may involve the review of new information presented by the GSA(s), including models and assumptions, and a reevaluation of that information based on scientific reasonableness. In conducting its reassessment, Department staff does not recalculate or reevaluate technical information or perform its own geologic or engineering analysis of that information.

The recommendation that a Plan previously determined to be incomplete be determined to be inadequate is based on staff’s conclusion that the GSAs have not taken sufficient actions to correct the deficiencies previously identified by the Department when it found the Plan incomplete.<sup>18</sup>

### 3 REQUIRED CONDITIONS

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For a Plan that the Department determined to be incomplete, the Department identifies corrective actions to address those deficiencies that preclude approval of the Plan as initially submitted. The GSAs in a basin, whether developing a single GSP covering the basin or multiple GSPs, must attempt to sufficiently address those corrective actions within the time provided, not to exceed 180 days, for the Plan to be evaluated by the Department.

#### 3.1 INCOMPLETE RESUBMITTAL

GSP Regulations specify that the Department shall evaluate a resubmitted GSP in which the GSAs have taken corrective actions within 180 days from the date the Department issued an incomplete determination to address deficiencies.<sup>19</sup>

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<sup>16</sup> 23 CCR § 350 *et seq.*

<sup>17</sup> 23 CCR § 355.4(b).

<sup>18</sup> Water Code § 10735 *et seq.*

<sup>19</sup> 23 CCR § 355.4(a)(4).

The Department issued the incomplete determination on January 28, 2022. The GSAs resubmitted their individual GSPs and the coordination agreement on July 27, 2022, in compliance with the 180-day deadline.

## 4 DEFICIENCY EVALUATION

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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 including whether the elements of a GSP were developed in the manner required by the GSP Regulations, whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable, 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.

In its initial incomplete determination, the Department identified three principal deficiencies in the Plan related to sustainable management criteria for groundwater levels, subsidence, and depletions of interconnected surface waters, which precluded the Plan’s approval in January 2022.<sup>20</sup> The GSAs were given 180 days to take corrective actions to remedy the identified deficiencies. Consistent with the GSP Regulations, Department staff are providing an evaluation of the revised Plan to determine if the GSAs have taken sufficient actions to correct the deficiencies.

This section describes the corrective actions recommended by the Department related to each deficiency, followed by Department staff’s evaluation on the actions taken by the GSAs to address this deficiency.

### 4.1 DEFICIENCY 1 – THE PLAN DOES NOT SET SUSTAINABLE MANAGEMENT CRITERIA FOR CHRONIC LOWERING OF GROUNDWATER LEVELS IN THE MANNER REQUIRED BY SGMA AND THE GSP REGULATIONS

#### 4.1.1 Corrective Action 1

Department staff identified the following corrective actions for the Kaweah Subbasin in the GSP Assessment Staff Report released in January 2022:<sup>21</sup>

- a) The GSAs must revise the Plan to define sustainable management criteria for the chronic lowering of groundwater levels by utilizing information specific to the Subbasin. The GSAs should first characterize undesirable results by describing the significant and unreasonable effects that could be, or are being caused by, lowering groundwater levels that the GSAs are seeking to avoid. The GSAs will

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<sup>20</sup> <https://sgma.water.ca.gov/portal/service/gspdocument/download/7778>.

<sup>21</sup> SGMA Portal, California Department of Water Resources.  
<https://sgma.water.ca.gov/portal/service/gspdocument/download/7778>.

need to define the criteria used to determine when and where the effects of the groundwater conditions will cause undesirable results and describe the potential effects on the beneficial uses and users of groundwater that may occur or are occurring from undesirable results, which analysis could include both physical and economic impacts.

Next, the GSAs should revise minimum thresholds to quantify groundwater conditions which represent a point in the Subbasin that, if exceeded, may cause undesirable results. The Plan's description of minimum thresholds should include (1) information and criteria relied upon to establish and justify the minimum thresholds supported by the basin setting and qualified by uncertainty in the understanding of the basin setting; (2) the relationship between these minimum thresholds and each sustainability indicator to show how these basin conditions would avoid undesirable results for each sustainability indicator; (3) a technical description explaining how operating the Subbasin to the proposed minimum thresholds would not be expected to cause undesirable results in adjacent basins or affect the ability of adjacent basins to achieve their sustainability goals; and (4) how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests. The GSAs should define the potential effects of lowered groundwater levels that their GSPs state could become an undesirable result such as: "reduced irrigation water supplies for agriculture and for municipal systems through loss of well capacity, loss or degradations of water supplies for smaller community water systems and domestic wells due to well failures, increased energy consumption due to lowered water levels, and the adverse economic consequences of the aforementioned effects such as increased energy usage to extract groundwater from deeper levels."<sup>22</sup>

- b) If the GSAs intend to rely on mitigation actions to address impacts that would occur as a result of the continued lowering of groundwater levels as a means to support the reasonableness of their sustainable management criteria, then the GSPs should be revised to include specific details of the mitigation measures that will be enacted, including the schedule for implementation and other details that will allow the Department to assess their feasibility and likely effectiveness.

## 4.1.2 Evaluation

### 4.1.2.1 Undesirable Results (a)

Corrective Action 1(a) required the amended GSPs to "characterize undesirable results by describing the significant and unreasonable effects," including "where the effects of the groundwater conditions will cause undesirable results" and impacts to beneficial users and uses.<sup>23</sup> The Plan defines significant and unreasonable effects for the Subbasin as the following:

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<sup>22</sup> 2020 Greater Kaweah GSP, Section 3.4.2, p. 73.

<sup>23</sup> 23 CCR §§ 354.26.

- Inability of the groundwater aquifer to recover in periods of average/above average precipitation following multi-year drought periods
- Dewatering of a subset of existing wells below the bottom of the well
- Substantial increase in costs for pumping groundwater, well development, well construction, etc., that impact the economic viability of the area
- Adverse effects on health and safety
- Interfere with other sustainability indicators<sup>24</sup>

The Plan generally describes the causes leading to undesirable results as primarily being associated with “groundwater pumping in excess of natural and artificial recharge over a multi-year period that includes both wetter than average and drier than average conditions.”<sup>25</sup> While general effects have been described, the GSAs have not described the specific effects they are trying to avoid. For example, the Plan does not clearly explain what is considered “substantial increased costs for pumping groundwater” or identify “adverse effects on health and safety” that would constitute undesirable results.

The definition of undesirable result has not been updated in the amended Plan. The Coordination Agreement continues to define the undesirable result for chronic lowering of groundwater levels as occurring when one-third of the monitoring sites exceed the respective minimum threshold groundwater elevation and states that “undesirable results are defined by the quantity of wells completely dewatered by 2040 if Minimum Thresholds are met or exceeded.”<sup>26</sup> In addition to a lack of specificity, the Plan does not explain how significant and unreasonable effects will be avoided if they are defined by the number of wells dewatered by 2040. Therefore, Department staff conclude the GSAs have not defined undesirable results consistent with the GSP Regulations.<sup>27</sup>

The Coordination Agreement lists general potential adverse effects associated with groundwater level declines on agricultural, industrial and municipal uses and users including financial impacts to lower pumps, repair/replace wells, and increased pumping costs, including impacts to domestic users and uses of “added costs to haul in water supplies, tie into other available supplies, consolidation with existing water service providers, or requiring other form of mitigation.”<sup>28</sup> In addition, the EKGSP<sup>29</sup> and GKGSP<sup>30</sup> describe additional effects. However, in both the Plans and Coordination Agreement, the effects or impacts are described in non-specific, vague, or subjective terms. It is never expressly made clear what specific conditions the Plans are meant to avoid, which causes uncertainty in how the basin will be managed to achieve sustainability and precludes or impairs the Department’s ability to evaluate the likelihood of the Plan to attain

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<sup>24</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.4, p. 70; 2022 EKGSP, Section 3.4.1.1.1, p. 168; 2022 GKGSP, Section 5.3.2, p.104; and 2022 MKGSP, Section 5.3.3, p.123.

<sup>25</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.4, p. 70-71.

<sup>26</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.4, p. 71.

<sup>27</sup> 23 CCR §§ 354.26(a).

<sup>28</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.4.4, p. 72.

<sup>29</sup> 2022 EKGSP, Section 3.4.1.1.3, p. 169.

<sup>30</sup> 2022 GKGSP, Section 5.3.4, p. 105.

sustainability goals, and would prevent the Department and the public a large from monitoring progress towards any sustainability goal under that Plan.

The one effect that appears to be quantified in response to the corrective action is related to the dewatering of wells. The Plan has completed a well impact analysis of well completed depths.<sup>31</sup> This Department's evaluation is further described in the discussion related to minimum thresholds below.

Department staff conclude that the GSAs have not taken sufficient action to correct the deficiency related to the definition of undesirable results and significant and unreasonable effects and impacts the Subbasin is attempting to avoid.

#### *4.1.2.2 Minimum Thresholds (a)*

The second part of Corrective Action 1(a) required the GSAs to revise minimum thresholds to quantify groundwater conditions which represent a point in the Subbasin that, if exceeded, may cause undesirable results.<sup>32</sup> This portion of the Department's evaluation considers four aspects of the revised minimum thresholds for the Subbasin: (1) the information relied upon to establish and justify minimum thresholds; (2) the relationship between these minimum thresholds and each sustainability indicator; (3) the relationship with adjacent basins; and (4) how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.

The amended Plan modified the approach taken to develop minimum thresholds relative to the 2020 Plan.

#### (1) Information to Establish and Justify Minimum Thresholds

The Plan has responded to the corrective action by developing a process for selecting minimum thresholds at each representative monitoring site based on a comparison of results of the following three methods: Method 1: Determining groundwater elevations that would be protective of 90% of wells; Method 2: Determining groundwater levels projected to 2040; and Method 3: Interpolating values calculated by Methods 1 and 2 under conditions specified in the Plan.<sup>33</sup> After calculating values using Methods 1 and 2 for each representative monitoring site, the highest (i.e., most protective) elevation was selected unless it was deemed necessary to use Method 3.

Method 2 is basically the same method relied upon by the 2020 Plan, which is discussed in the Incomplete Staff Report.

Method 1, which is new to the amended 2022 Plan, involves several relatively sophisticated steps, including consideration of aquifer type, beneficial user types, and similar completed well depth, and identification of relevant aquifer system. As noted above, the goal is to identify minimum thresholds that will be protective of 90% of wells. This value does not appear to be directly related to how the Plan defines undesirable

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<sup>31</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.4.4, p. 72.

<sup>32</sup> 23 CCR § 354.26(b)(3).

<sup>33</sup> Kaweah Subbasin Coordination Agreement (2022), Appendix 6-1, p. 96.

results, which have not been quantified. The factor that appears most decisive in this method involves a significant narrowing of the field of wells analyzed based on date drilled, completion data, and other factors.<sup>34</sup> In its review of the Plan, Department staff concluded that, by eliminating many of the wells considered in the 2020 Plan, the 2022 Plan purports to protect 90% of all wells in the basin, despite predicting higher numbers of well failures under the 2020 Plan.<sup>35</sup> However, the Plan does not appear to have adopted new projects or management actions that would protect wells but has simply narrowed the field of wells used to calculate the percentage of wells protected. Department staff do not suggest that a GSA is required to document the potential effects on each individual well in the basin, or to discourage using data from new wells for which comprehensive data are available. But a methodology that purports to improve conditions but involves no substantive change to projects and management actions raises questions about the assumptions relied upon in reaching that conclusion. Principal among these is whether the wells selected are representative of the basin as a whole, or whether certain category of uses and users are disproportionately represented among the class of wells excluded from calculations, thus putting them at greater risk of experiencing undesirable results. However, the GSAs do not provide specific information in the Plan demonstrating that their approach is statistically objective.

In reviewing the methods for the selection of minimum thresholds, Department staff conclude the minimum thresholds have not been selected based on the avoidance of undesirable results and significant and unreasonable impacts to beneficial users and uses as required by the GSP Regulations and specified in the corrective action.

## (2) Other Sustainability Indicators

Part of the corrective action required the GSAs to provide “the relationship between these minimum thresholds and each sustainability indicator to show how these basin conditions would avoid undesirable results for each sustainability indicator.”<sup>36</sup> Each GSP individually provided a response to this corrective action.

EKGSP identifies a correlation between groundwater storage and water levels; the GSA states that due to the bedrock present within the GSP area, groundwater storage was accounted for when establishing the thresholds. Water level correlation for subsidence, water quality, and interconnected surface water was either not present or unknown; therefore, an explanation of how the GSA’s minimum thresholds for groundwater levels would avoid undesirable results for these sustainability indicators was not described.<sup>37</sup>

MKGSP and GKGSP offer similar descriptions of the relationship to other sustainability indicators. The GSPs claim that no impact to groundwater storage is expected due to the close correlation to water levels and the use of water levels as a proxy. MKGSP and

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<sup>34</sup> Kaweah Subbasin Coordination Agreement (2022), Appendix 6-1, pp. 95-114.

<sup>35</sup> 2020 EKGSP, Figure 3-6, p. 172; 2020 GKGSP, Appendix 5A and 5C, pp. 1585-1596 and pp. 1634-1659; 2020 MKGSP, Appendix 5A and 5C, pp. 1442-1450 and pp. 1486-1511.

<sup>36</sup> 23 CCR § 354.28(b)(2).

<sup>37</sup> 2022 EKGSP, Section 3.4.1.2.2, pp. 172-173.

GKGGSP acknowledge that water level minimum thresholds will drop below historical lows and there is a potential for new depth dependent contaminants to be mobilized and effect beneficial users and uses. The GSPs do not discuss whether this could cause undesirable results, which Department staff believe the GSAs should evaluate. Both GSPs identify a correlation between groundwater levels and subsidence and state that while GSP implementation takes place, groundwater levels will continue to decline, and subsidence will occur. Department staff discuss how the Plan addressed subsidence under Deficiency 2, below, but knowing that groundwater level minimum thresholds are below historical lows and subsidence will continue to occur, the GSP has not provided an explanation of how undesirable results for subsidence will be avoided. Given that this Subbasin has historically experienced significant amount subsidence, Department staff believe the GSAs must consider the impacts of water levels so as not to cause undesirable results for subsidence.<sup>38</sup>

As it relates to interconnected surface water, MKGGSP states that groundwater levels are below 60 feet and therefore normally disconnected from surface water so that further groundwater elevation declines would not cause undesirable results due to depletion of interconnected surface waters. Conversely, the GKGGSP states that the correlation between groundwater elevation and interconnected surface water is unknown; that GSP proposes to fill that data gap and give additional consideration to the issue at that time.

Overall, none of the GSPs have thoroughly explained how water level minimum thresholds will not cause undesirable results for other sustainability indicators, in particular subsidence and water quality. As the GSAs fill data gaps associated with interconnected surface water, the impacts of water level minimum thresholds on interconnected surface water should be revisited. As mentioned previously, the Department's evaluation of Deficiency 2 further elaborates on the effects these proposed groundwater level minimum thresholds have on potential future land subsidence within the subbasin.

### (3) Relationship with Adjacent Basins

The corrective action required the GSAs to provide “a technical description explaining how operating the Subbasin to the proposed minimum thresholds would not be expected to cause undesirable results in adjacent basins or affect the ability of adjacent basins to achieve their sustainability goals.”<sup>39</sup> Because Plans for all surrounding basins were determined to be Incomplete, and given the short timelines for revisions, MKGSA states it was not able to determine how Kaweah Subbasin's minimum thresholds would affect adjacent basins, but planned to reach out for coordination after July 27, 2022.<sup>40</sup> EKGSP states the Kaweah Subbasin has met with neighboring subbasins, but that most thresholds had not been finalized and all parties understand that minimum threshold elevations along the boundaries will need to be coordinated during implementation in the

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<sup>38</sup> 2022 GKGGSP, Section 5.3.5.3, p. 115; 2022 MKGGSP, Section 5.3.4.3, p. 128.

<sup>39</sup> 23 CCR § 354.28(b)(3).

<sup>40</sup> 2022 MKGGSP, Section 5.3.4.4, p. 131.



future.<sup>41</sup> Department staff believe it is during the establishment of minimum thresholds that effects on neighboring Subbasins be considered prior to the finalization of minimum thresholds, but understands the limited time which agencies had to revise the GSPs and encourages GSAs to conduct this coordination moving forward to align the Plan with the GSP Regulations. At this time, Department staff conclude the Plan has taken sufficient action on this component of the deficiency.

#### (4) Interests of Beneficial Uses and Users

As part of the corrective action, GSAs were required to explain “how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.”<sup>42</sup> As described above in [Section 4.1.2.1](#) and [Section 4.1.2.2\(1\)](#), while the Plan states thresholds are protective of 90% of wells, Method 1 involves a significant narrowing of the field of wells analyzed based on date drilled, completion data, and other factors of which Department staff conclude the minimum thresholds have not been selected based on the avoidance of undesirable results and significant and unreasonable impacts to beneficial users and uses as required by the GSP Regulations and specified in the corrective action.

##### *4.1.2.3 Mitigation (b)*

Because the Plan relies on mitigation actions to address impacts that would occur as a result of the continued lowering of groundwater levels, the corrective action required the GSAs to include specific details of the mitigation measures that will be enacted.

The Coordination Agreement includes a Mitigation Program Framework which describes how each GSA has agreed to implement a Mitigation Program and adhere to the minimum requirements included in the Framework. As stated in the Framework, each Mitigation Program will include a claim process to address impacts to: (i) domestic and municipal wells; (ii) agricultural wells; and (iii) critical infrastructure. The Framework identifies potential mitigation options if the GSAs determine impacts are due to groundwater levels or subsidence.<sup>43</sup> Department staff note the Framework is labeled ‘draft’ and ‘for discussion purposes only’ and while the Coordination Agreement has been adopted, the GSAs’ commitment to this Framework is unclear.

Each GSA has provided a discussion on their individual Mitigation Plan. All GSAs will be establishing a committee to further detail each Mitigation Plan. The EKGSP has provided a trigger point table which identifies the investigation that will take place as water levels approach minimum thresholds. Department staff note that all trigger points consist of a degree of monitoring to qualify the well for mitigation and mitigation would then be determined. The GSA indicates county, state, and federal assistance will be needed to successfully implement a mitigation program. EKGSA plans to have a mitigation claims process for domestic and municipal impacts by first quarter 2023 and all other aspects of

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<sup>41</sup> 2022 EKGSP, Section 3.4.1.2.5, p. 174.

<sup>42</sup> 23 CCR § 354.28(b)(4).

<sup>43</sup> Kaweah Subbasin Coordination Agreement (2022), Appendix 6-3, pp. 180-184.

the Mitigation Program completed by June 30, 2023.<sup>44</sup> The MKGSP provides similar level of detail from the Framework and additionally details the estimated costs associated with the Mitigation Program. The MKGSA schedule appears to conflict with the schedule laid out in the Framework, with a completion date of December 31, 2023.<sup>45</sup> The GKGSP provides similar level details identified in the Framework, provides a rough budget estimate, and does not further elaborate on other components of GKGSA’s Mitigation Plan.<sup>46</sup>

While Department staff are encouraged by the steps taken by the GSAs to implement a management action which addresses impacts to beneficial users and uses, Department staff believe the scope of the mitigation plans must be revisited given they are focused on the narrowed subset of wells discussed in [Section 4.1.2.2\(1\)](#) of this staff report. Department staff are also encouraged by desire to implement an Interim Domestic Well Mitigation Program, but the details of that interim program were not provided.<sup>47</sup> The GSA’s commitment to the details laid out in the Framework is in question due to the document being labeled “For Discussion Purposes Only.” At this time, Department staff are unable to assess the feasibility and likely effectiveness of the mitigation actions as it is focused on the narrowed subset of wells and the GSA’s commitment to the Framework is unclear.

#### 4.1.2.4 Conclusion

Overall, Department staff believe the GSAs have taken great strides; however, conclude the GSAs have not taken sufficient action to address the deficiency.

## 4.2 DEFICIENCY 2 - THE PLAN DOES DO NOT SET SUSTAINABLE MANAGEMENT CRITERIA FOR SUBSIDENCE IN THE MANNER REQUIRED BY SGMA AND THE GSP REGULATIONS

### 4.2.1 Corrective Action 2

Department staff identified the following corrective actions for the Kaweah Subbasin in the GSP Assessment Staff Report released in January 2022.<sup>48</sup>

- a) Mid-Kaweah and Greater Kaweah must define sustainable management criteria for land subsidence in the manner required by SGMA and the GSP Regulations. The GSAs should develop criteria, including minimum thresholds, measurable objectives, interim milestones, and undesirable results based on the amount of subsidence that would substantially interfere with land surface uses. Developed criteria should be supported with information on the effects of subsidence on land

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<sup>44</sup> 2022 EKGSP, Section 5.3.8.2, pp. 283-288.

<sup>45</sup> 2022 MKGSP, Section 7.4.8, pp. 225-232.

<sup>46</sup> 2022 GKGSP, Section 7.3.6, pp. 223-229.

<sup>47</sup> Kaweah Subbasin Coordination Agreement (2022), Appendix 6-3, p. 183.

<sup>48</sup> SGMA Portal, California Department of Water Resources.

<https://sgma.water.ca.gov/portal/service/gspdocument/download/7778>.

surface beneficial uses and users and the amount of subsidence that would substantially interfere with those uses and users.

- b) Following changes to the GSPs described in Corrective Action 2a, Greater Kaweah also must explain how their minimum thresholds in the vicinity of identified critical infrastructure (i.e., the Friant Kern Canal) will not substantially interfere with the Canal's use (identified by East Kaweah GSA as an undesirable result). Address how the amount of potential cumulative subsidence allowed for by Greater Kaweah's subsidence rates, which currently exceeds the amount identified by East Kaweah that would cause an undesirable result, are compatible or provide revised rates for the eastern portion of the Subbasin that are compatible.

#### **4.2.2 Evaluation**

In response to Deficiency 2, the GSAs provided an analysis of the technical approach for developing subsidence sustainable management criteria in the Subbasin.<sup>49</sup> The analysis describes the process, methods, and results of estimating the total amount of subsidence that could occur during different timeframes if groundwater levels reached the minimum thresholds or measurable objectives established for chronic lowering of groundwater levels sustainable management criteria. The timeframes and estimates of subsidence include evaluating the total amount of active subsidence that could occur between 2020 and 2040 as a result of continued groundwater decline during plan implementation plus any previous residual subsidence as a result of historic active subsidence, the total amount of residual subsidence that could occur between 2040 and 2070 after sustainability is achieved and the rate of subsidence equals 0 feet per year, and the cumulative amount of subsidence that could occur between 2020 and 2070 as a result of the active subsidence plus the future residual subsidence.

The estimates of total subsidence are derived from extrapolating the results of a 1D Subsidence Model developed by Stanford University to observe and predict subsidence conditions at two monitoring sites in and adjacent to the Subbasin – one site in South Hanford on the border- of the Subbasin and the other in the Tulare Irrigation District. The results of the 1-D Model were used to develop a subsidence spreadsheet prediction tool in order to project the subsidence estimates across the Subbasin using a 77 point 2-mile grid that aligns with the United States Geological Survey's textural model of the San Joaquin Valley (Faunt, 2009). The GSAs used measured InSAR subsidence between 2015 and 2021 to calibrate the spreadsheet tool. The spreadsheet tool was used to predict Subbasin-wide subsidence conditions for the timeframes discussed above if the groundwater levels were to reach and stabilize at the minimum threshold or measurable objective for the chronic lowering of groundwater levels. The results of the modeling and analytical tool predictions indicate that the Subbasin could experience a maximum of approximately 40 feet of cumulative subsidence (i.e., active subsidence between 2020 and 2040 plus the future residual subsidence between 2040 and 2070) during the

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<sup>49</sup> 2022 GKGSP, Appendix 5E, pp. 2165-2117; 2022 MKGSP, Appendix 5E, pp.1627-1679; EKGSP, Appendix 3-E, pp. 1732-1784.

planning and implementation horizon at the subsidence monitoring site nearest the South Hanford monitoring site (i.e., representative monitoring site S228). If water levels were to be stabilized at the measurable objective for chronic lowering of groundwater levels, the analysis predicts a maximum cumulative subsidence of approximately 31 feet could occur at representative monitoring site S228. The results also indicate cumulative subsidence would be greatest in the western-northwestern portion of the Subbasin near the City of Hanford and steadily decrease laterally toward the Friant-Kern Canal and eastern boundary of the Subbasin.<sup>50</sup>

The results of the analytical methods briefly discussed above are described as the “worst-case” subsidence scenarios and are not expected to occur, especially the scenarios evaluating water levels at the minimum thresholds. The analysis, however, also evaluates impacts that could occur to conveyance infrastructure at the worst-case scenario, particularly the Friant-Kern Canal. The results indicate that “subsidence along the Friant-Kern Canal is greatest where it enters and leaves the Subbasin, which suggests there may be boundary errors in the analysis.” The analysis also indicates that, other than the boundaries at the northern and southern border of the Subbasin, the area on the Friant-Kern Canal near the city of Exeter has the greatest predicted cumulative subsidence which may approach 10 inches of subsidence, but also notes that it is not likely to occur because subsidence has not been historically observed in this portion of the Subbasin.<sup>51</sup> The analysis along the Friant-Kern Canal aligns with the Subbasin’s goal of not exceeding a 10% reduction of canal capacity which is estimated to occur if 10 inches of subsidence was to be realized at any portion of the canal.<sup>52</sup>

To establish sustainable management criteria that represents a cumulative amount of subsidence and rate of subsidence that avoids impacts to infrastructure, the GSAs conducted a four-step process. The first step included evaluating and describing what the GSAs consider significant and unreasonable subsidence. The Plan describes significant and unreasonable subsidence would be occurring if conveyance infrastructure capacity was reduced by 10% or more of capacity and if deep water supply wells began to collapse. The Plan estimates deep wells are susceptible to collapsed casings after 6 to 12 feet of subsidence and therefore establishes the minimum threshold related to collapsed casings at no more than 9 feet of subsidence. The second step involved assessing the results of the maximum “worstcase-” scenarios presented through the model and spreadsheet predictions analysis, as discuss above. The third step included comparing the model scenarios to the definitions of significant and unreasonable impacts (i.e., >10% reduction in capacity and >9 feet of subsidence near deep production wells). The final step involved establishing the minimum threshold for the various representative monitoring sites based

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<sup>50</sup> 2022 GKGSP, Appendix 5E, pp. 2190-2200; 2022 MKGSP, Appendix 5E, pp. 1652-1662; EKGSP, Appendix 3-E, pp. 1757-1767.

<sup>51</sup> 2022 GKGSP, Appendix 5E, p. 2203; 2022 MKGSP, Appendix 5E, p. 1665; EKGSP, Appendix 3-E, p. 1770.

<sup>52</sup> 2022 GKGSP, Section 5.5.5.1, p. 129; 2022 MKGSP, Section 5.6.2.2.1, p. 156; EKGSP, Section 3.4.4.2.1, p. 194.

on the more protective criteria after comparing the model results and the significant and unreasonable conditions.

Based on this process, the Plan establishes two sets of minimum thresholds for areas within a 1-mile buffer zone of either side of the Friant-Kern Canal and for areas outside of the canal buffer zone. All of the representative monitoring sites within the canal buffer zone have minimum thresholds set at or near 10 inches of cumulative subsidence. All representative monitoring sites outside of the canal buffer zone have minimum thresholds at or less than 9 feet of cumulative subsidence. The Plan also establishes the minimum threshold for a rate of subsidence at the 67<sup>th</sup> percentile of recent subsidence rates observed during two previous drought years (i.e., April 2015 to April 2016 and April 2021 to April 2022). The Plan sets the rate of subsidence minimum threshold at 0.67 feet per year.<sup>53</sup>

The Amended Coordination Agreement defines an undesirable results for subsidence will occur if one-third of the representative monitoring sites outside of the canal buffer zone hit or exceed their minimum threshold at the annual fall measurement and if a single representative monitoring site within the canal buffer zone hits or exceeds the minimum threshold at the annual fall measurement.<sup>54</sup> The Plan establishes the measurable objective at 0 feet of subsidence for the Subbasin.

While Department staff are encouraged by the updated approach to establishing sustainable management criteria, which includes a rate and a cumulative amount of subsidence associated with impacts to infrastructure, the Plan does not explain how it was determined that approximately 10 inches or greater amount of subsidence would result in a 10% or more capacity loss in the Subbasin's conveyance infrastructure. The GSAs should explicitly describe the analysis that went into establishing the 10% capacity criteria. Also, although the Plan states that the subsidence sustainable management criteria may limit the amount of groundwater level declines over the implementation period<sup>55</sup> and the "worst-case" scenario analysis incorporates the water level management criteria occurring throughout the Subbasin, Department staff are still not fully able to evaluate how the management criteria for chronic lowering of groundwater levels will affect potentially localized inelastic subsidence which is a permanent condition in relation to water levels that may decline and rebound over time. The Plan may consider providing an analysis comparing the collocated water level and subsidence representative monitoring sites to evaluate more localized conditions, especially for the area outside of the canal buffer zone which requires one-third of sites reaching the minimum threshold before a subsidence undesirable result occurs. For these reasons, Department staff conclude sufficient action has not been taken to address the deficiency associated with subsidence.

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<sup>53</sup> 2022 GKGSP, Table 5-5, pp. 130; 2022 MKGSP, Table 5-5, p. 161; EKGSP, Section 3.4.4.2.1, p. 194.

<sup>54</sup> 2022 First Amended Kaweah Subbasin Coordination Agreement, p. 76.

<sup>55</sup> 2022 GKGSP, Section 5.5.5.2, p. 133.

**4.3 DEFICIENCY 3 – THE PLAN DOES NOT CONSISTENTLY IDENTIFY INTERCONNECTED SURFACE WATER SYSTEMS, OR THE QUANTITY AND TIMING OF DEPLETION OF THOSE SYSTEMS DUE TO GROUNDWATER USE. THE PLAN DOES NOT CONSISTENTLY DEFINE SUSTAINABLE MANAGEMENT CRITERIA FOR DEPLETION OF INTERCONNECTED SURFACE WATER IN THE MANNER REQUIRED BY THE GSP REGULATIONS**

**4.3.1 Corrective Action 3**

As described in the Department’s GSP Assessment Staff Report released in January 2022, Department staff recommended the GSAs consider and address the following:

Greater Kaweah and East Kaweah must define sustainable management criteria for interconnected surface water in the manner required by SGMA and the GSP Regulations.

- a) Having identified that interconnected surface waters are present in their GSP area, and absent a demonstration that undesirable results related to depletion of interconnected surface water due to groundwater use are not present and not likely to occur, Greater Kaweah should develop sustainable management criteria for depletion of interconnected surface water consistent with the requirements of SGMA and the GSP Regulations. If the GSA does not have sufficient information to develop specific sustainable management criteria at this time, then they should properly identify depletion of interconnected surface water as a data gap and should provide a plan to close the data gap as soon as practical, with significant progress by the first required periodic evaluation. The plan to address the data gap should specifically outline how and when the GSA will:
  1. Acquire or develop data and tools to identify interconnected surface water reaches, and the quantity and timing of the depletion of interconnected surface water due to groundwater use for interconnected surface water systems identified in the Plan.
  2. Develop sustainable management criteria based on the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses and users of surface water.

East Kaweah should provide information to demonstrate that their selected groundwater level thresholds are a reasonable proxy for the depletion of interconnected surface water, as required by the GSP Regulations. If this information is a data gap then it should be properly identified as such, and a plan and schedule to address this data gap should be identified to acquire this information, similar to the data gap discussion in Corrective Action 3a, above.

**4.3.2 Evaluation**

In response to this corrective action, the revised Plan identifies data gaps, creates management actions for the development of Work Plans, describes the beneficial uses

and users and potential impacts on them, and establishes preliminary sustainable management criteria. More details are provided below for the GKGSP and the EKGSP, respectively.

#### 4.3.2.1 Greater Kaweah GSP

In response to Corrective Actions 3(a), the GKGSP identifies data gaps related to interconnected surface water<sup>56</sup> including having no “groundwater elevation monitoring in areas with shallower groundwater,”<sup>57</sup> and insufficient stream flow data.<sup>58</sup> The GKGSA plans to fill these data gaps in the first phase of the Work Plan developed. The other tasks/phases proposed in the Work Plan include analytical tool development, interconnection analysis and determination, and sustainable management criteria refinement and incorporation to the 2025 GSP Update.<sup>59</sup> In response to Corrective Action 3(a)(1), the proposed Work Plan outlines how and when the GKGSA will acquire or develop data and tools to identify interconnected surface water reaches, and to estimate the quantity and timing of the depletion of interconnected surface water. A timeline to complete the Work Plan is included in the GKGSP and spans October 2022 to January 2025.<sup>60</sup>

In response to Corrective Action 3(a)(2), the GKGSA has established preliminary sustainable management criteria based on the evaluation of potential impacts to beneficial users, indicating that sustainable management criteria based on the rate or volume of surface water depletions will be developed once the data gaps are addressed. The preliminary sustainable management criteria are discussed below. The GKGSA has identified in the beneficial uses and users related to interconnected surface water and described the potential effects on these beneficial uses and users.<sup>61</sup> The identified beneficial uses and users include “surface water users, riparian and/or groundwater dependent ecosystems, and water rights holders.” The potential effects on beneficial uses and users are described as “increasing surface water losses, reducing water supply reliability and volumes, negatively and significantly impacting the health of riparian and/or [groundwater dependent ecosystems], and violating laws and doctrines governing California’s surface water rights.”<sup>62</sup> The GKGSA also describes in the Coordination Agreement undesirable results related to interconnected surface water stating, “impacts that reduce the ability to deliver surface water can become significant and unreasonable and ultimately lead to an undesirable result.”<sup>63</sup> The GKGSA has set the preliminary minimum thresholds at 50% loss of the respective waterway’s flow, and measurable

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<sup>56</sup> 2022 GKGSP, Section 2.2, pp. 65-66.

<sup>57</sup> 2022 GKGSP, Section 2.2, pp. 64-66.

<sup>58</sup> 2022 GKGSP, Section 5.7.3 and Table 5-8, pp. 145-146 and 147.

<sup>59</sup> 2022 GKGSP, Section 7.3.12.1, p. 245.

<sup>60</sup> 2022 GKGSP, Table 7-1, p. 248.

<sup>61</sup> 2022 GKGSP, Section 5.7.2, p. 143.

<sup>62</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.8.3, p. 83; 2022 GKGSP, Section 5.7.2, p. 143.

<sup>63</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.8.2, p. 82; 2022 GKGSP, Section 5.7.1.2, p. 142.

objectives at 30% loss of the respective waterway's flow.<sup>64</sup> The GKGSA provides a map and table identifying the locations and estimated rates for the potentially interconnected portions of the surface waterways.<sup>65</sup> The preliminary minimum thresholds appear to set the GSA up to exceed minimum thresholds in dry years. In addition, the thresholds do not quantify the timing, location, and quantity of flow reduction due to groundwater extraction as required by the Regulations. However, the GKGSP states that the GSA will further investigate interconnected surface water and fill data gaps to refine the preliminary sustainable management criteria.<sup>66</sup> Department staff expect the GSA will be able to address issues related to the preliminary sustainable management criteria as they progress through the phases of the work plan.<sup>67</sup>

#### 4.3.2.2 *East Kaweah GSP*

In response to Corrective Action 3 requiring the EKGSA provide information to demonstrate that the selected groundwater level thresholds are a reasonable proxy for the depletion of interconnected surface water or identify this information as a data gap, the EKGSP is no longer using groundwater levels as a proxy and has identified data gaps for streamflow data and insufficient groundwater level data.<sup>68</sup> Utilizing limited dept-to-water data from Spring 2015 and Spring 2017 representing both the driest and wettest years, the EKGSP identifies potential waterways for further interconnectivity investigation.<sup>69</sup> The EKSGA has also developed a Work Plan consisting of four phases: filling data gaps and conducting further research and data collection, analytical tool development, interconnection analysis and determination, and sustainable management criteria refinement and incorporation into the 2025 GSP Update.<sup>70</sup> The timeline to complete the Work Plan spans October 2022 to January 2025.<sup>71</sup>

In response to Corrective Action 3(a)(2), the EKGSA has established preliminary sustainable management criteria based on the evaluation of potential impacts to beneficial users, which are discussed below. The EKGSA identified in the Coordination Agreement the potential beneficial uses and users of interconnected surface water and provides an evaluation of potential impacts related to depletions of interconnected surface water, which is the same as those described for the GKGSA. The EKGSA describes undesirable results related to interconnected surface water in the Coordination Agreement stating that “impacts that reduce the ability to deliver surface water can become significant and unreasonable and ultimately lead to an undesirable result.”<sup>72</sup> The EKGSA has set preliminary minimum thresholds at 50% loss of the yearly average flow

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<sup>64</sup> 2022 GKGSP, Section 5.7.3 and 5.7.4, pp. 145-146 and 148.

<sup>65</sup> 2022 GKGSP, Figure 5-7, p. 144, and Table 5-8, p. 147.

<sup>66</sup> 2022 GKGSP, Section 7.3.12.1, pp. 245-246.

<sup>67</sup> 23 CCR § 354.28(b)(5).

<sup>68</sup> 2022 EKGSP, Section 2.6, p. 151.

<sup>69</sup> 2022 EKGSP, Section 3.4.2.2.1, p. 181, and Figure 3-9 and 3-10, p. 182 and 183.

<sup>70</sup> 2022 EKGSP, Section 5.3.7.1, pp. 277 and 278.

<sup>71</sup> 2022 EKGSP, Section 5.3.7.6, p. 279.

<sup>72</sup> Kaweah Subbasin Coordination Agreement (2022), Section 6.8.2, p. 82; 2022 EKGSP, Section 3.4.2.1.1, p. 180.



for surface water channels, and set the measurable objectives at 30% loss of the yearly average flow.<sup>73</sup> The preliminary minimum thresholds appear to set the GSA up to exceed minimum thresholds in dry years. In addition, the thresholds do not quantify the timing, location, and quantity of flow reduction due to groundwater extraction as required by the regulations. However, the EKGSA plans to refine/revise the sustainable management criteria based on the rate or volume of surface water depletions once the data gaps are addressed. Department staff expect the GSA will be able to address issues related to the preliminary sustainable management criteria as they progress through the phases of the work plan.<sup>74</sup>

The GSAs have taken adequate steps to address the deficiency as identified in the Incomplete notice, and this deficiency consequently plays no role in the staff's Inadequate recommendation. However, as the GSAs modify their Plans in the future, they should do with an understanding that the sustainable management criteria as currently developed does not fully meet the requirements of the GSP Regulations for Interconnected Surface Water.

#### *4.3.2.3 Conclusion*

At this time, Department staff conclude sufficient progress has been made to address this deficiency as outlined in the Incomplete assessment and believe the GSAs can work with the Department to further efforts on interconnected surface water. Department staff do not find, at this time, that the data gaps identified in the revised Plan materially affect the GSAs' ability to define preliminary sustainable management criteria for interconnected surface water. Department staff will monitor progress toward filling data gaps and incorporating that information into the Plan updates. Staff conclude that the data gaps identified by the GSAs, their subsequent addition of management actions for the sustainable management criteria to be in accordance with the manner required by SGMA and the GSP Regulations.

Department staff understand that quantifying depletions of interconnected surface water from groundwater extractions is a complex task that likely requires developing new, specialized tools, models, and methods to understand local hydrogeologic conditions, interactions, and responses. During the initial review of GSPs, Department staff have observed that most GSAs have struggled with this requirement of SGMA. However, staff believe that most GSAs will more fully comply with regulatory requirements after several years of Plan implementation that includes projects and management actions to address the data gaps and other issues necessary to understand, quantify, and manage depletions of interconnected surface waters. Department staff further advise that at this stage in SGMA implementation GSAs address deficiencies related to interconnected surface water depletion where GSAs are still working to fill data gaps related to interconnected surface water and where these data will be used to inform and establish

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<sup>73</sup> 2022 EKGSP, Section 3.4.2.2.3 and Table 3-6, pp. 184 and 186.

<sup>74</sup> 23 CCR § 354.28(b)(5).

sustainable management criteria based on timing, volume, and depletion as required by the GSP Regulations.

The Department will continue to support GSAs in this regard by providing, as appropriate, financial and technical assistance to GSAs, including the development of guidance describing appropriate methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water caused by groundwater extractions. Once the Department's guidance related to depletions of interconnected surface water is publicly available, GSAs, where applicable, should consider incorporating appropriate guidance approaches into their future periodic updates to the GSP. GSAs should consider availing themselves of the Department's financial or technical assistance, but in any event must continue to fill data gaps, collect additional monitoring data, and implement strategies to better understand and manage depletions of interconnected surface water caused by groundwater extractions and define segments of interconnectivity and timing within their jurisdictional area. Furthermore, GSAs should coordinate with local, state, and federal resources agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion.

## 5 STAFF RECOMMENDATION

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Department staff believe sufficient action has not been taken by the GSAs to remedy two of the deficiencies identified. Department staff recommend the Plan be determined **INADEQUATE**.