



CALIFORNIA DEPARTMENT OF WATER RESOURCES

# SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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March 2, 2023

Doug Welch  
Chowchilla Water District GSA  
327 S. Chowchilla Blvd.  
Chowchilla, CA 93610  
[dwelch@cwdwater.com](mailto:dwelch@cwdwater.com)

RE: Inadequate Determination of the Revised 2020 Groundwater Sustainability Plan Submitted for the Chowchilla Subbasin

Dear Doug Welch,

The Department of Water Resources (Department) has evaluated the revised groundwater sustainability plan (GSP or Plan) for the Chowchilla Subbasin (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 Chowchilla Subbasin Groundwater Sustainability Plan

**STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES**

**STATEMENT OF FINDINGS REGARDING THE  
DETERMINATION OF INADEQUATE STATUS OF THE  
CHOWCHILLA 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 revised Plan by the Chowchilla Water District, Madera County, County of Merced, and Triangle T Water District Groundwater Sustainability Agencies (collectively, the GSAs or Agencies) for the San Joaquin Valley Basin – Chowchilla Subbasin (Subbasin) (Basin No. 5-022.05).

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 GSP. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the revised 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 GSAs for the Department's evaluation satisfied the required conditions 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 Subbasin to be 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 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 revised Plan, but instead focuses 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 revised 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 address several aspects of the Plan's disclosure, discussion, and analyses of groundwater level sustainable management criteria and potential impacts to groundwater users and uses. Although the revised GSP included revisions intended to respond to the corrective action components, the GSP did not provide sufficient information to support the Agencies' selection of the new chronic lowering of groundwater levels sustainable management criteria or how and why the Agencies concluded that the selected minimum thresholds would avoid undesirable results for subsidence. The Staff Report indicates 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 address several aspects of the Plan's disclosure, discussion, and analyses of land subsidence that precluded approval. Although the revised GSP included revisions intended to respond to the corrective action, the GSP has not provided adequate evidence to demonstrate a significant statistical

## Statement of Findings

San Joaquin Valley – Chowchilla Subbasin (No. 5-022.05)

March 2, 2023

correlation between the selected groundwater levels and subsidence to justify their use as a reasonable proxy for subsidence and has not sufficiently evaluated potential impacts to critical infrastructure at the minimum thresholds. The revised GSP also has not identified total cumulative subsidence tolerable by the beneficial uses and users the GSP intends to protect. 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 perform comprehensive analysis to support the conclusion that interconnected surface water is or is not present in the Subbasin and, if the analysis indicates interconnected surface water exists within the Subbasin, to develop sustainable management criteria. The revised GSP has concluded that intermittent interconnected surface water has occurred along the San Joaquin River within the Subbasin based on an analysis comparing groundwater levels and the thalweg of the river. The revised GSP has established interim sustainable management criteria for interconnected surface water using a metric called percent of time connected. 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:

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

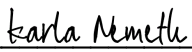
Statement of Findings

San Joaquin Valley – Chowchilla Subbasin (No. 5-022.05)

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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 GSP for Chowchilla 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 - Chowchilla Subbasin

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

Groundwater Basin Name: San Joaquin Valley – Chowchilla Subbasin (No. 5-022.05)

Submitting Agencies: Chowchilla Water District, Madera County, County of Merced, and Triangle T Water District Groundwater Sustainability Agencies

Submittal Type: Revised Plan in Response to Incomplete Determination

Submittal Date: July 27, 2022

Recommendation: Inadequate

Date: March 2, 2023

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On July 27, 2022, the Chowchilla Water District, Madera County, County of Merced, and Triangle T Water District Groundwater Sustainability Agencies (collectively, the GSAs) jointly resubmitted a revised Groundwater Sustainability Plan (GSP or Plan) for the San Joaquin Valley Groundwater Basin – Chowchilla Subbasin (Subbasin) 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>

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

- **Department staff recommend the Plan be determined: 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.

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<sup>1</sup> Water Code § 10733.4(b); 23 CCR § 355.4(a)(4); Incomplete Determination of the 2020 Chowchilla Subbasin Groundwater Sustainability Plan. California Department of Water Resources, January 28, 2022, <https://sgma.water.ca.gov/portal/service/gspdocument/download/7776>.

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

<sup>3</sup> 23 CCR § 350 *et seq.*

<sup>4</sup> 23 CCR § 355.2(e)(3)(C).

- **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 Chowchilla 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 GSP does not provide sufficient information to support the selection of the sustainable management criteria for chronic lowering of groundwater levels.

Deficiency 2 – The GSP does not provide sufficient information to support the selection of the sustainable management criteria for land subsidence.

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 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 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>

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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.*

<sup>16</sup> 23 CCR § 350 *et seq.*

<sup>17</sup> 23 CCR § 355.4(b).

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 revised 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>

The Department issued the incomplete determination on January 28, 2022. The GSAs resubmitted the revised GSP to the Department on July 27, 2022, in compliance with the 180-day deadline. On December 22, 2022, the GSAs submitted to the Department draft work plans related to interconnected surface water and subsidence. Since the submission was past the 180-day deadline, the additional material could not be considered as part of the revised Plan and thus was only preliminarily reviewed by the Department.

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

<sup>19</sup> 23 CCR § 355.4(a)(4).

## 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 deficiencies in the Plan 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 GSP DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE SELECTION OF THE CHRONIC LOWERING OF GROUNDWATER LEVELS SUSTAINABLE MANAGEMENT CRITERIA.

#### 4.1.1 Corrective Action 1

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

“The GSP must explain how the chronic lowering of groundwater level minimum thresholds, defined at representative monitoring sites, represent groundwater levels that indicate a depletion of supply at that location that may lead to undesirable results. Additionally, the GSP should support the explanation by describing the specific significant and unreasonable effects on groundwater supply uses and users that the GSA intends to avoid. The GSP should include specific details about those effects, supported by the best available information and science. If the GSAs intended that the minimum threshold values in the GSP do not explicitly represent a depletion of supply that may lead to undesirable results, but that those users impacted by planned depletion of supply (via lowering of groundwater levels and reduction of storage) would be mitigated, then the GSAs should more clearly describe, with specific detail, the Subbasin-wide mitigation

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<sup>20</sup> Incomplete Determination of the 2020 Chowchilla Subbasin Groundwater Sustainability Plan. California Department of Water Resources, January 28, 2022, <https://sgma.water.ca.gov/portal/service/gspdocument/download/7776>.

program. Department staff note that, while the GSP states significant adverse impacts to domestic wells are expected to be addressed through a temporary domestic well mitigation program that the GSAs in the Subbasin are currently developing with the assistance of Proposition 68 grant funding, it is unclear when the program will be implemented and financed by the GSAs, or how rapidly the GSAs will be able to respond to developing domestic well impacts. Department staff recommend the GSAs include additional information regarding the implementation of the mitigation program in responding to this deficiency. In addition to domestic wells, the GSAs should explain whether and how the mitigation program extends to other drinking water users that rely on shallow wells, such as public water systems and state small water systems.

The GSP should also clearly explain the relationship between the chronic lowering of groundwater levels minimum thresholds and those developed for subsidence and explain how allowing continued lowering of groundwater levels would avoid undesirable results for subsidence.”

#### **4.1.2 Evaluation**

The corrective action requested the GSP explain “how the chronic lowering of groundwater level minimum thresholds, defined at representative monitoring sites, represent groundwater levels that indicate a depletion of supply at that location that may lead to undesirable results.” In response, the GSP explains that the GSAs used a modeling approach to project future groundwater levels and select the minimum thresholds protective of agricultural and municipal wells in the context of implementing a basin wide mitigation program to protect domestic groundwater uses and users. Specifically, the minimum thresholds have been updated based on the projected lowest groundwater levels after January 2040 subtracting a 10-foot operational buffer. Then, the GSAs verified the selected minimum thresholds to ensure significant and unreasonable effects to beneficial uses and users would not occur.<sup>21</sup>

In response to the corrective action requesting the GSP supports its explanation by describing the specific significant and unreasonable effects on groundwater supply uses and users that the GSAs intend to avoid. The GSP provides updated language describing significant and unreasonable effects on both agricultural wells and municipal wells as 25 percent of agricultural wells and 10 percent of municipal wells requiring replacement because of lowered groundwater levels. The GSP also defines undesirable results as “greater than 30 percent exceedance of minimum thresholds for two consecutive years,”<sup>22</sup>. The GSP did not adequately justify the basis for selecting a percent of failing wells as the basis for defining undesirable results.

While the revised GSP does update the sustainable management criteria for chronic lowering of groundwater levels, the changes may exacerbate the subsidence condition in the area and cause additional adverse impacts to beneficial uses and users. By

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<sup>21</sup> Revised Chowchilla GSP, Section 3.3.1.3, p. 344.

<sup>22</sup> Revised Chowchilla GSP, Section 3.3.1, pp. 336-337, Table 3-14, p. 373.

comparing the revised minimum thresholds<sup>23</sup> to those previously proposed, Department staff noticed that while the revised minimum thresholds in the eastern part of the Subbasin have been raised, the minimum thresholds for representative monitoring wells screened at the lower aquifer within the western part of the Madera County GSA have been lowered approximately 40 – 80 feet.

In response to the Department’s request for additional details related to the Subbasin-wide mitigation program, the GSAs added additional details related to the plan to mitigate impacts to domestic groundwater users through implementation of the Domestic Well Mitigation Program (Mitigation Program).<sup>24</sup> The GSAs indicate that they are committed to implementing and funding the Mitigation Program and have executed a related memorandum of understanding (MOU) (in July 2022). The MOU defines the proportionate responsibilities, eligibility, terms and conditions, repercussions of failure to pay, and a starting date no later than January 1, 2023.<sup>25</sup> Department staff encourage the GSAs to closely monitor the progress and follow through with the commitments to the Mitigation Program. However, Department staff note that the Mitigation Program is limited to “private domestic wells only”<sup>26</sup> and the GSP does not discuss potential impacts to drinking water users relying on shallow wells, such as public water systems and state small water systems, which are additional issues Department staff requested the GSAs address in the corrective action. Because the GSP reports that there are a number of supply wells serving individual businesses, schools, or hospitals in the Subbasin,<sup>27</sup> The GSP does not clearly indicate whether the GSAs considered the impacts to these wells when establishing the sustainable management criteria for chronic lowering groundwater levels or if there is a potential for anticipated lowering of groundwater levels to cause a depletion of supply to these wells that could lead to undesirable results.<sup>28</sup>

As it relates to subsidence, Department staff provided a corrective action that “the GSP should also clearly explain the relationship between the chronic lowering of groundwater levels minimum thresholds and those developed for subsidence and explain how allowing continued lowering of groundwater levels would avoid undesirable results for subsidence.” While the GSP revised the minimum thresholds for chronic lowering of groundwater levels, the minimum thresholds are still set below the land subsidence minimum thresholds at most of the monitoring sites.<sup>29</sup> The GSP states that “...the minimum thresholds for these two [groundwater levels and subsidence] sustainability indicators have been set independently based on occurrence of undesirable results for each indicator.”<sup>30</sup> This is not in substantial compliance with the GSP Regulations, which require that a GSA determine that basin conditions at each minimum threshold will avoid

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<sup>23</sup> Revised Chowchilla GSP, Table 3-8, pp. 342-343.

<sup>24</sup> Revised Chowchilla GSP, Section 3.3.1.1, pp. 338-340, Appendix 3.C., pp. 1383-1399.

<sup>25</sup> Revised Chowchilla GSP, Appendix 3.D., pp. 1400-1460.

<sup>26</sup> Revised Chowchilla GSP, Appendix 3.D., Recital L, p. 1402.

<sup>27</sup> Revised Chowchilla GSP, Table 2-4, pp. 126-130.

<sup>28</sup> 23 CCR §§ 354.26(b)(3), 354.28(b)(4).

<sup>29</sup> Revised Chowchilla GSP, Figures 3-6A to 3-7D, pp. 402-407, Appendix 3.A., pp. 1336-1371.

<sup>30</sup> Revised Chowchilla GSP, Section 3.3.1.4, p. 345.

undesirable results for each of the sustainability indicators,<sup>31</sup> and not responsive to the corrective action provided to the GSAs. Given that the GSP presents further declines in groundwater levels within the Subbasin during GSP implementation, it is imperative that impacts to subsidence (and other sustainability indicators) be analyzed. The GSP did not provide sufficient information showing that lowering groundwater levels would not contribute to further subsidence, potentially exceeding minimum thresholds and causing undesirable results as required by the GSP Regulations. Department staff provide additional evaluation related to subsidence in the following section.

Department staff are encouraged by the GSAs' responses to the corrective action component related to the depletion of supply and explanation of the well mitigation program and conclude that the GSAs have taken sufficient action, although it leaves questions unanswered regarding the potential impacts to public water systems or small water systems that rely on shallow wells. Department staff also conclude the GSAs have not taken sufficient action to address the deficiency as it relates to impacts to other sustainability indicators, most specifically subsidence; therefore, Department staff have insufficient information and cannot determine whether the sustainable management criteria for chronic lowering of groundwater levels are reasonable and whether there is interference with subsidence.<sup>32</sup>

## **4.2 DEFICIENCY 2: THE GSP DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE SELECTION OF LAND SUBSIDENCE SUSTAINABLE MANAGEMENT CRITERIA.**

### **4.2.1 Corrective Action 2**

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

- a) "The GSP should be revised to include discussion of land surface beneficial uses and users in the Subbasin (e.g., infrastructure such as canals or levees) that may be susceptible to substantial interference as a result of continued subsidence. This information should be used to inform other revisions to the GSP necessitated by this corrective action."
- b) "The GSAs should provide supporting information for using groundwater levels as a proxy for subsidence in the Western Management Area. The GSP should be revised to include analysis that demonstrates a significant correlation between groundwater levels, which are allowed to decline below the historical low at up to 50 percent of monitoring sites, and land subsidence. The GSAs should evaluate the potential for subsidence impacts (i.e., substantial interference for surface land uses) related to any allowable further groundwater level decline. The GSAs should also consider incorporation of remotely sensed subsidence data made available

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<sup>31</sup> 23 CCR § 354.28 (b)(2).

<sup>32</sup> 23 CCR § 354.24.

by the Department on an ongoing basis to verify the appropriateness of the groundwater level proxy.”

- c) “The GSAs should revise their minimum thresholds and measurable objectives for land subsidence in the Eastern Management Area to reflect the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. The GSAs should explain how implementation of the projects and management actions is consistent both with achieving the long-term avoidance or minimization of subsidence and with not exceeding the tolerable amount of cumulative subsidence.”

#### 4.2.2 Evaluation

To address part “a” of the corrective action, the revised GSP provides a land subsidence sensitivity analysis to identify critical infrastructure in the Subbasin that may be adversely impacted by land subsidence including water conveyance facilities, wells, roads, bridges, and water and wastewater infrastructure.<sup>33</sup> The GSP states that subsidence has the potential to cause undesirable results to users of roads and highways, railroads, groundwater wells, and wastewater infrastructure by causing deterioration or loss of capacity of that infrastructure through fractures, unevenness, or other issues with structural integrity and has the potential to cause changes in the design profile and slope of gravity flow channels, affecting freeboard, and channel capacity for waterways and conveyance infrastructure.<sup>34</sup> Department staff note that while additional details and information have been provided related to land surface beneficial uses and users in the Subbasin that may be susceptible to substantial interference as a result of continued subsidence, the GSP has not provided discussion of how this information and the tolerable amount of cumulative subsidence by the beneficial users and uses was considered in the development of the sustainable management criteria for land subsidence as required by the corrective action.

In response to parts “b” and “c” of the corrective action, the GSP has updated its discussion of subsidence. The GSP presents a discussion regarding residual and new subsidence (activated by future groundwater conditions), identifying the two as being difficult to quantify but states that historical low groundwater levels are the cause of residual subsidence throughout the Subbasin.<sup>35</sup> Department staff concur with the GSAs’ statement regarding the cause of residual subsidence, as described above. However, SGMA and the GSP Regulations do not differentiate between residual and new subsidence. SGMA and the GSP Regulations requires that all subsidence must be considered when establishing sustainable management criteria.<sup>36</sup> While not requested to do so, the undesirable result definition for the Western Management Area has been updated as it now requires only “greater than 25 percent of wells near key infrastructure, or greater than 33 percent of wells not considered near key infrastructure exceeding

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<sup>33</sup> Revised Chowchilla GSP, Appendix 3.E., pp. 1462-1492.

<sup>34</sup> Revised Chowchilla GSP, Appendix 3.E., pp. 1469, 1470, 1473 and 1475.

<sup>35</sup> Revised Chowchilla GSP, Section 2.2.2.7.3, pp. 175-176.

<sup>36</sup> Water Code §§ 10721(x)(5), 10727.2; 23 CCR § 354.28(c)(5).

minimum thresholds for two consecutive fall measurements,”<sup>37</sup> compared to the undesirable results defined in the previous GSP requiring “greater than 50 percent of wells exceeding minimum thresholds for two consecutive fall measurements.” However, the GSP does not explain how the values of groundwater level-based minimum thresholds exceedance (25 percent or 30 percent) in the undesirable results definition effectively relate to the avoidance of subsidence undesirable results, given that groundwater levels have not been proved to be correlated to subsidence in the Subbasin (more in the following section).

Currently, the minimum thresholds for subsidence in the Western management area are using groundwater water levels in the lower aquifer as a proxy. Part “b” of the corrective action asked the GSAs to include an analysis that demonstrates a strong correlation between subsidence and groundwater levels. In response, the revised GSP includes two analyses based on different datasets: one analysis was based on time-series subsidence at San Joaquin River Restoration Program subsidence benchmark locations paired with groundwater levels at nearby monitoring wells,<sup>38</sup> and the other was based on the Department’s InSAR data.<sup>39</sup> While acknowledging the limited availability of the data, the revised GSP concludes that the correlation between groundwater levels and subsidence is apparent at some locations, but not at many other locations because residual subsidence continues even when water levels are stable or recovering.<sup>40</sup> Based on what the GSP presents, any correlation between subsidence and groundwater levels is inconsistent or variable. Accordingly, Department staff conclude the GSAs have not demonstrated with adequate supporting evidence that the GSP’s proposed use of groundwater levels is a reasonable proxy for minimum thresholds for subsidence in the basin.<sup>41</sup>

In the Western Management Area, the revised GSP states that the Subbasin already experienced significant impacts to infrastructure such as the Chowchilla/Eastside Bypass, San Joaquin River, and groundwater wells.<sup>42</sup> The GSAs use the modeled 2015 groundwater levels as the minimum thresholds for land subsidence, stating “keeping groundwater levels above the historical low levels is expected to limit any additional subsidence to only residual subsidence resulting from historical conditions.”<sup>43</sup> However, by examining the hydrographs of representative monitoring wells, Department staff observed that the modeled 2015 levels are significantly lower than the actual measured historical 2015 levels,<sup>44</sup> and that the projected future groundwater levels (including interim milestones) under the GSP’s proposed management program would be consistently and significantly below the historical lows at all representative monitoring wells. At times

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<sup>37</sup> Revised Chowchilla GSP, Table 3-14, p. 373.

<sup>38</sup> Revised Chowchilla GSP, Figure 2-70A, p. 302.

<sup>39</sup> Revised Chowchilla GSP, Figure 2-70B, p. 303.

<sup>40</sup> Revised Chowchilla GSP, Section 2.2.2.4.2 and 2.2.2.4.3, pp. 166-169.

<sup>41</sup> 23 CCR § 354.28(d).

<sup>42</sup> Revised Chowchilla GSP, Section 3.4.3, p. 376, Appendix 3.E., pp. 1472-1473.

<sup>43</sup> Revised Chowchilla GSP, Section 3.3.3, p. 351.

<sup>44</sup> Revised Chowchilla GSP, Table 3-14, p. 373, Appendix 3.A., pp. 1336-1371.



minimum thresholds for groundwater levels are more than 50 feet below the historical lows. Given these minimum thresholds, the GSP still has not evaluated potential impacts related to subsidence when establishing the sustainable management criteria in response to part “b” of this corrective action. It is unclear to Department staff how much subsidence is expected given these thresholds and whether these thresholds will avoid undesirable results. Also, as discussed in the Deficiency 1 section, the GSP does not provide sufficient information to explain whether or how undesirable results related to subsidence can be avoided consistent with the setting of minimum thresholds for groundwater levels below those established for subsidence.

Part “c” of the corrective action requires the GSAs to revise their minimum thresholds and measurable objectives for land subsidence in the Eastern Management Area to reflect the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. The previous GSP considered land subsidence is a sustainability indicator not applicable to the Eastern Management Area and adopted an adaptive management measure to maintain a subsidence rate no greater than 0.25 feet per year. In response to the corrective action, the revised GSP has developed the sustainable management criteria for using a combination of groundwater levels as a proxy method and geographic subsidence differential method. Using the proxy method, the GSAs set the minimum thresholds at modeled historical low groundwater levels, which in most cases appear to be lower than the observed 2015 groundwater levels.<sup>45</sup> The GSAs set the measurable objectives at projected average future groundwater levels between 2040-2090. As discussed previously, the GSP lacks adequate evidence to rely on groundwater elevations as a proxy for subsidence because the GSP was not able to demonstrate a significant statistical correlation between the two. The GSAs have also not explained the rationale behind selecting the modeled historical lows as the minimum thresholds, which are lower than the 2015 observed historical lows. As with the Western Management Area, the projected future groundwater levels in the Eastern management area (including interim milestones) are consistently below the 2015 historical lows at almost all representative monitoring wells.<sup>46</sup> The GSAs define subsidence undesirable results as “exceedance of subsidence tolerance amount minimum threshold and subsidence water level minimum threshold at greater than 25 percent of representative monitoring sites associated with any individual critical conveyance feature for two consecutive years.”<sup>47</sup> It is not clear to Department staff how the value of groundwater level-based minimum thresholds exceedance (25 percent) in the undesirable results definition effectively relates to the avoidance of subsidence undesirable results given that groundwater levels have not been proved to be correlated to subsidence in the Subbasin. Department staff note that the “subsidence tolerance amount” in the undesirable results definition refers to the historical geographic subsidence amount differential, which applies to the slopes of the

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<sup>45</sup> Revised Chowchilla GSP, Table 3-14, p. 373, Appendix 3.A., pp. 1336-1371.

<sup>46</sup> Revised Chowchilla GSP, Appendix 3.A., pp. 1336-1371.

<sup>47</sup> Revised Chowchilla GSP, Table 3-14, p. 373.

east-west oriented water conveyance facilities only but does not apply to well structures described in the GSP (more in the following section).

The GSP uses geographic subsidence differential method to develop minimum threshold for those east-west oriented water conveyance and set the maximum value of historical subsidence differential between two geographic locations as the minimum threshold. The GSP describes that such minimum threshold will be used to ensure the gradient of surface water conveyances will not be lessened to adversely impact their capacities. The selection of minimum thresholds and the definition of undesirable results for subsidence primarily focuses on maintaining the slopes of water conveyance facilities, although the GSP states subsidence could potentially cause well structure failure. The GSP states that the GSAs consider subsidence resulting in well structure failures of greater than 25 percent of agricultural wells or 10 percent of municipal wells to be significant and unreasonable.<sup>48</sup> The GSP indicates that the magnitude of total historical subsidence in the Eastern Management Area ranged from two feet to six feet for area west of Highway 99 from 2007 through 2021<sup>49</sup> and states there are “anecdotal reports of a great number of agricultural well structure failures in areas of greater historical subsidence”.<sup>50</sup> However, the GSAs have not developed sustainable management criteria for subsidence to protect well structures but decided to do so “if determined appropriate and necessary in the future”.<sup>51</sup> The GSP does not provide sufficient information to explain why the condition described above would not be considered “appropriate and necessary” and how it is consistent with GSP Regulations not to incorporate potential impacts to well structures in the development of sustainable management criteria for subsidence.<sup>52</sup>

Part “c” of the corrective action asks the GSAs to “explain how implementation of the projects and management actions is consistent both with achieving the long-term avoidance or minimization of subsidence and with not exceeding the tolerable amount of cumulative subsidence.” The GSP does not propose any specific projects and management actions related to subsidence plan for the Eastern Management Area, nor does it explain how implementation of the projects and management actions is consistent with avoiding or minimizing subsidence within the tolerable amount of cumulative subsidence over the long-term implementation horizon. Although it is not part of this corrective action, Department staff want to note that the GSP describes subsidence control measures proposed for the Western Management Area and states that the GSAs have implemented those over the past several years. Department encourage the GSAs to continue or expand the implementation of those subsidence control measures.

Overall, in a Subbasin with significant historical subsidence, Department staff conclude that the GSAs have not taken sufficient action to address the land subsidence deficiency previously identified by DWR. The GSP still does not identify minimum thresholds and

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<sup>48</sup> Revised Chowchilla GSP, Section 3.3.3, p. 352.

<sup>49</sup> Revised Chowchilla GSP, Figure 2-67, p. 298.

<sup>50</sup> Revised Chowchilla GSP, Section 3.3.3, p. 352.

<sup>51</sup> Revised Chowchilla GSP, Section 3.3.3, p. 352.

<sup>52</sup> 23 CCR §§ 354.26(b)(3), 354.28(c)(5).

undesirable results that reflect the level at which additional subsidence would interfere with surface land uses.

As mentioned above, the GSAs prepared a draft work plan outlining an approach to address data gaps related to subsidence that has not been considered in the evaluation of the GSP due to its late submission; however, the Department has done a preliminary review of the content. The draft work plan states the GSAs intend to enhance monitoring and improve understanding of relationships between groundwater conditions and land subsidence in the Subbasin through instrumenting existing wells, installing new monitoring wells and new land subsidence monitoring facilities, performing modeling runs to simulate land subsidence, and collecting/compiling other additional data available. The draft work plan also states that the GSAs plan to further evaluate the adequacy of subsidence sustainable management criteria and support development of a coordinated approach to implementation of the proposed projects and management actions. The GSAs proposed to complete most of the tasks in the work plan by 2024 while a couple of tasks will continue after 2024 or 2026, including additional field work, stakeholder outreach, and inter-basin coordination. Department staff encourage the GSAs to diligently continue efforts on this work plan.

#### **4.3 DEFICIENCY 3: THE GSP DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE DETERMINATION THAT INTERCONNECTED SURFACE WATER OR UNDESIRABLE RESULTS RELATED TO DEPLETIONS OF INTERCONNECTED SURFACE WATER ARE NOT PRESENT AND ARE NOT LIKELY TO OCCUR IN THE SUBBASIN.**

##### **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:

- a) “The GSP must be revised to include a clear and comprehensive analysis of the potential for interconnected surface water to be present along the San Joaquin River in the Subbasin. The revision should provide data and complete analysis to support any conclusion regarding the presence or absence of interconnected surface water. Department staff suggest the GSAs review information from adjacent GSPs. If the GSAs find that there is insufficient data to justify the conclusion that interconnected surface water is, or is not, present in the Subbasin, a plan and schedule should be developed and submitted to the Department to address this data gap.”
- b) “Should data indicate the presence of interconnected surface water, the GSAs should develop sustainable management criteria, as required in the GSP Regulations, based on best available information and science. The GSAs should evaluate and disclose, sufficiently and thoroughly, the potential effects of the GSP’s sustainable management criteria for depletion of interconnected surface

water on beneficial uses of the interconnected surface water and on groundwater uses and users.”

#### 4.3.2 Evaluation

In response to part “a” of the corrective action, the GSP has provided additional information which concludes that there may be some intermittent connection between shallow groundwater levels and surface water.<sup>53</sup> The method the GSP used to determine the connectivity was to compare the historical groundwater elevations at six representative monitoring sites<sup>54</sup> for interconnected surface water and the thalweg of the San Joaquin River. If a measured groundwater elevation was higher than the thalweg nearby, the GSAs considered that a connection existed between surface water and groundwater. The analysis of the six representative monitoring site indicates there is a saturated hydraulic connection between surface water and groundwater. While this approach is sufficient to confirm the presence of a hydraulic connection, Department staff note groundwater levels dropping below the thalweg of the San Joaquin River would not be sufficient to prove surface water and groundwater are disconnected. This is because water from the river is still recharging the aquifer and may do so at a rate that would cause mounding in the local water table surrounding the river. The mounding in the water table may enable the river and aquifer to maintain a saturated hydraulic connection when groundwater levels drop well below the bottom of the river. The GSP states that there are data gaps to fill in order to confirm whether or not interconnected surface water is present in the Subbasin. Particularly, the GSAs plan to investigate whether connection exists between the shallow perched aquifer and the unconfined principal aquifer.

In response to part “b” of the corrective action, the GSAs developed interim sustainable management criteria for interconnected surface water based on the preliminary conclusion that there may be intermittent connection between surface water and groundwater. The GSAs used a metric called “percent of time connected” to develop the interim sustainable management criteria for depletion of interconnected surface water. In reviewing the information provided in the GSP, Department staff conclude that the development of sustainable management criteria is not consistent with the GSP Regulations. Reporting the percent of time connected does not provide adequate information to describe or evaluate the quantity and timing of depletions of interconnected surface water, as required by the GSP Regulations.<sup>55</sup> The GSAs also did not evaluate and disclose the potential effects on the beneficial uses and users of surface water and groundwater in the development of sustainable management criteria. The statistical nature associated with the use of “percent of time connected” may not be able to provide useful information to properly characterize the potential impacts to the beneficial uses and users. Department staff note that the GSP identifies the beneficial uses and users that could be adversely impacted by surface water depletion, which includes riparian vegetation along the San Joaquin River and the wildlife habitat and ecosystem functions

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<sup>53</sup> Revised Chowchilla GSP, Section 2.2.2.5, pp. 169-171.

<sup>54</sup> Revised Chowchilla GSP, Figure 3-3, p. 401.

<sup>55</sup> 23 CCR §§ 354.28(c)(6)(A), 354.28(c)(6)(B).

it provides, as well as riverine habitat in the San Joaquin River that supports migration and potential spawning of special-status fishes including salmon and steelhead.<sup>56</sup>

As mentioned above, the GSAs prepared a work plan outlining an approach to fill these data gaps that has not been considered in the evaluation of the GSP due to its late submission; however, the Department has done a preliminary review of the content. The draft work plan states the GSAs intend to compile and review pertinent existing data/reports, construct/install new monitoring facilities, collect additional field data, and conduct additional technical analysis. The purpose is to make a more informed determination of whether interconnected surface water is present along the San Joaquin River, to improve understanding of the relationships between streamflow, shallow groundwater levels, and regional groundwater pumping. While the work plan states that the GSAs will potentially refine or modify the interim sustainable management criteria, it also indicates that the GSAs will continue using the metric of “percent of time connected” for sustainable management criteria – a metric Department staff conclude is not appropriate in estimating timing and volume of interconnected surface water depletion and evaluating potential impacts to beneficial uses and users. The GSAs proposed to complete most of the tasks in the work plan by 2024 while a couple of tasks will continue after 2024 or 2026, including additional field work and groundwater modeling. Department staff are encouraged by the GSA’s intent to increase data collection and field work.

At this time, Department staff conclude sufficient action has been taken on this deficiency and believe the GSAs can work with the Department to further efforts on interconnected surface water. 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 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

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<sup>56</sup> Revised Chowchilla, GSP, Section 3.2.5, p. 331, Appendix 2.B., pp. 585-621.

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 correct one or more of the deficiencies identified by the Department. Department staff recommend the Plan be determined **INADEQUATE**.