

Statement of Findings

San Joaquin Valley Basin – Tule Subbasin (No. 5-022.13)

March 2, 2023

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 the Plan to the Department for evaluation. When evaluating a resubmitted 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 Agencies have 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 Agencies have 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 Agencies to correct those deficiencies:

D. Deficiency 1: involved the definition of undesirable results or setting minimum thresholds and measurable objectives for groundwater levels. The corrective action advised the Agencies to define undesirable results or set minimum thresholds and measurable objectives for groundwater levels in a manner consistent with the GSP Regulations. Although the revised Plan included revisions intended to respond to the corrective action components, the Plan did not materially revise the method of setting minimum thresholds for groundwater levels for the responsible areas of most of the GSAs and did not explain how and why the selected minimum thresholds would avoid undesirable results for groundwater levels. 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.

E. Deficiency 2: involved the definition of undesirable results or setting minimum thresholds and measurable objectives for land subsidence. The corrective action advised the Agencies to define undesirable

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results or set minimum thresholds and measurable objectives for land subsidence in a manner consistent with the GSP Regulations. Although the Plan included revisions intended to respond to the corrective action components, the Plan has not quantified the amount of subsidence that would result in undesirable results for areas not adjacent to the Friant-Kern Canal, defined the criteria for undesirable results consistent with avoiding significant and undesirable effects, nor established minimum thresholds and measurable objectives consistent with the intent of SGMA. 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.

- F. Deficiency 3: involved lack of sufficient information to justify sustainability management criteria for degraded water quality. The corrective actions advised the Agencies to provide sufficient information to justify the proposed sustainable management criteria for degraded groundwater water quality. The Plan improves water quality sustainable management criteria. The Plan also redefines groundwater quality conditions suitable for agricultural and domestic use to align with the criteria set by the relevant regulatory agencies. The Staff Report indicates that the Agencies have taken sufficient actions to correct this deficiency

G. 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 within each basin prior to and during development and implementation of Plans. Under

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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 Tule Subbasin is hereby determined to be **INADEQUATE**.

Signed:



Karla Nemeth, Director

Date: March 2, 2023

Enclosure: Groundwater Sustainability Plan Assessment Staff Report – San Joaquin Valley Basin – Tule 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 – Tule Subbasin (No. 5-022.13)
Number of GSPs: 6 (see list below)
Number of GSAs: 7 (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 revised groundwater sustainability plans (GSPs) for the entire Tule 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, 2022,¹ for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)² and GSP Regulations.³ In total, six GSPs have been revised, adopted, and implemented by seven GSAs. Collectively, the six GSPs and the coordination agreement are, for evaluation and assessment purposes, treated and referred to as the Plan for the Subbasin. Individually, the revised GSPs include the following:

- *Updated Groundwater Sustainability Plan Version No. 2 – July 2022, Alpaugh Groundwater Sustainability Agency, (Alpaugh GSP)– prepared by the Alpaugh GSA.*
- *Sustainable Groundwater Management Act, Groundwater Sustainability Plan – Updated July 2022, Delano-Earlimart Irrigation District Groundwater Sustainability Agency (Delano-Earlimart Irrigation District GSP) – prepared by the Delano-Earlimart Irrigation District GSA.*
- *Sustainable Groundwater Management Act, Groundwater Sustainability Plan – Revised July 2022, Eastern Tule Groundwater Sustainability Agency, Tule Subbasin (Eastern Tule GSP)– prepared by the Eastern Tule GSA.*

¹ Water Code § 10733.4(b); 23 CCR § 355.4(a)(4); Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Tule Subbasin, California Department of Water Resources, January 28, 2022. <https://sgma.water.ca.gov/portal/service/gspdocument/download/7784>.

² Water Code § 10720 *et seq.*

³ 23 CCR § 350 *et seq.*

- *Sustainable Groundwater Management Act, Groundwater Sustainability Plan – July 2022, Lower Tule River Irrigation District Groundwater Sustainability Agency, Tule Subbasin* (Lower Tule River Irrigation District GSP) – prepared by the Lower Tule River Irrigation District GSA.
- *Sustainable Groundwater Management Act, Groundwater Sustainability Plan – July 2022, Pixley Irrigation District Groundwater Sustainability Agency, Tule Subbasin* (Pixley Irrigation District GSP) – prepared by the Pixley Irrigation District GSA.
- *Tri-County Water Authority, Groundwater Sustainability Plan Amended – July 2022* (Tri-County GSP) – prepared by the Tri-County Water Authority GSA.

The Tulare County GSA entered into a memorandum of understanding (MOU) with the Lower Tule River Irrigation District GSA and the Tri-County Water Authority GSA to ensure GSP coverage of Tulare County GSA's jurisdictional area.⁴ The Coordination Agreement (2022 Coordination Agreement) was revised by the GSAs.

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.⁵

Based on the reevaluation of the Plan, Department staff recommend the Plan be determined inadequate.

This assessment includes five sections:

- **[Section 1 – Summary](#)**: Overview of the Department's reassessment.
- **[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.

⁴ Tule Subbasin Coordination Agreement (2022), Section 1.2, p. 12.

⁵ 23 CCR § 355.2(e)(3)(C).

1 SUMMARY

Department staff recommend the Plan for the Tule Subbasin be determined **inadequate**.

In the evaluation of the revised Plan, Department staff concluded that sufficient action was taken to correct the following deficiency identified in the incomplete determination letter issued by the Department:

- **Deficiency 3** – The GSPs do not provide sufficient information to justify the proposed sustainable management criteria for degraded water quality.

However, Department staff concluded the GSAs did not take sufficient actions to correct the following deficiencies identified in the January 2022 Staff Report:

- **Deficiency 1** – The GSPs do not define undesirable results or set minimum thresholds and measurable objectives for groundwater levels in a manner consistent with the GSP Regulations.
- **Deficiency 2** – The GSPs do not define undesirable results or set minimum thresholds and measurable objectives for land subsidence in a manner consistent with 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 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.

2 EVALUATION CRITERIA

The Department evaluates whether a Plan conforms to the statutory requirements of SGMA⁶ and is likely to achieve the basin's sustainability goal,⁷ whether evaluating a basin's first Plan,⁸ a Plan previously determined incomplete,⁹ an amended Plan,¹⁰ or a GSA's periodic update to an approved Plan.¹¹ 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.¹² The Department is also required to evaluate, on an

⁶ Water Code §§ 10727.2, 10727.4, 10727.6.

⁷ Water Code § 10733; 23 CCR § 354.24.

⁸ Water Code § 10720.7.

⁹ 23 CCR § 355.2(e)(2).

¹⁰ 23 CCR § 355.10.

¹¹ 23 CCR § 355.6.

¹² Water Code § 10721(v).

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.¹³

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 approve¹⁴ the Plan or determine the Plan inadequate.¹⁵

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 Regulations¹⁶ to determine whether the Plan, with revisions or additions prepared by the GSA, complies with SGMA and substantially complies with the GSP Regulations.¹⁷ 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."¹⁸

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.¹⁹

¹³ Water Code § 10733(c).

¹⁴ 23 CCR §§ 355.2(e)(1).

¹⁵ 23 CCR §§ 355.2(e)(3).

¹⁶ 23 CCR § 355 *et seq.*

¹⁷ 23 CCR § 350 *et seq.*

¹⁸ 23 CCR § 355.4(b).

¹⁹ Water Code § 10735 *et seq.*

3 REQUIRED CONDITIONS

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.²⁰

The Department issued its 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

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 2022.²¹ 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 the deficiencies.

²⁰ 23 CCR § 355.4(a)(4).

²¹ <https://sgma.water.ca.gov/portal/service/gspdocument/download/7784>.

4.1 DEFICIENCY 1. THE GSPs DO NOT DEFINE UNDESIRABLE RESULTS OR SET MINIMUM THRESHOLDS AND MEASURABLE OBJECTIVES FOR GROUNDWATER LEVELS IN A MANNER CONSISTENT WITH THE GSP REGULATIONS

4.1.1 Corrective Actions

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

1. The GSAs should revise the GSP to describe, with information specific to the Subbasin, the groundwater level conditions that are considered significant and unreasonable and would result in undesirable results as these are described in the GSP Regulations and as discussed [in the 2020 Staff Report]. The GSAs should define the conditions, including specific water level depth and well construction information, anticipated to cause well failures, result in additional operational costs for groundwater extraction from deeper pumping levels, and result in additional costs to lower pumps, deepen wells, or drill new wells. The GSAs should then explain or justify how the quantitative definition of undesirable results (i.e., 50 percent minimum threshold exceedances for two consecutive years), which allows for potential continued groundwater decline at up to half of the monitoring sites, is consistent with avoiding the effects the GSAs have determined are undesirable results.
2. The GSAs must revise their GSPs to explain how minimum thresholds at the representative monitoring sites are consistent with the requirement to be based on a groundwater elevation indicating a depletion of supply at a given location. If the GSAs did not set minimum thresholds consistent with levels indicating a depletion of supply, they should revise the minimum thresholds accordingly. Groundwater sustainability agencies in other subbasins have used domestic wells as the shallowest beneficial user to constrain their groundwater thresholds. The Tule GSAs may consider incorporating an evaluation of domestic well impacts into the development of minimum thresholds for the chronic lowering of groundwater to ensure all beneficial uses and users of groundwater in the Subbasin are represented. The Tule Subbasin GSAs may need to look to other users, such as municipal or agricultural groundwater users, as applicable for each monitoring site, to determine the levels indicating supply depletion when setting minimum thresholds."²²

²² Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Tule Subbasin, California Department of Water Resources, January 28, 2022. <https://sgma.water.ca.gov/portal/gsp/assessments/65>.

4.1.2 Evaluation

4.1.2.1 Undesirable Results

The Coordination Agreement initially submitted in 2020 identified the potential effects associated with chronic lowering of groundwater levels as causing well failures, additional operational costs for groundwater extraction from deeper pumping levels, and additional costs to lower pumps, deepen wells, or drill new wells. The undesirable result for chronic lowering of groundwater levels was defined as a “basin-wide loss of well pumping capacity, which cannot be remedied.” Although that Coordination Agreement generally stated the possible effects caused by localized groundwater level declines, neither the 2020 Coordination Agreement nor the 2020 GSPs evaluated the potential impacts to beneficial uses and users of groundwater that would occur throughout the Subbasin as a result of the groundwater level declines.²³

Corrective action 1 requires the GSAs to “describe, with information specific to the Subbasin, the groundwater level conditions that are considered significant and unreasonable and would result in undesirable results.” The criteria used to define undesirable results is described as the “continued chronic lowering of groundwater levels below those needed to accommodate continued pumping during the transitional period of temporary overdraft” and the “lack of access to water supplies for all beneficial uses and users due to lowered groundwater levels is an undesirable result.”²⁴ The 2022 Coordination Agreement and five GSPs (all except for Tri-County GSP) describe the following steps to inform the Subbasin’s significant and unreasonable conditions:

- Development of a detailed hydrogeologic conceptual model of the Subbasin.
- Development of a calibrated numerical groundwater flow model of the Subbasin.
- Analysis of potential future groundwater levels using the model and incorporating each GSA’s planned projects and management actions.
- Comparison of model-forecasted groundwater levels with the best available information on well depths in the subbasin.²⁵

Corrective action 1 also requires the GSAs to “explain or justify how the quantitative definition of undesirable results (i.e., 50 percent minimum threshold exceedances for two consecutive years), which allows for potential continued groundwater decline at up to half of the monitoring sites, is consistent with avoiding the effects the GSAs have determined are undesirable results.” The Plan no longer defines undesirable results as 50 percent minimum threshold exceedances for two consecutive years. The 2022 Coordination agreement and five of the six GSPs²⁶ (all except Tri-County GSP) now define the

²³ Tule Subbasin Coordination Agreement (2020), pp. 48-49.

²⁴ Tule Subbasin Coordination Agreement (2022), Section 4.3.1, p. 53; Alpaugh GSP, Section 3.4, pp.50-51; Delano-Earlimart Irrigation District GSP, Section 3.4, pp.101-102; Eastern Tule GSP, Section 5.4, pp.223-224; Lower Tule River Irrigation District GSP, Section 3.4, pp. 199-201; Pixley Irrigation District GSP, Section 3.4, pp. 160-162.

²⁵ Tule Subbasin Coordination Agreement (2022), Section 4.3.1, pp. 53-54.

²⁶ These GSPs include Alpaugh GSP, Delano-Earlimart Irrigation District GSP, Eastern Tule GSP, Lower Tule River Irrigation District GSP, and Pixley Irrigation District GSP.

undesirable result for chronic lowering of groundwater levels as the “the lowering of the groundwater elevation below the minimum threshold at an [representative monitoring site] in any given GSA for the area and beneficial uses and users associated with that [representative monitoring site].”²⁷ From the steps that inform the significant and unreasonable conditions in the Subbasin, Department staff understand that identification of the undesirable result (and minimum thresholds as described below) is primarily based on the modeled results which incorporate continued overdraft pumping during the Plan’s transitional period (2020-2040).

The manner in which significant and unreasonable conditions are defined is not consistent with the GSP Regulations. As described in the corrective action, the GSAs should define the conditions that would cause undesirable results, as determined by the GSAs, including specific water level depth and well construction information, anticipated to cause well failures, result in additional operational costs for groundwater extraction from deeper pumping levels, and result in additional costs to lower pumps, deepen wells, or drill new wells. In the Department’s evaluation, the GSAs are relying on the modeled results to define significant and unreasonable conditions for the Subbasin. The GSAs then in turn utilize this modeled approach in defining significant and unreasonable effects to inform the description of undesirable result; however, that too is based on modeled results rather than the avoidance of significant and unreasonable effects.

The Tri-Country GSP prepared a GSP addendum to specifically address the three deficiencies outlined in the January 2022 Staff Report.²⁸ In addition to the definition of significant and unreasonable conditions identified in the 2022 Coordination Agreement, Tri-County also identifies “undesirable results for groundwater level as a groundwater elevation that would cause significant and unreasonable loss of beneficial uses for water supply, particularly for domestic/public supply.”²⁹ It is the Department’s understanding that this definition is actually a further description of what is considered significant and unreasonable for the GSP area rather than a definition of undesirable results based on a quantitative description of the combination of minimum threshold exceedances that would cause significant and unreasonable effects in the Subbasin as required by the GSP Regulations. Department staff is unsure if the GSA is defining it as undesirable if there is one minimum threshold exceedance.

As part of the steps taken to identify significant and unreasonable conditions, the Plan conducted a comparison of model-forecasted groundwater levels with the best available information on well depths in the subbasin, which included a well impact analysis for groundwater levels decreasing to the established minimum threshold.³⁰ The impact analysis includes wells for industrial, domestic, agricultural, and municipal water supply

²⁷ Tule Subbasin Coordination Agreement (2022), Section 4.3.1.2, p. 54; Alpaugh GSP, Section 3.4, p. 51; Delano-Earlimart Irrigation District GSP, Section 3.4, p.101; Eastern Tule GSP, Section 5.4, p.224; Lower Tule River Irrigation District GSP, Section 3.4, p. 201; Pixley Irrigation District GSP, Section 3.4, pp. 162.

²⁸ Tri-Country GSP (2022), Groundwater Sustainability Plan Addendum, pp. 1669-1711.

²⁹ Tri-Country GSP (2022), Groundwater Sustainability Plan Addendum, p. 1681.

³⁰ Tule Subbasin Coordination Agreement (2022), Attachment 4, pp. 847-860.

wells. The potentially impacted wells are determined based on the total depth of the well or where the bottom of the perforations are relative to the minimum threshold or where the total depth/bottom of perforations are below the minimum threshold but could not support pumping with a static groundwater level at the minimum threshold.³¹ The 2022 Coordination Agreement states that wells that were impacted prior to January 1, 2015, are excluded from the analysis. These wells were identified by generating a map of groundwater surface in January 2015 based on the calibrated groundwater flow model of the Subbasin.³² Of the total 4,190 wells identified from the Department’s database as having total depth information, 568 wells were impacted by January 1, 2015, and were, therefore, excluded from the analysis. Of the remaining 3,622 wells, 776 additional wells would be impacted if groundwater levels are lowered to or below the minimum thresholds. The following table summarizes potentially impacted wells by type of well (agricultural, domestic, industrial, municipal, and unknown) for each GSA. The locations of the impacted wells are shown on a figure in the 2022 Coordination Agreement.³³

*Table 1: Tule Subbasin Impacted Wells.*³⁴

GSA	Number of Agricultural Irrigation Wells Potentially Impacted	Number of Domestic Wells Potentially Impacted	Number of Industrial Wells Potentially Impacted	Number of Municipal Wells Potentially Impacted	Number of Unknown Use Wells Potentially Impacted	Total Wells Potentially Impacted
Alpaugh ID GSA	1	0	0	0	0	1
DEID	1	6	0	0	1	8
ETGSA	91	428	15	8	19	561
LTRID GSA	49	92	5	0	4	150
Pixley ID GSA	6	38	1	0	6	51
Tri-County GSA	1	4	0	0	0	5
Total	149	568	21	8	30	776

The above table shows that domestic wells would be most severely impacted (568 wells impacted, approximately 73 percent of the total impacted wells), followed by agricultural wells (149 wells impacted, approximately 19.2 percent of the total impacted wells). Among the Subbasin’s GSAs, the Eastern Tule GSA has the most wells which could be potentially impacted (561 wells potentially impacted, 72 percent of the total potentially impacted wells), followed by the Lower Tule GSA (150 wells potentially impacted, 19.3 percent of the totally potentially impacted wells).

³¹ Tule Subbasin Coordination Agreement (2022), Attachment 4, pp. 850 - 851.

³² Tule Subbasin Coordination Agreement (2022), Attachment 4, p. 850; p. 859.

³³ Tule Subbasin Coordination Agreement (2022), Attachment 4, p. 860.

³⁴ Tule Subbasin Coordination Agreement (2022), Attachment 4, p. 852.

In response to the well impact analysis, the Plan describes a framework to mitigate the potential impacts that could occur if the groundwater conditions were to reach the minimum thresholds for the chronic lowering of groundwater levels.³⁵ The mitigation actions in the framework includes a process for impacted well owners to contact their associated GSA, deepening impacted wells, or constructing a new deeper well. 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 framework does not provide specific details regarding under what conditions or circumstances the GSAs would take action to address potentially declining conditions being that the mitigation framework appears to be reliant on impacted well owners applying for assistance.³⁶ The Department is also concerned with the Plan's approach in using modeled values for January 1, 2015 groundwater levels rather than actual measured values used to determine the number of wells impacted before January 1, 2015. The Plan does not demonstrate the correlation between the modeled values and the actual measured values; therefore, the Department is unable to determine if the model outputs are reasonable predictions of actual conditions and potentially skews the impact analysis.

Department staff also note the water budget in the 2022 Coordination Agreement shows that estimated groundwater pumping in the Subbasin exceeds and will continue to exceed (i.e., total outflows are greater than 400,00 acre-feet per year)³⁷ the Subbasin sustainable yield (i.e., 130,000 acre-feet per year)³⁸ after the 20-year implementation period (2040). The continued over-pumping from the Subbasin results in projected groundwater levels at many monitoring sites to continue declining during and after the 20-year implementation period (2020-2040).³⁹ The Plan does not provide an explanation how the Subbasin will not experience undesirable results given the management proposed.

Based on a review of the information included in the revised Plan, Department staff conclude the GSAs have not taken sufficient action in addressing Deficiency 1 related to describing undesirable results and significant and unreasonable conditions for the Subbasin as it relates to groundwater levels. The Plan has not been coordinated for the Subbasin to describe, with information specific to the Subbasin, the groundwater level conditions that are considered significant and unreasonable and would result in undesirable results as described in the GSP Regulations.

4.1.2.2 Minimum Thresholds

Corrective action 2 required the GSAs to “revise their GSPs to explain how minimum thresholds at the representative monitoring sites are consistent with the requirement to be based on a groundwater elevation indicating a depletion of supply at a given location

³⁵ Tule Subbasin Coordination Agreement (2022), Attachment 7, pp. 894-897.

³⁶ Tule Subbasin Coordination Agreement (2022), Attachment 7, p. 895.

³⁷ Tule Subbasin Coordination Agreement (2022), Attachment 3, p. 657.

³⁸ Tule Subbasin Coordination Agreement (2022), Attachment 3, p. 50 and 626.

³⁹ Tule Subbasin Coordination Agreement (2022), Attachment 3, pp. 826-828.

[and] if the GSAs did not set minimum thresholds consistent with levels indicating a depletion of supply, they should revise the minimum thresholds accordingly.” The 2022 Coordination Agreement was revised to state that “each GSA established groundwater level minimum thresholds designed to reasonably protect access to groundwater for the majority of beneficial users. For those uses such as shallow domestic well owners where impacts to groundwater access may occur, each GSA will adopt a Mitigation Program or Programs consistent with the Framework.”⁴⁰ The addition of this mitigation program requirement is the significant change between the original submittal and the revised submittal.

Five of the six GSPs in the Subbasin made no changes to the approach used to define minimum thresholds and continue using a groundwater flow model projection of groundwater level conditions, which assumes successful implementation of all projects and management actions.⁴¹ The process presented in the Incomplete Determination Staff Report is the same used by the five revised GSPs.⁴² The minimum threshold values presented the 2022 GSPs have largely not changed for the Subbasin, with the exception of values in Delano-Earlimart GSP, Tri-County GSP, and newly added representative monitoring sites.

In addition to the process used to establish minimum thresholds mentioned above, the Delano-Earlimart Irrigation District GSP performs an additional step and considers well depth and screen interval when establishing the minimum thresholds. If necessary, the minimum thresholds are adjusted to avoid significant and unreasonable conditions. The updated minimum thresholds are higher in elevation than the minimum thresholds presented in the 2020 GSP at all representative monitoring sites.⁴³ The Delano-Earlimart Irrigation District GSP states that, compared with the initial submission in 2020 by applying the new minimum thresholds, the number of impacted wells is reduced from 90 to 28.⁴⁴ Department staff notice that the number of impacted wells (28) with the new minimum thresholds is different from the number of impacted wells (8) reported in the Coordination Agreement.⁴⁵ Department staff believe the difference is likely due to a typographical error in the well impact analysis result table in the 2022 Coordination Agreement but suggest the GSA confirms the discrepancy.

The Tri-County GSP utilizes a different approach to establish groundwater level thresholds and determines the minimum thresholds for groundwater elevations at representative wells in the upper aquifer are based on the 90th percentile of well completion elevations (including domestic, public, agricultural, irrigation, and industrial

⁴⁰ Tule Subbasin Coordination Agreement (2022), Section 4.4, p. 62.

⁴¹ These GSPs include Alpaugh GSP, Delano-Earlimart Irrigation District GSP, Eastern Tule GSP, Lower Tule River Irrigation District GSP, and Pixley Irrigation District GSP.

⁴² Alpaugh GSP (2022), pp. 62-63; Delano-Earlimart Irrigation District GSP (2022), p. 115; Eastern Tule GSP (2022), p. 255; Lower Tule River Irrigation District GSP (2022), p. 216; Pixley Irrigation District GSP (2022), p. 174.

⁴³ Delano-Earlimart Irrigation District GSP (2022 Redline), Table 3-8, p. 145.

⁴⁴ Delano-Earlimart Irrigation District GSP (2022), Table 3-145, p. 129.

⁴⁵ Tule Subbasin Coordination Agreement (2022), Attachment 4, p. 852.

wells) using the Department's Online System of Well Completion Record database records. This represents a water elevation to protect 90 percent of the wells in the upper aquifer in the database.⁴⁶ The Tri-County GSA does not explain how it arrived at this threshold for wells in the upper aquifer. The minimum thresholds in the lower aquifer in the Tri-County GSP are defined as the groundwater elevations above the confining layer (Corcoran Clay Layer) considering a reasonable groundwater pumping (1,000 gpm) and the associated drawdown (100 ft).⁴⁷ The Tri-County GSP further explains that groundwater levels below the elevation of the confining layer could make a water supply well unusable.⁴⁸

Department staff have concluded that the GSAs still have not developed minimum thresholds informed by that basin understanding and defined based on what conditions would lead to, or are causing, undesirable results in the Subbasin.⁴⁹ For the most part, Department staff still do not read the GSPs to have established minimum thresholds on the basis of groundwater conditions that would cause undesirable results based on significant and unreasonable conditions, but that they are, instead, based on future projected groundwater elevations, and that the GSPs do not establish a nexus between conditions at those predicted elevations and undesirable results the GSAs seek to avoid. While the Plan does provide the mitigation framework and each GSA is stating a mitigation program will be implemented, as mentioned above, Department staff believe the framework does not provide specific details regarding under what conditions or circumstances the GSAs would take action to address potentially declining conditions being that the mitigation framework appears to be reliant on impacted well owners applying for assistance.⁵⁰

Additionally, when comparing the approach of establishing the minimum thresholds in the six GSPs, it appears that the GSPs are still not using the same data and methodology. Four of the GSPs⁵¹ failed to establish minimum thresholds at the representative monitoring sites in a manner consistent with the requirement that thresholds be based on a groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results.⁵² Because minimum thresholds were defined with reference to targeted groundwater withdrawals and not as a means to avoid significant and unreasonable effects on the beneficial uses and users of groundwater, the GSPs still lack evidence demonstrating the GSAs considered the interests of beneficial uses and users of groundwater in establishing minimum thresholds.

⁴⁶ Tri-County GSP (2022), Addendum, p. 1684.

⁴⁷ Tri-County GSP (2022), Addendum, p. 1685.

⁴⁸ Tri-County GSP (2022), Addendum, p. 1685.

⁴⁹ Water Code § 10721(x); 23 CCR § 354.28(a).

⁵⁰ Tule Subbasin Coordination Agreement (2022), Attachment 7, p. 895.

⁵¹ These GSPs include Alpaugh GSP, Eastern Tule GSP, Lower Tule River Irrigation District GSP, and Pixley Irrigation District GSP.

⁵² 23 CCR § 354.28(c)(1).

4.1.3 Conclusion

As previously stated in the Incomplete Determination Staff Report, Department staff expected GSAs to establish what groundwater level conditions would be considered significant and unreasonable, which would be groundwater level conditions that the GSAs intended to avoid and should be based on their commensurate understanding of the basin setting.⁵³ Because the GSPs did not establish minimum thresholds in a manner consistent with the requirements of the GSP Regulations, Department staff are not able to assess whether the GSAs have established sustainable management criteria based on a commensurate level of understanding of the basin setting or whether the interests of beneficial uses and users have been considered.⁵⁴ Department staff conclude the GSAs have not taken sufficient action to address the deficiency related to chronic lowering of groundwater levels.

4.2 DEFICIENCY 2. THE GSPs DO NOT DEFINE UNDESIRABLE RESULTS OR SET MINIMUM THRESHOLDS AND MEASURABLE OBJECTIVES FOR LAND SUBSIDENCE IN A MANNER CONSISTENT WITH THE GSP REGULATIONS

4.2.1 Corrective Actions

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

1. For areas defined as adjacent to the [Friant-Kern] Canal in the Eastern Tule GSP, Delano-Earlimart Irrigation District GSP, and Lower Tule River Irrigation District GSP areas, the GSAs should identify, through analysis, the total amount of subsidence that can be tolerated by the Canal during implementation of the GSPs to maintain the ability to reasonably operate to meet contracted water supply deliveries. Eastern Tule GSA, Delano-Earlimart Irrigation District GSA, and Lower Tule River Irrigation District GSA 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 adjacent to the Canal.
 - a. GSPs adjacent to the Canal should provide an updated description of the Land Subsidence Management and Monitoring Plan and the associated subsidence management in the vicinity of the Canal. The GSPs should include details of any projects, management actions, or mitigation programs associated with the management of land subsidence in the Subbasin.
2. For areas not adjacent to the Canal, the GSAs should identify facilities and/or structures, land uses and property interests that may be susceptible to impacts from land subsidence and should quantify the amount of land subsidence that

⁵³ 23 CCR § 354.26(b)(1).

⁵⁴ 23 CCR § 355.4(b)(3-4).

would result in undesirable results. The GSAs should describe the rationale and any analysis performed to inform the quantification of undesirable results in these areas.

3. Tule Subbasin GSAs should define the criteria for when undesirable results occur in the Subbasin based on the results of analyses completed in response to Corrective Actions 1 and 2, the rationale behind the approach, and why it is consistent with avoiding the significant and unreasonable effects identified by the GSAs.
4. The GSAs should revise their minimum thresholds and measurable objectives for land subsidence to be consistent with the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. In doing that, the GSAs should identify a cumulative amount of tolerable subsidence that, if exceeded, would substantially interfere with groundwater and land surface beneficial uses and users in the Subbasin. The GSPs should explain how the extent of any future subsidence permitted by the GSPs would not substantially interfere with surface land uses. 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.”⁵⁵

4.2.2 Evaluation

4.2.2.1 Undesirable Results (Corrective Actions 1-3)

The 2020 Coordination Agreement and five of the six GSPs⁵⁶ initially defined an undesirable result for land subsidence to be, "unreasonable subsidence below minimum thresholds at greater than 50% of GSA Management Area [representative monitoring site] resulting in significant impacts to critical infrastructure.”⁵⁷ Additionally, the 2020 Coordination Agreement allowed GSAs to “acknowledge the need to include an additional standard that an undesirable result will also occur if land subsidence in particularized areas within a given GSA causes significant and unreasonable adverse effects on the functionality of a structure or facility, such as the [Friant-Kern Canal], regardless of whether more than 50% of the GSA Management Area [representative monitoring site] locations indicate exceedance of the subsidence standard.”⁵⁸ The revised Plan no longer utilizes this definition of undesirable result for subsidence.

Corrective action 1 required the Eastern Tule GSA, Delano-Earlimart Irrigation District GSA, and Lower Tule River Irrigation District GSA should identify, through analysis, the

⁵⁵ Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Tule Subbasin, California Department of Water Resources, January 28, 2022. <https://sgma.water.ca.gov/portal/gsp/assessments/65>.

⁵⁶ These GSPs include Alpaugh GSP, Delano-Earlimart Irrigation District GSP, Lower Tule River Irrigation District GSP, Pixley Irrigation District GSP, and Tri-County County GSP.

⁵⁷ Tule Subbasin Coordination Agreement (2020), Section 4.3.4.2, p. 51.

⁵⁸ Tule Subbasin Coordination Agreement (2020), Section 4.3.4.2, p. 51.

total amount of subsidence that can be tolerated by the Canal during implementation of the GSPs to maintain the ability to reasonably operate to meet contracted water supply deliveries, 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 adjacent to the Canal, provide an updated on the Land Subsidence Management and Monitoring Plan.” The 2022 Coordination Agreement has been updated to state “land subsidence along the canal exceeding three feet was determined to be an undesirable result because it would be beyond what the engineering design could accommodate to restore the flow capacity to its original condition and what the parties to the [Friant Water Authority]/ETGSA/Pixley GSA settlement agreement agreed to mitigate.”⁵⁹ Three feet is based on the groundwater flow model analysis forecasted until 2040.⁶⁰

Corrective action 1a required the GSPs adjacent to the Canal to provide an updated description of the Land Subsidence Management and Monitoring Plan and the associated subsidence management in the vicinity of the Canal, including details of any projects, management actions, or mitigation programs associated with the management of land subsidence in the Subbasin. The Eastern Tule GSA developed a Land Subsidence Monitoring Plan and a Management Plan for the mitigation of land subsidence along the Friant-Kern Canal. The 2022 Coordination Agreement refers to these plans in the Eastern Tule GSP and states “these plans are separate from, and in addition to, the monitoring plan established for the Tule Subbasin [and the] goal of the Land Subsidence Monitoring and Management Plans is to implement groundwater management measures necessary to minimize future non-recoverable land subsidence along the Friant-Kern Canal in the transition period from 2020 to 2040 and to arrest nonrecoverable land subsidence along the Friant-Kern Canal.”⁶¹ The Delano-Earlimart Irrigation District GSA and Lower Tule River Irrigation District GSA state they too will implement the Land Subsidence Management and Monitoring Plans identified in the Eastern Tule GSP and 2022 Coordination Agreement. The Subbasin added 94 subsidence benchmark sites in 2020 and 2021.⁶² Of these additional sites, 26 were added in the Eastern Tule GSA, mostly along the Friant-Kern Canal.

The Eastern Tule GSA Land Subsidence Monitoring Plan includes: (1) an enhanced benchmark and groundwater level monitoring network; (2) establishment of a Land Subsidence Monitoring and Management Committee, and (3) annual reporting. The Land Subsidence Management Plan establishes eight 0.5-mile east-west zones on each side of the Friant-Kern Canal (total of 16 zones), times six north-south zones, resulting in a total of 96 management zones. Four land subsidence thresholds, or “Tiers”, have been established: Tier 1, 0 to 1.49 feet; Tier 2, 1.5 to 1.99 feet; Tier 3, 2.0 to 2.49 feet; and Tier

⁵⁹ Tule Subbasin Coordination Agreement (2022), Section 4.3.4, pp. 59-60.

⁶⁰ Tule Subbasin Coordination Agreement (2022), Attachment 6, p 872.

⁶¹ Tule Subbasin Coordination Agreement (2022), Attachment 6, p. 872.

⁶² Tule Subbasin Coordination Agreement (2022), Section 2.4.3, p. 435.

4, 2.5 to 2.99 feet.⁶³ If the land subsidence in any given management zone exceeds the threshold, as measured semi-annually using Interferometric Synthetic Aperture Radar (InSAR) data, more restrictive management actions are triggered, including reduced pumping from the zone.⁶⁴ Department staff believe this approach is meant to address the requirement of subsidence being established as a rate and extent; however, the Plan is not clear about this.

The 2022 Coordination Agreement states each GSA will adopt its own subsidence Mitigation Program consistent with the Framework included in the Coordination Agreement, highlighting that Eastern Tule and Pixley GSAs participate in the Friant Water Authority settlement agreement to mitigate costs to repair subsidence anticipated to occur between 2020 and 2040. For impacts due to subsidence, the process may include: 1) an application process by the affected party; 2) data collection by the GSA to verify the claim; 3) identification of suitable mitigation; and/or 4) coordination, as necessary, with said affected parties to implement the mitigation.⁶⁵ Delano-Earlmart GSP and Lower Tule GSP refer back to the Coordination Agreement Framework without providing additional details.

Based on the quantification of the undesirable result and additional description related to the monitoring, management, and mitigation plans, Department staff conclude the GSAs have sufficiently responded to part 1 and 1a of the corrective action. However, Department staff note that current InSAR data shows subsidence surrounding the Friant-Kern Canal has already reached 1.5 feet and is concerned the management of the Subbasin may not be on track to reach sustainability by 2040. The Plan has not indicated the rate at which land subsidence will be abated, and when a basin loses half of all allowable subsidence within the first (# of) years of operation, barring a convincing explanation of how that rate will be reduced, the assumption is that the Plan is likely not on track to meet its goals. Although the focus of this assessment is the GSA's response to corrective actions identified in the Incomplete determination, the Department is equally concerned with the ability of a Plan to achieve the sustainability goal for the basin. In resolving other deficiencies, the GSA's should anticipate that the rate of subsidence, if not promptly addressed, will likely be grounds for future deficiencies.

Corrective Action 2 required the GSAs to identify facilities and/or structures, land uses and property interests that may be susceptible to impacts from land subsidence and should quantify the amount of land subsidence that would result in undesirable results for areas not adjacent to the Friant Kern Canal, including a description of the rationale and any analysis performed to inform the quantification of undesirable results in these areas. The 2022 Coordination Agreement analyzes the impact of land subsidence in areas other than the Friant-Kern Canal on land uses, property interests, and critical infrastructure vulnerable to land subsidence in the Tule Subbasin.⁶⁶ In the 2022 Coordination

⁶³ Tule Subbasin Coordination Agreement (2022), Attachment 6, p. 873.

⁶⁴ Eastern Tule GSA, SGMA Portal, p. 31-32.

⁶⁵ Tule Subbasin Coordination Agreement (2022), Attachment 7, pp. 894-897.

⁶⁶ Tule Subbasin Coordination Agreement (2022), Section 4.4.4, pp. 867-894.

Agreement, the following land uses potentially impacted by regional land subsidence have a higher priority: gravity-driven water conveyance canals, turnouts, stream channels, water delivery pipelines, basins, wells, and flood control infrastructure. The following land uses susceptible to differential land subsidence have a low priority: highways and bridges, railroads, other pipelines, wastewater collection, utilities, and buildings. The 2022 Coordination Agreement states that prioritization of land uses vulnerable to land subsidence was based on input from the GSAs in the Subbasin, a review of documented subsidence impacts, and historical and projected subsidence rates. The 2022 Coordination agreement states “the quantitative definition of undesirable results for land subsidence is ongoing land subsidence below the minimum threshold at any given representative monitoring site that cannot be attributable to recoverable land subsidence;” this is not based on the avoidance of significant and unreasonable effects,⁶⁷ but rather the results of the forecasted subsidence by the groundwater flow model for the 2020 to 2040 transition period.⁶⁸ Department staff appreciate the effort taken by the GSAs to identify infrastructure subject to impacts due to land subsidence; however, the Plan does not quantify the amount of land subsidence that would result in undesirable results for areas not adjacent to the Canal as indicated in corrective action 2.

Corrective action 3 requires the GSAs “define the criteria for when undesirable results occur in the Subbasin based on the results of analyses completed in response to Corrective Actions 1 and 2, the rationale behind the approach, and why it is consistent with avoiding the significant and unreasonable effects identified by the GSAs.” In addition to not quantifying the amount of subsidence that would be considered undesirable for areas of the Subbasin not adjacent to the Friant-Kern Canal, the GSAs have also not defined the criteria for when undesirable results occur in the Subbasin. The 2022 Coordination Agreement states “[I]and subsidence that occurs during the transition period from 2020 to 2040 will be considered significant and unreasonable if damage and/or loss of functionality of a structure or a facility occurs to the extent that the structure or facility cannot reasonably operate without either repair or replacement, as determined by the GSA where the structure and facility are located or where beneficial use is impacted due to the damage and/or loss of functionality of the structure or facility.” As previously identified in the Department’s Incomplete Determination Staff Report, the GSAs still have not defined what constitutes significant in this context and Department staff again conclude the lack of clearly defined undesirable results to mean that it would be impossible to understand and monitor whether the GSPs⁶⁹ are managing the Subbasin in a manner that would achieve the sustainability goal and avoid impacts to land uses and property interests for those areas not adjacent to the Friant-Kern Canal.

In most areas of the Tule Subbasin, the GSAs determined that the forecasted land subsidence during the transition period, which was of a similar magnitude to what had

⁶⁷ 23 CCR § 354.6(b)(2).

⁶⁸ Tule Subbasin Coordination Agreement (2022), pp. 59-60.

⁶⁹ These GSPs include Alpaugh GSP, Delano-Earlimart Irrigation District GSP, Lower Tule River Irrigation District GSP, Pixley Irrigation District GSP, and Tri-County County GSP.

been historically measured, was not anticipated to result in undesirable results to land uses or critical infrastructure because no undesirable results had previously been reported as a result of historical land subsidence in those areas.⁷⁰ Based on the lack of details identifying significant and unreasonable effects, the history of subsidence in this Subbasin, and the anticipated pumping and subsidence that is to continue until 2040, Department staff conclude the GSAs have not demonstrated subsidence undesirable results are not present and are not likely to occur.⁷¹

Furthermore, the 2022 Coordination Agreement states that each GSA will adopt a mitigation program or programs consistent with the mitigation framework for unforeseen impacts due to land subsidence.⁷⁸ However, with the lack of defined significant and unreasonable effects the Subbasin is trying to avoid, it's unclear to Department staff at what point each GSA will implement the mitigation program for areas not adjacent to the Friant-Kern Canal. The Plan does not provide sufficient detail regarding under what conditions or circumstances repairs would occur or a description of how to mitigate different types of structures (for example, delivery pipelines and flood control levees).

Overall, Department staff conclude the GSAs have not responded to Corrective Action 3.

4.2.2.2 Minimum Thresholds (Corrective Action 4)

Corrective action 4 required the GSAs to “revise their minimum thresholds and measurable objectives for land subsidence to be consistent with the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved.” While the GSAs included a new attachment in the 2022 Coordination Agreement to address the Department’s corrective action, the GSA’s approach has not changed in the manner in which thresholds are established.⁷² The 2022 Coordination Agreement and the Subbasin’s GSPs (except Tri-County GSP) continue to establish the minimum thresholds and measurable objectives for land subsidence based on the output of the groundwater flow model during the implementation period (2020-2040), which considers transitional pumping during that period.⁷³ By continuing to take this approach, the GSAs have not identified a cumulative amount of tolerable subsidence that, if exceeded, would substantially interfere with groundwater and land surface beneficial uses and users in the Subbasin.

The Tri-County 2022 GSP presents a different method to establish the minimum thresholds for land subsidence. In considering the minimum thresholds for total subsidence, the GSA considered the technical evaluation conducted on the critical infrastructure along with discussions of the operators of the infrastructure. The GSP addendum then states that the GSA also considered many of the historic impacts that have been mitigated. Based on the results of the evaluation, the Tri-County GSA sets the

⁷⁰ Tule Subbasin Coordination Agreement (2022), p. 60.

⁷¹ 23 CCR § 354.26(d).

⁷² Tule Subbasin Coordination Agreement (2022), Section 4.4.4, pp. 867-894.

⁷³ Tule Subbasin Coordination Agreement (2022), Sections 4.3.4.2 and 4.4.4.1, pp. 59 and 66.

minimum thresholds at values that would be protective of the critical infrastructure.⁷⁴ The Tri-County GSP states that the minimum thresholds for land subsidence was developed based, in part, on land subsidence forecast by the groundwater flow model for the 2020 to 2040 transition period. However, the GSP does not present a detailed methodology of establishing the minimum thresholds for land subsidence and the minimum threshold values are not provided.

As described above, significant and unreasonable conditions around the Friant-Kern Canal have been identified and minimum thresholds have been established at three feet to avoid undesirable results because it would be beyond what the engineering design could accommodate to restore the flow capacity to its original condition and what the parties to the Friant Water Authority/Eastern Tule GSA/Pixley GSA settlement agreement agreed to mitigate. Through coordination with the Friant Water Authority staff and consultants, this value became the basis for engineering design modifications to restore canal flow capacity to its original condition.⁷⁵ Department staff do note a couple monitoring sites appear to have minimum thresholds established greater than 3 feet based on Figure 7 provided in the Coordination Agreement.⁷⁶ While the Plan does have a mitigation plan in place for subsidence at the Friant-Kern Canal, it does not describe how the allowance of up to three feet of subsidence would impact downstream beneficial uses and users.

Corrective action 4 also requires the GSAs to explain how the extent of any future subsidence permitted by the GSPs would not substantially interfere with surface land uses and 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 2022 Coordination Agreement acknowledges additional subsidence will occur after 2040 as a residual subsidence is not quantified, with the GSAs identifying additional studies and data are needed to assess the rate and extent of this residual subsidence.⁷⁷ SGMA and the GSP Regulations does not differentiate residual subsidence; therefore, GSAs should assess total subsidence impacts caused by groundwater pumping. The GSP does not identify the studies and additional data are needed to determine the subsidence expected past 2040. Regardless, SGMA requires GSAs to avoid or minimize subsidence and the GSAs have not demonstrated the Plan's intent do accomplish this.⁷⁸ It is not clear whether the Plan will experience undesirable results beyond 2040. Department staff conclude the GSAs have not addressed the deficiency.

4.2.3 Conclusion

Overall, the Plan has not quantified the amount of subsidence that would result in undesirable results, defined the criteria for undesirable results consistent with avoiding

⁷⁴ Tri-County GSP, (2022), Groundwater Sustainability Plan Addendum, p. 1695.

⁷⁵ Tule Subbasin Coordination Agreement (2022), Section 4.4.4.1, p. 66.

⁷⁶ Tule Subbasin Coordination Agreement (2022), Figure 7, p. 887.

⁷⁷ Tule Subbasin Coordination Agreement (2022), Section 4.3.4, p. 60.

⁷⁸ Water Code § 10720.1(e).

significant and undesirable effects, nor established minimum thresholds and measurable objectives consistent with the intent of SGMA. Therefore, Department staff conclude the Subbasin has not taken sufficient action to address Deficiency 2.

4.3 DEFICIENCY 3. THE GSPs DO NOT PROVIDE SUFFICIENT INFORMATION TO JUSTIFY THE PROPOSED SUSTAINABLE MANAGEMENT CRITERIA FOR DEGRADED WATER QUALITY

4.3.1 Corrective Actions

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 Tule Subbasin GSPs should be revised to include a discussion of:

1. What groundwater quality conditions are considered suitable for agricultural irrigation and domestic use using the best available information and science, including information from existing groundwater quality programs, agencies, and regulatory standards. The GSPs should also explain why pH and conductivity in addition to nitrate are suitable constituents to evaluate impacts to beneficial uses and users, especially agricultural irrigation.
2. How and why the 10-year running average is being applied to set sustainable management criteria, especially if baseline conditions had not been established at the time the GSPs were submitted. How the sustainable management criteria for degraded water quality will avoid undesirable results due to degraded groundwater quality and relate potential effects of the undesirable results to existing regulatory standards. Clarify how the criteria defining when undesirable results occur in the Subbasin were established, the rationale behind the approach, and why it is consistent with avoiding the significant and unreasonable effects associated with groundwater pumping and other aspects of the GSAs’ implementation of their GSPs. Additionally, the GSPs should describe and disclose how the GSAs will assess whether any future degradation in groundwater quality is due to groundwater pumping and recharge projects occurring during GSP implementation.
3. How the sustainable management criteria for degraded water quality relate to existing groundwater quality regulatory requirements in the Subbasin and how the GSAs will coordinate with existing agencies and programs to assess whether or not implementation of the GSPs are contributing to the degradation of water quality throughout the Subbasin.”⁷⁹

⁷⁹ Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Tule Subbasin, California Department of Water Resources, January 28, 2022. <https://sgma.water.ca.gov/portal/gsp/assessments/65>.

4.3.2 Evaluation

In response to Deficiency 3, the Agencies developed a technical memorandum to address the groundwater quality corrective actions provided by the Department in the January 2020 incomplete determination. The technical memorandum is incorporated into the revised 2022 Coordination Agreement and includes a revised approach for re-establishing the sustainable management criteria for the degradation of groundwater quality.⁸⁰ The new approach to degradation of water quality defines an undesirable results as the exceedance of a minimum threshold at a groundwater quality representative monitoring site in any given GSA boundary resulting from the implementation of the Plan.⁸¹ The revised minimum thresholds are set at the regulatory standard (i.e., the maximum contaminant limit [MCL] or water quality objective [WQO]) based on the beneficial use of the individual representative monitoring sites. The newly established quantitative criteria have a lower tolerance for groundwater contamination and effectively eliminates the 10-year rolling average concentration criteria, which operates to the benefit of groundwater beneficial uses and users, compared to the Plan initially submitted in 2020. The 2022 Coordination Agreement also revises the approach for establishing the sustainable management criteria for groundwater quality as it relates to the “selection of constituents of concern for determining impacts to beneficial uses and users, the rationale to quantify undesirable results as it relates to existing regulatory standards, and how impacts will be assessed to determine if GSP implementation efforts are a contributing factor to groundwater quality.”⁸²

The approach to re-establish the sustainable management criteria for water quality categorizes well types by beneficial use such as drinking water, agricultural, or not-applicable for establishing water quality sustainable management criteria (i.e., non-groundwater production wells).⁸³ For agricultural and drinking water, the constituents of concern are evaluated based on the established MCL or WQO by the responsible regulatory agencies. In the case of drinking water, nine Title 22 constituents are established as constituents of concern and for agricultural, three WQO constituents are established as constituents of concern. Five of the GSPs refer to the technical memorandum in the revised Coordination Agreement for establishing degradation of water quality sustainable management criteria.⁸⁴ The sixth GSP, Tri-County GSP, while adopting the sustainable management criteria defined in the revised Coordination agreement also established an “early warning” system to assess whether or not water quality concentration trends were increasing in the representative monitoring sites before reaching the minimum threshold. The trend analysis will be evaluated against changes to

⁸⁰ Tule Subbasin Coordination Agreement (2022), Attachment 5, p. 861.

⁸¹ Tule Subbasin Coordination Agreement (2022), Section 4.3.3.2, pp. 57-58.

⁸² Tule Subbasin Coordination Agreement (2022), Attachment 5, p. 863.

⁸³ Tule Subbasin Coordination Agreement (2022), Attachment 5, p. 864.

⁸⁴ These GSPs include Alpaugh GSP (2022), Delano-Earlimart Irrigation District GSP (2022), Easter Tule GSP (2022), Lower Tule River Irrigation District GSP (2022), Pixley Irrigation District GSP (2022), and Pixley Irrigation District GSP (2022).

water levels to help identify the necessary actions to take in the Agency identifies upward trends.⁸⁵

As mentioned above, the revised Plan modifies the criteria to establish minimum thresholds for groundwater quality based on regulatory limits depending on the primary beneficial use of groundwater determined at each representative monitoring site well. The primary beneficial use for a monitoring well is based on the classification of wells within one mile of the representative monitoring site.

The revised Plan states that if the primary beneficial use is agricultural and there are no public water systems (including schools), the minimum threshold would be the WQO for a host of agricultural water quality constituents (chloride, sodium, and total dissolved solids [TDS]). If an representative monitoring site is located within an urban area, within one mile of a public water system (including schools), or the primary beneficial use is drinking water, the minimum threshold for constituents of concern would be set at the MCL for drinking water. The constituents of concern for drinking water include arsenic, nitrate as nitrogen, hexavalent chromium, dibromochloropropane (DBCP), 1,2,3-trichloropropane (TCP), tetrachloroethene (PCE), chloride, TDS, and perchlorate. In cases where both of the above criteria are found to be true, the minimum thresholds would be set at the more stringent of the two when considering common constituents. For representative monitoring sites that have historically exceeded the relevant water quality standard, the minimum threshold is set at the concentration observed prior to SGMA.⁸⁶

The 2022 Coordination Agreement states that the GSAs will coordinate with the responsible regulatory agency to prevent SGMA groundwater management activities from further degrading groundwater quality.⁸⁷ The Plan has not provided clarification of how the GSAs will coordinate with existing agencies and programs to assess whether or not implementation of the GSPs are contributing to the degradation of water quality throughout the Subbasin. While SGMA does not require GSAs to correct existing water quality issues in the Subbasin, water quality issues caused by groundwater pumping is within a GSA's authority to monitor and mitigate.

Department staff are encouraged that the Agencies took the steps to redefine the quantitative metric for a degraded water quality undesirable result to a single minimum threshold exceedance and aligned water quality minimum thresholds with existing regulatory requirements. Department staff also believe eliminating the 10-year running average concentration criteria and relying on MCLs and WQOs allows for more easily tracking and evaluating potential impacts to beneficial uses and users. Department staff find that the Agencies approach to degradation of water quality will require continued collaboration and coordination with existing regulatory agencies and programs to help avoid undesirable results and achieve the sustainability goal for the Subbasin. Based on the review of the resubmitted Plan, Department staff believe that sufficient actions have

⁸⁵ Tri-County GSP (2022), GSP Addendum, pp.1705-1706.

⁸⁶ Tule Subbasin Coordination Agreement (2022), Attachment 5, p. 864.

⁸⁷ Tule Subbasin Coordination Agreement (2022), Section 4.3.2.4, p. 66.

been taken to address the deficiency related to degraded water quality as identified in the Department's incomplete determination letter.

5 STAFF RECOMMENDATION

For the reasons discussed above, Department staff do not believe sufficient action has been taken by the GSAs in the Tule Subbasin to remedy two of the three deficiencies identified in the January 2022 Staff Report. Department staff recommend the Plan be determined **INADEQUATE**.