



CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

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January 28, 2022

Hicham Eltal
Merced GSP Plan Manager
744 W. 20th Street
Merced, CA 95340
heltal@mercedid.org

RE: Incomplete Determination of the 2020 Merced Subbasin Groundwater Sustainability Plan

Dear Hicham Eltal,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP) submitted for the Merced Subbasin (Subbasin) and has determined that the GSP is incomplete. The Department based its determination on recommendations from the Staff Report, included as an enclosure to the attached Statement of Findings, which describes that the Merced Subbasin GSP does not satisfy the objectives of the Sustainable Groundwater Management Act (SGMA) nor substantially comply with the GSP Regulations. The Staff Report also provides corrective actions which the Department recommends to address the identified deficiencies.

The Subbasin's Groundwater Sustainability Agencies (GSAs) have 180 days, the maximum allowed by GSP Regulations, to address the identified deficiencies. Where addressing the deficiencies requires modification of the GSP, the GSAs must adopt those modifications into the Subbasin's GSP or otherwise demonstrate that those modifications are part of the GSP before resubmitting it to the Department for evaluation no later than July 27, 2022. The Department understands that much work has occurred to advance sustainable groundwater management since the GSAs submitted the GSP in January 2020. To the extent to which those efforts are related or responsive to the Department's identified deficiencies, we encourage you to document that as part of your resubmittal. The Department prepared a [Frequently Asked Questions](#) document to provide general information and guidance on the process of addressing deficiencies in an incomplete determination.

Department staff will work expeditiously to review the revised components of your GSP resubmittal. If the revisions address the identified deficiencies, the Department will determine that the GSP is approved. In that scenario, Department staff will identify additional recommended corrective actions that the GSAs should address early in implementing their GSP (i.e., no later than the first required periodic evaluation). Among other items, those recommendations will include for the GSAs to provide more detail on

their plans and schedules to address data gaps. Those recommendations will also call for significantly expanded documentation of the plans and schedules to implement specific projects and management actions. Regardless of those recommended corrective actions, the Department expects the first periodic evaluations, required no later than January 2025 – one-quarter of the way through the 20-year implementation period – to document significant progress toward achieving sustainable groundwater management.

If the GSAs cannot address the deficiencies identified in this letter by July 27, 2022, then the Department, after consultation with the State Water Resources Control Board, will determine the GSP to be inadequate. In that scenario, the State Water Resources Control Board may identify additional deficiencies that the GSAs would need to address in the state intervention processes outlined in SGMA.

Please contact Sustainable Groundwater Management staff by emailing sgmps@water.ca.gov if you have any questions about the Department's assessment, implementation of your GSP, or to arrange a meeting with the Department.

Thank You,

Paul Gosselin

Paul Gosselin
Deputy Director of Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Determination of Incomplete Status of the San Joaquin Valley - Merced Subbasin Groundwater Sustainability Plan

**STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES**

**STATEMENT OF FINDINGS REGARDING THE
DETERMINATION OF INCOMPLETE STATUS OF THE
SAN JOAQUIN VALLEY - MERCED 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.) This Statement of Findings explains the Department's decision regarding the Plan submitted jointly by the Merced Irrigation-Urban Groundwater Sustainability Agency (GSA), Merced Subbasin GSA, and Turner Island Water District GSA #1 (collectively, the GSAs) for the San Joaquin Valley – Merced Subbasin (No. 5-022.04).

Department management has reviewed the enclosed Staff Report, which recommends that the identified deficiencies should preclude approval of the GSP. Based on its review of the Staff Report, Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Plan and concurs with, and hereby adopts, staff's recommendation and all the corrective actions provided. The Department thus deems the Plan incomplete based on the Staff Report and the findings contained herein.

- A. The GSP does not provide sufficient justification for identifying that undesirable results for chronic lowering of groundwater levels, subsidence, and depletion of interconnected surface waters can only occur in consecutive non-dry water year types.
 1. The GSP's description of the water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e., two consecutive non-dry years) is not consistent with the intent of SGMA and could potentially allow for an unmanaged and continued lowering of groundwater levels under certain hydrologic or climatic conditions that have occurred historically.
 2. In the GSP's proposal to exclude dry and critically dry years in the definition of undesirable results, the GSP fails to identify specific extraction and groundwater recharge management actions that would be

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San Joaquin Valley - Merced Subbasin (Basin No. 5-022.04)

implemented, or otherwise describe how the Subbasin will be managed to offset, by increases in groundwater levels or storage during other periods, dry year reductions of groundwater in storage. Furthermore, the GSP does not present specific detail for how projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater levels identified as minimum thresholds are potentially exceeded for an extended period of time in the absence of two consecutive non-dry years.

3. While SGMA states that overdraft resulting in groundwater level or groundwater storage declines during periods of drought could be managed with increases of groundwater storage during other periods, as noted above; SGMA does not extend this premise to land subsidence and depletions of interconnected surface water. The greatest impacts to infrastructure from land subsidence and beneficial uses of surface water from depletions of interconnected surface water are likely to occur when groundwater levels are lowest, which would likely be during dry and critically dry water years.
 4. If, after considering this deficiency, the GSAs retain minimum thresholds that allow for continued lowering of groundwater levels, then it is reasonable to assume that some groundwater well impacts (e.g., loss of production capacity) may occur during the implementation of the GSP.
 5. The GSAs have not explained how groundwater level declines allowed by the GSA's minimum thresholds declines relate to the degradation of groundwater quality sustainability indicator.
- B. The GSP has not defined sustainable management criteria for chronic lowering of groundwater levels in the manner required by SGMA and the GSP Regulations.
1. There is an apparent discrepancy between the GSP objective of the chronic lowering of groundwater levels minimum thresholds to protect the shallowest wells and the results of studies indicating potentially significant quantities of domestic wells could go dry. This discrepancy may be in part for several factors: 1) Based on Department staff's assessment of information in the GSP, approximately 60 percent of the area of the Subbasin is outside of the 2-mile radius of the GSP's 25 representative wells. 2) The GSP describes in a footnote that "outliers" from its domestic

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San Joaquin Valley - Merced Subbasin (Basin No. 5-022.04)

well dataset were removed and it also describes the quantitative rules for the removal. 3) The GSP notes that its analysis is based on Merced County's electronic well permitting database, while Department staff's understanding is that others have used well completion reports in the Department's Online System for Well Completion Reports (OSWCR).

C. The GSP has not defined sustainable management criteria for land subsidence in the manner required by SGMA and the GSP Regulations.

1. The GSP describes minimum thresholds and measurable objectives in relation to historical subsidence rates and the observed effects within the Merced Subbasin but are poorly supported relative to the requirements of the GSP regulations regarding how future rates of subsidence could interfere with beneficial uses and users of groundwater or surface land uses and property interests.
2. The Plan provides description of the Subbasin's historical subsidence and infrastructure identified as being susceptible to future subsidence but does not identify the total cumulative amount of subsidence that can occur without causing significant and unreasonable impacts to beneficial uses and users, surface land uses, and property interests.

Based on the above, the GSP submitted by the GSAs for the San Joaquin Valley - Merced Subbasin is determined to be incomplete because the GSP does not satisfy the requirements of SGMA, nor does it substantially comply with the GSP Regulations. The corrective actions provided in the Staff Report are intended to address the deficiencies that, at this time, preclude approval. The GSAs have up to 180 days to address the deficiencies outlined above and detailed in the Staff Report. Once the GSAs resubmit their Plan, the Department will review the revised GSP to evaluate whether the deficiencies were adequately addressed. Should the GSAs fail to take sufficient actions to correct the deficiencies identified by the Department in this assessment, the Department shall disapprove the Plan if, after consultation with the State Water Resources Control Board, the Department determines the Plan inadequate pursuant to 23 CCR § 355.2(e)(3)(C).

Statement of Findings
San Joaquin Valley - Merced Subbasin (Basin No. 5-022.04)

Signed:



Karla Nemeth, Director

Date: January 28, 2022

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

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

Groundwater Basin Name: San Joaquin Valley – Merced Subbasin (No. 5-022.04)
Submitting Agencies: Merced Irrigation-Urban Groundwater Sustainability Agency; Merced Subbasin Groundwater Sustainability Agency; and Turner Island Water District Groundwater Sustainability Agency #1
Recommendation: Incomplete
Date: January 28, 2022

The Sustainable Groundwater Management Act (SGMA)¹ allows for any of the three following planning scenarios: a single groundwater sustainability plan (GSP) developed and implemented by a single groundwater sustainability agency (GSA); a single GSP developed and implemented by multiple GSAs; and multiple GSPs implemented by multiple GSAs and coordinated pursuant to a single coordination agreement.² Here, as presented in this staff report, a single GSP covering the entire basin was adopted and submitted to the Department of Water Resources (Department) for review.³

The Merced Irrigation-Urban GSA, Merced Subbasin GSA, and Turner Island Water District GSA #1 (collectively, the GSAs) jointly submitted the San Joaquin Valley Groundwater Basin - Merced Subbasin Groundwater Sustainability Plan (GSP or Plan) to the Department for evaluation and assessment as required by SGMA and the GSP Regulations.⁴ The GSP covers the entire Merced Subbasin (Subbasin) for the implementation of SGMA.

Evaluation and assessment by the Department is based on whether the adopted and submitted GSP, either individually or in coordination with other adopted and submitted GSPs, complies with SGMA and substantially complies with GSP Regulations. Department staff base their assessment on information submitted as part of an adopted GSP, public comments submitted to the Department, and other materials, data, and reports that are relevant to conducting a thorough assessment. Department staff have evaluated the GSP and have identified deficiencies that staff recommend should preclude its approval.⁵ In addition, consistent with the GSP Regulations, Department staff have

¹ Water Code § 10720 *et seq.*

² Water Code § 10727.

³ Water Code §§ 10727(b)(1), 10733.4; 23 CCR § 355.2.

⁴ 23 CCR § 350 *et seq.*

⁵ 23 CCR §355.2(e)(2).

provided corrective actions⁶ that the GSAs should review while determining how and whether to address the deficiencies. The deficiencies and corrective actions are explained in greater detail in Section 3 of this staff report and are generally related to the need to define sustainable management criteria in the manner required by SGMA and the GSP Regulations.

This assessment includes four sections:

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

⁶ 23 CCR §355.2(e)(2)(B).

1 EVALUATION CRITERIA

The Department evaluates whether a GSP conforms to the statutory requirements of SGMA⁷ and is likely to achieve the basin’s sustainability goal.⁸ To achieve the sustainability goal, the GSP must demonstrate that implementation of its groundwater sustainability program 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.⁹ Undesirable results are required to be defined quantitatively by the GSAs overlying a basin and occur when significant and unreasonable effects for any of the applicable sustainability indicators are caused by groundwater conditions occurring throughout the basin.¹⁰ The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.¹¹

To evaluate a GSP, the Department must first determine a GSP was submitted by the statutory deadline,¹² is complete,¹³ and covers the entire basin.¹⁴ For those GSAs choosing to develop multiple GSPs, the GSPs must be coordinated pursuant to a single coordination agreement that covers the entire basin.¹⁵ If these conditions are satisfied, the Department evaluates the GSP to determine whether it complies with SGMA and substantially complies with the GSP Regulations.¹⁶ As stated in the GSP Regulations, “[s]ubstantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal.”¹⁷

When evaluating whether implementation of the GSP is likely to achieve the sustainability goal for the basin, Department staff review the information provided and relied upon in the GSP for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.¹⁸ The Department’s review considers whether there is a reasonable relationship between the information provided by the GSA and the

⁷ Water Code §§ 10727.2, 10727.4.

⁸ Water Code §§ 10733(a).

⁹ Water Code § 10721(v).

¹⁰ 23 CCR § 354.26 *et seq.*

¹¹ Water Code § 10733(c).

¹² Water Code § 10720.7; 23 CCR § 355.4(a)(1).

¹³ 23 CCR §§ 355.4(a)(2).

¹⁴ 23 CCR § 355.4(a)(3).

¹⁵ Water Code §§ 10727(b)(3), 10727.6; 23 CCR § 357.4.

¹⁶ 23 CCR § 350 *et seq.*

¹⁷ 23 CCR § 355.4(b).

¹⁸ 23 CCR § 351(h).

assumptions and conclusions presented in the GSP, including whether the interests of the beneficial uses and users of groundwater in the basin have been considered; whether sustainable management criteria and projects and management actions described in the GSP are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.¹⁹ The Department also considers whether the GSA has the legal authority and financial resources necessary to implement the GSP.²⁰

To the extent that overdraft is present in a basin, the Department evaluates whether the GSP provides a reasonable assessment of the overdraft and includes reasonable means to mitigate it.²¹ When applicable, the Department will assess whether coordination agreements have been adopted by all relevant parties and satisfy the requirements of SGMA and the GSP Regulations.²² The Department also considers whether the GSP provides reasonable measures and schedules to eliminate identified data gaps.²³ Lastly, the Department's review considers the comments submitted on the GSP and evaluates whether the GSA adequately responded to the comments that raise credible technical or policy issues with the GSP.²⁴

The Department is required to evaluate the GSP within two years of its submittal date and issue a written assessment.²⁵ The assessment is required to include a determination of the GSP's status.²⁶ The GSP Regulations provide three options for determining the status of a GSP: approved,²⁷ incomplete,²⁸ or inadequate.²⁹

After review of the GSP, Department staff may find that the information provided is not sufficiently detailed, or the analyses not sufficiently thorough and reasonable, to evaluate whether the GSP is likely to achieve the sustainability goal for the basin. If the Department determines the deficiencies precluding approval may be capable of being corrected by the GSA in a timely manner,³⁰ the Department will determine the status of the GSP to be incomplete. A formerly deemed incomplete GSP may be resubmitted to the Department for reevaluation after all deficiencies have been addressed by the GSA within 180 days after the Department makes its incomplete determination. The Department will review the revised GSP to evaluate whether the identified deficiencies were sufficiently addressed. Depending on the outcome of that evaluation, the Department may determine the resubmitted GSP is approved. Alternatively, the Department may find a formerly deemed

¹⁹ 23 CCR §§ 355.4(b)(1), (3), (4) and (5).

²⁰ 23 CCR § 355.4(b)(9).

²¹ 23 CCR § 355.4(b)(6).

²² 23 CCR § 355.4(b)(8).

²³ 23 CCR § 355.4(b)(2).

²⁴ 23 CCR § 355.4(b)(10).

²⁵ Water Code § 10733.4(d); 23 CCR § 355.2(e).

²⁶ *Ibid.*

²⁷ 23 CCR § 355.2(e)(1).

²⁸ 23 CCR § 355.2(e)(2).

²⁹ 23 CCR § 355.2(e)(3).

³⁰ 23 CCR § 355.2 (e)(2)(B)(i).

incomplete GSP is inadequate if, after consultation with the State Water Resources Control Board, it determines that the GSA has not taken sufficient actions to correct any identified deficiencies.³¹

Even when the Department determines a GSP is approved, indicating that it satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may still recommend corrective actions.³² Recommended corrective actions are intended to facilitate progress in achieving the sustainability goal within the basin and the Department's future evaluations, and to allow the Department to better evaluate whether implementation of the GSP adversely affects adjacent basins. While the issues addressed by the recommended corrective actions in an approved GSP do not, at the time the determination was made, preclude its approval, the Department recommends that the issues be addressed to ensure the GSP's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the basin's sustainability goal.³³ Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first five-year assessment.³⁴

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

Lastly, the Department's review of an approved GSP is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the GSP.³⁵ Also, GSAs have an ongoing duty to reassess their GSPs, provide annual reports to the Department and, when necessary, update or amend their GSPs.³⁶ The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether GSP implementation adversely affects the ability of adjacent basins to achieve its sustainability goals.

³¹ 23 CCR § 355.2 (e)(3)(C).

³² Water Code § 10733.4(d).

³³ Water Code § 10733.8.

³⁴ 23 CCR § 356.4.

³⁵ Water Code § 10733.8; 23 CCR § 355.6 *et seq.*

³⁶ Water Code §§ 10728 *et seq.*, 10728.2.

2 REQUIRED CONDITIONS

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline.³⁷ The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin. If a GSP is determined to be incomplete, Department staff may require corrective actions that address minor or potentially significant deficiencies identified in the GSP. The GSAs in a basin, whether developing a single GSP covering the basin or multiple GSPs, must sufficiently address those required corrective actions within the time provided, not to exceed 180 days, for the GSP to be reevaluated by the Department and potentially approved.

2.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority as of January 1, 2017 and that were subject to critical conditions of overdraft to submit a GSP no later than January 31, 2020.³⁸

The GSAs in the Merced Subbasin submitted the GSP on January 28, 2020, in compliance with the statutory deadline.

2.2 COMPLETENESS

GSP Regulations specify that the Department shall evaluate a GSP if that GSP is complete and includes the information required by SGMA and the GSP Regulations.³⁹

The GSAs submitted an adopted GSP for the entire Merced Subbasin. Department staff found the GSP to be complete and include the required information, sufficient to warrant an evaluation by the Department. The Department posted the GSP to its website on January 31, 2020.

2.3 BASIN COVERAGE

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.⁴⁰ A GSP that intends to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSAs.

The GSP intends to manage the entire Merced Subbasin and the jurisdictional boundaries of the submitting GSAs cover the Subbasin.

³⁷ Water Code § 10720.7.

³⁸ Water Code § 10720.7(a)(1).

³⁹ 23 CCR § 355.4(a)(2).

⁴⁰ Water Code § 10727(b); 23 CCR § 355.4(a)(3).

3 PLAN EVALUATION

As stated in Section 355.4 of the GSP Regulations, a basin “shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act.” The Department’s assessment is based on a number of related factors 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.

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

3.1 DEFICIENCY 1. THE GSP LACKS SUFFICIENT JUSTIFICATION FOR IDENTIFYING THAT UNDESIRABLE RESULTS FOR CHRONIC LOWERING OF GROUNDWATER LEVELS, LAND SUBSIDENCE, AND DEPLETION OF INTERCONNECTED SURFACE WATERS CAN ONLY OCCUR IN CONSECUTIVE NON-DRY WATER YEAR TYPES.

3.1.1 Background

SGMA defines the term “Undesirable Result,” in part, as one or more of the following effects caused by groundwater conditions occurring throughout the basin:⁴¹

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.
- Significant and unreasonable land subsidence that substantially interferes with surface land uses.
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

⁴¹ Water Code § 10721(x).

3.1.2 Deficiency Details

The GSP identifies that an undesirable result for chronic lowering of groundwater levels occurs “...when November groundwater levels at greater than 25% of representative monitoring wells (at least 7 of 25) fall below their minimum thresholds for two consecutive years where both years are categorized hydrologically as below normal, above normal, or wet.”⁴² Department staff find that the water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e. two consecutive non-dry years) is not consistent with the intent of SGMA and could potentially allow for an unmanaged and continued lowering of groundwater levels under certain hydrologic or climatic conditions that have occurred historically. A review of the historical San Joaquin Valley water-year type classifications⁴³ indicates the potential for dry periods without the occurrence of two consecutive non-dry water years to persist for greater than 10 years. (See e.g., the 11-year period from water years 1985 through 1995, where the lack of concurrent below normal/above normal/wet years would have rendered groundwater level minimum threshold exceedances not applicable by the GSAs’ definition. Department staff also note that concurrent below-normal, above-normal, or wet years occurred in only five of the last twenty water years from 2001 through 2020.) By requiring minimum thresholds to be exceeded for two consecutive non-dry years to trigger an undesirable result for the Subbasin, it appears that the GSAs in the Subbasin could disregard potential impacts associated with groundwater level declines below minimum thresholds during extended periods of dry years, even if interrupted by below-normal, above-normal, or wet years.

Department staff also find this methodology inconsistent with other portions of the GSP. For example, while describing measurable objectives for groundwater levels, the GSP states “the condition between the measurable objective and the minimum threshold is known as the margin of operational flexibility. The margin of operational flexibility is intended to accommodate droughts, climate change, conjunctive use operations, or other groundwater management activities.”⁴⁴ Based on these statements, it appears that the minimum thresholds are already defined at values that accommodate drought conditions, so it is unclear why minimum threshold exceedances during dry water years would be excluded from the GSP’s definition of undesirable results. (See Corrective Action 1a.)

SGMA states that “overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.”⁴⁵ In response to public comments on the draft GSP that questioned the

⁴² Merced GSP, Section 3.3.1, p. 243.

⁴³ Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices, Water Year 1901 through 2020. California Department of Water Resources, <https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST>.

⁴⁴ Merced GSP, Section 3.3.3, p. 248.

⁴⁵ Water Code § 10721(x)(1).

exclusion of dry and critically dry years in the definition of undesirable results, the GSAs provide a response referencing that portion of the law.⁴⁶ However, if the GSP intended to incorporate this concept into its definition of the undesirable result for chronic lowering of groundwater levels, the GSP fails to identify specific extraction and groundwater recharge management actions that would be implemented,⁴⁷ or otherwise describe how the Subbasin will be managed to offset, by increases in groundwater levels or storage during other periods, dry year reductions of groundwater in storage. The GSP identifies many projects that, once implemented, may lead to the elimination of long-term overdraft conditions in the Subbasin; however, Department staff find that the GSP does not present specific detail for how projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater levels identified as minimum thresholds are potentially exceeded for an extended period of time in the absence of two consecutive non-dry years. (See Corrective Action 1b.)

The GSP uses a similar approach for land subsidence (i.e., stating that undesirable results occur when minimum threshold subsidence rates are exceeded at three or more of the four proposed monitoring sites for two consecutive non-dry years⁴⁸), and uses the same approach for depletion of interconnected surface waters, which use the chronic lowering of groundwater level sustainable management criteria as a proxy. However, while SGMA states that overdraft resulting in groundwater level or groundwater storage declines during periods of drought could be managed with increases during other periods, as noted above; SGMA does not extend this premise to land subsidence and depletions of interconnected surface water. The greatest impacts to infrastructure from land subsidence and beneficial uses of surface water from depletions of interconnected surface water are likely to occur when groundwater levels are lowest, which would likely be during dry and critically dry water years. (See Corrective Action 1c.)

If, after considering this deficiency, the GSAs retain minimum thresholds that allow for continued lowering of groundwater levels, then it is reasonable to assume that some groundwater well impacts (e.g., loss of production capacity) may occur (e.g., to the outlier wells mentioned above) during the implementation of the GSP. SGMA requires GSAs to consider the interests of all groundwater uses and users and to implement their GSPs to mitigate overdraft conditions.⁴⁹ Implementing specific projects and management actions prevents undesirable results and achieves the sustainable yield of the basin. The GSAs should describe how projects and management actions would address drinking water impacts due to continued overdraft between the start of GSP implementation and the achievement of the sustainability goal. If the GSP does not include projects or management actions to address drinking water impacts, the GSP should contain a

⁴⁶ Merced GSP, Appendix O, p. 1128.

⁴⁷ 23 CCR § 354.44(b)(9).

⁴⁸ Merced GSP, Section 3.7.1, p. 257.

⁴⁹ 23 CCR §§ 355.4(b)(4), 355.4(b)(6).

thorough discussion, with supporting facts and rationale, explaining how and why the GSAs determined not to include specific actions to address those impacts that result from continued groundwater lowering below pre-SGMA levels. (See Corrective Action 1d.)

Additionally, related to the groundwater level declines allowed by the GSA's minimum thresholds, the GSAs have not explained how those groundwater level declines relate to the degradation of groundwater quality sustainability indicator. GSAs must describe, among other items, the relationship between minimum thresholds for a given sustainability indicator (in this case, chronic lowering of groundwater levels) and the other sustainability indicators.⁵⁰ The GSAs generally commit to monitoring a wide range of water quality constituents but they have only developed sustainable management criteria for total dissolved solids because they state they have not observed a causal nexus between groundwater management and degradation associated with the other constituents. While Department staff are not aware of evidence sufficient to conclude that the GSAs acted unreasonably by focusing on total dissolved solids, it is clear that the GSAs did not consider, or at least did not document, the potential for degradation to occur due to further lowering of groundwater levels beyond the historic lows. (See Corrective Action 1e.)

3.1.3 Corrective Action 1

- a) Department staff believe the management approach described in the GSP, which couples minimum thresholds and measurable objectives that account for operational flexibility during dry periods with a definition of undesirable results that disregards minimum threshold exceedances in all years except consecutive below normal, above normal, or wet years, to be inconsistent with the objectives of SGMA. Therefore, the GSAs should remove the water-year type requirement from the GSP's undesirable result definition.
- b) The GSP should be revised to include specific projects and management actions the GSAs would implement to offset drought-year groundwater level declines.
- c) The GSAs should thoroughly explain how their approach avoids undesirable results for subsidence and depletion of interconnected surface waters, as SGMA does not include an allowance or exemption for those conditions to continue in periods of drought.
- d) The GSAs should revise the GSP to describe how they would address drinking water impacts caused by continued overdraft during the period between the start of GSP implementation and achieving the sustainability goal. If the GSP does not include projects or management actions to address those impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why the GSAs determined not to include specific actions to mitigate drinking water impacts from continued groundwater lowering below pre-SGMA levels.

⁵⁰ 23 CCR § 354.28(b)(2).

- e) The GSP should be revised to explain how the GSAs will assess groundwater quality degradation in areas where further groundwater level decline, below historic lows, is allowed via the minimum thresholds. The GSAs should further describe how they will coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the GSP. The GSAs should also discuss efforts to coordinate with water quality regulatory agencies and programs in the Subbasin to understand and develop a process for determining if continued lowering of groundwater levels is resulting in degraded water quality in the Subbasin during GSP implementation.

3.2 DEFICIENCY 2. THE GSP DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE SELECTION OF CHRONIC LOWERING OF GROUNDWATER LEVELS SUSTAINABLE MANAGEMENT CRITERIA.

3.2.1 Background

The GSP Regulations require that a GSP include a description of the processes and criteria relied upon to define undesirable results applicable to the basin.⁵¹ The criteria to describe undesirable results must be based on a quantitative combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.⁵² The minimum threshold for chronic lowering of groundwater levels must be based on groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Additionally, the consideration of beneficial uses and users of groundwater is a key component of SGMA and the GSP Regulations. Related to this corrective action, GSP Regulations require that the description of minimum thresholds include “how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests,”⁵³ and that the description of undesirable results include “potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.”⁵⁴

3.2.2 Deficiency Details

The GSP defines an undesirable result as “...sustained groundwater elevations that are too low to satisfy beneficial uses within the basin over the planning and implementation horizon of this GSP.”⁵⁵ The GSP also identifies specific “potential undesirable results” that it says were identified by stakeholders, including significant and unreasonable stranding of groundwater infrastructure, reduced groundwater production, increased lift costs, and shallow domestic wells going dry.⁵⁶ The GSP defines the minimum threshold

⁵¹ 23 CCR § 354.26(a).

⁵² 23 CCR § 354.26(b)(2).

⁵³ 23 CCR § 354.28(b)(4).

⁵⁴ 23 CCR § 354.26(b)(3).

⁵⁵ Merced GSP, Section 3.3.1, p. 243.

⁵⁶ Merced GSP, Section 3.3.1, p. 243.

for chronic lowering of groundwater levels as equivalent to the construction depth of the shallowest domestic well within a 2-mile radius of a representative monitoring well.⁵⁷ In response to public comments, the GSP states that representative wells are intended to represent groundwater level conditions beyond the 2-mile radius.⁵⁸

While the apparent goal of the minimum thresholds, defined by the shallowest domestic well depth, is, at face value, reasonable and consistent with the GSP's goals, several items have raised concern during review by Department staff. Public comments and publicly available reports analyzing the effects of groundwater-level minimum thresholds on well infrastructure indicate the potential for more than 1,000 domestic wells to go dry at the GSP's minimum thresholds.⁵⁹ The GSP does not clearly describe what caused the apparent discrepancy between the objective of the thresholds to protect the shallowest wells and the results of those studies indicating potentially significant quantities of domestic wells could go dry. However, several factors, which the GSAs should assess and disclose, may be important. First, based on Department staff's assessment of information in the GSP, approximately 60 percent of the area of the Subbasin is outside of the 2-mile radius of the GSP's 25 representative wells. It is unclear to Department staff how many domestic wells exist outside of the buffer area, but that should be assessed by the GSAs and additional representative monitoring wells to cover these areas should be considered. Second, the GSP describes in a footnote that "outliers" from its domestic well dataset were removed, and it also describes the quantitative rules for the removal. However, the GSP does not describe the number of wells that the outlier analysis ultimately removed from consideration or the characteristics of those wells. Third, the GSP notes that its analysis is based on Merced County's electronic well permitting database,⁶⁰ while Department staff's understanding is that others have used well completion reports in the Department's Online System for Well Completion Reports⁶¹ (OSWCR) repository. The GSAs should evaluate and discuss the additional data that may be present in the OSWCR repository, if applicable. To the extent that those, or other factors, led to the apparent discrepancy, then those should be examined by the GSAs and described to better understand the potential impacts of the minimum thresholds on beneficial uses and users of groundwater. (See Corrective Action 2a.)

⁵⁷ Merced GSP, Section 3.3.2, p. 246.

⁵⁸ Merced GSP, Appendix O, p. 1128.

⁵⁹ See public comments submitted to the Department on the SGMA Portal from the State Water Resources Control Board, which concluded between 395 to 1,195 domestic wells outside or above the Corcoran Clay could go dry at the minimum thresholds. A study by a group affiliated with UC Davis found 415 wells could go dry at the minimum threshold (see Table 3 in the paper: Bostic, Darcy; Kristen Dobbin; Rich Pauloo; Jessica Mendoza; Michael Kuo; Jonathon London. 2020. *Sustainable for Whom? The Impact of Groundwater Sustainability Plans on Domestic Wells*. UC Davis Center for Regional Change).

⁶⁰ Merced GSP, Section 3.3.2, p. 246.

⁶¹ Well Completion Report Map Application. California Department of Water Resources, <https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Completion-Reports>.

3.2.3 Corrective Action 2

- a) As required by the GSP Regulations, the GSP must provide a description of how the minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property.⁶² In particular, the GSAs should address the apparent or potential discrepancies between the stated rationale for the minimum thresholds versus the results of multiple studies showing a potentially significant number of well impacts if groundwater levels are operating near those minimum thresholds. Furthermore, the GSAs should explain whether other drinking water users that may rely on shallow wells, such as public water systems and state small water systems, were considered in the GSAs' site-specific thresholds. If not, the GSAs should conduct outreach with those users and incorporate their shallow wells, as applicable, into the site-specific minimum thresholds and measurable objectives.

3.3 DEFICIENCY 3. THE GSP DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE SELECTION OF LAND SUBSIDENCE SUSTAINABLE MANAGEMENT CRITERIA.

3.3.1 Background

The GSP Regulations require minimum thresholds for land subsidence based on the rate and extent of subsidence.⁶³ The GSP Regulations require that the description of minimum thresholds include “[h]ow minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests,”⁶⁴ and that the description of undesirable results include “[p]otential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.”⁶⁵ Also, in the development of minimum thresholds for land subsidence, the GSP Regulations require the identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how those uses and interests were determined and considered, and the rationale for establishing minimum thresholds in relations to those effects.⁶⁶

3.3.2 Deficiency Details

The GSP describes land subsidence as a significant issue in the southwestern portion of the Subbasin and states that the subsidence is likely a result of groundwater extraction from below the Corcoran Clay.⁶⁷ The GSP defines an undesirable result for land subsidence as “[t]he significant and unreasonable reduction in the viability of the use of

⁶² 23 CCR § 354.28(b)(4).

⁶³ 23 CCR § 354.28(c)(5).

⁶⁴ 23 CCR § 354.28(b)(4).

⁶⁵ 23 CCR § 354.26(b)(3).

⁶⁶ 23 CCR § 354.28(c)(5).

⁶⁷ Merced GSP, Section 2.2.5, p. 180.

infrastructure over the planning and implementation horizon...”.⁶⁸ The GSP further explains that the Eastside Bypass in the southwest corner of the Subbasin has the largest potential to be damaged due to subsidence.⁶⁹ The GSAs identify land subsidence as an area of concern in the Subbasin but do not, at this time, consider land subsidence to have caused a significant and unreasonable reduction in the viability of the use of infrastructure. The GSP states that land subsidence observed over the last 50 years has caused a reduction in freeboard of the Middle Eastside Bypass and caused problems in neighboring subbasins, highlighting the need for further monitoring and management.⁷⁰

The GSP includes minimum thresholds and measurable objectives defined as rates of subsidence, but both are poorly supported relative to the requirements of the GSP Regulations. The minimum threshold, defined as 0.75 feet per year of subsidence, is described as “slightly higher” than measured subsidence rates between 2011 and 2018, the effects of which “...did not result in significant and unreasonable effects within the Merced Subbasin.”⁷¹ However, whether or not those historical rates were considered significant and unreasonable is immaterial to a prospective evaluation of sustainability. Rather, the GSAs should be concerned with whether and how future rates of subsidence could interfere with beneficial uses and users of groundwater or surface land uses and property interests. To properly address that concern, the GSAs should understand, through efforts such as coordination and technical studies, the amount of subsidence that would be significant and unreasonable, because it would substantially interfere with groundwater and land surface beneficial uses and users. That understanding would inform not only the selection of sustainable management criteria, but also the types and timing of projects and management actions that would be needed to avoid the significant and unreasonable effects. (See Corrective Action 3a.)

The measurable objective, set to 0.25 feet per year, is described as being “based on recent subsidence rates, which are believed to be reflective of subsidence due to historical dewatering.”⁷² The GSP specifically notes that rates of subsidence were between 0.17 and 0.32 feet per year from December 2017 to December 2018. The GSP states that “some level of future subsidence, likely at rates similar to those currently experienced, is likely to be underway already and will not be able to be prevented.”⁷³ Here, the GSP appears to be referring to residual or delayed compaction, and Department staff do not dispute that some level of residual compaction is expected after groundwater level decline is arrested. However, the GSP contains no evidence to support its conclusion that the 2017-2018 rates would be likely to continue over the planning and

⁶⁸ Merced GSP, Section 3.7.1, p. 256.

⁶⁹ Merced GSP, Section 3.7.2, p. 257.

⁷⁰ Merced GSP, ES-3, p. 24.

⁷¹ Merced GSP, Section 3.7.2, pp. 258-259.

⁷² Merced GSP, Section 3.7.3, p. 259.

⁷³ Merced GSP, Section 3.7.2, p. 258.

implementation horizon of the GSP. Evidence presented by the GSAs⁷⁴ and by others⁷⁵ has shown that, at least in some areas, compaction rates quickly attenuate following recovery of groundwater levels. The GSAs should substantiate its apparent residual compaction rates with data and analyses or explain how they intend to address this data gap. (See Corrective Action 3b.)

It was the intent of the legislature that implementation of SGMA would avoid or minimize subsidence⁷⁶ once basins achieve their sustainability goals. To be consistent with that intent, and in the absence of compelling information as to why additional long-term subsidence is acceptable for a basin, Department staff suggest that the measurable objective be zero inelastic subsidence and that the minimum thresholds be set commensurate with expected residual subsidence. It may be that those rates are exceeded during the implementation period (i.e., between 2020 and 2040), as projects and management actions are implemented and sustainability is achieved, but that can be acceptable if the GSAs are making adequate progress in implementing their GSP. As stated above, the rates at which projects and management actions are implemented should be consistent with the cumulative subsidence that the GSAs determine need to be avoided, as informed by the understanding of potential impacts or interference to beneficial uses and users of groundwater and surface land uses. (See Corrective Action 3c.)

The GSAs have identified that “...sensitivity of local infrastructure to land subsidence is not well understood...”⁷⁷, that they “...will continue to coordinate efforts with surrounding subbasins to develop regional and local solutions to subsidence occurring in the Merced, Chowchilla, and Delta-Mendota Subbasins...”⁷⁸, and that they will identify a plan, including coordinating with other agencies and developing timelines, to fill data gaps within two years of the GSP being approved by the Department.⁷⁹ Department staff agree that all of those items are important and should be implemented immediately, without waiting for approval of the GSP by the Department. However, staff do not believe that the GSP, in a Subbasin with significant historical subsidence and with infrastructure identified as being susceptible to future subsidence, should be recommended for approval without identifying the total cumulative amount of subsidence that can occur without causing significant and unreasonable impacts to beneficial uses and users, surface land uses, and property interests. Department staff recognize that the total allowable cumulative subsidence may be modified as the GSP is implemented, data gaps are filled, and additional analyses are conducted, and therefore Department staff encourage the GSAs

⁷⁴ Merced GSP, Section 2.2.5, pp. 183-186.

⁷⁵ Figure 6a and accompanying discussion, Faunt, C.C., Sneed, M., Traum, J. et al. Water availability and land subsidence in the Central Valley, California, USA. *Hydrogeology Journal* 24, 675–684 (2016), <https://doi.org/10.1007/s10040-015-1339-x>.

⁷⁶ Water Code § 10720.1(e).

⁷⁷ Merced GSP, Section 3.7.2, p. 257.

⁷⁸ Merced GSP, Section 3.7.2, p. 259.

⁷⁹ Merced GSP, Section 4.9.7, p. 294.

to actively evaluate and adjust management criteria as new information and data are acquired.

3.3.3 Corrective Action 3

- a) The GSAs should identify the amount of subsidence that can be tolerated by critical infrastructure during the implementation of the GSP. This identification should be supported by information on the effects of subsidence on land surface and groundwater beneficial uses and users, and the amount of subsidence that would substantially interfere with those uses and users.
- b) If, pending resolution of this corrective action, rates of delayed or residual compaction are used to inform minimum thresholds or measurable objectives, then information should be provided to substantiate those rates, or explanation should be provided for how those rates will be evaluated as a data gap.
- c) The GSAs should revise their minimum thresholds and measurable objectives for land subsidence to reflect the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. The GSAs should explain how the 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 (i.e., less than substantial interference).

4 STAFF RECOMMENDATION

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