CALIFORNIA DEPARTMENT OF WATER RESOURCES
SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE
715 P Street | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001

September 22, 2022

John Davids
Madera Point of Contact
1772 Picasso Avenue, Suite A
Davis, CA 95618
john@davidsengineering.com

RE: ”Incomplete” Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Madera Subbasin

Dear John Davids,

The Department of Water Resources (Department) has evaluated the four groundwater sustainability plans (GSPs) submitted for the San Joaquin Valley – Madera Subbasin (Subbasin), as well as the materials considered to be part of the required coordination agreement. Collectively, the four GSPs and the coordination agreement are referred to as the Plan for the Subbasin. The Department has determined that the Plan is “incomplete” pursuant to Section 355.2(e)(2) of the GSP Regulations.

The Department based its incomplete determination on recommendations from the Staff Report, included as an enclosure to the attached Statement of Findings, which describes that the Subbasin’s Plan 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 the Subbasin’s 7 groundwater sustainability agencies (GSAs) review while determining how and whether to address the deficiencies in a coordinated manner.

The Subbasin’s GSAs have 180 days, the maximum allowed by the GSP Regulations, to address the identified deficiencies. Where addressing the deficiencies requires modification of the Plan, the GSAs must adopt those modifications into their respective GSPs and all applicable coordination agreement materials, or otherwise demonstrate that those modifications are part of the Plan before resubmitting it to the Department for evaluation no later than March 21, 2023. The Department understands that much work has occurred to advance sustainable groundwater management since the GSAs submitted their GSPs 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 Plan 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 Plan resubmittal. If the revisions sufficiently address the identified deficiencies, the Department will determine that the Plan is “approved”. In that scenario, Department staff will identify additional recommended corrective actions that the GSAs should address early in implementing their GSPs (i.e., no later than the first required periodic evaluation). Among other items, those corrective actions will recommend the GSAs provide more detail on their plans and schedules to address data gaps. Those recommendations will 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 Subbasin's GSAs cannot address the deficiencies identified in this letter by March 21, 2023, 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 Office staff by emailing sgmps@water.ca.gov if you have any questions about the Department's assessment, implementation of your Plan, or to arrange a meeting with the Department.

Thank you,

Paul Gosselin

Paul Gosselin
Deputy Director of Sustainable Groundwater Management

Attachment: Statement of Findings Regarding the Determination of Incomplete Status of the San Joaquin Valley – Madera Subbasin Groundwater Sustainability Plans

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE DETERMINATION OF INCOMPLETE STATUS OF THE SAN JOAQUIN VALLEY - MADERA SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin, and whether the GSP 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 GSP within two years of its submission. (Water Code § 10733.4.)

SGMA allows for multiple GSPs implemented by multiple groundwater sustainability agencies (GSAs) and coordinated under a single coordination agreement that covers the entire basin. (Water Code § 10727.) In the San Joaquin Valley – Madera Subbasin (Subbasin), four separate GSPs were prepared by seven GSAs. This Statement of Findings explains the Department's decision regarding the multiple GSPs covering the Subbasin. Collectively, the four GSPs and the coordination agreement are referred to as the Plan for the Subbasin. Individually, the GSPs include the following:

- Madera Subbasin Joint Groundwater Sustainability Plan (Joint GSP) – prepared by Madera Irrigation District GSA, Madera Water District GSA, City of Madera GSA, and County of Madera GSA
- Madera Subbasin Gravelly Ford Water District Groundwater Sustainability Plan (Gravelly GSP) – prepared by Gravelly Ford Water District GSA
- Madera Subbasin Root Creek Water District Groundwater Sustainability Plan (Root Creek GSP) – prepared by Root Creek Water District GSA
- Madera Subbasin New Stone Water District Groundwater Sustainability Plan (New Stone GSP) – prepared by New Stone Water District GSA

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 determines the Plan Incomplete based on the staff assessments and recommendations. In particular, the Department finds:

A. Details in the GSPs fail to demonstrate that the four GSPs have coordinated to address the regulatory aspects of SGMA in a manner that complies with SGMA and substantially complies with the GSP Regulations.

   1. The Plan does not present a coordinated sustainability goal in the Coordination Agreement that is applicable to the entire Subbasin. Instead, GSAs describe related, but varied sustainability goals in each GSP without describing how the goals are unified to be applicable to the entire Subbasin.

   2. Although the Coordination Agreement provides a coordinated historical water budget for each GSA, it lacks information regarding a coordinated current or future water budget. Additionally, because of inconsistent information presented in the GSPs, it is unclear as to whether the GSAs relied on the same data and methodologies to develop a water budget and sustainable yield for the Subbasin.

   3. The Plan does not describe agreed upon undesirable results for the Subbasin. The undesirable result descriptions are provided in each GSP and are applicable only within each GSP area—without agreement between GSAs—and some of the information provided is insufficiently detailed. Additionally, the descriptions that are currently in the GSPs do not provide sufficient details regarding the criteria relied upon to develop the definition of undesirable results, but instead leave the definitions broad and qualitative.

B. The Plan does not establish minimum thresholds for chronic lowering of groundwater levels in a manner substantially compliant with the GSP regulations.

   1. Descriptions of minimum thresholds are not provided with sufficient supporting information to allow Department staff to evaluate whether the criteria are reasonable or whether operating the Subbasin to avoid those thresholds is consistent with avoiding undesirable results—in part due to the definitions of undesirable results in the Plan being insufficiently detailed. In some sections of the Plan, the GSAs provide incomplete, conflicting, and missing information. Additionally, the GSPs do not present a sufficient analysis of potential effects of currently established minimum thresholds on the beneficial uses and users of groundwater or land uses and property interests.

C. The Plan does not develop sustainable management criteria for land subsidence using the best available information and science

1. The GSAs do not sufficiently demonstrate that undesirable results related to land subsidence are not present and are not likely to occur in the Subbasin. Some information is presented describing land subsidence management criteria in the New Stone GSP; however, it is not sufficiently detailed for Department staff to evaluate the Plan or determine whether information in that GSP is applicable throughout the Subbasin.

D. The Plan does not develop sustainable management criteria for the depletions of interconnected surface water using the best available information and science.

1. Based on conflicting information contained in the Plan, the GSAs do not sufficiently demonstrate that interconnected surface water or undesirable results related to depletions of interconnected surface water are not present and are not likely to occur in the Subbasin. There is sufficient data to indicate the potential of interconnected surface water in the Subbasin, which warrants and requires setting initial sustainable management criteria that may be reevaluated and potentially modified as new data become available through future investigation. Thus, information provided in the Plan at this time does not support the exclusion of depletion of interconnected surface water as a required sustainability indicator for this Subbasin.

Based on the above, the Department determines the Plan submitted by the GSAs for the Madera Subbasin (No. 5-022.06) to be Incomplete because the GSPs contains deficiencies that, at this time, preclude approval, but which may be capable of being corrected by the Agencies in a timely manner. The GSAs have up to 180 days to address the deficiencies outlined above and detailed in the Staff Report. Once the Agencies resubmit their Plan, the Department will review the revised GSPs to evaluate whether the deficiencies were adequately addressed and make a final determination of whether the Plan is approved or inadequate. Should the Agencies 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).

Signed:

Karla Nemeth

Karla Nemeth, Director

Date: 9/20/2022

Enclosure: Groundwater Sustainability Plan Assessment Staff Report – Madera Subbasin (No. 5-022.06)

State of California
Department of Water Resources
Sustainable Groundwater Management Program
2022 Groundwater Sustainability Plan Assessment
Staff Report

Groundwater Basin Name:	San Joaquin Valley - Madera Subbasin (No. 5-022.06)
Number of GSPs:	4 (see list below)
Number of GSAs:	7 (see list below)
Point of Contact:	John Davids
Recommendation:	Incomplete
Date:	September 22, 2022

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

In the Madera Subbasin (Subbasin), four separate GSPs were prepared by seven GSAs pursuant to a required coordination agreement.[5] The coordination agreement is a legal agreement signed by all GSAs in the Subbasin. Collectively, the GSPs and the coordination agreement will, for evaluation and assessment purposes, be treated and referred to as the Plan for the Subbasin. Individually, the GSPs include the following:

- *Gravelly Ford Water District Groundwater Sustainability Plan (Gravelly Ford GSP)* – prepared by the Gravelly Ford Water District GSA.
- *Joint Groundwater Sustainability Plan* (Joint GSP) – prepared jointly by the City of Madera GSA, Madera County GSA, Madera Irrigation District GSA, and Madera Water District GSA.

[1] Water Code § 10720 *et seq*.
[2] Water Code § 10727.
[3] 23 CCR § 350 *et seq*.
[4] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[5] Water Code § 10733.4(b).

- *New Stone Water District Groundwater Sustainability Agency Groundwater Sustainability Plan (New Stone GSP)* – prepared by the New Stone Water District GSA.
- *Root Creek Water District Groundwater Sustainability Agency Groundwater Sustainability Plan (Root Creek GSP)* – prepared by the Root Creek Water District GSA.

Department staff have thoroughly evaluated the Plan, the Subbasin's coordination agreement, and other information provided or available and known to staff, and have identified deficiencies in the Plan that staff recommend should preclude its approval.[6] In addition, consistent with the GSP Regulations, Department staff have provided corrective actions that the GSAs should review while determining how and whether to address the deficiencies in a coordinated manner.[7] 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 have a coordinated approach to the data and methodologies in the four GSPs, define sustainable management criteria in the manner required by SGMA and the GSP Regulations, and the development of sustainable management criteria for land subsidence and depletions of interconnected surface water.

This assessment includes four sections:

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

[6] 23 CCR §355.2(e)(2).
[7] 23 CCR §355.2(e)(2)(B).

1 EVALUATION CRITERIA

The Department evaluates whether a Plan conforms to the statutory requirements of SGMA [8] and is likely to achieve the basin's sustainability goal. [9] To achieve the sustainability goal, the Plan must demonstrate that implementation will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. [10] 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. [11] The Department is also required to evaluate whether the Plan will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.[12]

For a Plan to be evaluated by the Department, it must first be determined that it was submitted by the statutory deadline[13] and that it is complete and covers the entire basin.[14] Additionally, for those GSAs choosing to develop multiple GSPs, the Plan submission must include a coordination agreement.[15] The coordination agreement must explain how the multiple GSPs in the basin have been developed and implemented utilizing the same data and methodologies and that the elements of the multiple GSPs are based upon consistent interpretations of the basin's setting. If these required conditions are satisfied, the Department evaluates the Plan to determine whether it complies with SGMA and substantially complies with the GSP Regulations.[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 the Plan is likely to achieve the sustainability goal for the basin, Department staff review the information provided for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice. [18] The Department's review considers whether there is a reasonable relationship between the

[8] Water Code §§ 10727.2, 10727.4, 10727.6.
[9] Water Code § 10733(a).
[10] Water Code § 10721(v).
[11] 23 CCR § 354.26.
[12] Water Code § 10733(c).
[13] 23 CCR § 355.4(a)(1).
[14] 23 CCR §§ 355.4(a)(2), 355.4(a)(3).
[15] 23 CCR § 357.4.
[16] 23 CCR § 350 *et seq*.
[17] 23 CCR § 355.4(b).
[18] 23 CCR § 351(h).

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

To the extent overdraft is present in a basin, the Department evaluates whether the Plan provides a reasonable assessment of the overdraft and includes reasonable means to mitigate it.[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 Plan provides reasonable measures and schedules to eliminate identified data gaps.[23] Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSAs have adequately responded to the comments that raise credible technical or policy issues with the Plan.[24]

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

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

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

evaluation, the Department may determine the resubmitted Plan is approved. Alternatively, the Department may find a formerly deemed incomplete GSP is inadequate if, after consultation with the State Water Resources Control Board, it determines that the GSAs have not taken sufficient actions to correct any identified deficiencies.[31]

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

Lastly, the Department's review and assessment of an approved Plan is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the Plan.[32] Also, GSAs have an ongoing duty to reassess their GSPs, provide annual reports to the Department, and, when necessary, update or amend their GSPs.[33] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the GSA's progress toward achieving the basin's sustainability goal and whether implementation of the Plan adversely affects the ability of GSAs in adjacent basins to achieve their sustainability goals.

[31] 23 CCR § 355.2(e)(3)(C).
[32] Water Code § 10733.8; 23 CCR § 355.6 *et seq*.
[33] 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.[34] The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin.[35] Additionally, when multiple GSPs are developed in a basin, the submission of all GSPs must include a coordination agreement.[36] The coordination agreement must explain how the multiple GSPs in the basin have been developed and implemented utilizing the same data and methodologies and that the elements of the multiple GSPs are based upon consistent interpretations of the basin's setting. If a Plan is determined to be incomplete, Department staff may require corrective actions that address minor or potentially significant deficiencies identified in the Plan. The GSAs in a basin, whether developing a single GSP covering the basin or multiple GSPs, must sufficiently address those required corrective actions within the time provided, not to exceed 180 days, for the Plan to be reevaluated by the Department and potentially approved.

2.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority as of January 1, 2017 and that were subject to critical conditions of overdraft to submit a GSP no later than January 31, 2020.[37]

The GSAs submitted their individual GSPs and accompanying coordination agreement to the Department on January 31, 2020. However, the coordination agreement submitted by the statutory deadline did not meet the requirements of SGMA or the GSP Regulations (see Section 2.2); the Department did not evaluate the individual GSPs at that time.

Subsequently, the GSAs have resubmitted a coordination agreement that meets regulatory requirement. The Department, after consultation with the State Water Resources Control Board (State Water Board), initiated the review of the four adopted GSPs and signed coordination agreement on October 9, 2020.

2.2 COMPLETENESS

GSP Regulations specify that the Department shall evaluate a Plan if that Plan is complete and includes the information required by SGMA and the GSP Regulations.[38] For those basins choosing to submit multiple GSPs, a coordination agreement is required.

The Subbasin's seven GSAs submitted four adopted GSPs that cover the entire Subbasin, and a coordination agreement. However, the coordination agreement

[34] Water Code § 10720.7.
[35] 23 CCR § 355.4(a)(3).
[36] Water Code § 10733.4(b); 23 CCR § 357.4.
[37] Water Code § 10720.7(a)(1).
[38] 23 CCR § 355.4(a)(2).

submitted by the statutory deadline did not cover the entire basin as it was not signed by all of the submitting GSAs. Thus, on February 21, 2020, after communication between staff and representatives from various GSA which confirmed the omitted signature of New Stone Water District GSA was intentional, the Department initiated consultation with the State Water Board in accordance with GSP Regulations[39]. On March 10, 2020, the Department determined the four GSPs submitted collectively were INADEQUATE based solely on the lack of a coordination agreement.[40]

On October 2, 2020, the State Water Board informed the Department[41] that given recent coordination among GSAs and that the GSAs have since executed and submitted to the Department an agreed upon a coordination agreement, the State Water Board was not considering a probationary designation for the basin at that time and, instead, requested the Department review and evaluate the coordinated GSPs under Water Code Section 10733 et seq.

Department staff found the GSPs and coordination agreement to be complete and include the required information, sufficient to warrant an evaluation by the Department. The Department subsequently initiated the review of the four adopted GSPs and signed coordination agreement on October 9, 2020.

The Department posted the Subbasin's four GSPs and coordination agreement to its website on October 9, 2020.

2.3 Basin Coverage

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[42] 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 Plan intends to manage the entire Madera Subbasin and the jurisdictional boundaries of the submitting GSAs appear to cover the entire Subbasin.[43]

[39] 23 CCR § 355.2(e)(3).
[40] https://sgma.water.ca.gov/portal/service/gspdocument/download/9294.
[41] https://sgma.water.ca.gov/portal/service/gspdocument/download/9305.
[42] Water Code § 10727(b); 23 CCR § 355.4(a)(3).
[43] Madera Subbasin Coordination Agreement.

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[44] including whether the elements of a GSP were developed in the manner required by the GSP Regulations, [45] whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable,[46] 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.[47]

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

GENERAL BACKGROUND

SGMA allows for multiple GSPs to be implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers an entire basin.[48] The GSP Regulations and SGMA detail the requirements for a coordination agreement and the elements of the GSPs necessary to be coordinated to achieve the basin's sustainability goal.[49] The coordination agreement must provide both administrative and technical coordination and consistency between all the GSPs. The collective submittals for the basin are to be based upon consistent interpretations of the basin setting and utilize the same data and methodologies.[50] In the context of utilizing the same data and methodologies, the coordination agreement must provide the following:[51]

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

[44] 23 CCR § 355.4.
[45] 23 CCR § 355.4(a)(1).
[46] 23 CCR § 355.4(b)(1).
[47] 23 CCR §§ 355.4(b)(5), 355.4(b)(6).
[48] Water Code § 10727(b)(3).
[49] 23 CCR § 357.4; Water Code § 10727.6.
[50] 23 CCR § 357.4(a).
[51] Water Code § 10727.6 *et al;* 23 CCR §§ 357.4(b)(3)(B), 357.4(b)(3)(C), 357.4(c).

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

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

The Department is tasked with evaluating whether the GSPs, in coordination with one another, conform with the required regulatory contents and are likely to achieve the sustainability goal for the basin.[52]

For basins with multiple GSPs, the GSAs must justify and explain how the GSPs implemented together would effectively achieve the sustainability goal for the entire Subbasin.[53]

3.1 Deficiency 1. The GSPs have not sufficiently coordinated on data and methodologies including coordination of sustainability goal, water budget and sustainable yield, and undesirable results as required by SGMA and the GSP Regulations.

3.1.1 Background

SGMA defines sustainable groundwater management as the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.[54] A sustainability goal for a basin that culminates in the absence of undesirable results is thus explicitly part of sustainable groundwater management, as established by SGMA, and critical to the success of a GSP. SGMA also defines the sustainability goal to mean the existence and implementation of one or more groundwater sustainability plans that achieve sustainable groundwater management by identifying and causing the implementation of measures targeted to ensure that the applicable basin is operated within its sustainable yield. To achieve sustainable groundwater management under SGMA, the basin must experience no undesirable results by the end of the 20-year GSP implementation period and be able to demonstrate an ability to maintain sustainable conditions over the 50-year planning and implementation horizon.

It is up to GSAs to define, in their GSPs, the specific significant and unreasonable effects that would constitute undesirable results and to define the groundwater conditions that would produce those results in their basins. The description of undesirable results applicable to the basin needs to include the following:[55]

[52] Water Code § 10733(b); 23 CCR § 355.4(b).
[53] Water Code § 10733.4(b)(2).
[54] Water Code § 10721(v).
[55] 23 CCR § 354.26(b)(1), 354.26(b)(2), 354.26(b)(3).

- The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results.
- The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator.
- 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.

The definition of sustainable yield in a basin is directly tied to undesirable results. As established in SGMA, sustainable yield means the maximum quantity of water, calculated over a base period representative of long-term conditions in a basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.[56]

The GSP Regulations require coordination to ensure that GSPs utilize the same data and methodologies for the following sustainable groundwater management assumptions: *groundwater elevation data; groundwater extraction data; surface water supply; total water use; change in groundwater storage; water budget; and sustainable yield*.[57] The GSP Regulations also require basins that prepare and implement multiple plans to describe, in the basin's coordination agreement, the sustainability goal, the undesirable results for the basin, and the sustainable yield for the basin and an explanation of how the minimum thresholds and measurable objectives defined by each GSP relate to those undesirable results based on information described in the basin setting.[58] For basins that establish management areas, the GSP Regulations state that management areas may establish "different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin."[59]

3.1.2 Deficiency Details

Although the Coordination Agreement includes general statements that the collection and presentation of data are coordinated throughout the Subbasin, details in the GSPs lack confirmation that the four GSPs have coordinated to address the regulatory aspects of SGMA in a manner that substantially complies with the GSP Regulations.

The Plan does not establish a Sustainability Goal applicable to the entire Subbasin.

The sustainability goal for a basin is intended to be a succinct and qualitative description of the overall purpose of sustainable groundwater management and must be presented in the coordination agreement. An insufficiently coordinated sustainability goal can result in GSAs disagreeing on objectives and desired conditions of the groundwater basin or

[56] Water Code § 10721(w).
[57] Water Code § 10727.6.
[58] 23 CCR § 357.4(b)(3)(C).
[59] 23 CCR § 354.20(a).

how the basin will get to that desired condition, and why the measures planned will lead to success.[60] After review, staff find that the sustainability goal descriptions in the Plan are not coordinated to the degree required by the GSP Regulations.

The Plan does not present a coordinated sustainability goal in the Coordination Agreement that is applicable to the entire Subbasin. Instead, GSAs describe related, but varied sustainability goals in each GSP without describing how the goals are unified to be applicable to the entire Subbasin. For example, in describing the sustainability goal the GSPs provide:

- The Gravelly Ford GSP describes the sustainability goal for the Madera Subbasin, stating that the "sustainability goal for this Subbasin is to *minimize* the listed undesirable results throughout the Subbasin by providing a Gravelly Ford GSP water supply that supports current cultivated acreage in the Plan area by developing an expanded surface water irrigation and recharge program, and groundwater monitoring and land elevation measurement program."[61]

- The Joint GSP describes the sustainability goal as "to implement a package of projects and management actions that will, by 2040, balance long-term groundwater system inflows with outflows"[62] However, the goal is stated to only be applicable in the Joint GSP area, not the entire Subbasin.

- The New Stone GSP states "[t]he goal for the GSP is to provide a tool for managing groundwater, basin-wide, on a long-term basis and to meet measurable objectives for each indicator by maintaining a sustainable yield, thus avoiding undesirable results"; the GSPs discussion highlights collective participation to develop projects and actions "to achieve the goals outlined in the GSP… over the course of the next 20 years."[63]

- The Root Creek GSP states "[t]he goal for the GSA is that the participants in the Madera Groundwater Subbasin will collectively work together to sustainably manage the groundwater resources of the basin while maintaining openness to the public and stakeholder such that local citizenry has a voice in the outcome."[64] The Root Creek GSP adds an additional goal stating "[t]he groundwater quality sustainability goal is to maintain the overall groundwater quality within the [GSP area] at its general current state or to improve it."[65]

These descriptions do not clearly articulate a sustainability goal applicable to the entire basin. Instead, they appear to describe conflicting or different objectives within the

[60] California Department of Water Resources, *Draft Sustainable Management Criteria Best Management Practices*, November 2017, p. 33.
[61] Gravelly Ford GSP, Section 3.1, p. 48.
[62] Joint GSP, Section 3.1.1, p. 243.
[63] New Stone GSP, Section 4.1, pp. 110-111.
[64] Root Creek GSP, Section 4.1, p. 157.
[65] Root Creek GSP, Section 4.4.1, p. 178.

Subbasin. For instance, the Gravelly Ford GSP indicates it aims to "minimize" undesirable results while other GSPs evidence a different intent, namely to sustainably manage the Subbasin, which necessarily means avoiding undesirable results. Staff question whether achieving the goals, as currently described, would avoid undesirable results in the entire Subbasin. In addition to the Gravelly Ford goal being inconsistent with the other GSPs, the stated goal is inconsistent with SGMA which defines sustainable groundwater management as groundwater management maintained without causing undesirable results. Therefore, based on the information provided, Department staff do not believe the Plan defines undesirable results in a manner that satisfies the requirements of the GSP Regulations for coordination agreements.

The Plan does not use the same data and methodologies to develop Water Budgets and estimates of Sustainable Yield.

A key component of achieving the sustainability goal, as defined by SGMA, is the operation of the Subbasin within its sustainable yield—calculated from a coordinated water budget. A coordinated water budget, as required by the GSP Regulations, ensures that multiple GSPs in the Subbasin are developed and implemented utilizing the same data and methodologies, and that assumptions are based on consistent interpretations of the basin setting.

Though the Coordination Agreement contains a historical water budget for each GSA, it does not include a coordinated current or future water budget as required.[66] Furthermore, a preliminary sustainable yield estimate is provided for the Subbasin in the GSPs, but it is inconsistent. In the Root Creek GSP and New Stone GSP the estimate is given as 303,100 acre-feet per year, while the Joint GSP estimates the yield as ranging from 437,300 to 439,300 acre-feet per year based on updates to the analysis.[67] The Gravelly Ford GSP provides a GSP area specific sustainable yield of 14,400 acre-feet per year; however, this information is without relevant context as the Plan does not provide information on how the Subbasin-wide sustainable yield would be allocated between GSAs or GSP specific areas. Moreover, public comments from four of the Subbasin GSAs indicate there is disagreement with the New Stone GSP using "entirely different methodologies" which overestimates groundwater inflows by 4,500 acre-feet per year resulting in a groundwater deficit of only 800 acre-feet per year. Additionally, there are several other inconsistencies or errors in the values presented in the GSPs, which reduces Department staff's confidence in the validity of the results and associated management criteria.

The water budgets presented in each GSP are unclear, use different data, and, therefore, are difficult to assess. Additionally, the water budget along with an estimate of sustainable yield should be included in the coordination agreement as required, which ensures the GSAs in the Subbasin have agreed to the same interpretation of the basin setting.

[66] 23 CCR § 357.4(b)(3)(B).
[67] Root Creek GSP, Table 3-6, p. 143, Table 3-8, p. 150; New Stone GSP, Table 3-6, p. 95, Table 3-8, p.102; Joint GSP, Table 2-34, p. 167, Table 2-35, p. 168.

Therefore, having not met these requirements, Department staff do not believe the information provided in each GSP satisfies the GSP Regulations.

The Plan does not describe agreed upon Undesirable Results for the Subbasin.

Undesirable results will be used by the Department as one way to measure Plan implementation to determine whether the sustainability goal has been achieved within the Subbasin. A single undesirable result description for each applicable sustainability indicator within the Subbasin must be agreed upon by all GSAs and documented in the coordination agreement.[68]

The Coordination Agreement, however, does not contain such agreed upon and coordinated descriptions. Instead, undesirable result descriptions are provided in each GSP and are applicable only within each GSP area--without agreement between GSAs—and some of the information provided is insufficiently detailed. For example, the Joint GSP describes undesirable results for chronic lowering of groundwater levels as when groundwater conditions cause significant financial burden to local agricultural interests or others who rely on GSP area groundwater resources, cause groundwater level conditions at private domestic wells that cannot be mitigated, or interfere with other sustainability indicators. [69] Quantitative criteria for identifying when and where undesirable results are occurring are defined as more than 30 percent of representative monitoring sites exceeding their minimum thresholds for the same two consecutive Fall readings. While, in the New Stone GSP, the lowering of groundwater elevations is considered significant and unreasonable if pumping has caused 25 percent of wells in the GSP area to go dry.[70] The Root Creek GSP considered undesirable results for chronic lowering of groundwater levels to be a rate of decline of 3.5 feet per year or greater for 10 consecutive years. The Gravelly Ford GSP states the definition of sustainability indicators in the GSP area "is the same as that appropriate to the Subbasin" and adding that "over extraction and reduced inflow of surface waters to the area would be the most likely combination that would …result in undesirable results."[71]

It is unclear to Department staff if the individual and different descriptions provided in each GSP are coordinated. Though undesirable results can be defined by minimum threshold exceedances at a single monitoring site, multiple monitoring sites, a portion of a basin, a management area, or an entire basin[72], neither the GSPs nor the Coordination Agreement contain an explanation of how the different definitions relate to one another to define undesirable results in the entire Subbasin. GSAs are required to develop these agreed upon definitions and explain how management criteria defined in each GSP relate to those defined undesirable results, based on information in the basin setting.

[68] 23 CCR § 357.4(b)(3)(C).
[69] Joint GSP, Section 3.4.1, pp. 276-277.
[70] New Stone GSP, Section 4.2.1.1, pp. 111-112.
[71] Gravelly Ford GSP, Section 3.4.1, pp. 51-52.
[72] California Department of Water Resources, *Draft Sustainable Management Criteria Best Management Practices*, November 2017, p. 22.

Additionally, the descriptions that are currently provided in the GSPs do not provide sufficient details regarding the criteria relied upon to develop the definition of undesirable results, but instead leave the definitions broad and qualitative.[73] For example, in the Joint GSP the specific criteria used to define "significant financial burden", or to determine when wells "cannot be mitigated" is not provided in the GSP. Also, the intended quantitative criteria in the Joint GSP is explained as "[t]he 30 percent criterion was selected to balance the interest of beneficial use with the practical aspect of groundwater management uncertainty."[74] However, further details describing the "balance" in relation to significant and unreasonable effects was not provided. Moreover, the Joint GSP does not describe, with sufficient detail and supporting analysis, the potential effects on the beneficial uses and users of groundwater, on land uses and property interests, or other potential effects that may occur or are occurring if the basin experiences undesirable results.[75] As another example, the Gravelly Ford GSP and the Root Creek GSP do not provide quantitative criteria used to define when and where the effects of the groundwater conditions are expected to cause undesirable results.[76]

A sufficient level of detailed information with supporting information and analysis describing effects is required in the GSPs so that Department staff can assess the likelihood of the Plan in achieving its sustainable goal (i.e., evaluate if minimum thresholds are established at levels that avoid the stated significant and unreasonable effects within the basin's definition of undesirable results[77]).

3.1.3 Corrective Actions

1. The Plan does not provide sufficient explanation to confirm that the GSPs have been developed using the same data and methodologies and that elements of the GSPs have been based upon consistent interpretations of the Subbasin's setting. The GSAs in the Subbasin should modify each of their respective GSPs, as well as any applicable coordination materials, to substantially comply with the GSP Regulations and define sustainable yield and undesirable results, and develop water budgets in a manner that addresses groundwater conditions occurring throughout the Subbasin, not for only the portion of the Subbasin represented by the respective GSPs.

[73] 23 CCR § 354.26(a).
[74] Joint GSP, Section 3.4.1, p. 277.
[75] 23 CCR § 354.26(b)(3).
[76] 23 CCR § 354.26 (a).
[77] 23 CCR § 354.26(b)(2).

3.2 Deficiency 2. The Plan does not establish minimum thresholds for chronic lowering of groundwater levels in a manner substantially compliant with the GSP Regulations.

3.2.1 Background

SGMA leaves the task of establishing minimum thresholds largely to the discretion of the GSA, subject to review by the Department. In its review, the Department requires a thorough and reasonable analysis of the groundwater conditions the GSA is trying to avoid, and the GSA's stated rationale for setting objective and quantitative sustainable management criteria to prevent those conditions from occurring.

Additionally, minimum thresholds for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Under SGMA, 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.[78] These quantitative values should be supported by:

- The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin;
- Potential effects on other sustainability indicators.[79]

Department staff rely on sufficient detail in the GSP, supported by best available information and science, for evaluation. If a Plan does not meet these requirements, the Department is unable to evaluate the likelihood of the Plan in achieving its sustainability goal, culminating in the absence of undesirable results. This does not necessarily mean that the Plan or its objectives are inherently unreasonable; however, it is unclear which conditions the Plan seeks to avoid, making it difficult for the Department to monitor whether the GSAs will be successful in that effort when implementing its Plan. This information is also required for the GSPs to serve their additional functions of demonstrating and supporting informed local decision making and public disclosure.

3.2.2 Deficiency Details

Based on its review, Department staff conclude the Plan has not defined sustainable management criteria for chronic lowering of groundwater levels in a manner required by SGMA and the GSP Regulations. Generally, descriptions of minimum thresholds are not provided with sufficient supporting information to allow Department staff to evaluate whether the criteria are reasonable or whether operating the Subbasin to avoid those thresholds is consistent with avoiding undesirable results—in part due to defined undesirable results in the Plan being insufficiently detailed (as described in Section 3.1

[78] Water Code § 10721(x)(1).
[79] 23 CCR § 354.28(c)(1).

above).[80] Furthermore, in some instances, the information provided is incomplete, inconsistent, or missing.

For example, the Gravelly Ford GSP and Root Creek GSP both utilize similar "water level trend" methods to establish thresholds instead of establishing thresholds at levels to avoid undesirable results. Specifically, the Root Creek GSP explains approximately 20 years of historical data was used to project the rate of historical decline for the period of 2020 to 2030, and then the rate was "cut in half" for the period 2030 to 2040; the final value is then "offset" to account for the lowest water table data point that is likely due to "a dry period or season which caused an increase in the volume of groundwater pumped".[81] Similarly, the Joint GSP states that "groundwater levels are anticipated to fall below 2015 levels during the GSP implementation period. Thus, the minimum thresholds have been designated with these considerations in mind."[82] The GSP acknowledges "groundwater elevation minimum thresholds are set below 2015 baseline groundwater elevations, consistent with the potential action of pumping in excess of sustainable yield, continued overdraft, during the Implementation Period and to encompass a theoretical drought sequence that would span multiple years during the Sustainability Period."[83] As a result, minimum thresholds "are the lowest of temporary low points that potentially could occur during both the Implementation and Sustainability Periods."[84] Minimum thresholds are summarized to be established at "[t]he lower of a) projected lowest future groundwater level at end of estimated 10-year drought or b) lowest modeled groundwater level from projected with projects model simulation (2019-2090)".[85] The New Stone GSP establishes minimum thresholds by estimating the depth at which 25% of 25 wells that were investigated in 2012 would go dry.[86] Accordingly "the minimum threshold … [is] established through the [New Stone Water] District at a depth of 231 feet below ground surface" and that "[w]hether or not a minimum threshold is being exceeded will be based on a five-year rolling average of fall and spring measurements".[87]

However, this is not consistent with the GSP Regulations which require minimum thresholds to represent groundwater levels above which undesirable results, as defined in the Plan, are avoided, and not to be established at levels that represent the lowest projected point in an effort to avoid being exceeded. The GSPs appear to have taken the latter, incorrect approach, namely by establishing minimum thresholds based on managing the Subbasin to allow either historic rates of decline to continue or become more severe. For example, in the New Stone GSP, the minimum thresholds represent more than 60 years of continued groundwater level decline at the current average rate of

[80] 23 CCR §§ 354.28(b)(1), 354.28(b)(2), 354.28(b)(3), 354.28(b)(4), 354.28(c)(1).
[81] Root Creek GSP, Section 4.2.2.1, p. 160.
[82] Joint GSP, Section 3.3.1, p. 259.
[83] Joint GSP, Section 3.3.1.2, p. 264.
[84] Joint GSP, Section 3.3.1.3, p. 266.
[85] Joint GSP, Table 3-8, p. 276.
[86] New Stone GSP, Section 4.2.2.3, p. 113.
[87] New Stone GSP, Section 4.2.2.1, p. 112-113.

decline. As stated earlier, this results in threshold levels being generally established below 2015 groundwater elevations.

Department staff also find the GSPs do not present a sufficient analysis of potential effects of currently established minimum thresholds on the beneficial uses and users of groundwater or land uses and property interests. A Plan should include quantitative information regarding how uses, users, and interests will be affected at minimum thresholds to explain and support the GSAs determination that the thresholds it has established avoid undesirable results. Additionally, a detailed description of effects presented in a Plan informs beneficial users of groundwater in the Subbasin and other members of the interested public of the potential effects of proposed management criteria. Specifically, the Plan anticipates agricultural users will be "significantly impacted" in terms of increased costs and reduced crop yield, and that domestic well owners "may experience declining groundwater levels" but the Plan does not quantify the cost increases, crop yield reductions, groundwater level declines, or users effected.

The Joint GSP, which covers 94 percent of the Subbasin, discusses a temporary domestic well mitigation program for wells that will be affected during the initial 10 to 15 years of plan implementation after which water levels are expected to stabilize with some potential recovery.[88] The program estimates the total number of affected domestic wells under the "with-SGMA scenario" would be 120[89]; however, staff are unclear if "with-SGMA scenario" involves evaluating effects at minimum thresholds, measurable objectives, model-based projections, or some other method. Also, Department staff have significant concerns that this estimate is likely appreciably lower than the actual number of domestic wells that may be impacted at the proposed minimum thresholds, which, as stated earlier, are lower than levels previously experienced in the Subbasin.

Staff concern is also based on information and analyses in public comments submitted on the GSPs and other publicly available data. For instance, a public comment from the State Water Board provides an analysis estimating between 895 to 1399 domestic wells may go dry at the current minimum thresholds.[90] Furthermore, DWR's Dry Well Reporting System indicates that there have been 184 dry well outages voluntarily reported in Madera County since the GSP was submitted on January 31, 2020.[91] The fact that this many dry wells have been voluntarily reported over the last 32 months while groundwater levels have been above the minimum thresholds strongly suggests the GSPs' analysis of potential impacts to domestic wells requires revaluation and revision. Department staff understand estimating the potential impacts to domestic wells is challenging and there may be an explanation for these large discrepancies; however, the estimates contained in the GSP appear to not use the best available data or science, resulting in

[88] Joint GSP, Section 3.3.1.4, p. 266.
[89] Joint GSP, Appendix 3.d, p. 1701.
[90] https://sgma.water.ca.gov/portal/service/gspdocument/download/8165.
[91] Department of Water Resources, Dry Well Reporting System Data, Dry Well Reporting System (ca.gov), Query: Subbasin = 'San Joaquin Valley – Madera', Report_Type = 'Outage', Report_Date = 'After 1/31/20'), Query Ran on 09/19/2022.

underestimating potential impacts to wells, which could also affect the scope, planning, and resources needed to implement the proposed dry well mitigation program in the basin.

Additionally, the Plan contains incomplete, conflicting, and missing information. For example, in the Gravelly Ford GSP, a figure depicting thresholds similar to the Root Creek GSP is provided, however, while the Root Creek GSP briefly explains the figure and the process for establishing thresholds, a thorough or meaningful description is not provided in Gravelly Ford GSP for setting thresholds nor are the locations of the monitoring wells provided, making it difficult for Department staff to evaluate the justification for the established thresholds. In the New Stone GSP, information provided shows the minimum threshold is set 400 feet below ground surface (or at 235 feet mean sea level) which is inconsistent with the explanation that levels are established "at a depth of 231 feet below ground surface". [92] In the Joint GSP, the impact of selected minimum thresholds to adjacent basins is not sufficiently detailed. Instead, the GSP indicates "impacts on adjacent subbasins will primarily be a function of average water levels in the Plan area during the Sustainability Period, ... [and] average groundwater levels expected for the Plan area are reflected in the *Measurable Objectives*."[93] This explanation is not consistent with the requirements of the GSP Regulations which require a description of how *minimum thresholds* are selected to avoid undesirable results or affecting the ability to reach the sustainability goal of adjacent basins.[94] In fact, a public comment from the adjacent Delta-Mendota Subbasin states the Madera Subbasin sustainable management criteria may "put the Delta-Mendota Subbasin's ability to achieve groundwater sustainability at risk".[95] Lastly, the GSPs need to provide sufficiently detailed descriptions of the relationship between the minimum thresholds for groundwater levels and other sustainability indicators, such as land subsidence and depletion of interconnected surface water, as required.[96]

3.2.3 Corrective Actions

The GSAs must provide more detailed explanation and justification regarding the selection of the sustainable management criteria for groundwater levels, particularly the minimum thresholds, and the effects of those criteria on the interests of beneficial uses and users of groundwater. Department staff recommend the GSAs consider and address the following:

1. The GSAs should describe the specific undesirable results they aim to avoid through implementing the Plan. If, for example, significant and unreasonable impacts to domestic wells are a primary management concern for the Subbasin, then the GSAs should sufficiently explain why that effect was selected and what

[92] New Stone GSP, Figure 4-2, p. 116.
[93] Joint GSP, Section 3.3.1.3 p. 266.
[94] 23 CCR § 354.28(b)(3).
[95] https://sgma.water.ca.gov/portal/service/gspdocument/download/4441.
[96] 23 CCR § 354.28 (b)(2).

level of impact(s) to those wells the GSAs consider to be significant and unreasonable. In support of its explanation, the GSPs should also clearly discuss and disclose the anticipated impact of operating the Subbasin at conditions protective against those effects on users of domestic wells and all other beneficial uses and users of groundwater in the Subbasin. The discussion should be supported using best available information, such as using State or county information on well completion reports and dry well reports, to analyze the locations and quantities of domestic wells and other types of well infrastructure that could be impacted by groundwater management when implementing the Plan.

2. The GSAs should either explain how the existing minimum threshold groundwater levels are consistent with avoiding undesirable results or they should establish minimum thresholds at the representative monitoring wells that account for the specific undesirable results the GSAs aim to avoid. The Plan should include a detailed description of the factors and information considered and the analytic route and rationale the GSAs employed to reach conclusions regarding significant and unreasonable effects constituting undesirable results for groundwater levels and other applicable sustainability indicators.

   Information from DWR's Dry Well Reporting System[97] indicates some domestic groundwater wells in the Subbasin have reported impacts from lowering of groundwater levels. If, after considering the deficiency described above, the GSAs retain minimum thresholds that allow for continued lowering of groundwater levels, then it is reasonable to assume that additional wells may be impacted during implementation of the Plan.

3. The GSAs need to provide a description of the relationship between established minimum thresholds for all applicable sustainability indicators including how conditions at minimum thresholds avoid undesirable results for each applicable indicator.

Information is available to the GSAs to support their explanation and justification for the criteria established in their Plan. For example, the Department's well completion report dataset,[98] or other similar data, can be used to estimate the number and kinds of wells expected to be impacted at the proposed minimum thresholds. Additionally, public water system well locations and water quality data can currently be obtained using the State Water Board's Geotracker website.[99] Administrative contact information for public water systems, and well locations and contacts for state small water systems and domestic wells, can be obtained by contacting the State Water Board's Needs Analysis staff. The

[97] Department of Water Resources, *California Dry Well Reporting Data* [website], https://mydrywatersupply.water.ca.gov/report/publicpage, (accessed 26 July 2022).
[98] Department of Water Resources, *Well Completion Reports* [website], https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Completion-Reports, (accessed 26 July 2022).
[99] State Water Resources Control Board, *GeoTracker* [website], https://geotracker.waterboards.ca.gov/, (accessed 26 July 2022).

State Water Board is developing a database to allow for more streamlined access to this data in the future.

3.3 Deficiency 3. The Plan does not develop sustainable management criteria for land subsidence based on best available information and science.

3.3.1 Background

SGMA identifies six effects of basin groundwater conditions that GSAs must avoid to achieve sustainable groundwater management. The GSP Regulations refer to these effects as sustainability indicators and they are chronic lowering of groundwater levels, reduction of groundwater storage, seawater intrusion, degraded water quality, land subsidence, and depletions of interconnected surface water.[100] SGMA requires GSAs to sustainably manage groundwater, which is defined as avoiding undesirable results for any sustainability indicator during the planning and implementation horizon.[101] Specifically, for each applicable indicator a GSA must develop sustainable management criteria, describe the process used to develop those criteria based on information in the basin setting, and establish a monitoring network to adequately monitor conditions.[102]

A GSA that is able to demonstrate one or more sustainability indicators are not present and are not likely to occur in the basin is not required to develop sustainable management criteria for those indicators.[103] Absent an explanation of why a sustainability indicator is not applicable, the Department assumes all sustainability indicators apply.[104] Demonstration of applicability (or non-applicability) of sustainability indicators must be supported by best available information and science and should be provided in descriptions throughout the Plan (e.g. information describing basin setting, discussion of the interests of beneficial users and uses of groundwater).

The Department's assessment of a Plan's likelihood to achieve its sustainability goal for its basin is based, in part, on whether it provides sufficiently detailed and reasonable supporting information and analysis for all applicable indicators. The GSP Regulations require the Department to evaluate whether establishment of sustainable management criteria is commensurate with the level of understanding of the basin setting.[105]

The GSP Regulations require a Plan to identify land subsidence in the basin and evaluate the rate and extent of land subsidence. using the best available information.[106] As noted above, absent a demonstration of the inapplicability of the land subsidence sustainability

[100] 23 CCR § 351(a-h).
[101] Water Code §§ 10721(v), 10721(r).
[102] 23 CCR §§ 354.12, 354.22, 354.32.
[103] 23 CCR §§ 354.22, 354.26(d), 354.28(e).
[104] California Department of Water Resources, *Draft Sustainable Management Criteria Best Management Practices*, November 2017.
[105] 23 CCR § 355.4(b)(3).
[106] 23 CCR §§ 354.28(c)(5).

indicator, GSAs in basins with subsidence must develop sustainable management criteria as described in the GSP Regulations.

3.3.2 Deficiency Details

Department staff conclude, based on information contained in the Plan, that the GSAs do not sufficiently demonstrate that undesirable results related to land subsidence are not present and are not likely to occur in the Subbasin. Some information is presented describing land subsidence management criteria in the New Stone GSP; however, it is not sufficiently detailed for Department staff to evaluate the Plan. Therefore, in the absence of a clear demonstration or sufficiently detailed management criteria, the GSAs must develop initial sustainable management criteria for land subsidence as required by the GSP Regulations.[107]

Information in the Plan indicates that historical groundwater conditions in the Subbasin have resulted in increasing rates of subsidence. For instance, a review of the information provided in the GSPs show areas of the Subbasin have experienced 1 to 2 feet of land subsidence between 1926 and 1970, 0.5 to 1.0 feet between 2007 and 2011, and 1.0 to 1.5 feet between 2015 and 2017.[108] Specifically, in the lower aquifer—an area underlaying the Gravelly Ford GSP, Joint GSP, and New Stone GSP—, groundwater surface elevation maps provided show that elevations in 2016 are generally lower when compared to 2014.

The Gravelly Ford GSP asserts the majority of subsidence has been caused by groundwater pumping in the area adjacent to the Gravelly Ford GSP area, because those areas do not have imported surface water flows and therefore pump groundwater from below the Corcoran clay layer, which is the primary cause of subsidence.[109] Though, a 2018 study in the Gravelly Ford GSP area states “the majority of active irrigation wells in the GSA with records range from about 350 to 600 feet. Only a small percent of these wells tap only the upper aquifer.”[110] This indicates that irrigation wells pump, in part, from below the Corcoran clay. In fact, the GSP describes that “[b]ecause the GSA is in a subsiding area, an additional source of water has been compaction from the Corcoran Clay and underlying clay layers.”[111] If subsidence in the GSP area is providing an additionally source of groundwater, this would indicate that groundwater pumping within the GSP area is potentially contributing to subsidence in the Subbasin.

The Joint GSP acknowledges that “[c]onditions that may lead to an undesirable result of a significant and unreasonable amount for land subsidence has historically occurred during periods with groundwater pumping in excess of sustainable yield in areas where critical infrastructure exists. This is a particular concern in the Lower Aquifer.[112] However,

[107] 23 CCR §§ 354.22, 354.26(d), 354.28(e), 354.34(j).
[108] Joint GSP, Section 2.2.2.4, p. 105; Figures 2-67 to 2-70, pp. 232-235.
[109] Gravelly Ford GSP, Section 3.4.4, p. 56.
[110] Gravelly Ford GSP, Appendix B, p. 109.
[111] Gravelly Ford GSP, Section 2.2.2, p. 25.
[112] Joint GSP, Section 3.4.3, p. 278.

the Joint GSP also contradictorily states that “historic/current subsidence has not been considered to have caused harm to infrastructure” and concludes that the sustainability indicator is “[n]ot [a]pplicable”[113] and sustainable management criteria are not defined at this time.

Instead, the GSAs propose ongoing monitoring of subsidence and review of these surveys to determine if adaptive management is needed.[114] For example, the Joint GSP proposes an adaptive management program based on maintaining “an annual subsidence rate of no greater than 0.25 feet/year” across the Joint GSP area over a three-year period.[115] This definition, as stated, would seem to mute the effects of localized areas of subsidence within the Subbasin. Department staff note that in some areas of the Subbasin, based on information provided from 2015 to 2017 and as discussed above, the rate of subsidence exceeds 0.25 feet/year.

The Root Creek GSP proposes to monitor subsidence by relying on National Aeronautics and Space Administration (NASA) Interferometric Synthetic Aperture Radar (InSAR) data and any publicly available land subsidence information, and to continue discussion through stakeholder outreach, to confirm that significant and unreasonable land subsidence that leads to undesirable results is not occurring within the Root Creek GSP area.[116] The Gravelly Ford GSP proposes to analyze subsidence data from the San Joaquin River Restoration Project in 2025 to determine if more investigation should be initiated.[117]

The New Stone GSP presents some information for land subsidence management criteria; however, the information is not sufficiently detailed and does not seem to be coordinated among the GSPs. For example, the GSP states that "[t]he most significant subsidence is occurring directly to the north of New Stone GSA. The Eastside Bypass and Sand Slough are experiencing decreased design capacity due to this subsidence; however, the Chowchilla Bypass maintains its capacity. Therefore, the minimum threshold for land subsidence in New Stone GSA is a range from approximately 0.15 feet per year on the south end to 0.45 feet per year on the north end, corresponding to recent historical trends from 2011 to 2017."[118] However, the New Stone GSP does not provide any further statements or analysis supporting these rates nor a discussion of the extent of subsidence that may interfere with land uses and property interests likely to be affected.[119] Though the GSP states the GSP area is not currently experiencing issues with infrastructure due to subsidence, public comments received by the Department indicate that subsidence in the area has resulted in damage to infrastructure. Specifically,

[113] Joint GSP, Table 3-8, p. 276.
[114] Joint GSP, Section 3.4.3, p. 279; Gravelly Ford GSP, Section 3.4.4, p. 56; Root Creek GSP, Section 4.5, p. 186.
[115] Joint GSP, Section 3.3.3.1, p. 270.
[116] Root Creek GSP, Section 5.5.3, p. 205.
[117] Gravelly Ford GSP, Section 3.4.4, p. 56.
[118] New Stone GSP, Section 4.5.2, p. 126.
[119] New Stone GSP, Section 4.5, pp. 125-129.

comments from the Central Valley Flood Protection Board[120] state that the Chowchilla Bypass has experienced "serious operational, maintenance, and construction-design problems." Additionally, subsidence has resulted in damages to wells, pipelines, roads, bridges, and canals with reduced freeboard and structural damage. These comments and other information available and reviewed by Department staff strongly suggest that subsidence may be causing these issues in the basin, and therefore these public comments raise credible technical or policy issues that have not been adequately addressed in the Plan.

Furthermore, during the implementation period from 2020 to 2040, the Plan indicates groundwater elevations are to be managed at levels lower than historical averages. For example, the Joint GSP describes established minimum threshold as below 2015 baseline groundwater elevations, consistent with the potential action of pumping in excess of sustainable yield during the implementation period. The Root Creek GSP and Gravelly Ford GSP also project recent historical downward trending groundwater elevations from 2020 to 2040 to establish minimum thresholds at new lows. The New Stone GSP even establishes measurable objectives—which are higher than minimum thresholds—for groundwater levels below historical lows.[121] Given the historical land subsidence present and demonstrated impacts and ongoing concerns to important surface infrastructure in the Subbasin, and the potential for increased subsidence due to established management criteria, Department staff do not believe the Plan has demonstrated undesirable results from cumulative land subsidence from potential continued lowering of groundwater levels are not likely to occur under the management program described in the Plan.

Given that significant and unreasonable land subsidence has historically occurred in the Subbasin due to pumping in excess of sustainable yield and the potential of pumping in excess during the implementation period, Department staff disagree with the conclusion that the sustainability indicator is not applicable. It does not seem reasonable nor commensurate with the current level of understanding of the Subbasin to not develop sustainable management criteria for land subsidence.

3.3.3 Corrective Action

The GSAs must provide more detailed information, as required in the GSP Regulations, regarding land subsidence associated with groundwater use. Department staff recommend the GSAs consider and address the following:

1. Clarify and address the currently conflicting information in the Plan regarding what is known, qualified by the level of associated uncertainty, about the existence and impact of land subsidence.

2. The GSP should develop sustainable management criteria based on information in the basin setting and establish a monitoring network to adequately monitor

[120] https://sgma.water.ca.gov/portal/service/gspdocument/download/4352.
[121] New Stone GSP, Figure 4-2, p. 116.

conditions.[122] The basin setting should sufficiently detail the physical setting and characteristics of the Subbasin including descriptions of principal aquifers. the definable bottom of the Subbasin and identify data gaps and uncertainty within the hydrogeologic conceptual model. If applicable, data gaps monitoring and steps to fill data gaps before the next five-year assessment should be described.

3.4 Deficiency 4. The Plan does not develop sustainable management criteria for the depletions of interconnected surface water based on best available information and science.

3.4.1 Background

SGMA identifies six effects of groundwater conditions occurring throughout the basin that GSAs must evaluate to achieve sustainable groundwater management. The GSP Regulations refer to these effects as sustainability indicators and they are chronic lowering of groundwater levels, reduction of groundwater storage, seawater intrusion, degraded water quality, land subsidence, and depletions of interconnected surface water.[123] Generally, when any of these effects are significant and unreasonable, as defined in SGMA, they are referred to as undesirable results.[124] SGMA requires GSAs to sustainably manage groundwater, which is defined as avoiding undesirable results for any sustainability indicator during the planning and implementation horizon.[125] Specifically, for each applicable indicator a GSA must develop sustainable management criteria based on information in the basin setting, describe the process used to develop those criteria, and establish a monitoring network to adequately monitor conditions.[126]

A GSA that is able to demonstrate one or more sustainability indicators are not present and are not likely to occur in the basin is not required to develop sustainable management criteria for those indicators.[127] Absent an explanation of why a sustainability indicator is not applicable, the Department assumes all sustainability indicators apply.[128] Demonstration of applicability (or non-applicability) of sustainability indicators must be supported by best available information and science and should be provided in descriptions throughout the Plan (e.g. information describing basin setting, discussion of the interests of beneficial users and uses of groundwater).

The Department's assessment of a Plan's likelihood to achieve its sustainability goal for its basin is based, in part, on whether it provides sufficiently detailed and reasonable supporting information and analysis for all applicable indicators. The GSP Regulations

[122] 23 CCR § 354.26.
[123] 23 CCR § 351(a-h).
[124] Water Code § 10721(x).
[125] Water Code §§ 10721(v), 10721(r).
[126] 23 CCR §§ 354.22, 354.32.
[127] 23 CCR §§ 354.22, 354.26(d), 354.28(e).
[128] California Department of Water Resources, *Draft Sustainable Management Criteria Best Management Practices*, November 2017.

require the Department to evaluate whether establishment of sustainable management criteria is commensurate with the level of understanding of the basin setting.[129]

The GSP Regulations require a Plan to identify interconnected surface water systems in the basin and evaluate the quantity and timing of depletions of those systems using the best available information.[130] As noted above, absent a demonstration of the inapplicability of the depletion of interconnected surface water sustainability indicator, GSAs in basins with interconnected surface waters must develop sustainable management criteria for those depletions as described in the GSP Regulations.

3.4.2 Deficiency Details

Department staff conclude, based on conflicting information contained in the Plan, that the GSAs do not sufficiently demonstrate that interconnected surface water or undesirable results related to depletions of interconnected surface water are not present and are not likely to occur in the Subbasin. Therefore, in the absence of a clear demonstration, the GSAs must develop initial sustainable management criteria for depletions of interconnected surface water as required by the GSP Regulations.[131]

The Plan did not establish sustainable management criteria for interconnected water surface, describing present day regional groundwater elevations as being below the San Joaquin River channel for at least the last several years, and for many decades in most of the Subbasin.[132] However, the GSPs provide conflicting information. For example, while the Joint GSP determines the sustainability indicator is not applicable to the Joint GSP area since "a connection between regional groundwater and streams does not exist,"[133] it is also stated that the shallow groundwater system—which underlies portions of the San Joaquin River and supports groundwater dependent ecosystems—do have the potential to be affected by regional groundwater pumping, though details are not presented.[134] The location of these groundwater dependent ecosystems is along the San Joaquin river upstream and downstream of the Root Creek GSP area. The Root Creek GSP further indicates a connection by stating that "[w]hen river discharge is high, groundwater elevations in both wells are higher than the channel bed elevation indicating interconnected groundwater-surface water during these times."[135] The Root Creek GSP indicates the GSA's review of available literature yields "no direct discussions" stating that the groundwater was disconnected from San Joaquin River, where stream flow was perennial, for the Rook Creek GSP area.[136] However, despite these findings the GSP concludes that "[i]nformation to evaluate the presence of interconnected surface water … is minimal" and that management criteria do not apply "due to the inclusive nature that

[129] 23 CCR § 355.4(b)(3).
[130] 23 CCR §§ 354.28(c)(6)(A), 354.28(c)(6)(B).
[131] 23 CCR §§ 354.22, 354.26(d), 354.28(e), 354.34(j).
[132] Joint GSP, Section 3.3.5, p. 275; Root Creek GSP, Section 3.2.8, p. 129.
[133] Joint GSP Section, 3.3.5, p. 275.
[134] Joint GSP, Section 3.4.5, p. 280.
[135] Root Creek GSP, Section 3.2.8, p. 132.
[136] Root Creek GSP, Section 3.2.8, p. 129.

comes with a lack of available data."[137] Furthermore, the Gravelly Ford GSP in a 2018 study identifies locations of interconnected surface and groundwater bodies along the San Joaquin in and near the Gravelly Ford GSP and the Joint GSP areas.[138] However, no management criteria were developed.

The information and science included in the Plan related to interconnected surface water represents, at this time, the best available to the GSAs even if the available data may be imperfect or the analysis incomplete. This information does not support the exclusion of depletion of interconnected surface water as a required sustainability indicator for this basin. Department staff believe there is sufficient data to indicate the potential of interconnected surface water in the Subbasin that warrants and requires setting initial sustainable management criteria that may be reevaluated and potentially modified as new data become available through investigation. Lack of criteria indicate to Department staff that the Subbasin potentially will not be sustainably managed within 20 years.

3.4.3 Corrective Action

The GSAs must provide more detailed information, as required in the GSP Regulations, regarding the presence and degree of interconnected surface waters and depletions associated with groundwater use. Department staff recommend the GSAs consider and address the following:

1. Clarify and address the currently conflicting information in the Plan regarding what is known, qualified by the level of associated uncertainty, about the presence and degree of interconnected surface water and, if applicable, the depletion of that interconnected surface water by groundwater use, including quantities, timing, and locations.[139]

2. If the GSAs cannot provide a sufficient, evidence-based justification for the absence of interconnected surface water, then they should develop sustainable management criteria, as required in the GSP Regulations,[140] based on best available information and science. Evaluate and disclose, sufficiently and thoroughly, the potential effects of the Plan's sustainable management criteria for depletion of interconnected surface water on beneficial uses of the interconnected surface water and on groundwater uses and users. Additionally, development of sustainable management criteria must be supported by information in the basin setting and the GSAs must develop a monitoring network capable of collecting sufficient data to support analysis of the quantified spatial and temporal exchanges between surface water and groundwater that can be associated with groundwater pumping.

[137] Root Creek GSP, Section 3.2.8, p. 128; Section 5.6.1, p. 206.
[138] Gravelly Ford GSP, Appendix B, pp. 123-124.
[139] 23 CCR §§ 354.28(c)(6)(A-B).
[140] 23 CCR §§ 354.26, 354.28, 354.30.

4 STAFF RECOMMENDATION

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