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

January 28, 2022

Doug Welch
Chowchilla Subbasin Plan Manager
327 S. Chowchilla Blvd.
Chowchilla, CA 93610
dwelch@cwdwater.com

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

Dear Doug Welch,

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

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE DETERMINATION OF INCOMPLETE STATUS OF THE CHOWCHILLA SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted jointly by the Chowchilla Water District Groundwater Sustainability Agency (GSA), Madera County GSA, County of Merced Chowchilla GSA, and Triangle T Water District GSA (collectively, the GSAs or Agencies) for the Chowchilla Subbasin (No. 5-022.05).

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 has not defined sustainable management criteria in the manner required by SGMA and the GSP Regulations.

    1. The GSP lacks justification for, and effects associated with, the sustainable management criteria for groundwater levels, particularly the minimum thresholds and undesirable results, and the effects of those criteria on the interests of beneficial uses and users of groundwater.

        i. The GSP does not describe when the Potential Domestic Well Mitigation Program will be implemented and financed by the GSAs in the Subbasin, or how rapidly the GSAs will be able to respond to developing domestic well impacts. Absent this information, Department staff cannot evaluate whether the sustainable management criteria for groundwater levels are reasonable and will avoid undesirable results.

ii. The GSP does not provide supporting information for how it determined that the selected minimum thresholds will not interfere with other sustainability indicators. The GSP fails to examine the relationship between allowable groundwater level declines and land subsidence in the Subbasin. Absent that supporting information and specific details regarding how that information was considered by the GSAs, Department staff cannot evaluate whether the criteria are reasonable or whether operating the Subbasin to avoid those thresholds is consistent with avoiding interference with other sustainability indicators.

2. The GSP lacks justification for, and effects associated with, the sustainable management criteria for land subsidence, particularly the minimum thresholds and undesirable results and the effects of those criteria on the interests of land surface beneficial uses and users in the Subbasin.

    i. The GSP does not describe in specific terms what land surface beneficial uses and users in the Subbasin (e.g., infrastructure such as canals or levees) may be susceptible to substantial interference as a result of continued subsidence, or what amount of continued subsidence is tolerable for the identified land surface beneficial uses and users. Absent this information, Department staff cannot evaluate whether the criteria will avoid undesirable results.

    ii. The GSP does not include analysis demonstrating a significant correlation between groundwater levels, which are allowed to decline below the historical low at up to 50 percent of monitoring sites, and land subsidence in the Western Management Area. Absent this information, Department staff cannot evaluate whether the criteria will avoid undesirable results.

    iii. The GSP allows for continued land subsidence in the Eastern Management Area, which does not reflect the intent of SGMA that subsidence be avoided or minimized once sustainability is achieved. The GSP does not explain how implementation of the projects and management actions is consistent both with achieving the long-term avoidance or minimization of subsidence and with not exceeding the tolerable amount of cumulative subsidence.

B. 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.

    1. The GSP does not provide a clear and comprehensive analysis of the potential for interconnected surface water to be present along the San Joaquin River in the Subbasin.

Based on the above, the GSP submitted by the Agencies for the Chowchilla 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 Agencies 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 GSP to evaluate whether the deficiencies were adequately addressed. 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, Director
Date: January 28, 2022

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

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

Groundwater Basin Name:	Chowchilla Subbasin (No. 5-022.05)
Submitting Agencies:	Chowchilla Water District Groundwater Sustainability Agency, Madera County Groundwater Sustainability Agency, County of Merced Chowchilla Groundwater Sustainability Agency, Triangle T Water District Groundwater Sustainability Agency
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 Chowchilla Water District GSA, Madera County GSA, County of Merced Chowchilla GSA, and Triangle T Water District GSA (collectively, the GSAs) jointly submitted the Chowchilla 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 Chowchilla 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 actions[6] 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 and the development of sustainable management criteria for 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, 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 SGMA[7] 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 submitted the Plan for the Chowchilla Subbasin on January 29, 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 Chowchilla 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 Chowchilla Subbasin and the jurisdictional boundaries of the submitting GSAs cover the entire 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 DOES NOT PROVIDE SUFFICIENT INFORMATION TO SUPPORT THE SELECTION OF THE CHRONIC LOWERING OF GROUNDWATER LEVELS SUSTAINABLE MANAGEMENT CRITERIA.

3.1.1 Background

The GSP Regulations state that the description of minimum thresholds shall include the relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the GSA has determined that basin conditions at each minimum threshold would avoid undesirable results for each of the sustainability indicators.[41]

The GSP Regulations state that 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. 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.[42]

[41] 23 CCR § 354.28(b)(2).
[42] 23 CCR § 354.28(c)(1)(B).

3.1.2 Deficiency Details

Department staff find that the Chowchilla Subbasin GSP's explanation of the chronic lowering of groundwater levels sustainable management criteria, particularly for undesirable results and minimum thresholds, does not include sufficient detail and analysis as required by the GSP Regulations.

The GSP provides quantitative values for the minimum thresholds and includes a combination of those minimum threshold exceedances that the GSAs consider to be an undesirable result.[43] However, the GSP does not appear to base its minimum thresholds on groundwater levels that indicate "a depletion of supply at a given location that may lead to undesirable results," as required by the GSP Regulations.[44] Nor does the GSP explain the GSAs' understanding of the effects those corresponding groundwater conditions would have on beneficial uses and users of groundwater. In the absence of documented analysis and explanation for selecting the minimum thresholds and undesirable results, the GSP does not satisfy the requirements of the GSP Regulations.[45] Due to this deficiency, Department staff cannot determine whether the sustainable management criteria for chronic lowering of groundwater levels are reasonable.[46]

The GSP defines significant and unreasonable lowering of groundwater levels as "conditions that:

1) cause significant financial burden to local agricultural interests or others who rely on subbasin groundwater resources,

2) cause groundwater level conditions at private domestic wells that cannot be mitigated, and

3) interfere with other sustainability indicators."[47]

The GSP describes undesirable results due to chronic lowering of groundwater levels as having been present during the historical period and during existing conditions,[48] but does not describe what those undesirable results specifically were, who or what they affected, or where in the Subbasin they occurred.

Department staff review of the minimum thresholds presented in the GSP indicates that the GSAs consider that further groundwater level declines below historical groundwater level lows in the Upper Aquifer of the Western Management Area and the Lower Aquifer in the Eastern Management Area are tolerable and acceptable. A review of the minimum thresholds for each representative monitoring site (and the site's respective historic low reading) indicates that proposed management under the GSP could allow groundwater

[43] Chowchilla Subbasin GSP, Table 3-6, p. 253-254, p. 271.
[44] 23 CCR § 354.28(c)(1).
[45] 23 CCR §§ 354.26, 354.28.
[46] 23 CCR § 355.4(b)(1).
[47] Chowchilla Subbasin GSP, p. 271.
[48] Chowchilla Subbasin GSP, Table 3-1, p. 232.

level declines of up to 85 feet in the Upper Aquifer of the Western Management Area and 190 feet in the Lower Aquifer of the Eastern Management Area.[49]

In its discussion of these groundwater level minimum thresholds and the relation to the three defined significant and unreasonable conditions, the GSP states that the predominant financial burden on agricultural interests in the Subbasin would be costs associated with executing direct and in-lieu recharge projects and lost crop yield associated with converting farmland to recharge areas. The GSP anticipates that impacts to private domestic wells would be mitigated via the Potential Domestic Well Mitigation Program detailed in Appendix 3.C. of the GSP.[50] Lastly, in its discussion of groundwater level minimum thresholds and their relation to subsidence, the GSP fails to examine the relationship between allowable groundwater level declines and land subsidence in the Subbasin.[51]

Although the referenced Potential Domestic Well Mitigation Program provides a first step in addressing impacts to domestic wells in the Subbasin, it is still in the development phase, with a more accurate survey of domestic wells in the Subbasin underway.[52] It is unclear to Department staff when the program will be implemented and financed by the GSAs in the Subbasin, or how rapidly the GSAs will be able to respond to developing domestic well impacts. Also, the GSP does not provide explanation of how established groundwater level minimum thresholds will affect land subsidence in the Eastern Management Area of the Subbasin. Without commitment to the Potential Domestic Well Mitigation Program or an analysis of how groundwater level minimum thresholds may affect land subsidence included in the GSP, Department staff cannot determine whether the sustainable management criteria for chronic lowering of groundwater levels will avoid conditions that cause groundwater level conditions at private domestic wells that cannot be mitigated or interfere with other sustainability indicators.[53]

3.1.3 Corrective Action 1

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

[49] Chowchilla Subbasin GSP, Appendix A2.E, p. 735-836.
[50] Chowchilla Subbasin GSP, Appendix 3.C., p. 1137-1147.
[51] Chowchilla Subbasin GSP, p. 256.
[52] Chowchilla Subbasin WY2020 Annual Report, p. 50.
[53] Chowchilla Subbasin GSP, p. 271.

GSAs should more clearly describe, with specific detail, the Subbasin-wide mitigation program. Department staff note that, while the GSP states significant adverse impacts to domestic wells are expected to be addressed through a temporary domestic well mitigation program that the GSAs in the Subbasin are currently developing with the assistance of Proposition 68 grant funding,[54] it is unclear when the program will be implemented and financed by the GSAs, or how rapidly the GSAs will be able to respond to developing domestic well impacts. Department staff recommend the GSAs include additional information regarding the implementation of the mitigation program in responding to this deficiency. In addition to domestic wells, the GSAs should explain whether and how the mitigation program extends to other drinking water users that rely on shallow wells, such as public water systems and state small water systems.

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

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

3.2.1 Background

The GSP Regulations state that minimum thresholds for land subsidence should identify the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. These quantitative values should be supported by:

- The identification of land uses or property interests potentially affected by land subsidence;
- An explanation of how impacts to those land uses or property interests were considered when establishing minimum thresholds; and
- Maps or graphs showing the rates and extents of land subsidence defined by the minimum thresholds.[55]

The GSP Regulations allow the use of groundwater elevations as a proxy for land subsidence. However, GSAs must demonstrate a significant correlation between groundwater levels and land subsidence and must demonstrate that the groundwater level minimum threshold values represent a reasonable proxy for avoiding land subsidence undesirable results.[56]

[54] Chowchilla Subbasin WY2020 Annual Report, p. 50.
[55] 23 CCR § 354.28(c)(5).
[56] 23 CCR § 354.28(d).

3.2.2 Deficiency Details

The GSP states that significant and unreasonable conditions due to land subsidence are significant impacts to infrastructure and, specifically for the Western Management Area, significant continued subsidence that impacts infrastructure.[57] However, the GSP does not define or identify what infrastructure is susceptible to impacts from land subsidence. (See Corrective Action 1.)

The GSP creates two management areas, the Western and Eastern management areas, in the Subbasin to address undesirable results due to land subsidence observed in the western side of the Subbasin. In describing the rationale for creating two management areas in the Subbasin, the GSP states that a distinguishing hydrogeologic feature is that the Western Management Area is comprised of two distinct aquifers, the Upper Aquifer and the Lower Aquifer, which are situated above and below the Corcoran Clay, respectively, and the Eastern Management Area is largely unsaturated or contains a thin perched aquifer, or the Corcoran Clay layer is not present.[58]

In the Western Management Area, where the GSP explains historical subsidence has been significant, Lower Aquifer groundwater levels are used as a proxy to establish subsidence minimum thresholds.[59] Minimum thresholds for the Lower Aquifer in the Western Management Area are set at "the higher of:

- projected lowest future groundwater level at the end of an estimated 10-year drought; or
- recent historic groundwater level lows observed in the well, which in most cases occurred during 2014-2016."[60]

As defined in the GSP, 50 percent of the representative monitoring site wells (four out of seven) for the Lower Aquifer in the Western Management Area would need to exceed the established minimum thresholds for two consecutive fall readings to trigger an undesirable result for land subsidence.[61] In justifying the monitoring of groundwater levels as proxy for land subsidence in the Western Management Area, the GSP states, "the recent drought from 2012 to 2015 resulted in historic low groundwater elevations in many Lower Aquifer wells in the 2014 to 2016 time frame, which correlates recent rates of subsidence."[62] While Department staff agree that there will always be some correlation between groundwater levels and subsidence, the GSP fails to provide adequate evidence to further evaluate this correlation, specifically with regard to potential subsidence caused by groundwater levels falling below historical lows, as would occur if groundwater levels are allowed to decline below historical lows at up to 50 percent of representative monitoring wells. The GSP does not provide an analysis of how much subsidence may

[57] Chowchilla Subbasin GSP, p. 272.
[58] Chowchilla Subbasin GSP, p. 158.
[59] Chowchilla Subbasin GSP, p. 261-262.
[60] Chowchilla Subbasin GSP, p. 262.
[61] Chowchilla Subbasin GSP, p. 272-273.
[62] Chowchilla Subbasin GSP, p. 290.

be expected if up to 50 percent of representative monitoring site wells exceed their established minimum thresholds. Additionally, the GSP does not provide an analysis of how much land subsidence may be expected if groundwater levels exceed their historical lows in the Lower Aquifer of the Western Management Area, as MCSim groundwater model simulation results show that, even after implementing all the projects proposed in the GSP, groundwater levels may still decline below historical lows.[63] Without these analyses, and a discussion of how continued subsidence relates to sensitive infrastructure, Department staff are unable assess whether representative groundwater level values are a reasonable proxy for monitoring for subsidence in the Western Management Area.[64] (See Corrective Action 2.)

The GSP defines an adaptive management strategy for land subsidence in the Eastern Management Area which establishes a minimum threshold of 0.25 feet per year of land subsidence over a three-year period but, should the threshold be exceeded or should significant and unreasonable impacts be observed, groundwater level minimum thresholds as a proxy will be developed and implemented.[65] The GSAs provided no discussion or evidence for why they selected 0.25 feet per year as the minimum threshold in the Eastern Management Area. The GSAs should document their understanding, through efforts such as coordination and technical studies, of the amount of subsidence that would be significant and unreasonable, because it would substantially interfere with groundwater and land surface beneficial uses and users. Department staff note that public comments were received which expressed concern about impacts to infrastructure due to allowable continued land subsidence under the GSP. Without a discussion of what would constitute a significant and unreasonable impact or how 0.25 feet per year of continued land subsidence relates to sensitive infrastructure in the Eastern Management Area, Department staff are unable to assess whether this minimum threshold and the adaptive management strategy are reasonable.

Also, because the GSP, in its current form, allows for continuation of subsidence in perpetuity in the Eastern Management Area, Department staff note that it was the intent of the legislature that implementation of SGMA would avoid or minimize subsidence[66] 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 the Subbasin, Department staff suggest that the Eastern Management Area minimum threshold be revised and 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 result can be acceptable if the GSAs are making adequate progress in implementing their GSP. The rates at which projects and management actions are implemented should be consistent with the cumulative

[63] Chowchilla Subbasin GSP, pp. 1947 and 1951.
[64] 23 CCR § 354.28(d).
[65] Chowchilla Subbasin GSP, p. 262.
[66] Water Code § 10720.1(e).

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. (Corrective Action 3.)

Department staff do not believe that the GSP, in a Subbasin with significant historical subsidence that has been identified as an undesirable result, should be recommended for approval without identifying minimum thresholds and undesirable results that reflect the level of additional subsidence that would interfere with surface land uses. 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; therefore, Department staff encourage the GSAs to actively evaluate and adjust management criteria as new information and data are acquired.

3.2.3 Corrective Action 2

a) The GSP should be revised to include discussion of land surface beneficial uses and users in the Subbasin (e.g., infrastructure such as canals or levees) that may be susceptible to substantial interference as a result of continued subsidence. This information should be used to inform other revisions to the GSP necessitated by this corrective action.

b) The GSAs should provide supporting information for using groundwater levels as a proxy for subsidence in the Western Management Area. The GSP should be revised to include analysis that demonstrates a significant correlation between groundwater levels, which are allowed to decline below the historical low at up to 50 percent of monitoring sites, and land subsidence. The GSAs should evaluate the potential for subsidence impacts (i.e., substantial interference for surface land uses) related to any allowable further groundwater level decline. The GSAs should also consider incorporation of remotely-sensed subsidence data made available by the Department on an ongoing basis to verify the appropriateness of the groundwater level proxy.

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

3.3 Deficiency 3. The GSP does not provide sufficient information to support the determination that interconnected surface water or undesirable results related to depletions of interconnected surface water are not present and are not likely to occur in the Subbasin.

3.3.1 Background

The GSP Regulations require a GSP 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.[67]

The GSP Regulations state that 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.[68] Absent an explanation of why a sustainability indicator is inapplicable, the Department assumes all sustainability indicators apply.[69] 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 GSP (e.g., information describing basin setting, discussion of the interests of beneficial users and uses of groundwater).

The Department's assessment of a GSP's likelihood to achieve its sustainability goal for its basin is based, in part, on whether a GSP 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.[70]

3.3.2 Deficiency Details

The GSP explains that the primary surface water features in the Subbasin are the Chowchilla River, Ash Slough, Berenda Slough, and the San Joaquin River and that, while each of these are a source of natural groundwater recharge, none are interconnected with groundwater. For the development of the GSP, a comparison of the historical regional groundwater levels to stream thalweg elevations was performed and regional groundwater levels were determined to be "relatively far below"[71] the thalweg elevations. The GSP states that the analysis indicated the San Joaquin River, along the western boundary of the Subbasin, was connected through 2008 but that from 2009 to 2016 the groundwater levels were "generally below (and apparently disconnected from)" the river.[72] The GSP lacks adequate documentation of the analysis used for the

[67] 23 CCR §§ 354.28(c)(6)(A), 354.28(c)(6)(B).
[68] 23 CCR §§ 354.22, 354.26(d), 354.28(e).
[69] DWR Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria (DRAFT), November 2017.
[70] 23 CCR § 355.4(b)(3).
[71] Chowchilla Subbasin GSP, p. 99.
[72] Chowchilla Subbasin GSP, p. 99-100.

development of this conclusion. The GSP provides and references maps showing the depth to shallow groundwater for 2014 and 2016 but does not provide details regarding the wells selected for these maps.[73] It is unclear if these wells are screened in only the Upper Aquifer or if composite wells or wells with unknown construction details were also included. The GSP does not provide the stream thalweg depths that were used for comparison to the groundwater levels, nor does it quantify what "relatively far below" the thalweg is.

A brief analysis of groundwater levels in Upper Aquifer well SJRRP_MW-10-89 (located approximately 100 feet from the San Joaquin River) is provided in the discussion of hydrologic conditions associated with the groundwater dependent ecosystems assessment. Recorded measurements at SJRRP_MW-10-89 show groundwater levels approximately 2 feet below ground surface in early 2017.[74] Also in this analysis, the following statement is made: "The shallowest well depths indicate that the surface water may be temporarily connected with the perched/mounded groundwater beneath the well."[75] Further, in its own discussion of groundwater and surface water interaction near the San Joaquin River, the GSP states, "given the apparent fully saturated water column at these locations [areas adjacent to the San Joaquin River], there is at least potential for regional groundwater pumping to impact groundwater dependent ecosystems (GDEs) with roots extending down 20 to 30 feet along the San Joaquin River."[76] Department staff note that is generally understood that perched groundwater is separated from an underlying body of groundwater by an unsaturated zone.[77] Due to the presence of the fully saturated water column in areas adjacent to the San Joaquin River, it appears the GSP has identified areas of interconnected surface water, instead of identifying areas of perched/mounded groundwater that support riparian habitat. The possible presence of interconnected surface water along the San Joaquin River is further reinforced by information found in an adjacent subbasin's GSP.

The Subbasin shares a boundary with the Delta-Mendota Subbasin, and that boundary is aligned with the San Joaquin River. The San Joaquin River Exchange Contractors (SJREC) GSP in the Delta-Mendota Subbasin, which is adjacent to the Chowchilla Subbasin, states, "The SJRRP [San Joaquin River Restoration Program] and the SJREC have established a series of shallow monitoring wells near the San Joaquin River as part of the Seepage Management Plan for the Program. Data from these wells were used to determine the location of potentially connected surface water and groundwater. Figure 52 in Appendix I has a map that shows the potential locations of the interconnected portions of the San Joaquin River."[78] Appendix I is the hydrogeologic conceptual model for the SJREC GSP. In the hydrogeologic conceptual model section titled "Interconnected

[73] Chowchilla Subbasin GSP, Figures 2-70 and 2-71, p. 226-227.
[74] Chowchilla Subbasin GSP, Figure A2.B-4, p. 468.
[75] Chowchilla Subbasin GSP, Appendix 2.B., p. 469.
[76] Chowchilla Subbasin GSP, p. 100.
[77] Water Basics Glossary. U.S. Geological Survey (USGS), https://water.usgs.gov/water-basics_glossary.html.
[78] SJREC GSP, p. 130; Appendix I, Figure 52, p. 956.

Surface Water and Groundwater Systems in the SJREC GSA" there are "several areas where the shallow groundwater is indicated to be in direct hydraulic continuity with streamflow."[79] Department staff note that Figure 52 in Appendix I indicates potentially connected surface water and groundwater along the San Joaquin River at the southern portion of the boundary between the Delta-Mendota and Chowchilla subbasins.

Department staff do not believe the GSAs 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.

3.3.3 Corrective Action 3

a) The GSP must be revised to include a clear and comprehensive analysis of the potential for interconnected surface water to be present along the San Joaquin River in the Subbasin. The revision should provide data and complete analysis to support any conclusion regarding the presence or absence of interconnected surface water. Department staff suggest the GSAs review information from adjacent GSPs, as described above. If the GSAs find that there is insufficient data to justify the conclusion that interconnected surface water is, or is not, present in the Subbasin, a plan and schedule should be developed and submitted to the Department to address this data gap.

b) Should data indicate the presence of interconnected surface water, the GSAs should develop sustainable management criteria, as required in the GSP Regulations,[80] based on best available information and science. The GSAs should evaluate and disclose, sufficiently and thoroughly, the potential effects of the GSP's sustainable management criteria for depletion of interconnected surface water on beneficial uses of the interconnected surface water and on groundwater uses and users.

[79] SJREC GSP, Appendix I, p. 951-956.
[80] 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 GSP for the Chowchilla Subbasin. Department staff recommend that the GSP be determined incomplete.