



CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

715 P Street, 8th Floor | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001

October 26, 2023

Lisa Hunter
County of Glenn Groundwater Sustainability Agency - Corning
225 North Tehama Street
Willows, CA 95988
lhunter@countyofglenn.net

RE: Sacramento Valley – Colusa Subbasin - 2022 Groundwater Sustainability Plan

Dear Lisa Hunter,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP or Plan) submitted for the Sacramento Valley – Colusa 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 groundwater sustainability agencies (GSAs) review while determining how to address the deficiencies.

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 April 23, 2024. The Department understands that much work has occurred to advance sustainable groundwater management since the GSAs submitted their GSPs in January 2022. 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 2027 – 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 April 23, 2024, 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 related to the Department's assessment or implementation of your GSP.

Thank You,



Paul Gosselin
Deputy Director
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Determination of Incomplete Status of the Sacramento Valley – Colusa Subbasin Groundwater Sustainability Plan

**STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES**

**STATEMENT OF FINDINGS REGARDING THE
DETERMINATION OF INCOMPLETE STATUS OF THE
SACRAMENTO VALLEY – COLUSA 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 Subbasin, and whether the GSP adversely affects the ability of an adjacent basin or subbasin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin or subbasin. (Water Code § 10733.) The Department is directed to issue an assessment of the GSP within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the submitted Plan by the Colusa Groundwater Authority Groundwater Sustainability Agency and Glenn Groundwater Authority Groundwater Sustainability Agency (GSAs or Agencies) for the Sacramento Valley – Colusa Subbasin (Subbasin) (Basin No. 5-021.52).

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. In particular, the Department finds:

- A. The GSAs should revise the GSP to provide a reasonable assessment of overdraft conditions using the best available information and describe a reasonable means to mitigate overdraft. Specifically, the Plan must be amended as follows:
 1. Reevaluate the assessment of overdraft conditions in the Subbasin. Specifically, the GSAs should examine the assumptions that were used to develop the current overdraft and the projected overdraft estimates in the projected water budget considering the results vary greatly from the values reported in the recent annual report data. The assessment should include the latest information for the Subbasin to ensure the GSP includes the required projects and management actions to mitigate overdraft in the Subbasin.

2. Develop and describe a reasonable means to mitigate the overdraft that is continuing to occur in the Subbasin. Specifically, the GSAs should describe proposed management actions that are commensurate with the level of understanding of groundwater conditions in the Subbasin and provide sufficient details for Department staff to be able to clearly understand how the Plan's projects and management actions will mitigate overdraft in the Subbasin under different climate scenarios.
- B. The GSAs must provide a more detailed explanation and justification regarding the selection of the sustainable management criteria for groundwater levels, particularly minimum thresholds and measurable objectives, and quantitatively describe 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. Refine the description of undesirable results to clearly describe the significant and unreasonable conditions the GSAs are managing the Subbasin to avoid. This must include a quantitative description of the negative effects to beneficial uses and users that would be experienced at undesirable result conditions. The GSAs should fully disclose and describe and explain its rationale for determining the number of wells that may be dewatered and the level of impacts to groundwater dependent ecosystems that may occur without rising to significant and unreasonable levels constituting undesirable results. Lastly, the GSAs should explain how potential alternate supplies of water or well mitigation will be considered by the GSAs during their management of the Subbasin in a project or management action as part of the GSP. Department staff also encourage the GSAs to review the Department's April 2023 guidance document titled *Considerations for Identifying and Addressing Drinking Water Well Impacts*.
 2. Revise minimum thresholds to be set at the level where the depletion of supply across the Subbasin may lead to undesirable results and provide the criteria used to establish and justify minimum thresholds. Fully document the analysis and justifications performed to establish the criteria used to establish minimum thresholds. Clearly show each step of the analysis and provide supporting information used in the analysis.
 3. Provide an evaluation of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property

interests.¹ Identify the number and location of wells that may be negatively affected when minimum thresholds are reached. Compare well infrastructure for all well types in the Subbasin with minimum thresholds at nearby, suitably representative, monitoring sites. Document all assumptions and steps clearly so that it will be understood by readers of the GSP. Include maps of potentially affected well locations, identify the number of potentially affected wells by well type, and provide a supporting discussion of the effects.

4. Analyze how groundwater level minimum thresholds, which allow continued declines in the Subbasin, may impact land subsidence conditions.
- C. The GSAs must provide a more detailed explanation and justification regarding the selection of the sustainable management criteria, monitoring method, and projects or management actions related to land subsidence. Department staff recommend the GSAs consider and address the following:
1. Identify facilities and/or structures, land uses and property interests that may be susceptible to impacts from land subsidence and should quantify the amount of land subsidence that would result in functional impacts to that infrastructure. The GSAs should describe the rationale and any analysis performed to inform the quantification of undesirable results in these areas. Provide maps and graphs showing the extent and rate of land subsidence in the basin at the minimum threshold.
 2. Provide the information and criteria relied upon to establish and justify the minimum threshold.² Describe how the interests of beneficial uses and users may be affected if conditions reach minimum thresholds.
 3. Revise the individual minimum thresholds to identify the rate and extent of land subsidence that substantially interferes with surface land uses and may lead to undesirable results. Identify a cumulative amount of tolerable subsidence that, if exceeded, would substantially interfere with groundwater and land surface beneficial uses and users in the Subbasin. The GSAs should also explain how the rate and extent of any future subsidence permitted in the Subbasin may interfere with surface land uses.

¹ 23 CCR 354.28 (b)(4).

² 23 CCR § 354.28 (b)(1).

4. Provide a clear schedule for more frequent land subsidence monitoring using the best available data and describe how the monitoring data will be evaluated to determine if undesirable results are occurring in the Subbasin. If the GSAs determine not to use available InSAR data, the GSAs should provide support and justification for why an alternative approach that excludes InSAR data is reasonable and uses the best available information.
5. Provide specific details and schedule for projects or management actions that will be implemented to minimize or eliminate subsidence. The projects or management actions must be supported by best available information and science³ and take into account the level of uncertainty associated with the Subbasin.

³ 23 CCR § 354.44 (c).

Statement of Findings
Sacramento Valley – Colusa Subbasin (No. 5-021.52)

October 26, 2023

Based on the above, the GSP submitted by the Agencies for the Sacramento Valley – Colusa 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 its 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: October 26, 2023

Enclosure: Groundwater Sustainability Plan Assessment Staff Report – Sacramento Valley – Colusa Subbasin

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

Groundwater Basin Name: Sacramento Valley – Colusa Subbasin (No. 5-021.52)
Colusa Groundwater Authority Groundwater
Submitting Agency: Sustainability Agency and Glenn Groundwater Authority
Groundwater Sustainability Agency
Submittal Type: Initial GSP Submission
Submittal Date: January 28, 2022
Recommendation: Incomplete
Date: October 26, 2023

The Colusa Groundwater Authority Groundwater Sustainability Agency and Glenn Groundwater Authority Groundwater Sustainability Agency (collectively, the GSAs) submitted the Colusa Subbasin Groundwater Sustainability Plan (GSP or Plan) to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)¹ and the GSP Regulations.² The GSP covers the entire Sacramento Valley – Colusa Subbasin (Subbasin) for the implementation of SGMA. As presented in this staff report, a single GSP covering the entire basin was adopted and submitted to the Department for review by the GSAs.³

Evaluation and assessment by the Department is based on whether an adopted and submitted GSP, either individually or in coordination with other adopted and submitted GSPs, complies with SGMA and substantially complies with the GSP Regulations. Department staff base its 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.⁴ In addition, consistent with the GSP Regulations, Department staff have provided required corrective actions⁵ that the GSAs should review while determining how and whether to address the deficiencies. The deficiencies and required corrective actions are explained in greater detail in Section 3 of this staff report and are generally related to

¹ Water Code § 10720 *et seq.*

² 23 CCR § 350 *et seq.*

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

⁴ 23 CCR §355.2(e)(2).

⁵ 23 CCR §355.2(e)(2)(B).

the need to define sustainable management criteria in the manner required by SGMA and the GSP Regulations.

This assessment includes four sections:

- **Section 1 – Evaluation Criteria**: Describes the legislative requirements and the Department’s evaluation criteria.
- **Section 2 – Required Conditions**: Describes the submission requirements, GSP completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 3 – Plan Evaluation**: Provides a detailed assessment of identified deficiencies in the GSP. 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.

1 EVALUATION CRITERIA

The Department evaluates whether a Plan conforms to the statutory requirements of SGMA⁶ and is likely to achieve the basin’s sustainability goal.⁷ 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.⁸ Undesirable results are required to be defined quantitatively by the GSA 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.⁹ 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.¹⁰

For a Plan to be evaluated by the Department, it must first be determined that it was submitted by the statutory deadline¹¹ and that it is complete and covers the entire basin.¹² 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.¹³ 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.”¹⁴

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.¹⁵ The Department’s review considers whether there is a reasonable relationship between the information provided by the GSA 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

⁶ Water Code §§ 10727.2, 10727.4, 10727.6.

⁷ Water Code § 10733(a).

⁸ Water Code § 10721(v).

⁹ 23 CCR § 354.26.

¹⁰ Water Code § 10733(c).

¹¹ 23 CCR § 355.4(a)(1).

¹² 23 CCR §§ 355.4(a)(2), 355.4(a)(3).

¹³ 23 CCR § 350 *et seq.*

¹⁴ 23 CCR § 355.4(b).

¹⁵ 23 CCR § 351(h).

are feasible and likely to prevent undesirable results.¹⁶ The Department also considers whether the GSAs have the legal authority and financial resources necessary to implement the Plan.¹⁷

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.¹⁸ The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.¹⁹ 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.²⁰

The Department is required to evaluate the Plan within two years of its submittal date and issue a written assessment.²¹ The assessment is required to include a determination of the Plan's status.²² The GSP Regulations provide three options for determining the status of a Plan: approved,²³ incomplete,²⁴ or inadequate.²⁵

Even when the Department determines a Plan 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.²⁶ 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 Plan adversely affects adjacent basins. While the issues addressed by the recommended corrective actions in an approved Plan do not, at the time the determination was made, preclude its approval, the Department recommends that the issues be addressed to ensure the Plan's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the basin's sustainability goal.²⁷ Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first periodic assessment.²⁸

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

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

¹⁷ 23 CCR § 355.4(b)(9).

¹⁸ 23 CCR § 355.4(b)(6).

¹⁹ 23 CCR § 355.4(b)(2).

²⁰ 23 CCR § 355.4(b)(10).

²¹ Water Code § 10733.4(d); 23 CCR § 355.2(e).

²² Water Code § 10733.4(d); 23 CCR § 355.2(e).

²³ 23 CCR § 355.2(e)(1).

²⁴ 23 CCR § 355.2(e)(2).

²⁵ 23 CCR § 355.2(e)(3).

²⁶ Water Code § 10733.4(d).

²⁷ Water Code § 10733.8.

²⁸ 23 CCR § 356.4.

Department determines the deficiencies precluding approval may be capable of being corrected by the GSA in a timely manner,²⁹ 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 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 GSA have not taken sufficient actions to correct any identified deficiencies.³⁰

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 GSA 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.³¹ Also, GSAs have an ongoing duty to reassess their GSPs, provide annual reports to the Department, and, when necessary, update or amend their GSPs.³² 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 GSA in adjacent basins to achieve their sustainability goals.

2 REQUIRED CONDITIONS

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline.³³ 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

²⁹ 23 CCR § 355.2(e)(2)(B)(i).

³⁰ 23 CCR § 355.2(e)(3)(C).

³¹ Water Code § 10733.8; 23 CCR § 355.6.

³² Water Code §§ 10728, 10728.2.

³³ Water Code § 10720.7.

incomplete, Department staff may require corrective actions that address minor or potentially significant deficiencies identified in the GSP. The GSA 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, to submit a GSP no later than January 31, 2022.³⁴

The GSAs submitted the Colusa GSP to the Department on January 28, 2022, 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.³⁵

The GSA submitted an adopted GSP for the entire Subbasin. Department staff found the Colusa GSP to be complete and include the required information, sufficient to warrant an evaluation by the Department. Therefore, the Department posted the GSP to its website on February 7, 2022.

2.3 BASIN COVERAGE

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.³⁶ 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 GSA.

The GSP intends to manage the entire Colusa Subbasin and the jurisdictional boundaries of the submitting GSA appear to cover the entire Subbasin.

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.

³⁴ Water Code § 10720.7(a)(2).

³⁵ 23 CCR § 355.4(a)(2).

³⁶ Water Code § 10727(b); 23 CCR § 355.4(a)(3).

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 GSA 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.

Department staff have concluded the GSP as proposed does not conform with the requirements of SGMA and is not likely to achieve the sustainability goals for the basin. The GSP does not sufficiently identify and propose management for current conditions including the overdraft, chronic lowering of groundwater levels, and land subsidence. The GSP does not establish sustainable management criteria that considered effects on the full range of known beneficial uses and users, such as domestic wells and critical infrastructure.

3.1 DEFICIENCY 1. THE GSP DOES NOT INCLUDE A REASONABLE ASSESSMENT OF OVERDRAFT CONDITIONS AND REASONABLE MEANS TO MITIGATE OVERDRAFT.

3.1.1 Background

For basins where overdraft conditions occur, the GSP Regulations require a Plan to quantify the overdraft over a period of years during which water year and water supply conditions approximate average conditions.³⁷ Furthermore, the Plan must describe projects or management actions, including quantification of demand reduction or other methods, for the mitigation of overdraft and achievement of the sustainability goal for the basin.³⁸

As part of the Department's evaluation, staff assess whether the Plan provides a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present.³⁹ To substantially comply with the GSP Regulations,⁴⁰ the assessment provided in the Plan must be supported with sufficiently detailed information and the analyses must be sufficiently thorough and reasonable. Discussion and analyses in a Plan must be detailed and thorough enough for Department staff to evaluate if any discrepancy in the information provided in the Plan may materially affect the ability of the Agency to achieve the sustainability goal for the basin.

3.1.2 Deficiency Details

The GSP Regulations require the Department to evaluate whether the Plan includes a reasonable assessment of overdraft conditions and includes a reasonable means to

³⁷ 23 CCR § 354.18(b)(5).

³⁸ 23 CCR §§ 354.44(a) and 354.44(b)(2).

³⁹ 23 CCR § 355.4 (b)(6).

⁴⁰ 23 CCR § 355.4 (b).

mitigate overdraft.⁴¹ While the GSP presents information about overdraft, it is unclear whether this assessment is reasonable or uses the best available information, because the GSP's reported overdraft varies greatly from recent change in groundwater storage data. Furthermore, the projects and management actions proposed in the GSP, which have been developed to address the projected overdraft conditions, do not appear to be sufficient to mitigate the actual overdraft conditions in the Subbasin. Department staff have identified this as a deficiency that should preclude plan approval at this time. The following section describes specific details about the deficiency and outlines one or more corrective actions the GSAs must take to address to correct it.

The GSP presents conflicting information about overdraft occurring in the Subbasin. While the Plan acknowledges overdraft is observed in the Subbasin in the historical and projected water budgets, the current water budget shows a positive change in storage. The historical water budget, which reflects the period from 1990 to 2015, estimates an average negative change in groundwater storage (overdraft) of 28,000 acre-feet per year (AFY).⁴² The change in storage figure provided in the GSP shows annual overdraft has increased recently resulting in an overdraft of approximately 1,000,000 acre-feet from 2006 to 2015.⁴³ However, the Plan's current water budget shows an increase in storage of 1,000 AFY. The projected water budget with future land use and climate change anticipates an increase in groundwater pumping by 58,000 AFY yet presents a lower value of overdraft of 7,300 AFY (cumulative change in groundwater storage of -365,000 acre-feet) over the 50-year implementation horizon.⁴⁴

Since the GSP submittal, annual report data submitted to the Department demonstrates that groundwater storage within the Subbasin has dramatically decreased, deviating from the values reported in the GSP for the historical and projected water budgets. Specifically, the overdraft reported for water year (WY) 2021 (which represents change between October 1, 2020, and September 30, 2021) was -418,000 acre-feet and -377,170 acre-feet for WY 2022.⁴⁵ Combined, these values represent a loss of storage of over 795,000 acre-feet in just a two-year period, which is more than double the anticipated overdraft predicted over the 50-year implementation horizon. Department staff recognize WY 2021 and WY 2022 were critically dry years; however, the magnitude of the loss of storage observed during these two years is significantly greater than the average value provided in the historical water budget of -166,000 acre-feet for the previous critically dry water year types, indicating that overdraft is increasing.⁴⁶ Based on a review of the information included in the GSP and annual reports, and the discrepancies in the reported projections of overdraft, Department staff are unable to conclude the GSAs have included a

⁴¹ 23 CCR § 355.4(b)(6).

⁴² Colusa Subbasin GSP, Table 3-12, p. 215.

⁴³ Colusa Subbasin GSP, Figure 3-29, p. 184.

⁴⁴ Colusa Subbasin GSP, Section 3.3.6, p. 229.

⁴⁵ Department of Water Resources, SGMA Portal, Annual Report Module, WY 2021 and WY 2022 Data, Reported Overdraft, Colusa Subbasin.

⁴⁶ Colusa Subbasin GSP, Table 3-13, p. 218.

reasonable assessment of overdraft conditions for the Subbasin based on the best available information. (See [Corrective Action 1a](#)).

GSP Regulations require the Department to evaluate whether the Plan includes a reasonable means to mitigate overdraft.⁴⁷ While the GSP documents a projected groundwater overdraft in the Subbasin of 7,300 AFY, Department staff believe the actual overdraft the GSAs will be required to mitigate is likely much more based on information included in the GSP and annual reports. The GSP proposes an adaptive management approach with planned projects and management actions to address groundwater level declines in the Orland and Arbuckle areas and a portfolio of other ongoing and potential projects to achieve sustainability across the Subbasin.⁴⁸ The planned projects all involve reducing groundwater pumping by securing more surface water for direct application or in-lieu groundwater recharge.

The GSP states that the expected benefits of all planned projects will provide more than 80,000 AFY to the Subbasin at full implementation and “are expected to address potential sustainability concerns in the projected future conditions water budgets, even under the effects of 2070 CT climate change.”⁴⁹ However, Department staff note the GSP states that certain projects will not be available for implementation during critically dry years and two of the projects described as ongoing are described as having expiring contracts so the actual benefits of these projects may be lower than the projected values. Further, given the recent reduction of groundwater storage of 795,000 acre-feet in the last two years, it would take nearly ten years of these projects being fully implemented combined with the Subbasin operating within its sustainable yield to offset this loss of storage. While SGMA states that overdraft during a period of drought is not sufficient to establish an undesirable result for the chronic lowering of groundwater levels, this is contingent on the GSAs managing extractions and recharge as necessary to ensure that reductions in groundwater levels or storage are offset by increases in groundwater levels or storage during other periods.⁵⁰ Based on the information contained in the GSP, it does not appear the GSAs have proposed a suite of projects and management actions that will be sufficient to offset the recent overdraft observed in the Subbasin. The GSAs do not appear to have an urgency to implement the necessary projects and management actions to mitigate overdraft and Department staff are concerned that continued overdraft will exacerbate the current problems the basin is experiencing, which include dry wells and worsening land subsidence. Accordingly, for the above reasons, Department staff cannot conclude that the GSP has presented a reasonable means to mitigate overdraft (see [Corrective Action 1b](#)).

⁴⁷ 23 CCR § 355.4(b)(6).

⁴⁸ Colusa Subbasin GSP, Chapter 6, p. 301.

⁴⁹ Colusa Subbasin GSP, Section 6.2.2, p. 312.

⁵⁰ Water Code § 10721(x)(1).

3.1.3 Corrective Action 1

The GSAs should revise the GSP to provide a reasonable assessment of overdraft conditions using the best available information and describe a reasonable means to mitigate overdraft. Specifically, the Plan must be amended as follows:

- a. Reevaluate the assessment of overdraft conditions in the Subbasin. Specifically, the GSAs should examine the assumptions that were used to develop the current overdraft and the projected overdraft estimates in the projected water budget considering the results vary greatly from the values reported in the recent annual report data. The assessment should include the latest information for the Subbasin to ensure the GSP includes the required projects and management actions to mitigate overdraft in the Subbasin.
- b. Develop and describe a reasonable means to mitigate the overdraft that is continuing to occur in the Subbasin. Specifically, the GSAs should describe proposed management actions that are commensurate with the level of understanding of groundwater conditions in the Subbasin and provide sufficient details for Department staff to be able to clearly understand how the Plan's projects and management actions will mitigate overdraft in the Subbasin under different climate scenarios.

3.2 DEFICIENCY 2. THE GSP DOES NOT ESTABLISH SUSTAINABLE MANAGEMENT CRITERIA FOR CHRONIC LOWERING OF GROUNDWATER LEVELS IN A MANNER SUBSTANTIALLY COMPLIANT WITH THE GSP REGULATIONS.

3.2.1 Background

It is up to the GSA to define undesirable results and describe the effect of undesirable results on the beneficial uses and users of groundwater.⁵¹ From this definition, the GSA establishes minimum thresholds, which are quantitative values that represent groundwater conditions at representative monitoring sites that, when exceeded individually or in combination with minimum thresholds at other monitoring sites, may cause the basin to experience undesirable results.⁵² Put another way, the minimum thresholds represent conditions that, if not exceeded, should prevent the basin from experiencing the undesirable results identified by the GSA. Minimum thresholds for chronic lowering of groundwater levels are the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results.⁵³ Quantitative values for minimum thresholds should be supported by information and criteria relied upon to establish and justify the minimum threshold,⁵⁴ and a quantitative description of

⁵¹ 23 CCR § 354.26 (b)(3), § 354.28 (b)(4).

⁵² 23 CCR § 354.28, DWR Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria (DRAFT), November 2017.

⁵³ 23 CCR § 354.28 (c)(1).

⁵⁴ 23 CCR § 354.28 (b)(1).

how conditions at minimum thresholds may affect the interests of beneficial uses and users of groundwater.⁵⁵

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, the GSP's descriptions of undesirable results are unclear and justification for the establishment of minimum thresholds is not provided with evidence of the consideration of the interests of beneficial uses and users, and sufficient supporting information is not provided in the GSP. The lack of this information limits Department staff's ability to evaluate whether the criteria are reasonable or whether the GSA plans to operate the Subbasin to avoid undesirable results.⁵⁶

GSP Regulations require that GSAs define undesirable results caused by the chronic lowering of groundwater levels by identifying a significant and unreasonable depletion of supply that is present when an undesirable result occurs.⁵⁷ The GSP describes an undesirable result as: "if sustained groundwater levels are too low to reasonably satisfy beneficial uses and users within the Subbasin over the planning and implementation horizon of this GSP."⁵⁸ The GSP additionally states that an undesirable result would occur "when 25 percent or more of the representative monitoring wells (i.e., 12 of 48 wells) in the Subbasin fall below their minimum groundwater elevation threshold levels for 24 consecutive months."⁵⁹

Department staff have identified deficiencies with how the GSAs have defined undesirable results. The Plan's definition of undesirable results uses undefined qualifying language that renders the meaning indeterminate. The GSP aims to prevent "...levels [that] are too low to reasonably satisfy beneficial uses and users within the Subbasin," as mentioned above. However, the GSP does not define or describe these conditions, or explain who would make this determination. Additionally, without a quantitative definition or clear description of the qualifier "reasonably", it is unclear how the GSAs will identify whether observed impacts would be considered significant and unreasonable. While the GSP includes in its portfolio of potential management actions a domestic well mitigation program, this management action "is currently in the early conceptual stage"⁶⁰ and "would only be implemented if determined to be necessary under future monitoring of the Subbasin."⁶¹ The GSP indicates each GSA will investigate implementing a program in its respective portions of the Subbasin and acknowledge details of the potential programs have yet to be determined. Consequently, the GSP presents no details regarding the action's implementation timeline, criteria for implementation, benefits, or costs and

⁵⁵ 23 CCR § 354.28 (b)(4).

⁵⁶ 23 CCR §§ 354.28(b)(1), 354.28(b)(2), 354.28(b)(3), 354.28(b)(4), 354.28(c)(1).

⁵⁷ 23 CCR § 354.26 (a).

⁵⁸ Colusa Subbasin GSP, Section 5.3.1.1, p. 269.

⁵⁹ Colusa Subbasin GSP, Section 5.3.1.2, p. 270.

⁶⁰ Colusa Subbasin GSP, Table 6-46, p. 384.

⁶¹ Colusa Subbasin GSP, Section 6.5.1, p. 359.

funding. Without more information, Department staff are unable to evaluate when and how the well mitigation program may be implemented or evaluate its potential feasibility and effectiveness at this time.

Additionally, the Plan defines undesirable results as a function of minimum conditions necessary to reasonably satisfy beneficial uses and users of groundwater but does not describe or explain what those conditions would be or how they were determined. This is compounded by the fact that the Plan does not demonstrate how or whether the interests of those beneficial uses and users were considered. As a result, it would not be possible to know whether it was appropriate to the needs of beneficial uses and users in the Subbasin, as determined by the GSAs. The quantification of undesirable results as 25 percent or more of the representative monitoring wells (i.e., 12 of 48 wells) in the Subbasin fall below their minimum groundwater elevation threshold levels for 24 consecutive months is unsatisfactory because the Plan does not explain why this threshold would avoid effects the GSAs have determined to be significant and unreasonable. On the contrary, the values and timing of exceedances appear to be arbitrary.

The lack of specificity in what the GSAs are managing the Subbasin to avoid (i.e., undesirable results) is especially problematic considering current and projected conditions. The Subbasin has already experienced 102 dry wells according to the Household Dry Well Reporting System.⁶² The GSAs have proposed minimum thresholds that will allow at least 20 percent of the Subbasin's 3,500 domestic wells⁶³ (700 wells) to be dewatered. The GSAs have not explained how it was determined the current and projected well outages in the Subbasin are not considered an undesirable result, even though those conditions appear to meet the definition of an undesirable result provided in the GSP (i.e., "sustained groundwater levels are too low to reasonably satisfy beneficial uses and users within the Subbasin"). Department staff conclude the GSAs must reevaluate and clearly define and provide its rationale for when undesirable results occur in the Subbasin, based on a thorough consideration of the interests of beneficial uses and users of groundwater, as required by the GSP Regulations (see [Corrective Action 2a](#)).

The GSP Regulations require GSAs to set the minimum thresholds for chronic lowering of groundwater levels at "the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results."⁶⁴ The GSP sets minimum thresholds for the principal aquifer as the deeper value of the 20th percentile of shallowest domestic well depths in the monitoring well's Thiessen polygon, or 50 percent of [historical] range below the historical low groundwater elevation.⁶⁵ The GSAs use the 20th percentile of shallowest domestic well depths for 35 of the 48 representative monitoring sites and 50 percent of the range below the historical low for the remaining 13 representative

⁶² Department of Water Resources, Dry Well Reporting System, Accessed September 2023, <https://mydrywatersupply.water.ca.gov/report/>.

⁶³ Colusa Subbasin GSP, Section 2.1.2.4, p. 88.

⁶⁴ 23 CCR § 354.28(c)(1).

⁶⁵ Colusa Subbasin GSP, Section 5.4.1.1, p. 284.

monitoring sites.⁶⁶ For these 13 sites, the protection of 80 percent of domestic wells does not apply to their Thiessen polygons, and the GSP explains these minimum thresholds were developed to provide adequate operational flexibility to protect the conjunctive use of groundwater for agricultural production.⁶⁷

The GSAs acknowledge some of the minimum thresholds were not developed to represent a depletion of supply that would lead to undesirable results, but instead developed to “protect the conjunctive use of groundwater for agricultural production.”⁶⁸ The GSP does not explain why the value of 50 percent of the range of historical levels was selected or why this threshold represents a depletion of supply. The Plan does not adequately describe the information used to develop the criteria used to establish this minimum threshold,⁶⁹ nor explain how managing the Subbasin to this minimum threshold will avoid the undesirable results it describes and defines. The subjective and vague nature of the GSP’s undesirable result definitions (as discussed above) compounds this problem. Department staff conclude that the minimum thresholds must be revised by the GSAs to be based upon the depletion of supply that would lead to undesirable results (see [Corrective Action 2b](#)).

GSP Regulations require GSAs to consider how conditions at minimum thresholds may affect the interests of beneficial uses and users of groundwater⁷⁰ and require the Department to evaluate whether the interests of those beneficial uses and users were considered.⁷¹ While the GSAs utilized the 20th percentile of domestic well depth to establish the majority of the minimum threshold values, for 13 of the sites they selected a deeper threshold and the potential effects to the beneficial uses and users in these areas is unclear. Further, the GSAs do not describe how allowing more than 20 percent of domestic wells to go dry has considered the interests of these particular beneficial uses and users. Considering that the GSAs have set minimum thresholds substantially below historical lows, the Plan does not provide a clear description of the circumstances under which such impacts would become significant and unreasonable to particular beneficial uses and users. Department staff are unable to determine whether the interests of beneficial uses and users of groundwater, as well as the land uses and property interests potentially affected by the use of groundwater in the Subbasin, have been considered.⁷² The GSAs must identify the number, location, and percentage of all wells that may be impacted at the proposed minimum thresholds that will not receive assistance through the well mitigation program and explain how the interests of beneficial uses and users were considered (see [Corrective Action 2c](#)).

⁶⁶ Colusa Subbasin GSP, Table 5-2, p. 285.

⁶⁷ Colusa Subbasin GSP, Section 5.4.1.1, p. 284.

⁶⁸ Colusa Subbasin GSP, Section 5.4.1.1, p. 284.

⁶⁹ 23 CCR 354.28 (a).

⁷⁰ 23 CCR 354.28 (b)(4).

⁷¹ 23 CCR 355.4 (b)(4).

⁷² 23 CCR § 355.4 (b)(4).

GSP Regulations require GSAs to discuss 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 will avoid undesirable results for each of the sustainability indicators.⁷³ The GSP discusses the relationship between groundwater levels and land subsidence by stating, “The minimum thresholds for groundwater levels are not expected to contribute to undesirable results for inelastic land subsidence, as they are protective of a range around historical groundwater elevations.”⁷⁴ The discussion included in the GSP describing the relationship between land subsidence is insufficient, especially considering areas within the Subbasin are prone to, and have active, land subsidence conditions. The GSP proposes minimum thresholds that allow groundwater levels to drop more than 150 feet in portions of the Subbasin, including substantial declines between 100 and 150 feet near Arbuckle and 50 to 100 feet near Orland in areas experiencing land subsidence. Based on the currently proposed thresholds, it is highly likely the Subbasin will experience ongoing and potentially worsening land subsidence as water levels decline during plan implementation. It is imperative the GSAs include a robust discussion of the relationship between the proposed groundwater level thresholds and land subsidence and analyze how allowing continued declines in the Subbasin will impact land subsidence conditions (see [Corrective Action 2d](#)).

3.2.3 Corrective Action 2

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

- a. Refine the description of undesirable results to clearly describe the significant and unreasonable conditions the GSA is managing the Subbasin to avoid. This must include a quantitative description of the negative effects to beneficial uses and users that would be experienced at undesirable result conditions.⁷⁵ The GSA should fully disclose and describe and explain its rationale for determining the number of wells that may be dewatered and the level of impacts to groundwater dependent ecosystems that may occur without rising to significant and unreasonable levels constituting undesirable results. Lastly, the GSA should explain how potential alternate supplies of water or well mitigation will be considered by the GSA during its management of the Subbasin in a project or management action as part of the GSP. Department staff also encourage the

⁷³ 23 CCR § 354.28 (b)(2).

⁷⁴ Colusa Subbasin GSP, Section 5.4.1.1.1, p. 286.

⁷⁵ 23 CCR § 354.28 (b)(3).

GSAs to review the Department's April 2023 guidance document titled *Considerations for Identifying and Addressing Drinking Water Well Impacts*.⁷⁶

- b. Revise minimum thresholds to be set at the level where the depletion of supply across the Subbasin may lead to undesirable results⁷⁷ and provide the criteria used to establish and justify minimum thresholds.⁷⁸ Fully document the analysis and justifications performed to establish the criteria used to establish minimum thresholds. Clearly show each step of the analysis and provide supporting information used in the analysis.⁷⁹
- c. Provide an evaluation of how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.⁸⁰ Identify the number and location of wells that may be negatively affected when minimum thresholds are reached. Compare well infrastructure for all well types in the Subbasin with minimum thresholds at nearby, suitably representative, monitoring sites. Document all assumptions and steps clearly so that it will be understood by readers of the GSP. Include maps of potentially affected well locations, identify the number of potentially affected wells by well type, and provide a supporting discussion of the effects.
- d. Analyze how groundwater level minimum thresholds, which allow continued declines in the Subbasin, may impact land subsidence conditions.

3.3 DEFICIENCY 3. THE GSP DOES NOT ESTABLISH SUSTAINABLE MANAGEMENT CRITERIA FOR LAND SUBSIDENCE IN A MANNER SUBSTANTIALLY COMPLIANT WITH THE GSP REGULATIONS.

3.3.1 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 established in accordance with SGMA and the GSP Regulations, which require information and criteria relied upon to establish and justify the minimum threshold,⁸¹ and how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests,⁸² including maps or graphs showing the rates and extents of

⁷⁶ <https://water.ca.gov/Programs/Groundwater-Management/Drinking-Water-Well>

⁷⁷ 23 CCR 354.28 (c)(1).

⁷⁸ 23 CCR 354.28 (a).

⁷⁹ 23 CCR 354.28 (b)(1).

⁸⁰ 23 CCR 354.28 (b)(4).

⁸¹ 23 CCR § 354.28 (b)(1).

⁸² 23 CCR § 354.28 (b)(4).

land subsidence defined by the minimum thresholds.⁸³ Additionally, the legislative intent of SGMA is to avoid or minimize subsidence.⁸⁴

It is up to the GSAs to define undesirable results and the GSAs must describe the effect of undesirable results on the beneficial uses and users of groundwater.⁸⁵ From this definition, the GSAs establish minimum thresholds, which are quantitative values that represent groundwater conditions at representative monitoring sites that, when exceeded individually or in combination with minimum thresholds at other monitoring sites, may cause the basin to experience undesirable results.⁸⁶ Put another way, the minimum thresholds represent conditions that, if not exceeded, should prevent the Subbasin from experiencing the undesirable results identified by the GSAs.

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 and property interests that have been affected, or are likely to be affected, by land subsidence in the Subbasin, including an explanation of how the GSAs have determined and considered those uses and interests, and the GSAs' rationale for establishing minimum thresholds in light of those effects.⁸⁷ Further, quantitative values for minimum thresholds should be supported by information and criteria relied upon to establish and justify the minimum threshold,⁸⁸ and a quantitative description of how conditions at minimum thresholds may affect the interests of beneficial uses and users of groundwater.⁸⁹

3.3.2 Deficiency Details

Based on its review, Department staff conclude the Plan has not defined sustainable management criteria for land subsidence in a manner required by SGMA and the GSP Regulations. Generally, descriptions of undesirable results are unclear, justification for the establishment of minimum thresholds is not provided with evidence of the consideration of the interests of beneficial uses and users, and sufficient supporting information is not provided in the GSP. The lack of these details does not allow Department staff to evaluate whether the criteria are reasonable or whether the GSAs plan to operate the Subbasin to avoid undesirable results.⁹⁰

The GSP defines undesirable results for land subsidence in the Subbasin as “a result that would cause significant and unreasonable impacts to critical infrastructure over the planning and implementation horizon of this GSP.”⁹¹ Department staff regard this

⁸³ 23 CCR § 354.28(c)(5).

⁸⁴ Water Code § 10720 (e).

⁸⁵ 23 CCR § 354.26 (b)(3), § 354.28 (b)(4).

⁸⁶ 23 CCR § 354.28, DWR Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria (DRAFT), November 2017.

⁸⁷ 23 CCR § 354.28 (c)(5)(A).

⁸⁸ 23 CCR § 354.28 (b)(1).

⁸⁹ 23 CCR § 354.28 (b)(4).

⁹⁰ 23 CCR §§ 354.28(b) *et seq.*, 354.28(c)(5) *et seq.*

⁹¹ Colusa Subbasin GSP, Section 5.3.5.1, p. 278.

definition to be problematic. Although the GSP provides a general list of critical infrastructure, the GSP does not identify specific infrastructure that the GSA deems “critical” or indicate what effect subsidence would have on that infrastructure and explain the point at which those impacts would become “significant and unreasonable”. The GSP states that “the Subbasin has extensive networks of pipelines and open canals and drains owned by various surface water suppliers that are used to convey irrigation and drain water. These networks are likely the existing infrastructure most sensitive to land subsidence.”⁹² However, the GSP does not identify specific infrastructure susceptible to land subsidence or describe what constitutes significant and unreasonable effects. Without specific information describing the features susceptible to experiencing adverse impacts due to subsidence and the point at which the GSA considers those impacts to be significant and unreasonable, Department staff are not able to evaluate whether the Plan has adopted a reasonable approach to avoid those impacts.

The GSP provides some information about infrastructure that is susceptible to subsidence. The GSP states that “the Subbasin has extensive networks of pipelines and open canals and drains owned by various surface water suppliers that are used to convey irrigation and drain water. These networks are likely the existing infrastructure most sensitive to land subsidence.”⁹³ The GSP provides a map of streams, rivers, and water conveyance features.⁹⁴ However, the GSP does not identify specific infrastructure susceptible to land subsidence or describe what constitutes significant and unreasonable effects. Department staff recommend the GSAs identify critical infrastructure susceptible to land subsidence and describe what constitutes significant and unreasonable effects for land subsidence in the Subbasin (see [Corrective Action 3a](#)).

When updating its definition of undesirable results, the GSA will need to determine conditions that would be significant and unreasonable even if they occur locally. Department staff note that the proposed definition of undesirable results could potentially lead to localized significant and unreasonable impacts within the Subbasin without them being considered undesirable results by the GSAs, and as a result, may end up being insufficiently protective of the interests of beneficial uses and users of groundwater in the Subbasin, including infrastructure features of concern identified by the GSA. Additionally, in reviewing the Department’s InSAR subsidence data, Department staff note that the subsidence rate has increased significantly in localized areas near Orland (up to 0.5 feet per year) and Arbuckle (up to 0.8 feet per year) between July 2021 and July 2023, and that a water-conveyance facility, the Tehama-Colusa Canal, runs through these areas. Department staff recommend the GSAs revise the definition of undesirable results to specifically identify and quantify of subsidence cause significant and unreasonable effects on beneficial uses and users of groundwater caused by land subsidence and define the

⁹² Colusa Subbasin GSP, Section 5.4.5.1, p. 293.

⁹³ Colusa Subbasin GSP, Section 5.4.5.1, pp. 292-293.

⁹⁴ Colusa Subbasin GSP, Figure 3-6, p.129.

narrowest geographic extent of basin conditions that could lead to such results (see [Corrective Action 3b](#)).

Because the legislative intent of SGMA is to avoid or minimize subsidence.⁹⁵ Considering the Subbasin has significant recent subsidence and contains infrastructure that the GSP identifies as susceptible to subsidence, that the GSAs should identify the total cumulative amount of subsidence that can occur without causing significant and unreasonable impacts to the beneficial uses and users of groundwater, surface land uses, and property interests, all of which must be clearly defined. The total cumulative amount of subsidence should consider the conditions necessary to minimize or halt subsidence during GSP implementation and maintain those conditions once sustainability has been achieved on or before 2042 (see [Corrective Action 3c](#)).

Additionally, the GSAs do not intend to assess exceedances of minimum thresholds until Sacramento Valley benchmarks are resurveyed and five years of subsidence has been measured. GSAs may use the Sacramento Valley benchmarks data, collected and made available through the Department's Ground Surface Displacement - Land Subsidence Monitoring program, but that monitoring program was not designed for and would not provide information sufficient to track subsidence for SGMA purposes. Despite this, the GSP does not provide any commitment to a monitoring schedule for the land subsidence network, which may lead to periods of more than five years without measurements to assess subsidence and the potential for undesirable results that may require responsive action. Because of the infrequent schedule of monitoring, the Sacramento Valley benchmark surveying network will not be sufficient to detect gradual changes in subsidence or identify the exceedance of minimum thresholds in time to prevent significant impacts to beneficial uses and users of groundwater. As such, the Plan's proposal to monitor subsidence would not provide the short-term information required by the GSP regulations.⁹⁶ Considering the Department provides quarterly updates for monthly InSAR subsidence data covering much of the Subbasin, the GSP does not address or explain why the GSAs have decided to not utilize this reliable data source to assess whether management is causing significant and unreasonable effects to surface land uses. Further, Department staff cannot conclude the GSP's proposed monitoring for subsidence during GSP Plan implementation is utilizing the best available information. The GSAs must provide a clear schedule for land subsidence monitoring and describe how the monitoring data will be evaluated to determine if undesirable results are occurring in the Subbasin (see [Corrective Action 3d](#)).

Under SGMA, subsidence must be minimized or eliminated. Given the occurrence and increasing rates of subsidence in the Colusa Subbasin, the GSP must include specific actions that will be taken to minimize subsidence (see [Corrective Action 3e](#)).

⁹⁵ Water Code § 10720 (e).

⁹⁶ 23 CCR § 354.34(a).

3.3.3 Corrective Action 3

The GSAs must provide a more detailed explanation and justification regarding the selection of the sustainable management criteria, monitoring method, and projects or management actions related to land subsidence. Department staff recommend the GSAs consider and address the following:

- a. Identify facilities and/or structures, land uses and property interests that may be susceptible to impacts from land subsidence and should quantify the amount of land subsidence that would result in functional impacts to that infrastructure. The GSAs should describe the rationale and any analysis performed to inform the quantification of undesirable results in these areas. Provide maps and graphs showing the extent and rate of land subsidence in the basin at the minimum threshold.⁹⁷
- b. Provide the information and criteria relied upon to establish and justify the minimum threshold.⁹⁸ Describe how the interests of beneficial uses and users may be affected if conditions reach minimum thresholds.⁹⁹
- c. Revise the individual minimum thresholds to identify the rate and extent of land subsidence that substantially interferes with surface land uses and may lead to undesirable results. Identify a cumulative amount of tolerable subsidence that, if exceeded, would substantially interfere with groundwater and land surface beneficial uses and users in the Subbasin. The GSAs should also explain how the rate and extent of any future subsidence permitted in the Subbasin may interfere with surface land uses.
- d. Provide a clear schedule for more frequent land subsidence monitoring using the best available data and describe how the monitoring data will be evaluated to determine if undesirable results are occurring in the Subbasin. If the GSAs determine not to use available InSAR data, the GSAs should provide support and justification for why an alternative approach that excludes InSAR data is reasonable and uses the best available information.
- e. Provide specific details and schedule for projects or management actions that will be implemented to minimize or eliminate subsidence. The projects or management actions must be supported by best available information and science¹⁰⁰ and take into account the level of uncertainty associated with the Subbasin.¹⁰¹

⁹⁷ 23 CCR § 354.28 (c)(5) *et seq.*

⁹⁸ 23 CCR § 354.28 (b)(1).

⁹⁹ 23 CCR § 354.28 (b)(4).

¹⁰⁰ 23 CCR § 354.44 (c).

¹⁰¹ 23 CCR § 354.44 (d).

4 STAFF RECOMMENDATION

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