



CALIFORNIA DEPARTMENT OF WATER RESOURCES
**SUSTAINABLE GROUNDWATER
MANAGEMENT OFFICE**

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November 18, 2021

Kris Balaji, PMP, P.E.
Eastern San Joaquin Subbasin Plan Administrator
1810 E. Hazelton Avenue, Stockton, CA 95201
kbalaji@sjgov.org

RE: Eastern San Joaquin Subbasin - 2020 Groundwater Sustainability Plan

Dear Kris Balaji,

The Eastern San Joaquin Groundwater Authority submitted the Eastern San Joaquin Groundwater Subbasin (Subbasin) Groundwater Sustainability Plan (GSP) to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA).¹

Department staff have substantially completed an initial review of the GSP and have identified potential deficiencies (see the enclosed document) which may preclude the Department's approval.² Department staff have also developed potential corrective actions³ for each potential deficiency. The potential deficiencies do not necessarily represent all deficiencies or discrepancies that the Department may identify in the GSP but focus on those deficiencies that staff believe, if not addressed, could lead to a determination that the GSP is incomplete or inadequate.⁴ This letter initiates consultation between the Department, the Plan Manager, and the Subbasin's 15 groundwater sustainability agencies (GSAs) regarding the amount of time needed to address the potential deficiencies and corrective actions. The Department will issue a final determination as described under the GSP Regulations⁵ no later than January 29, 2022.

If the Department determines the GSP to be incomplete, the deficiencies precluding approval would need to be addressed within a period not to exceed 180 days from the

¹ Water Code § 10720 et seq.

² 23 CCR § 355.2(e)(2).

³ 23 CCR § 355.2(e)(2)(B).

⁴ The Department recognizes that litigation regarding the GSP has been filed. The filing of litigation does not alter or affect the Department's mandate to issue its final assessment of the Agency's groundwater sustainability plan (GSP or Plan) for the basin within two years of its submission. (Water Code §10733.4(d).) Furthermore, the Department's assessment will consist of a technical review of the submitted Plan, as required by SGMA and the GSP Regulations, and the filing of the litigation did not in any way influence or affect the Department's evaluation of the Plan. The Department expresses no opinion on the claims of the parties in the pending litigation involving the GSP.

⁵ 23 CCR Division 2, Chapter 1.5, Subchapter 2.

determination. A determination of incomplete would allow the GSAs to formally address identified deficiencies and submit a revised GSP to the Department for further review and evaluation. Department staff will contact you before making the final determination to discuss the potential deficiencies and the amount of time needed by the GSAs to address the potential corrective actions detailed in the enclosed document.

Materials submitted to the Department to address deficiencies must be part of the GSP. The GSAs must justify that any materials submitted are part of the revised GSP; this justification is also part of the submittal. To facilitate the Department's review of the revised GSP, the GSAs should also provide a companion document with tracked changes of modifications made to address deficiencies. The GSAs must submit the revised GSP through the DWR SGMA Portal where, as is currently available, interested parties may provide comments on submitted materials to the Department.

Department staff will work expeditiously to review materials submitted to address deficiencies and to evaluate compliance of the revised GSP. The Department will keep a GSP status designated as incomplete during its review of the submitted materials. The Department could subsequently approve an incomplete GSP if the GSAs have taken corrective actions to address deficiencies identified by the Department within a period not to exceed 180 days from the determination. The Department could also issue a determination of inadequate for an incomplete GSP if the Department, after consultation with the State Water Resources Control Board, determines the GSAs have not taken sufficient actions to correct the deficiencies identified by the Department.

If you have any questions, please do not hesitate to contact the Sustainable Groundwater Management Office staff by emailing sgmps@water.ca.gov.

Thank you,

Paul Gosselin

Paul Gosselin
Deputy Director for Sustainable Groundwater Management

Enclosure:

1. Potential Deficiencies and Corrective Actions

2020 Groundwater Sustainability Plan
Eastern San Joaquin Subbasin (Basin No. 5-022.01)

Potential Deficiencies and Corrective Actions

Department of Water Resources (Department) staff have identified deficiencies regarding the Eastern San Joaquin Subbasin (Subbasin) Groundwater Sustainability Plan (GSP) that may preclude the Department's approval. Therefore, consistent with the GSP Regulations, Department staff are considering corrective actions the Subbasin's groundwater sustainability agencies (GSAs) should review to determine whether and how the deficiencies can be addressed. The deficiencies and potential corrective actions are explained below, including the general regulatory background, the specific deficiencies identified in the GSP, and specific actions to address the deficiencies. The specific actions identified are potential corrective actions until the Department makes a final determination.

General Background

Potential deficiencies identified in the Eastern San Joaquin Subbasin GSP relate to the development and documentation of sustainable management criteria, including undesirable results and minimum thresholds that define when undesirable results may occur.

The Department's GSP Regulations describe several required elements of a GSP under the heading of "Sustainable Management Criteria"⁶, including undesirable results, minimum thresholds, and measurable objectives. These components of sustainable management criteria must be quantified so that GSAs, the Department, and other interested parties can monitor progress towards sustainability in a basin consistently and objectively.

A GSA relies on local experience, public outreach and involvement, and information about the basin it has described in the GSP basin setting (i.e., the hydrogeologic conceptual model, the description of current and historical groundwater conditions, and the water budget), among other factors, to develop criteria for defining undesirable results and setting minimum thresholds and measurable objectives.⁷

The Sustainable Groundwater Management Act (SGMA) defines sustainable groundwater management as the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.⁸ Avoidance of undesirable results is thus explicitly part of sustainable groundwater management as established by SGMA and critical to the success of a GSP.

The definition of undesirable results is critical to establishing an objective method to define and measure sustainability for a basin. As an initial matter, SGMA provides a

⁶ 23 CCR § Article 5, Subarticle 3.

⁷ 23 CCR §§ 354.8, 354.10, 354.12 *et seq.*

⁸ Water Code § 10721(v).

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qualitative definition of undesirable results as “one or more” of six specific “effects caused by groundwater conditions occurring throughout the basin.”⁹

GSAAs define, in their GSPs, the specific significant and unreasonable effects that would constitute undesirable results and the groundwater conditions that would produce those results in their basins.¹⁰ The GSAAs’ definition must include a description of the processes and criteria relied upon to define undesirable results and describe the effect of undesirable results on the beneficial uses and users of groundwater, surface land uses (for subsidence), and surface water (for interconnected surface water).¹¹

SGMA leaves the task of establishing undesirable results and setting thresholds largely to the discretion of the GSAAs, subject to review by the Department. In its review, the Department requires a thorough and reasonable analysis of the groundwater conditions and the associated effects the GSAAs must manage the groundwater basin to avoid, and the GSAAs’ stated rationale for setting objective and quantitative sustainable management criteria to prevent those undesirable conditions from occurring.¹² If a GSP does not meet this requirement, the Department cannot evaluate the GSAAs’ likelihood of achieving their sustainability goal. That does not necessarily mean that the GSP or its objectives are inherently unreasonable; rather, the Department cannot evaluate whether the GSP’s implementation would successfully achieve sustainable management if it is unclear what undesirable conditions the GSAAs seek to avoid.

Potential Deficiency 1. The GSP lacks sufficient justification for identifying that undesirable results for chronic lowering of groundwater levels, subsidence, and depletion of interconnected surface waters can only occur in consecutive non-dry water year types. The GSP also lacks sufficient explanation for its chronic lowering of groundwater levels minimum thresholds and undesirable results.

The first potential deficiency relates to the GSP’s requirement of two consecutive non-dry (i.e., below normal, above normal, or wet) water-year types and the exclusion of dry and critically dry water-year types in the identification of undesirable results for chronic lowering of groundwater levels, and, by proxy, land subsidence and depletions of interconnected surface water.

Background

Related to this potential deficiency, SGMA defines the term “Undesirable Result,” in part, as one or more of the following effects caused by groundwater conditions occurring throughout the basin:¹³

⁹ Water Code § 10721(x).

¹⁰ California Department of Water Resources, Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria (Draft), November 2017.

¹¹ 23 CCR §§ 354.26(b), 354.28(c)(5), 354.28(c)(6).

¹² 23 CCR § 355.4(b)(1).

¹³ Water Code § 10721(x).

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

Potential Deficiency Details

Department staff identified two areas of concern, described below, which, if not addressed, may preclude approval of the GSP. Regarding the first area of concern, the GSP identifies that an undesirable result occurs “when at least 25 percent of representative monitoring wells used to monitor groundwater levels (5 of 20 wells in the Subbasin) fall below their minimum level thresholds for two consecutive years that are categorized as non-dry years (below-normal, above-normal, or wet), according to the San Joaquin Valley Water Year Hydrologic Classification.” The GSP further states that “the lowering of groundwater levels during consecutive dry or critically-dry years is not considered to be unreasonable, and would therefore not be considered an undesirable result, unless the levels do not rebound to above the thresholds following those consecutive non-dry years.”¹⁴

Department staff find that the water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e., two consecutive non-dry years) is not consistent with the intent of SGMA. The water-year type requirement could potentially allow for unmanaged and continued lowering of groundwater levels under certain hydrologic or climatic conditions that have occurred historically. A review of historical San Joaquin Valley water-year type classifications¹⁵ indicates the potential for dry periods without the occurrence of a second consecutive non-dry year to persist for greater than ten years (see, e.g., the 11 years from water years 1985 through 1995). Department staff also note that concurrent below normal, above normal, or wet years occurred in only five of the last twenty water years from 2001 through 2020. Because of this definition, GSAs in the Subbasin could disregard potential impacts of groundwater level declines below the minimum thresholds during extended periods of dry years, even if interrupted by normal or wet years.

¹⁴ ESJ GSP, p. 253.

¹⁵ Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices, Water Year 1901 through 2020. California Department of Water Resources, <https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST>.

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Department staff also find this methodology inconsistent with other portions of the GSP. For example, while describing measurable objectives for groundwater levels, the GSP states, “the margin of operational flexibility is intended to accommodate droughts, climate change, conjunctive use operations, or other groundwater management activities. The margin of operational flexibility is defined as the difference between the minimum threshold and the measurable objective.”¹⁶ Based on these statements, it appears the minimum thresholds already accommodate drought conditions, so it is unclear why the GSP’s definition of undesirable results further excludes minimum threshold exceedances during dry water years. (See Potential Corrective Action 1a.)

SGMA states that “overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.”¹⁷ If the GSAs intended to incorporate this concept into their definition of the undesirable result for chronic lowering of groundwater levels, the GSP fails to identify specific extraction and groundwater recharge management actions the GSAs would implement¹⁸ or otherwise describe how the Subbasin would be managed to offset, by increases in groundwater levels or storage during other periods, dry year reductions of groundwater storage. The GSP identifies many projects that, once implemented, may lead to the elimination of long-term overdraft conditions in the Subbasin. However, the GSP does not sufficiently detail how projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater level minimum thresholds are potentially exceeded for an extended period in the absence of two consecutive non-dry years. (See Potential Corrective Action 1b.)

As noted above, the GSP states that minimum thresholds developed for chronic lowering of groundwater levels serve as proxies for subsidence¹⁹ and depletion of interconnected surface waters.²⁰ Therefore, Department staff assume the GSAs intend to apply the same water-year type criteria to undesirable results for those sustainability indicators (i.e., land subsidence or depletion of interconnected surface water undesirable results do not occur until groundwater levels exceed the thresholds for two consecutive non-dry water years). However, where SGMA acknowledges that groundwater level declines during drought periods are not sufficient to cause an undesirable result for chronic lowering of groundwater levels, the statute does not similarly provide an exception for subsidence or stream depletion during periods of drought. (See Potential Corrective Action 1c.)

¹⁶ ESJ GSP, p. 259.

¹⁷ Water Code § 10721(x)(1).

¹⁸ 23 CCR § 354.44(b)(9).

¹⁹ ESJ GSP, p. 270.

²⁰ ESJ GSP, p. 271.

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Department staff's second area of concern is the GSP's evaluation of the effects of the proposed minimum thresholds and undesirable results on beneficial uses and users of groundwater. The GSP identifies that the chronic lowering of groundwater levels could cause undesirable results from wells going dry, reductions in pumping capacities, increased pumping costs, the need for deeper well installations or lowering of pumps, and adverse impacts to environmental uses and users.²¹ The GSP builds an analysis of domestic wells going dry into its minimum thresholds, thereby considering the factors of wells going dry and the need for deeper well installations. However, it does not address how the management criteria address the other factors identified by the GSAs as potential undesirable results, including reductions in pumping capacity or increased pumping costs for shallow groundwater users, or adverse impacts to environmental uses and users.

The GSAs set minimum thresholds in the Subbasin at the shallower of the 10th percentile domestic [or municipal] well depth or the historical low groundwater levels with a subtracted buffer value, which the GSP states allows for operational flexibility.²² These minimum threshold values generally allow groundwater levels to decline below historic lows; minimum thresholds defined using the buffer value approach allow twice the historical drawdown from the shallowest recorded groundwater levels.²³ Aside from the GSP's domestic well analysis, the only description of how minimum thresholds were evaluated to avoid undesirable results appears to be the statements that "for the majority of the Subbasin, GSA representatives identified no undesirable results, even if groundwater were to reach historical low groundwater levels" and that no GSA indicated undesirable results would occur "if the minimum threshold was set deeper than the [historic low] based on their understanding."²⁴ The GSP provides no further explanation or description of how the individual GSAs concluded that there would be no undesirable results based on the minimum thresholds.

The GSP only considers an undesirable result to occur for groundwater levels in the Subbasin when at least 25 percent of representative monitoring wells (5 of 20 wells) fall below their minimum threshold value for two consecutive non-dry water years.²⁵ The GSP does not justify or discuss how the GSAs developed the 25 percent threshold, nor does it explain or disclose the potential impacts anticipated during extended drier climate conditions using this threshold. In other words, the proposed management program may lead to potential effects on domestic wells or other beneficial uses and users during prolonged dry- or below-normal periods, and that information should, at a minimum, be disclosed and considered in the GSP. (See Potential Corrective Action 1d.)

If, after considering this potential deficiency, the GSAs retain minimum thresholds that allow for continued lowering of groundwater levels, it is reasonable to assume that some

²¹ ESJ GSP, p. 253.

²² ESJ GSP, p. 254.

²³ ESJ GSP, p. 258.

²⁴ ESJ GSP, p. 255.

²⁵ ESJ GSP, p. 253.

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groundwater well impacts (e.g., loss of production capacity) will occur during the implementation of the GSP. SGMA requires GSAs to consider the interests of all groundwater uses and users and to implement their GSPs to mitigate overdraft conditions.²⁶ Implementing specific projects and management actions prevents undesirable results and achieves the sustainable yield of the basin. The GSAs should describe how projects and management actions would address drinking water impacts due to continued overdraft between the start of GSP implementation and the achievement of the sustainability goal. If the GSP does not include projects or management actions to address drinking water impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why GSAs determined not to include actions to address those impacts from continued groundwater lowering below pre-SGMA levels. (See Potential Corrective Action 1e.)

Additionally, related to the groundwater level declines allowed for by the GSA's minimum thresholds, the GSAs have not explained how those groundwater level declines relate to the degradation of groundwater quality sustainability indicator. GSAs must describe, among other items, the relationship between minimum thresholds for a given sustainability indicator (in this case, chronic lowering of groundwater levels) and the other sustainability indicators.²⁷ The GSAs generally commit to monitoring a wide range of water quality constituents but they have only developed sustainable management criteria for total dissolved solids because they state they have not observed a causal nexus between groundwater management and degradation associated with the other constituents. While Department staff are not aware of evidence sufficient to conclude that the GSAs acted unreasonably by focusing on total dissolved solids, it is clear that the GSAs did not consider, or at least did not document, the potential for degradation to occur due to further lowering of groundwater levels beyond the historic lows. (See Potential Corrective Action 1f.)

Potential Corrective Action 1

- a) Department staff believe the management approach described in the GSP, which couples minimum thresholds and measurable objectives that account for operational flexibility during dry periods with a definition of undesirable results that disregards minimum threshold exceedances in all years except consecutive below normal, above normal, or wet years, to be inconsistent with the objectives of SGMA. Therefore, the GSAs should remove the water-year type requirement from the GSP's undesirable result definition.
- b) The GSP should be revised to include specific projects and management actions the GSAs would implement to offset drought-year groundwater level declines.
- c) The GSAs should thoroughly explain how their approach avoids undesirable results for subsidence and depletion of interconnected surface waters, as SGMA does not

²⁶ 23 CCR § 355.4(b)(4), 355.4(b)(6).

²⁷ 23 CCR § 354.28(b)(2).

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- include an allowance or exemption for those conditions to continue in periods of drought.
- d) Removing the water-year type requirement from the definition of an undesirable result (item a, above) would result in a GSP with groundwater level minimum thresholds designed to be generally protective of 90 percent of domestic wells regardless of regional hydrologic conditions. In that scenario, the GSAs should explain the rationale for determining that groundwater levels can exceed those thresholds at 25 percent of monitoring sites for two consecutive years before the effects would be considered significant and unreasonable. The GSAs should also explain how other factors they identified as "potential undesirable results" (e.g., adverse impacts to environmental uses and users) factored into selecting minimum thresholds and describe anticipated effects of the thresholds on beneficial uses and users of groundwater. Furthermore, the GSAs should explain whether other drinking water users that may rely on shallow wells, such as public water systems and state small water systems, were considered in the GSAs' site-specific thresholds. If not, the GSAs should conduct outreach with those users and incorporate their shallow wells, as applicable, into the site-specific minimum thresholds and measurable objectives.
 - e) The GSAs should revise the GSP to describe how they would address drinking water impacts caused by continued overdraft during the period between the start of GSP implementation and achieving the sustainability goal. If the GSP does not include projects or management actions to address those impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why the GSAs determined not to include specific actions to address drinking water impacts from continued groundwater lowering below pre-SGMA levels.
 - f) The GSP should be revised to explain how the GSAs will assess groundwater quality degradation in areas where further groundwater level decline, below historic lows, is allowed via the minimum thresholds. The GSAs should further describe how they will coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the GSP. The GSAs should also discuss efforts to coordinate with water quality regulatory agencies and programs in the Subbasin to understand and develop a process for determining if continued lowering of groundwater levels is resulting in degraded water quality in the Subbasin during GSP implementation.

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Potential Deficiency 2. The GSP does not provide enough information to support the use of the chronic lowering of groundwater level sustainable management criteria and representative monitoring network as a proxy for land subsidence.

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:²⁸

- 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;
- Maps or graphs showing the rates and extents of land subsidence defined by the minimum thresholds.

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 groundwater level minimum thresholds represent a reasonable proxy for avoiding land subsidence undesirable results. Additionally, the GSAs must demonstrate how the monitoring network is adequate to identify undesirable results for both metrics.

Potential Deficiency Details

Department staff find that the GSP does not adequately identify or define minimum thresholds and undesirable results for land subsidence. The GSP also does not provide adequate justification and explanation for using the groundwater level minimum thresholds and representative monitoring network as a proxy for land subsidence.

Generally, the GSP identifies that irrecoverable loss of groundwater storage and damage to infrastructure, including water conveyance facilities and flood control facilities, are potential impacts of land subsidence.²⁹ However, the GSP does not identify specific infrastructure locations, particularly those associated with public safety, in the Subbasin and the rate and extent of subsidence that would substantially interfere with those land surface uses and may lead to undesirable results. Additionally, without identifying infrastructure considered at risk for interference from land subsidence, Department staff cannot evaluate whether the groundwater level representative monitoring network is adequate to detect potential subsidence-related impacts.

Department staff find the GSP does not provide adequate evidence to demonstrate a significant correlation between groundwater levels and land subsidence in the Subbasin.

²⁸ 23 CCR § 354.28(c)(5).

²⁹ ESJ GSP, p. 269.

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Without explaining this correlation, the Department cannot evaluate whether the groundwater level minimum thresholds and associated conditions required for identifying an undesirable result would protect against significant and unreasonable impacts related to land subsidence. The GSP states a significant correlation exists between groundwater levels and land subsidence, with lowering groundwater levels driving further land subsidence.³⁰ Department staff agree with this general statement. However, the GSP fails to provide adequate evidence to evaluate further this correlation, specifically concerning potential subsidence caused by groundwater levels falling below historic lows, as would be allowed by the groundwater level minimum thresholds set in the GSP.

The GSP's justification for using the proposed groundwater level minimum thresholds as a proxy for land subsidence appears to rely mainly on an incomplete analysis and a data set with significant data gaps. The GSP states there are no historical records of significant and unreasonable land subsidence in the Subbasin.³¹ The GSP also states that there is a lack of direct land subsidence monitoring in the Subbasin.³² The GSP uses this absence of historical records to assert that historically dewatered geologic units are not compressible and, therefore, not at risk for land subsidence. Although groundwater level minimum thresholds are below historic lows, the GSP states that the GSAs do not expect further declines in groundwater levels to de-water materials deeper than 205 feet below ground surface (the deepest groundwater level minimum threshold value in the Subbasin).³³ The GSP states that subsurface materials encountered up to this depth are the same [non-compressible] geologic units that have been historically dewatered.

Department staff find multiple aspects of this justification speculative and not supported by the best available science. First, the GSP presents no analysis of historic groundwater levels or historically dewatered subsurface materials to support the conclusion that the geologic units are not compressible. Second, the GSP does not provide an evaluation showing how additional declines in groundwater levels would only affect subsurface materials similar to those which have been historically dewatered. Third, the GSP is unclear on whether the conditions required to identify an undesirable result for chronic lowering of groundwater levels in the Subbasin are also required to identify an undesirable result for land subsidence. Management proposed in the GSP could allow groundwater level minimum thresholds to be exceeded in periods where two consecutive non-dry years do not occur, which does not support the claim that only materials up to the deepest groundwater level minimum threshold (205 feet below ground surface) will be dewatered.

Department staff note that the legislature intended that implementation of SGMA would avoid or minimize subsidence³⁴ once GSAs achieve the sustainability goal for a basin. Without analysis examining how allowable groundwater levels below those historically

³⁰ ESJ GSP, p. 270.

³¹ ESJ GSP, p. 269.

³² ESJ GSP, p. 270.

³³ ESJ GSP, p. 270.

³⁴ Water Code § 10720.1(e).

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experienced in the Subbasin may affect land subsidence, Department staff cannot determine if the GSP adequately avoids or minimizes land subsidence. While SGMA does not require prevention of all land subsidence, the GSP does not provide sufficient evidence to conclude that the proposed chronic lowering of groundwater level minimum thresholds are adequate to detect and avoid land subsidence undesirable results.

Potential Corrective Action 2

The GSAs must provide detailed information to demonstrate how the use of the chronic lowering of groundwater level minimum thresholds are sufficient as a proxy to detect and avoid significant and unreasonable land subsidence that substantially interferes with surface land uses. Alternatively, the GSAs could commit to utilizing direct monitoring for subsidence, e.g., with remotely sensed subsidence data provided by the Department. In that case, the GSAs should develop sustainable management criteria based on rates and extents of subsidence. Department staff suggest the GSAs consider and address the following issues:

1. The GSAs should revise the GSP to identify the total subsidence that critical infrastructure in the Subbasin can tolerate during GSP implementation. Support this identification with information on the effects of subsidence on land surface beneficial uses and users and the amount of subsidence that would substantially interfere with those uses and users.
2. The GSAs should revise the GSP to document a significant correlation between groundwater levels and specific amounts or rates of land subsidence. The analysis should account for potential subsidence related to groundwater level declines below historical lows and further declines that are allowed to exceed minimum thresholds (i.e., during non-consecutive non-dry years, if applicable based on the resolution to Potential Deficiency 1, above). This analysis should demonstrate that groundwater level declines allowed during GSP implementation are preventative of the rates and magnitudes of land subsidence considered significant and unreasonable based on the identified infrastructure of concern. If there is not sufficient data to establish a correlation, the GSAs should consider other options such as direct monitoring of land subsidence (e.g., remotely sensed data provided by the Department, extensometers, or GPS stations) until such time that the GSAs can establish a correlation.
3. The GSAs should explain how the groundwater level representative monitoring network is sufficient to detect significant and unreasonable subsidence that may substantially interfere with land uses, specifically any identified infrastructure of concern. If the groundwater level monitoring network alone is not adequate, based on specific infrastructure locations, Department staff suggest incorporating continued analysis of available InSAR data to cover areas with data gaps.