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

Kristin Sicke
Yolo Subbasin Groundwater Agency
34274 State Highway 16
Woodland, CA 95695
ksicke@ycfcwcd.org

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

Dear Kristin Sicke,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP or Plan) submitted for the Sacramento Valley – Yolo Subbasin and has determined the GSP is approved. The approval is based on recommendations from the Staff Report, included as an exhibit to the attached Statement of Findings, which describes that the Yolo Subbasin GSP satisfies the objectives of the Sustainable Groundwater Management Act (SGMA) and substantially complies with the GSP Regulations. The Staff Report also proposes recommended corrective actions that the Department believes will enhance the GSP and facilitate future evaluation by the Department. The Department strongly encourages the recommended corrective actions be given due consideration and suggests incorporating all resulting changes to the GSP in future updates.

Recognizing SGMA sets a long-term horizon for groundwater sustainability agencies (GSAs) to achieve their basin sustainability goals, monitoring progress is fundamental for successful implementation. GSAs are required to evaluate their GSPs at least every five years and whenever the Plan is amended, and to provide a written assessment to the Department. Accordingly, the Department will evaluate approved GSPs and issue an assessment at least every five years. The Department will initiate the first periodic review of the Yolo Subbasin GSP no later than January 28, 2027.

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

Paul Gosselin
Deputy Director
Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Approval of the Sacramento Valley – Yolo Subbasin Groundwater Sustainability Plan

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE APPROVAL OF THE SACRAMENTO VALLEY – YOLO SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted by the Yolo Subbasin Groundwater Agency (GSA or Agency) for the Sacramento Valley – Yolo Subbasin (Basin No. 5-021.67).

Department management has discussed the Plan with staff and has reviewed the Department Staff Report, entitled Sustainable Groundwater Management Program Groundwater Sustainability Plan Assessment Staff Report, attached as Exhibit A, recommending approval of the GSP. Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Plan and concurs with staff's recommendation and all the recommended corrective actions. The Department therefore **APPROVES** the Plan and makes the following findings:

A. The Plan satisfies the required conditions as outlined in § 355.4(a) of the GSP Regulations (23 CCR § 350 et seq.):

    1. The Plan was submitted within the statutory deadline of January 31, 2022. (Water Code § 10720.7(a); 23 CCR § 355.4(a)(1).)

    2. The Plan was complete, meaning it generally appeared to include the information required by the Act and the GSP Regulations sufficient to warrant a thorough evaluation and issuance of an assessment by the Department. (23 CCR § 355.4(a)(2).)

    3. The Plan, either on its own or in coordination with other Plans, covers the entire Subbasin. (23 CCR § 355.4(a)(3).)

B. The general standards the Department applied in its evaluation and assessment of the Plan are: (1) "conformance" with the specified statutory requirements, (2) "substantial compliance" with the GSP Regulations, (3) whether the Plan is likely

to achieve the sustainability goal for the Subbasin within 20 years of the implementation of the Plan, and (4) whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) Application of these standards requires exercise of the Department's expertise, judgment, and discretion when making its determination of whether a Plan should be deemed "approved," "incomplete," or "inadequate."

The statutes and GSP Regulations require Plans to include and address a multitude and wide range of informational and technical components. The Department has observed a diverse array of approaches to addressing these technical and informational components being used by GSAs in different basins throughout the state. The Department does not apply a set formula or criterion that would require a particular outcome based on how a Plan addresses any one of SGMA's numerous informational and technical components. The Department finds that affording flexibility and discretion to local GSAs is consistent with the standards identified above; the state policy that sustainable groundwater management is best achieved locally through the development, implementation, and updating of local plans and programs (Water Code § 113); and the Legislature's express intent under SGMA that groundwater basins be managed through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner. (Water Code § 10720.1(h)) The Department's final determination is made based on the entirety of the Plan's contents on a case-by-case basis, considering and weighing factors relevant to the particular Plan and Subbasin under review.

C. In making these findings and Plan determination, the Department also recognized that: (1) the Department maintains continuing oversight and jurisdiction to ensure the Plan is adequately implemented; (2) the Legislature intended SGMA to be implemented over many years; (3) SGMA provides Plans 20 years of implementation to achieve the sustainability goal in a Subbasin (with the possibility that the Department may grant GSAs an additional five years upon request if the GSA has made satisfactory progress toward sustainability); and, (4) local agencies acting as GSAs are authorized, but not required, to address undesirable results that occurred prior to enactment of SGMA. (Water Code §§ 10721(r); 10727.2(b); 10733(a); 10733.8.)

D. The Plan conforms with Water Code §§ 10727.2 and 10727.4, substantially complies with 23 CCR § 355.4, and appears likely to achieve the sustainability goal for the Subbasin. It does not appear at this time that the Plan will adversely affect the ability of adjacent basins to implement their GSPs or impede achievement of sustainability goals.

1. The sustainable management criteria to maintain groundwater levels at or near the historical lows are sufficiently justified and explained. The Plan relies on credible information and science to quantify the groundwater conditions that the Plan seeks to avoid and provides an objective way to determine whether the Subbasin is being managed sustainably in accordance with SGMA. (23 CCR § 355.4(b)(1).)

2. The Plan has identified reasonable measures and schedules to eliminate data gaps in order to refine the sustainable management criteria and monitoring network and to improve the hydrogeologic model and the numerical groundwater model. (23 CCR § 355.4(b)(2).)

3. The projects and management actions proposed are designed to increase groundwater recharge and augment water supply are reasonable and commensurate with the level of understanding of the Subbasin setting. The projects and management actions described in the Plan provide a feasible approach to achieving the Subbasin's sustainability goal and should provide the GSA with greater versatility to adapt and respond to changing conditions and future challenges during GSP implementation. (23 CCR § 355.4(b)(3).)

4. The Plan provides a detailed explanation of how the varied interests of groundwater uses and users in the Subbasin were considered in developing the sustainable management criteria and how those interests, including shallow domestic wells and groundwater depended ecosystems, would be impacted by the chosen minimum thresholds. (23 CCR § 355.4(b)(4).)

5. The Plan's projects and management actions appear feasible at this time and appear capable of preventing undesirable results and ensuring that the Subbasin is managed within its sustainable yield within 20 years. The Department will continue to monitor Plan implementation and reserves the right to change its determination if projects and management actions are not implemented or appear unlikely to prevent undesirable results or achieve sustainability within SGMA timeframes. (23 CCR § 355.4(b)(5).)

6. The Plan includes a reasonable assessment of overdraft conditions and includes reasonable means to mitigate overdraft, if present. (23 CCR § 355.4(b)(6).)

7. At this time, it does not appear that the Plan will adversely affect the ability of an adjacent basin to implement its GSP or impede achievement of sustainability goals in an adjacent basin as the GSP sets the minimum thresholds for groundwater levels at or near historical lows. The GSA expects to provide more detailed impact analysis to the adjacent basins in

the next periodic evaluation for the Department's review. (23 CCR § 355.4(b)(7).)

8. Because a single plan was submitted for the Subbasin, a coordination agreement was not required. (23 CCR § 355.4(b)(8).)

9. The GSA's 20 member agencies and six affiliated parties have historically implemented numerous projects and management actions to address problematic groundwater conditions in the Subbasin. For instance, Yolo County Flood Control & Water Conservation District has implemented a conjunctive use program delivering surface water from Clear Lake and the Indian Valley Reservoirs to the farmers in the Subbasin in lieu of groundwater. And the Davis-Woodland Water Supply Project provides surface water from the Sacramento River to the cities of Woodland, Davis, and UC Davis's drinking water. The GSA's member agencies and their history of groundwater management provide a reasonable level of confidence that the GSA has the legal authority and financial resources necessary to implement the Plan. (23 CCR § 355.4(b)(9).)

10. Through review of the Plan and consideration of public comments, the Department determines that the GSA adequately responded to comments that raised credible technical or policy issues with the Plan, sufficient to warrant approval of the Plan at this time. The Department also notes that the recommended corrective actions included in the Staff Report are important to addressing certain technical or policy issues that were raised and, if not addressed before future, subsequent plan evaluations, may preclude approval of the Plan in those future evaluations. (23 CCR § 355.4(b)(10).)

E. In addition to the grounds listed above, DWR also finds that:

1. The Department developed its GSP Regulations consistent with and intending to further the State's human right to water policy through implementation of SGMA and the Regulations, primarily by achieving sustainable groundwater management in a basin. By ensuring substantial compliance with the GSP Regulations, the Department has considered the state policy regarding the human right to water in its evaluation of the Plan. (Water Code § 106.3; 23 CCR § 350.4(g).)

2. The Plan acknowledges and identifies interconnected surface waters within the Subbasin. The GSA proposes initial sustainable management criteria to manage this sustainability indicator and measures to improve understanding and management of interconnected surface water. The GSA acknowledges, and the Department agrees, that many data gaps related to interconnected surface water exist. The GSA should continue

filling data gaps, collecting additional monitoring data, and coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping. Future periodic evaluations of the Plan and amendments to the Plan should aim to improve the initial sustainable management criteria as more information and improved methodology becomes available.

3. The basin is not currently in a state of long-term overdraft and projections of future basin extractions are likely to stay within current and historic ranges, at least until the next periodic evaluation by the GSA and the Department. Projections of future subbasin extractions appear likely to stay within current and historic ranges, at least until the next periodic evaluation by the GSA and the Department. Subbasin groundwater levels and other SGMA sustainability indicators appear unlikely to substantially deteriorate while the GSA implements the Department's recommended corrective actions.

4. The California Environmental Quality Act (Public Resources Code § 21000 *et seq*.) does not apply to the Department's evaluation and assessment of the Plan.

Accordingly, the GSP submitted by the Agency for the Yolo Subbasin is hereby **APPROVED.** The recommended corrective actions identified in the Staff Report will assist the Department's future review of the Plan's implementation for consistency with SGMA and the Department therefore recommends the Agency address them by the time of the Department's periodic review, which is set to begin on January 28, 2027, as required by Water Code § 10733.8. Failure to address the Department's recommended corrective actions before future, subsequent plan evaluations, may lead to a Plan being determined incomplete or inadequate.

Signed:

Karla Nemeth

Karla Nemeth, Director
Date: October 26, 2023

Exhibit A: Groundwater Sustainability Plan Assessment Staff Report – Sacramento Valley – Yolo Subbasin

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

Groundwater Basin Name:	Sacramento Valley – Yolo Subbasin (No. 5-021.67)
Submitting Agency:	Yolo Subbasin Groundwater Sustainability Agency
Submittal Type:	Initial GSP Submission
Submittal Date:	January 28, 2022
Recommendation:	Approved
Date:	October 26, 2023

The Yolo Subbasin Groundwater Sustainability Agency (GSA or Agency) submitted the Yolo Groundwater Sustainability Plan (GSP or Plan) for the Sacramento Valley – Yolo Subbasin (Subbasin) to the Department of Water Resources (Department) for evaluation and assessment as required by the Sustainable Groundwater Management Act (SGMA)[1] and GSP Regulations.[2] The GSP covers the entire Subbasin for the implementation of SGMA.

After evaluation and assessment, Department staff conclude that the Plan includes the required components of a GSP, demonstrates a thorough understanding of the Subbasin based on what appears to be the best available science and information, sets well explained, supported, and reasonable sustainable management criteria to prevent undesirable results as defined in the Plan, and proposes a set of projects and management actions that will likely achieve the sustainability goal defined for the Subbasin.[3] Department staff will continue to monitor and evaluate the Subbasin's progress toward achieving the sustainability goal through annual reporting and future periodic evaluations of the GSP and its implementation.

- ***Based on the current evaluation of the Plan, Department staff recommend the GSP be approved with the recommended corrective actions described herein.***

This assessment includes five sections:

- **Section 1 – Summary:** Provides an overview of Department staff's assessment and recommendations.

[1] Water Code § 10720 *et seq*.
[2] 23 CCR § 350 *et seq*.
[3] 23 CCR § 350 *et seq*.

- **Section 2 – Evaluation Criteria:** Describes the legislative requirements and the Department's evaluation criteria.
- **Section 3 – Required Conditions:** Describes the submission requirements, Plan completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 4 – Plan Evaluation:** Provides an assessment of the contents included in the GSP organized by each Subarticle outlined in the GSP Regulations.
- **Section 5 – Staff Recommendation:** Includes the staff recommendation for the Plan and any recommended or required corrective actions, as applicable.

1 SUMMARY

Department staff recommend approval of the Yolo Subbasin GSP. The GSA has identified areas for improvement of its Plan (e.g., groundwater levels, groundwater quality, and land subsidence). Department staff concur that those items are important and recommend the GSA address them as soon as possible. Department staff have also identified additional recommended corrective actions within this assessment that the GSA should consider addressing by the first periodic evaluation of the Plan. The recommended corrective actions generally focus on the following:

(1) Provide rationale/justification for requiring two or more management areas to define undesirable results for groundwater levels, land subsidence, and interconnected surface water.
(2) Include all constituents of concern in the development of sustainable management criteria if degradation of water quality or migration of existing elevated concentrations for these constituents could lead to undesirable results.
(3) Revise the sustainable management criteria for land subsidence.
(4) continuing to fill data gaps, collecting additional monitoring data, coordinating with resources agencies and interested parties to understand beneficial uses and users that may be impacted by depletions of interconnected surface water caused by groundwater pumping, and potentially refine sustainable management criteria.

Addressing the recommended corrective actions identified in Section 5 of this assessment will be important to demonstrate, on an ongoing basis, that implementation of the Plan is likely to achieve the sustainability goal.

2 EVALUATION CRITERIA

The GSA submitted a single GSP to the Department to evaluate whether the Plan conforms to specified SGMA requirements[4] and is likely to achieve the sustainability goal for the Yolo Subbasin.[5] To achieve the sustainability goal for the Subbasin, the GSP must demonstrate that implementation of the Plan 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.[6] Undesirable results must be defined quantitatively by the GSAs.[7] The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its GSP or achieve its sustainability goal.[8]

For the GSP to be evaluated by the Department, it must first be determined that the Plan was submitted by the statutory deadline,[9] and that it is complete and covers the entire basin.[10] If these conditions are satisfied, the Department evaluates the Plan to determine whether it complies with specific SGMA requirements and substantially complies with the GSP Regulations.[11] Substantial 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.[12]

When evaluating whether the Plan is likely to achieve the sustainability goal for the Subbasin, Department staff reviewed the information provided and relied upon in the GSP for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.[13] The Department's review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the GSA, including whether the interests of the beneficial uses and users of groundwater in the basin have been considered; whether sustainable management criteria and projects and management actions described in the Plan are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.[14]

[4] Water Code §§ 10727.2, 10727.4.
[5] Water Code § 10733(a).
[6] Water Code § 10721(v).
[7] 23 CCR § 354.26 *et seq.*
[8] Water Code § 10733(c).
[9] 23 CCR § 355.4(a)(1).
[10] 23 CCR §§ 355.4(a)(2), 355.4(a)(3).
[11] 23 CCR § 350 *et seq.*
[12] 23 CCR § 355.4(b).
[13] 23 CCR § 351(h).
[14] 23 CCR §§ 355.4(b)(1), (3), (4), and (5).

The Department also considers whether the GSA has the legal authority and financial resources necessary to implement the Plan.[15]

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 the overdraft.[16] The Department also considers whether the Plan provides reasonable measures and schedules to eliminate identified data gaps.[17] Lastly, the Department's review considers the comments submitted on the Plan and evaluates whether the GSA adequately responded to the comments that raise credible technical or policy issues with the Plan.[18]

The Department is required to evaluate the Plan within two years of its submittal date and issue a written assessment of the Plan.[19] The assessment is required to include a determination of the Plan's status.[20] The GSP Regulations define the three options for determining the status of a Plan: Approved,[21] Incomplete,[22] or Inadequate.[23]

Even when review indicates that the GSP satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may recommend corrective actions.[24] 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 the Plan adversely affects adjacent basins. While the issues addressed by the recommended corrective actions do not, at this time, preclude approval of the Plan, 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 sustainability goal within the basin.[25] Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first periodic assessment.[26]

The staff assessment of the GSP involves the review of information presented by the GSA, including models and assumptions, and an evaluation of that information based on scientific reasonableness, including standard or accepted professional and scientific methods and practices. The assessment does not require Department staff to recalculate or reevaluate technical information provided in the Plan or to perform its own geologic or

[15] 23 CCR § 355.4(b)(9).
[16] 23 CCR § 355.4(b)(6).
[17] 23 CCR § 355.4(b)(2).
[18] 23 CCR § 355.4(b)(10).
[19] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[20] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[21] 23 CCR § 355.2(e)(1).
[22] 23 CCR § 355.2(e)(2).
[23] 23 CCR § 355.2(e)(3).
[24] Water Code § 10733.4(d).
[25] Water Code § 10733.8.
[26] 23 CCR § 356.4 *et seq*.

engineering analysis of that information. The staff recommendation to approve a Plan does not signify that Department staff, were they to exercise the professional judgment required to develop a GSP for the basin, would make the same assumptions and interpretations as those contained in the 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 approval of the 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.[27] Also, GSAs have an ongoing duty to provide reports to the Department, periodically reassess their plans, and, when necessary, update or amend their plans.[28] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether Plan implementation adversely affects the ability of adjacent basins to achieve their sustainability goals.

3 REQUIRED CONDITIONS

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline. The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin.

3.1 SUBMISSION DEADLINE

SGMA required basins categorized as high- or medium-priority and not subject to critical conditions of overdraft to submit a GSP no later than January 31, 2022.[29]

The GSA submitted its Plan on January 28, 2022.

3.2 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.[30]

The GSA submitted an adopted GSP for the entire Subbasin. After an initial, preliminary review, Department staff found the GSP to be complete and appearing to include the

[27] Water Code § 10733.8; 23 CCR § 355.6.
[28] Water Code §§ 10728 *et seq.*, 10728.2.
[29] Water Code § 10720.7(a)(2).
[30] 23 CCR § 355.4(a)(2).

required information, sufficient to warrant a thorough evaluation by the Department.[31] The Department posted the GSP to its website on February 14, 2022.[32]

3.3 Basin Coverage

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[33] A GSP that is intended to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSAs.

The GSP intends to manage the entire Yolo Subbasin and the jurisdictional boundary of the submitting GSA fully contains the Subbasin.[34]

4 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. The Department staff's evaluation of the likelihood of the Plan to attain the sustainability goal for the Subbasin is provided below.

4.1 Administrative Information

The GSP Regulations require each Plan to include administrative information identifying the submitting Agency, its decision-making process, and its legal authority;[35] a description of the Plan area and identification of beneficial uses and users in the Plan area;[36] and a description of the ability of the submitting Agency to develop and implement a Plan for that area.[37]

The Yolo Subbasin's (Subbasin) GSP was prepared and is being implemented by the Yolo Subbasin Groundwater Sustainability Agency (GSA). The entirety of the Subbasin

[31] The Department undertakes a preliminary completeness review of a submitted Plan under section 355.4(a) of the GSP Regulations to determine whether the elements of a Plan required by SGMA and the Regulations have been provided, which is different from a determination, upon review, that a Plan is "incomplete" for purposes of section 355.2(e)(2) of the Regulations.
[32] https://sgma.water.ca.gov/portal/gsp/preview/96.
[33] Water Code § 10727(b); 23 CCR § 355.4(a)(3).
[34] Yolo Subbasin GSP, Section 1.5, p. 61.
[35] 23 CCR § 354.6 *et seq*.
[36] 23 CCR § 354.8 *et seq*.
[37] 23 CCR § 354.6(e).

is covered by the GSA.[38] The GSA was formed through a Joint Powers Agreement[39] (JPA) composed of 20 member agencies and six affiliated parties.[40] The GSP's Table 1-1 lists these member agencies and Figure 1-2 illustrates each member agency's jurisdictional and/or service area boundaries.[41] The GSP describes the GSA's organizational and management structure.[42]

The Subbasin encompasses 844 square miles within the Sacramento Valley Groundwater Basin. The Subbasin is bounded on the west by the coast range, to the east by the Sacramento River, and the south by Putah Creek and the County line.[43] The adjacent subbasins include Colusa to the north, Sutter to the northeast, North American to the east, South American to the southeast, and Solano to the south.[44]

The GSP describes the Subbasin's jurisdictions, land uses, disadvantaged communities, and tribal lands. The GSP states that the GSA's jurisdictional boundary covers the entire Yolo Subbasin.[45] The GSP includes figures illustrating the Subbasin's agricultural, domestic, and municipal well density.[46] The Subbasin contains more than 20 agencies with land and water management responsibilities, including agricultural water purveyors, urban water purveyors, and flood management agencies.[47] The Subbasin's disadvantaged communities include Dunnigan, Knights Landing, and the main campus of the University of California, Davis.[48] The GSP describes the Subbasin's land uses as follows: 60% agriculture, 31% vegetation, 6% managed wetlands, and 5% urban and incorporated land use areas.[49] Staff note that these numbers add up to 102% instead of 100% which appears to be due to a rounding error. Lastly, the GSP describes the Subbasin's tribal lands, which includes the Yocha Dehe Wintun Nation that owns or manages 5,000 acres within the Capay Valley, including trust land held by the federal government and fee land owned by the Tribe. The Tribe uses a combination of surface water, from Cache Creek, and groundwater extracted from the Subbasin.[50]

[38] Yolo Subbasin GSP, Section 1.5, p. 61, Figure 1-2, p. 57.
[39] Yolo Subbasin GSP, Appendix A, pp. 377-414.
[40] Yolo Subbasin GSP, Section 1.4.3, pp. 55-61.
[41] Yolo Subbasin GSP, Section 1, Figure 1-2, p. 57.
[42] Yolo Subbasin GSP, Section 1.4.2, pp. 56-60.
[43] Yolo Subbasin GSP, Section 1.5, pp. 61-62.
[44] Yolo Subbasin GSP, Section 2.1.2.1.1, p. 98.
[45] Yolo Subbasin GSP, Section 1.5, p. 61, Figure 1-2, p. 57.
[46] Yolo Subbasin GSP, Figures 1-6 to 1-8, pp. 72-74.
[47] Yolo Subbasin GSP, Section 1.5.1, p. 62, Figure 1-5, p. 71.
[48] Yolo Subbasin GSP, Section 1.5.2.1, pp. 63-64, Figure 1-10, p. 76.
[49] Yolo Subbasin GSP, Section 1.5.2, p. 63, Figure 1-4, p. 70.
[50] Yolo Subbasin GSP, Section 1.5.2.2, p. 65.

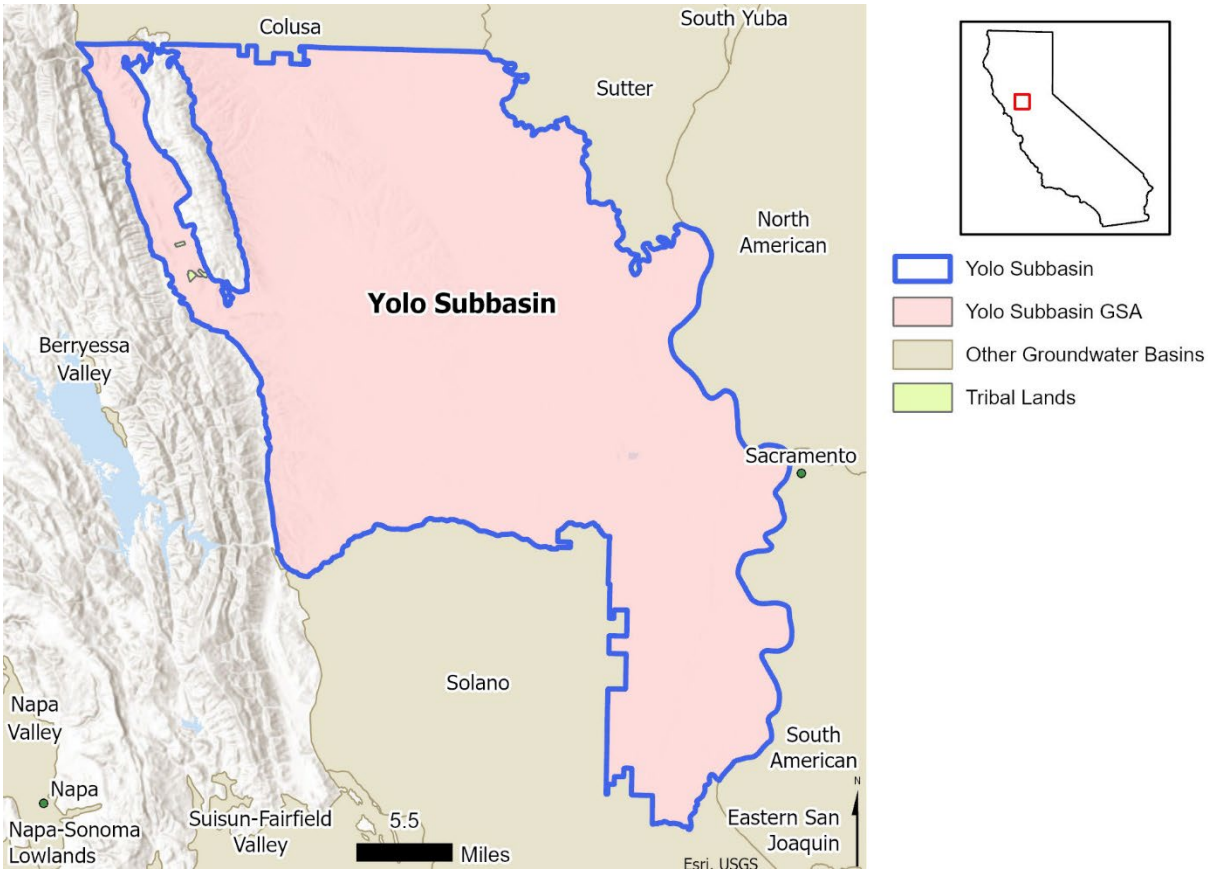

Figure 1: Yolo Subbasin Location Map.

The GSP lists the existing water resources management programs.[51] The existing water resources programs include Groundwater Management Plans, an Integrated Regional Water Management Plan, and Conjunctive Use Programs.[52] Several member agencies have established groundwater management plans including the cities of Davis and Woodland, Dunnigan Water District, RD 108, 787, 2035, and Yolo County Flood Control and Water Conservation District (YCFC & WCD). The Subbasin's notable conjunctive use programs include the YCFC&WCD Conjunctive Use Program and the David-Woodland Water Supply Project. The YCFC&WCD Conjunctive Use Program delivers surface water from Clear Lake and the Indian Valley Reservoirs to farmers and recharges approximately 40,000 acre-feet per year, intending to improve water delivery flexibility and minimize the period of waiting for farms during peak demand periods.[53] The Davis-Woodland Water Supply Project diverts up to 45,000 acre-feet per year from the Sacramento River for the cities of Woodland, Davis, and UC Davis's drinking water.[54]

[51] Yolo Subbasin GSP, Table 4-1, pp. 77-78.
[52] Yolo Subbasin GSP, Section 1.5.3.1.2, pp. 66-67. Sections 1.5.3.1.3 to 1.5.3.1.6, pp. 79-80.
[53] Yolo Subbasin GSP, Section 1.5.3.2.1, pp. 80-81.
[54] Yolo Subbasin GSP, Section 1.5.3.2.2, p. 81.

The Subbasin's beneficial uses include agricultural, municipal, industrial, domestic, and environmental uses, while its beneficial users include agricultural operations (e.g., farms, dairies, and food processors), rural residents, managed and natural wetlands, groundwater dependent ecosystems (GDEs), commercial and industrial users, incorporated cities and communities, unincorporated communities, and state facilities.

The GSA's underlying JPA outlines the decision-making process for the Agency.[55] The JPA states that the Agency of Board of Directors will conduct all business by majority vote, except for certain actions requiring a supermajority vote (e.g., budgetary items, policies and procedures, GSP approval, and membership, etc.). Each member has one vote. Affiliated members participate in the governance of the Agency and on its Board of Directors in the same manner as members through a memorandum of understanding (MOU) with the Agency.

The GSP contains a Communications and Engagement Plan.[56] The GSP describes that the GSP development involves several public meeting opportunities including board meetings, executive committee meetings, working group meetings, public meetings, and technical advisory group meetings. In addition, the GSA provides various outreach and engagement opportunities, such as special workshops and outreach meetings.[57] The Plan also notes that the Agency's website is a valuable resource for outreach and communication. The website also allows interested parties to register to receive updates on upcoming events, such as board and working group meetings, and to stay updated on the Agency's activities and the GSP's implementation.[58] The GSP lists the public meetings and workshops that have been held by the Agency.[59] All meeting materials are posted on the GSA's website. Lastly, the GSP notes that the Agency received and responded to 280 comments for this GSP.[60]

The GSA estimates that annual plan implementation costs will include $150,000 for administration, $90,000 for monitoring, and $50,000 for annual report development, additionally, costs will include $60,000 for sustainability management and $150,000 for the 5-year GSP update.

Overall, staff conclude that the administrative information included in the Plan substantially complies with the requirements outlined in the GSP Regulations.

4.2 Basin Setting

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model; a

[55] Yolo Subbasin GSP, Section 1.4.2, pp. 59-60, Appendix A, pp. 377 – 407.
[56] Yolo Subbasin GSP, Appendix B, pp. 415-448.
[57] Yolo Subbasin GSP, Section 1.5.5.2.1, p. 91.
[58] Yolo Subbasin GSP, Section 1.5.5.3, p. 95.
[59] Yolo Subbasin GSP, Section 1.5.5.3, Table 1-5, pp.91-95.
[60] Yolo Subbasin GSP, Appendix C, pp. 449-626.

description of historical and current groundwater conditions; and a water budget accounting for total annual volume of groundwater and surface water entering and leaving the basin, including historical, current, and projected water budget conditions.[61]

4.2.1 Hydrogeologic Conceptual Model

The hydrogeologic conceptual model is a non-numerical model of the physical setting, characteristics, and processes that govern groundwater occurrence within a basin, and represents a local agency's understanding of the geology and hydrology of the basin that support the geologic assumptions used in developing mathematical models, such as those that allow for quantification of the water budget.[62] The GSP Regulations require a descriptive hydrogeologic conceptual model that includes a written description of geologic conditions, supported by cross sections and maps,[63] and includes a description of basin boundaries and the bottom of the basin,[64] principal aquifers and aquitards,[65] and data gaps.[66]

The GSP's hydrogeologic conceptual model includes written descriptions, cross-sections, and maps describing the Subbasin's regional geologic and structural setting, principal aquifers, and physical characteristics The description covers the general geology, structural features, and the major geologic units of the Subbasin.[67] In describing general geology, the GSP states that the Subbasin contains consolidated continental sediments and borders the uplifted, marine sedimentary rocks of the eastern Coast Range mountains. The GSP describes the Capay Valley in the northwest as an isolated, hydrogeologically complex region between the Coast Range and Capay Hills serving as a groundwater tributary to the Subbasin. In describing structural features, the GSP identifies the north-south trending Capay Hills anticline, the north-south trending doubly plunging Plainfield Ridge anticline, the north-south trending Madison syncline, the Zamora reverse fault, and a series of other unnamed faults that cut sedimentary deposits or folded rocks. The primary geologic formations include Alluvium (Q), the Red Bluff Formation (Qrb), and the Tehama Formation (TQc). The Tehama Formation is further divided into the upper Tehama Formation and the lower Tehama Formation.[68]

[61] 23 CCR § 354.12.
[62] DWR Best Management Practices for the Sustainable Management of Groundwater: Hydrogeologic Conceptual Model, December 2016: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-3-Hydrogeologic-Conceptual-Model_ay_19.pdf.
[63] 23 CCR §§ 354.14 (a), 354.14 (c).
[64] 23 CCR §§ 354.14 (b)(2-3).
[65] 23 CCR § 354.14 (b)(4) *et seq.*
[66] 23 CCR § 354.14 (b)(5).
[67] Yolo Subbasin GSP, Section 2.1.5, pp. 113-129.
[68] Yolo Subbasin GSP, Section 2.1.5.1, p. 114.

The GSP describes the lateral boundaries[69] and the bottom of the Subbasin.[70] The description of the lateral boundaries covers geographic boundaries[71], adjacent basins,[72] and physical boundaries.[73] The GSP defines the bottom of the Subbasin as the base of freshwater based on depths where specific conductance measurements remain less than 3,000 micromhos per centimeter, which occurs between approximately 1,000 to 3,000 feet below mean sea level. The GSP states that the base of freshwater is highest along the western and northeastern edges of the Subbasin, deepening toward the central and southern regions. The GSP considers the base of freshwater generally equivalent to the base of the Tehama Formation.

The GSP describes one principal aquifer and its properties and principal uses.[74] The GSP identifies three zones (shallow, intermediate, and deep aquifer zones) within the principal aquifer system extending from the Quaternary Alluvium at the surface down through the upper Tehama Formation. The shallow zone (approximately 220 feet below ground surface) encompasses alluvium and upper portions of the upper Tehama Formation, consisting of thick sand and gravel deposits that are thin and fine outward from major creeks. The intermediate zone (approximately 220 to 600 feet below ground surface) encompasses the upper Tehama Formation consisting of sheet flood sands interbedded with silts and clays with thicker sand layers occurring in the eastern Subbasin and thinner layers occurring in the west. The deep zone (approximately 600 to 1,500 feet below ground surface) encompasses the deeper portions of the upper Tehama Formation consisting of fluvial sand sequences with many thicker sand beds occurring in the eastern Subbasin and fewer, thinner sand beds in the western Subbasin. The GSP also describes the physical properties such as hydraulic conductivity, transmissivity, storage coefficient, and specific yield.[75]

The GSP identifies data gaps in the hydrogeologic conceptual model.[76] The GSP states that data gaps exist in the lateral boundaries (e.g., connectivity with the adjacent basins) and the base of freshwater, delineation and characteristics of the three aquifer zones, and hydrogeology of the Dunnigan Hills area.

Overall, staff conclude that the information included in the Plan for the hydrogeologic conceptual model substantially complies with the requirements outlined in the GSP Regulations.

[69] Yolo Subbasin GSP, Section 2.1.2.1, pp. 97-98.
[70] Yolo Subbasin GSP, Section 2.1.2.2, p. 101.
[71] Yolo Subbasin GSP, Figure 2-1, p. 99.
[72] Yolo Subbasin GSP, Section 2.1.2.1.1, p. 98.
[73] Yolo Subbasin GSP, Section 2.1.2.1.2, p. 101.
[74] Yolo Subbasin GSP, Section 3.1.3, pp. 101-108.
[75] Yolo Subbasin GSP, Section 2.1.3.4, pp. 106-108.
[76] Yolo Subbasin GSP, Section 2.1.10, p. 131.

4.2.2 Groundwater Conditions

The GSP Regulations require a written description of historical and current groundwater conditions for each of the applicable sustainability indicators and groundwater dependent ecosystems that includes the following: groundwater elevation contour maps and hydrographs,[77] a graph depicting change in groundwater storage,[78] maps and cross-sections of the seawater intrusion front,[79] maps of groundwater contamination sites and plumes,[80] maps depicting total subsidence,[81] identification of interconnected surface water systems and an estimate of the quantity and timing of depletions of those systems,[82] and identification of groundwater dependent ecosystems.[83]

The GSP provides hydrographs and groundwater elevation contour maps to describe the Subbasin's historical groundwater elevation conditions. The GSP includes more than 70 hydrographs that generally include data from the 1970s to 2018.[84] In general, the Subbasin's groundwater levels have fluctuated over time increased approximately 20 feet from 1975 to 2011, decreased approximately 15 feet from 2012-2017, and increased approximately 10 feet from 2017-2018. Overall, Department staff conclude the Subbasin appears to have generally stable groundwater levels. The GSP also discusses vertical gradients between the three zones of the principal aquifer based on hydrographs for two nested monitoring wells each with four well completions.[85] These hydrographs demonstrate a downward vertical gradient from the shallow zone to the upper intermediate zone, an upward vertical gradient from the lower and upper intermediate zones, and an upward vertical gradient from the deep zone to the intermediate zone.

The GSP includes fall and spring groundwater elevation contour maps for 2015 (a dry year) and 2018 (a wet year).[86] Additionally, the GSP includes figures illustrating the change in groundwater elevations between Spring 2006 (end of a 10-year wet period) and Spring 2016 (end of a 10-year dry period).[87] Based on these figures, staff note that the Subbasin experiences cones of depression in urban areas, near Davis and Woodland, and in rural areas, near Zamora. These cones of depression correspond to municipal and agricultural areas extracting relatively high volumes of groundwater.

The GSP describes the change in groundwater storage. The GSP provides graphs depicting the annual and cumulative changes in the volume of groundwater storage.[88] The GSP estimates the cumulative storage change between 1975 and 2018 to be a

[77] 23 CCR §§ 354.16 (a)(1-2).
[78] 23 CCR § 354.16 (b).
[79] 23 CCR § 354.16 (c).
[80] 23 CCR § 354.16 (d).
[81] 23 CCR § 354.16 (e).
[82] 23 CCR § 354.16 (f).
[83] 23 CCR § 354.16 (g).
[84] Yolo Subbasin GSP, Figure 2-20, p. 149, Figures 2-21 and 2-22, pp. 153-154, Appendix H, pp. 919-998.
[85] Yolo Subbasin GSP, Section 2.2.1.3, pp. 151-155.
[86] Yolo Subbasin GSP, Figures 2-15 to 2-18, pp. 143-146.
[87] Yolo Subbasin GSP, Figure 2-19, p. 147.
[88] Yolo Subbasin GSP, Figure 2-23, p. 159 and Appendix F, Figure 13, p. 846.

decrease of 1.5 percent of the total estimated 13 million acre-feet of the Subbasin's storage.[89] Based on the cumulative storage change graph, Department staff estimate that the Subbasin has lost approximately 180,000 acre-feet of groundwater in the storage for the period between 1975 and 2018, or an average of 5,200 acre-feet per year.

The GSP describes the groundwater conditions related to groundwater quality for the Subbasin. It identifies the constituents of concern and provides historical water quality data including total dissolved solids (TDS), nitrate, arsenic, boron, and hexavalent chromium.[90] The GSP also provides maps of historic and current cleanup, as well as all open case cleanup sites in Yolo County as of 2019.[91] Overall, nitrate, TDS, boron, and hexavalent chromium appear to be the constituents of concern with the largest amount of exceedances in wells throughout the Subbasin.

The GSP identifies areas where elevated concentrations exist for each constituent of concern, as described below.

- TDS: elevated concentrations (>1,000 milligrams per liter (mg/L)) are present in shallow groundwater zone in the agricultural areas surrounding Woodland, Davis, and the Capay Valley, with patches of elevated TDS in areas near Clarksburg and Knight's Landing.[92]
- Nitrate (as N): elevated concentrations (> 10 mg/L) are mostly present in shallow groundwater zone in agricultural areas surrounding Woodland and Davis. A particularly large strip of high nitrate concentration exists between West Sacramento and Davis, with other pockets of high concentrations present near Woodland, Knight's Landing, and Madison water systems. More current data suggest nitrate accumulation in the shallow and intermediate groundwater zones is continuing in some areas and may be extending into the deep zone.[93]
- Boron: average boron concentrations for the shallow groundwater zone ranged from 660 micrograms per liter (ug/L) in the Western Yolo Area to 2,300 ug/L in the Capay Valley area. Concentrations greater than 4,000 ug/L are generally toxic to non-tolerate plants, and concentrations between 500 ug/L and 4,000 ug/L can be harmful to sensitive plant species.[94]
- Arsenic: pockets of elevated concentration (>10 ug/L) present in the deep groundwater zone west of Woodland, and east of Davis.[95]

[89] Yolo Subbasin GSP, Section 2.2.2.1, p. 156.
[90] Yolo Subbasin GSP, Section 3.5, p. 292 and Section 2.2.4.3, pp. 169-192.
[91] Yolo Subbasin GSP, Figure 2-24 and Figure 2-25, pp. 167-168.
[92] Yolo Subbasin GSP, Figures 2-27 to 2-28, pp. 174-175, Section 2.2.4.3.1, pp. 170-171.
[93] Yolo Subbasin GSP, Figures 2-29 to 2-32, pp. 179-182, Section 2.2.4.3.2, p. 177.
[94] Yolo Subbasin GSP, Figures 2-33 to 2-34, pp. 185-186, Section 2.2.4.3.3, p. 183.
[95] Yolo Subbasin GSP, Figure 2-35, p. 189, Section 2.2.4.3.4, p. 187.

- Chromium/Hexavalent Chromium: total chromium (chromium III and chromium VI) was particularly elevated near Davis ranging between 25 and 50 ug/L.[96]

In describing seawater intrusion, the GSP states that the Subbasin is located far from coastal areas and that seawater intrusion is not a relevant sustainability indicator for the Subbasin.[97]

The GSP describes current and historical conditions with maps related to land subsidence in the Subbasin.[98] The GSP states that land subsidence has been measured in the Yolo Subbasin since late 1960s using the following methods/sources: 1) GPS surveys utilizing over 50 stations throughout the Subbasin that have been conducted several times from 1999 to 2016,[99] 2) 2017 Stanford InSAR study, 3) 2017 Sacramento Valley Subsidence Survey conducted by DWR, 4) DWR's InSAR mapping from 2015-2019, and 5) two extensometers (installed in 1992) and three continuous GPS stations. The GSP reports minimal subsidence for much of the Subbasin, but it notes that steady levels of subsidence (1.2 inches per year) have been documented in the central portion and a significant northern portion of the Subbasin.[100]

The GSP describes interconnected surface water systems in the Subbasin.[101] By comparing the historical high groundwater elevations between 2006-2015 and the stream bed elevations, the GSP identifies that groundwater and surface water are interconnected for the Sacramento River, Putah Creek, and Cache Creek.[102] Canals and sloughs in the YCFC&WCD service area and other areas in the Subbasin typically go dry except during the times of rain and in the summer due to surface water deliveries and runoff from irrigated agriculture.[103] In addition, the GSP also estimates the monthly and annual depletions of interconnected surface water using the groundwater model (YSGA Model) developed for the Subbasin.[104] The GSP notes the depletion estimates may contain significant uncertainties associated with the model.

The GSP also identifies GDEs in the Subbasin including vegetation GDEs and wetland GDEs.[105] The GSP then aggregates individual GDEs into 30 GDE units based on the USGS's 12-digit Hydrologic Unit Code polygons. The GSP evaluates and maps the groundwater level trend[106] and summer vegetation greenness[107] in each GDE unit.

[96] Yolo Subbasin GSP, Figure 2-36, p. 190, Section 2.2.4.3.5, p. 187.
[97] Yolo Subbasin GSP, Section 2.2.3, pp. 156-157.
[98] Yolo Subbasin GSP, Section 2.2.5, pp. 203-215, Figures 2-40 to 2-42, pp. 207-209.
[99] Yolo Subbasin GSP, Section 2.2.5.1, p. 204.
[100] Yolo Subbasin GSP, Section 2.2.5, p. 204.
[101] Yolo Subbasin GSP, Section 2.2.6, pp. 215-227.
[102] Yolo Subbasin GSP, Section 2.2.6.1, pp. 219-220, Table 2-47, p. 222.
[103] Yolo Subbasin GSP, Section 2.2.6.2.4, pp. 224-225.
[104] Yolo Subbasin GSP, Table 2-18, p. 227.
[105] Yolo Subbasin GSP, Section 2.2.7, pp. 229-244.
[106] Yolo Subbasin GSP, Figure 2-50, p. 239.
[107] Yolo Subbasin GSP, Figure 2-51, p. 240.

Overall, staff conclude that the information included in the Plan for basin conditions complies with the requirements outlined in the GSP Regulations.

4.2.3 Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical; current; and projected water budget conditions,[108] and the sustainable yield.[109]

The GSP provides historical, current, and projected water budgets using the YSGA groundwater model.[110] The YSGA model uses inputs such as climate variables, land use, irrigation information, urban water plans, and groundwater and surface water hydrologic conditions to estimate water budgets.[111]

The GSP includes historical water budgets for the period of 1971-2018 including land surface water budget[112] and groundwater budget.[113] The GSP indicates that the historical water budget modeling incorporates data from land use surveys in 1989, 1997, 2008, and 2016.[114] The GSP notes the Subbasin experienced an increase in acreage for perennial crops (field crops conversion) and for urban areas (agricultural land conversion). The GSP estimates the historical average annual groundwater pumping to be 346,000 acre-feet per year. In evaluating groundwater storage change over time,[115] The GSP states that "over the past 50 years, there is evidence of basin-wide overdraft." The Plan notes deep groundwater storage declines following the droughts and storage recovery follows in the intervening wet periods.

The GSP treats 2018 – the last year of the model simulation in the historical period - as the period to represent the Basin's current water budget.[116] The GSP does not present current water budget values separately, although the historical water budgets include the 2018 values (both land surface water budget and groundwater budget) only in graphic format.[117] Staff estimate the groundwater pumping to be around 360,000 acre-feet in 2018, slightly higher than the historical annual average. Staff note that the GSP identifies 2018 as a below normal year.[118]

For projected water budgets, the YSGA model simulates five scenarios over a 50-year simulation period including one baseline scenario and four climate change scenarios

[108] 23 CCR §§ 354.18 (a), 354.18 (c) *et seq*.
[109] 23 CCR § 354.18 (b)(7).
[110] Yolo Subbasin GSP, Section 2.3, pp. 244-267.
[111] Yolo Subbasin GSP, Table 2-22, pp. 246-247.
[112] Yolo Subbasin GSP, Table 2-27, p. 256, Figure 2-55, p. 257.
[113] Yolo Subbasin GSP, Table 2-28, p. 259, Figure 2-56, p. 258.
[114] Yolo Subbasin GSP, Section 2.3.2, p. 249.
[115] Yolo Subbasin GSP, Figure 2-57, p. 260.
[116] Yolo Subbasin GSP, Section 2.3.1, p. 245.
[117] Yolo Subbasin GSP, Figures 2-55 and 2-56, pp. 257-258.
[118] Yolo Subbasin GSP, Table 2-26, p.255.

based on climate change model centered around the mid-2030's and mid-2070's. The GSP presents the projected water budgets for all five scenarios in tables.[119] The GSP estimates that future groundwater pumping ranges from 325,000 acre-feet (Extreme Wet climate change scenario) to 400,000 acre-feet (Extreme Dry climate change scenario).

The Plan estimates the Subbasin's sustainable yield to be 346,000 acre-feet per year based on the historical average annual pumping.[120] The GSP explains that the Subbasin has historically been sustainable for the 48 years between 1971 – 2018 and that groundwater storage and observed elevations have almost recovered by the end of 2018 to initial storage and elevation. The sustainable yield estimate incorporates the increased surface water availability due to the conjunctive use program (Indian Valley Reservoir), improved irrigation practices, and improved urban water practices. In addition, the GSP describes that the estimate of sustainable yield also takes into consideration climate change scenarios. The GSP also indicates that the sustainable yield will be re-visited and potentially updated in the spirit of adaptive planning.

Overall, staff conclude that the information included in the Plan for basin conditions complies with the requirements outlined in the GSP Regulations.

4.2.4 Management Areas

The GSP Regulations provide the option for one or more management areas to be defined within a basin if the GSA has determined that the creation of the management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives, provided that undesirable results are defined consistently throughout the basin.[121]

The GSP establishes six management areas covering the entire Subbasin "for implementation of project and management actions to achieve groundwater sustainability." The six management areas include Capay Valley, Dunnigan Hills, North Yolo, Central Yolo, South Yolo, and Clarksburg.[122] The GSP describes each management area with further details on geologic, aquifer, and topographic characteristics.[123] The GSP also states that consistent minimum thresholds and measurable objectives have been developed for each management area to prevent undesirable results in adjacent management areas.[124]

Overall, staff conclude that the information included in the Plan for management areas complies with the requirements outlined in the GSP Regulations.

[119] Yolo Subbasin GSP, Tables 2-28 and 2-29, pp. 259.
[120] Yolo Subbasin GSP, Section 2.3.7, p. 265-267.
[121] 23 CCR § 354.20.
[122] Yolo Subbasin GSP, Section 2.4, p. 271, Figure 2-61, p.275.
[123] Yolo Subbasin GSP, Sections 2.4.1 – 2.4.6, pp. 272-277.
[124] Yolo Subbasin GSP, Section 2.4, p.271.

4.3 SUSTAINABLE MANAGEMENT CRITERIA

GSP Regulations require each Plan to include a sustainability goal for the basin and to characterize and establish undesirable results, minimum thresholds, and measurable objectives for each applicable sustainability indicator, as appropriate. The GSP Regulations require each Plan to define conditions that constitute sustainable groundwater management for the basin including the process by which the GSA characterizes undesirable results and establishes minimum thresholds and measurable objectives for each applicable sustainability indicator.[125]

4.3.1 Sustainability Goal

GSP Regulations require that GSAs establish a sustainability goal for the basin. The sustainability goal should be based on information provided in the GSP's basin setting and should include an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation.[126]

The GSP describes the sustainability goals for the Yolo Subbasin as follows:

- "Achieve sustainable groundwater management in the Yolo Subbasin by maintaining or enhancing groundwater quantity and quality through the implementation of projects and management actions to support beneficial uses and users."
- "Maintain surface water flows and quality to support conjunctive use programs in the Subbasin that promote increased groundwater levels and quality."
- "Operate within the established sustainable management criteria and maintain sustainable groundwater use through continued implementation of a monitoring and reporting program."
- "Maintain sustainable operations to maintain sustainability over the implementation and planning horizon."[127]

The GSP summarizes measures to achieve the sustainable goal through the conjunctive use programs, the monitoring and reporting program, and sustainable operations. The GSP discusses these measures in more detail in Projects and Management Actions.[128]

Overall, Department staff conclude the GSP's discussion and presentation of information on the sustainability goal covers the specific items listed in the regulations in an understandable format using appropriate data. Staff are aware of no significant inconsistencies or contrary information to that presented in the GSP and therefore have no significant concerns regarding the quality, data, and discussion of this subject in the GSP.

[125] 23 CCR § 354.22 *et seq*.
[126] 23 CCR § 354.24.
[127] Yolo Subbasin GSP, Section 3.1, p. 280.
[128] Yolo Subbasin GSP, Section 5.0, pp. 345-365.

4.3.2 Sustainability Indicators

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results.[129] Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon, significant and unreasonable reduction of groundwater storage, significant and unreasonable seawater intrusion, significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water[130] – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

GSP Regulations require that GSAs provide descriptions of undesirable results including defining what are significant and unreasonable potential effects to beneficial uses and users for each sustainability indicator.[131] GSP Regulations also require GSPs provide the criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.[132]

GSP Regulations require that the description of minimum thresholds include the information and criteria relied upon to establish and justify the minimum threshold for each sustainability indicator.[133] GSAs are required to describe how conditions at minimum thresholds may affect beneficial uses and users,[134] and the relationship between the minimum thresholds for each sustainability indicator, including an explanation for how the GSA has determined conditions at each minimum threshold will avoid causing undesirable results for other sustainability indicators.[135]

GSP Regulations require that GSPs include a description of the criteria used to select measurable objectives, including interim milestones, to achieve the sustainability goal within 20 years.[136] GSP Regulations also require that the measurable objectives be

[129] 23 CCR § 351(ah).
[130] Water Code § 10721(x).
[131] 23 CCR §§ 354.26 (a), 354.26 (b)(c).
[132] 23 CCR § 354.26 (b)(2).
[133] 23 CCR § 354.28 (b)(1).
[134] 23 CCR § 354.28 (b)(4).
[135] 23 CCR § 354.28 (b)(2).
[136] 23 CCR § 354.30 (a).

established based on the same metrics and monitoring sites as those used to define minimum thresholds.[137]

The following subsections thus consolidate three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information, as presented in the Plan, pertaining to the processes and criteria relied upon to define undesirable results applicable to the Subbasin, as quantified through the establishment of minimum thresholds, are addressed for each applicable sustainability indicator. A submitting agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.[138]

4.3.2.1 Chronic Lowering of Groundwater Levels

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the chronic lowering of groundwater, the GSP Regulations require the minimum threshold for chronic lowering of groundwater levels to be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results that is supported by information about groundwater elevation conditions and potential effects on other sustainability indicators.[139]

The GSP describes the potential effects of chronic lowering of groundwater levels to beneficial use and users. These include: 1) groundwater well dewatering and increased pumping lift, and 2) impacts on surface water-groundwater interactions along Subbasin's waterways such as Putah Creek and Cache Creek and GDEs.[140] The GSP reports that the Subbasin is "a relatively stable basin, with groundwater levels maintaining a relatively consistent long-term average elevation or depth to groundwater."[141] The GSP states that chronic lowering of groundwater levels could occur due to "increased groundwater pumping during dry periods, reduction in surface water use, reduced groundwater inflows from adjacent areas, and/or climate change related impacts that result in more frequent dry years."[142]

The GSP defines significant and unreasonable effects results for chronic lowering of groundwater levels as "the point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth or elevation of groundwater, affect the reasonable use of, and access to, groundwater by overlying users."[143] Department staff note the definition of significant and unreasonable effects is vague and circular. Simply stating avoiding conditions that are "significant and unreasonable impacts over the planning and implementation horizon" is insufficient to understand what constitutes these conditions and when they would occur. Department

[137] 23 CCR § 354.30 (b).
[138] 23 CCR § 354.26 (d).
[139] 23 CCR § 354.28(c)(1) *et seq*.
[140] Yolo Subbasin GSP, Section 3.3.1.2, pp. 281-282.
[141] Yolo Subbasin GSP, Section 3.3.2.1, p. 282.
[142] Yolo Subbasin GSP, Section 3.3.1.1, p. 281.
[143] Yolo Subbasin GSP, Section 3.3.1, p. 281.

staff recommend the GSA clarify what significant and unreasonable effects are in the Subbasin that they are managing the Subbasin to avoid (see Recommended Corrective Action 1a).

The GSP quantitatively defines undesirable results as "…the minimum threshold criteria exceeded in 51 percent or more of representative monitoring wells in two (2) MAs [Management Areas]."[144] The GSP discusses how the value of 51 percent in minimum threshold exceedances was selected stating, "this 51 percent value was selected to allow for interim projects and management actions to take place within the subbasin." However, the GSP does not explain why this is the point to take action and describe specifically what the interim projects and management actions are. Staff also note that requiring two management areas to have minimum threshold exceedances could potentially neglect local or regional undesirable results. Also, staff note that the GSP does not include a time element in the definition of undesirable results but includes it in the description of the minimum threshold instead. The GSP considers a well violating the minimum threshold when the groundwater level exceeds the minimum threshold in two consecutive fall measurements.[145] Staff understand this means an undesirable result will occur when 51 percent of wells exceed their minimum threshold for two fall measurements; however, the GSA should clarify this within the definition of an undesirable result. Department staff recommend the GSA provide additional discussion and revise the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result. Further, the GSA should clearly define a time component for when an undesirable result will occur (see Recommended Corrective Action 1b).

The GSP sets the minimum threshold at the historical low groundwater level or 20 percent (approximately 10-30 feet by staff's estimate) below the historical low groundwater levels. The minimum thresholds are set at the historical lows in the following management areas: Capay Valley, Dunnigan Hills, Central Yolo, and South Yolo. The minimum thresholds are set at 10-30 feet below the historical lows in the North Yolo Management Area.[146] The GSP states that water districts in North Yolo, such as RD 108, "may experience reductions in surface water deliveries from the Sacramento River as the Voluntary Agreements with the State Water Board are implemented."[147] While the GSP does not elaborate on the details of these Voluntary Agreements, Department staff conclude this appears to be a reasonable approach in this management area to maintain groundwater levels near historical lows plus a small range of operational flexibility to account for existing water management agreements operating within the Subbasin. The GSP does not set minimum thresholds for Clarksburg Management Area due to no groundwater usage, which

[144] Yolo Subbasin GSP, Section 3.3.1, p. 281.
[145] Yolo Subbasin GSP, Section 3.3.2.1.1, p. 282.
[146] Yolo Subbasin GSP, Appendix H, pp. 976-990.
[147] Yolo Subbasin GSP, Section 3.3.2.1.2, p. 285.

appears to be a reasonable approach.[148] The GSP presents the minimum thresholds for all representative monitoring wells[149] in a table [150] and graphs.[151] The GSP also provides a contour map of minimum threshold values to eliminate large vertical differences in minimum thresholds between adjacent wells.[152]

The GSP discusses the potential effects of the minimum thresholds on beneficial uses and users. The GSP states that the GSA conducted a well impact analysis to compare the minimum thresholds with the well depth information obtained from the Department's Online System of Well Completion Reports (OSWCR).[153] Based on the information presented for this analysis, staff estimate that approximately 285 out of 4,550 domestic wells (or six percent) in the Subbasin would go dry if groundwater levels dropped below the minimum thresholds.

Department staff note the GSP proposes a domestic well impact mitigation program in the Projects and Management Actions.[154] However, the GSP does not provide much information related to the well mitigation program except that it expects to start in 2022 and complete in 2027.[155] Department staff are encouraged by the GSAs' proposed management action to assist well owners who may be impacted by the proposed groundwater management of the Subbasin. Department staff recommend the GSAs utilize the Department's Drinking Water Guidance as appropriate and provide updates to the Plan about the progress of this program during GSP implementation.

In describing the relationship between the minimum thresholds for groundwater levels and other sustainability indicators, the GSP provides little information on how the basin conditions at the minimum thresholds of groundwater levels will avoid undesirable results for any other sustainability indicators.[156] Considering the GSA is choosing to manage the Subbasin below historic lows in the North Yolo Management Area, understanding this relationship will be important during plan implementation. Department staff recommend the GSA describe the relationship between established minimum thresholds for the chronic lowering of groundwater levels and how they avoid undesirable results for each of the other sustainability indicators in the North Yolo Management Area (see Recommended Corrective Action 1c).

The GSP sets the measurable objective at the average fall (September to December) groundwater elevation from 2000 – 2011 at each representative well[157] and sets interim

[148] Yolo Subbasin GSP, Section 3.3.2.1.3, p. 285.
[149] Yolo Subbasin GSP, Figure 3-1, p. 283.
[150] Yolo Subbasin GSP, Table 3-1, pp. 289-290.
[151] Yolo Subbasin GSP, Appendix H, pp. 919-998.
[152] Yolo Subbasin GSP, Section 3.2.2.2, p. 285.
[153] Yolo Subbasin GSP, Appendix I, pp. 999-1039.
[154] Yolo Subbasin GSP, Table 5-1, p. 350.
[155] Yolo Subbasin GSP, Appendix J, p. 1042.
[156] 23 CCR § 354.28 (b) (2).
[157] Yolo Subbasin GSP, Section 3.3.3.1, p. 286, Table 3-1, pp. 289-290, Appendix H, pp. 919-998.

milestones equal to the measurable objective.[158] Staff note the GSP sets the measurable objectives higher than the minimum thresholds providing a reasonable margin of operational flexibility. Staff consider the information provided for measurable objectives and interim milestones consistent with the GSP Regulations.

Overall, the GSP's discussion of minimum thresholds and measurable objectives for the chronic lowering of groundwater levels seems to be comprehensive and includes adequate support, justification, and information to understand the GSAs' process, analysis, and rationale. Although recommended corrective actions have been identified, due to the GSA's proposed management to maintain water levels at or near the historical range combined with the generally stable groundwater level and storage conditions in the Subbasin, these concerns do not preclude plan approval at this time. Department staff expect the GSA to update the plan accordingly and potentially refine the groundwater level sustainable management criteria as more information becomes available to ensure the proposed management considers beneficial uses and users and does not cause undesirable results for other sustainability indicators.

4.3.2.2 Reduction of Groundwater Storage

In addition to components identified in 23 CCR §§ 354.28 (a-b), for the reduction of groundwater storage, the GSP Regulations require the minimum threshold for the reduction of groundwater storage to be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.[159]

The GSP uses groundwater levels as a proxy for groundwater storage. The sustainable management criteria for the reduction of groundwater storage are identical to those for the chronic lowering of groundwater levels. The GSP states that the GSA intends to use changes in groundwater elevations to estimate changes in groundwater storage.[160] Staff note that the Subbasin is an unconfined aquifer and groundwater storage is closely related to groundwater levels.

Staff concur that the GSP's use of groundwater levels as a proxy is a reasonable approach and the information included in the Plan for this topic complies with the requirements outlined in the GSP Regulations.

4.3.2.3 Seawater Intrusion

In addition to components identified in 23 CCR §§ 354.28 (a-b), for seawater intrusion, the GSP Regulations require the minimum threshold for seawater intrusion to be defined

[158] Yolo Subbasin GSP, Section 3.3.4, p. 286.
[159] 23 CCR § 354.28(c)(2).
[160] Yolo Subbasin GSP, Section 3.4, p. 286.

by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.[161]

The GSP does not establish sustainable management criteria for seawater intrusion because the GSA determines that seawater intrusion is not a sustainability indicator applicable to the Subbasin. The GSP states that seawater intrusion "has been determined to not be a concern in the Yolo Subbasin with no potential for seawater intrusion to occur under water quality management objectives in the Sacramento-San Joaquin Delta or changes in water management activities in the Subbasin."[162]

Department staff concur with the rationale for not setting sustainable management criteria for seawater intrusion for the Subbasin.

4.3.2.4 Degraded Water Quality

In addition to components identified in 23 CCR §§ 354.28 (a-b), for degraded water quality, the GSP Regulations require the minimum threshold for degraded water quality to be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.[163]

The GSP defines significant and unreasonable effects of degraded groundwater quality as "the point at which water quality is degraded to the extent of causing significant and unreasonable impacts from groundwater management actions in the Yolo Subbasin, that affect the reasonable and beneficial use of, and access to, groundwater overlying users."[164] The GSP quantitatively defines undesirable results as "the minimum threshold criteria is exceeded in 50 percent or more of representative monitoring wells monitored for total dissolved solids".[165]

The GSP's definition of undesirable results for degraded water quality, which solely focuses on water quality impacts caused directly by the GSA implementing an action, is incorrect. SGMA includes in its definition of undesirable results the "significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies."[166] SGMA specifies that the significant and unreasonable effects are those "caused by groundwater conditions occurring throughout the basin," which does not limit them to only impacts directly caused by a GSA's implementation of physical

[161] 23 CCR § 354.28(c)(3).
[162] Yolo Subbasin GSP, Section 3.7, pp. 299-300.
[163] 23 CCR § 354.28(c)(4).
[164] Yolo Subbasin GSP, Section 3.5.1, p. 292.
[165] Yolo Subbasin GSP, Section 3.5.1, p. 292.
[166] Water Code § 10721(x)(4).

projects or management actions in the Subbasin. As currently defined, if for instance, a minimum threshold exceedance occurs because of mobilization of naturally occurring constituents or migration of a contaminant plume to supply wells caused by groundwater pumping in the Subbasin, but the GSA has not implemented any pumping regulations, the GSA would not identify this as an undesirable result. Staff consider this to be inconsistent with the intent of SGMA, which requires GSAs to ensure management of groundwater conditions in the Subbasin, including any action taken by the GSA, will not significantly and unreasonably degrade water quality. Therefore, degraded water quality caused by groundwater pumping, changes in groundwater levels, changes in the direction of groundwater flow, or changes in horizontal or vertical movement of groundwater within the Subbasin, whether the GSA has implemented pumping regulations or not, should be considered in the assessment of undesirable results in the Subbasin. Department staff recommend the GSA revise the definition of its overly-narrow definition of undesirable results such that groundwater pumping and other factors, whether due to action or inaction of the GSA with respect to Subbasin management, is considered and not excluded in the undesirable result definition (see Recommended Corrective Action 2a).

Department staff recommend the GSA consider including a metric (e.g., isocontour concentration map) in the minimum threshold to define the areas experiencing elevated concentration to ensure the existing water quality problem will not be exacerbated. Additionally, the GSA should consider discussing the rationale for choosing the 50 percent minimum threshold exceedance in defining undesirable results.

The GSP establishes sustainable management criteria for TDS only and will rely on local, state, and federal regulatory programs for other constituents of concern. The GSP defines the minimum threshold for TDS as “the concentration exceeds 1,000 ppm over a three (3) year rolling average.”[167]

Department staff question the GSP’s rationale for only establishing sustainable management criteria for TDS because the GSP also identifies elevated concentrations for other constituents of concern (nitrate, boron, arsenic, and hexavalent chromium) in the Subbasin. Although GSAs are not responsible for removing the elevated concentration under SMGA, they are required to manage the basin without exacerbating the groundwater quality. For instance, groundwater pumping and basin management activities could mobilize the chemicals to migrate into new areas causing significant and unreasonable impacts on beneficial uses and users. Staff recommend the GSA include all constituents of concern in the development of sustainable management criteria for groundwater quality. Department staff recommend that the GSA either provide additional information to demonstrate that TDS is the Basin’s only constituent of concern or establish sustainable management criteria applicable to all constituents of concern in the Basin (see Recommended Corrective Action 2b).

[167] Yolo Subbasin GSP, Section 3.5.2, p. 294.

The GSP sets a measurable objective for TDS at 750 ppm over a three (3) year rolling average[168] and interim milestones equal to the measurable objective.[169] Staff encourage the GSA to include measurable objectives and interim milestones for other constituents of concern.

Overall, staff conclude that the Plan needs to provide additional information related to the sustainable management criteria for groundwater quality. The identified recommended corrective action does not preclude plan approval at this time as the information used to set the minimum threshold and measurable objective for TDS appears to use the best available information and is supported by the information described in the basin setting. However, the Department's requested changes will improve the management of the Subbasin and should be addressed by the first periodic evaluation.

4.3.2.5 Land Subsidence

In addition to components identified in 23 CCR §§ 354.28 (a-b), the GSP Regulations require the minimum threshold for land subsidence to be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.[170] Minimum thresholds for land subsidence shall be supported by identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects and maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum thresholds and measurable objectives.[171]

The GSP defines undesirable results for subsidence as "the point at which the rate and extent of subsidence in the Subbasin causes significant and unreasonable impacts to surface land uses or critical infrastructure."[172] The GSP states that potential effects of land subsidence on beneficial uses and users of groundwater and overlying land uses within the Subbasin would include damage to gravity-driven water conveyance infrastructure, groundwater well casings, and other public infrastructure such as roadways and utility infrastructure.[173] The GSP does not identify specific infrastructure susceptible to land subsidence or describe what constitutes significant and unreasonable effects. Department staff note the definition of an undesirable result is vague and circular. Simply stating avoiding conditions that are "significant and unreasonable impacts is insufficient to understand what constitutes these conditions and when they would occur. Department staff recommend the GSA identify critical infrastructure susceptible to land subsidence

[168] Yolo Subbasin GSP, Section 3.5.3, p. 294.
[169] Yolo Subbasin GSP, Section 3.5.4, p. 294.
[170] 23 CCR § 354.28(c)(5).
[171] 23 CCR §§ 354.28(c)(5)(A-B).
[172] Yolo Subbasin GSP, Section 3.6.1, p. 294.
[173] Yolo Subbasin GSP, Section 3.6.1.2, p. 295.

and describe what constitutes significant and unreasonable effects for land subsidence in the Subbasin (see Recommended Corrective Action 3a).

The GSP quantitatively defines undesirable results for subsidence as "…the minimum threshold is exceeded over 25 percent of the management [area] or [sub-management area] sub-MA in three (3) or more management [areas] or sub-MAs in the same reporting year."[174] Staff note that the GSA divides the Central Yolo Management Area into two Sub-MAs (East Central Yolo and West Central Yolo) for land subsidence evaluation. However, the GSP does not explain how the GSA determined the value of "25 percent of the management or Sub-MA" in defining undesirable results, whether it means 25 percent of monitoring sites or 25 percent of area. Additionally, the GSA does not explain and justify the requirement of three (3) or more management areas experiencing the minimum threshold exceedances. This proposed definition could potentially lead to localized or regional significant and unreasonable impacts within the Subbasin without it being considered an undesirable result. Department staff recommend the GSA revise the definition of undesirable results to consider localized instances of subsidence and how they would be determined to be significant and unreasonable. This should include describing how minimum thresholds being exceeded in multiple management areas or a quarter of one management area does not constitute an undesirable result (see Recommended Corrective Action 3b).

The GSP sets the minimum threshold for subsidence at approximately the current rate of subsidence in various parts of the Subbasin.[175] Specifically, the minimum threshold is set at 3.0 centimeters per year (cm/year) for North Yolo, 2.5 cm/year for East Central Yolo, 1.8 cm/year for Dunnigan Hills and West Central Yolo, and 0.0 cm/year for South Yolo and Clarksburg, respectively. Staff note that the GSP does not set a minimum threshold for Capay Valley at this time and does not provide an explanation for doing so.[176] The GSP then uses the 5-year running average subsidence rate as the metric to evaluate if the minimum threshold is exceeded.

The GSP's minimum threshold development is based on the current land subsidence rate instead of the cumulative amount of subsidence that would lead to undesirable results in the Subbasin. While the minimum threshold of an annual rate up to 3.0 cm/year only allows a small degree of land subsidence annually, staff are concerned that it could result in a significant total cumulative subsidence amount if the subsidence rate at the minimum threshold persists. For instance, North Yolo could experience a cumulative amount of 60 cm (or two feet) subsidence if the subsidence rate of 3.0 cm/year lasts for 20 years. In fact, in reviewing the Department's InSAR data, staff note that the subsidence rate picked up in the last couple of years (2020 -2022) in North Yolo and Central Yolo Management

[174] Yolo Subbasin GSP, Section 3.6.1, p. 294.
[175] Yolo Subbasin GSP, Section 3.6.1.3, p. 295, Table 3-2, p. 296.
[176] Yolo Subbasin GSP, Table 3-2, p. 296.

Areas. The subsidence rate was 0.4 feet per year in a large portion of the Subbasin and reached 0.6 feet per year in some pocket areas.

Department staff note that setting the minimum threshold as the current rate of land subsidence that is occurring in the Subbasin does not meet the intent of SGMA to minimize or avoid subsidence. Given the current minimum thresholds, land subsidence could occur into the future in the Subbasin and never constitute an undesirable result. Further, averaging subsidence rates over five years (as proposed in the GSP) could potentially smooth out any significant land subsidence that occurs in a single year. Department staff recommend the GSA include a cumulative metric for land subsidence that may lead to significant and unreasonable impacts occurring in the Subbasin and revise the minimum thresholds as appropriate. The GSA should also elaborate on how the proposed management will avoid or minimize the land subsidence that has been occurring and increasing in severity recently in the Subbasin (see Recommended Corrective Action 3c).

The GSP sets the measurable objectives and interim milestones at the same average subsidence rates established for the minimum thresholds. However, the GSP proposes to use a three-year running average instead of the five-year running average proposed as the metric for the minimum thresholds. As discussed above, using the current rate of land subsidence as a minimum threshold or measurable objective is not appropriate and should be revised by the GSA. Department staff recommend the GSA revise the measurable objective and interim milestones for land subsidence to a value that achieves the sustainability goal for the basin within 20 years of Plan implementation and reflects sustainable management of the groundwater basin while also meeting the intent of SGMA (i.e. minimizing or avoiding land subsidence) (see Recommended Corrective Action 3d).

While staff have identified multiple issues with the sustainable management criteria proposed for land subsidence that have led to the identification of a recommended corrective action, these problems do not preclude plan approval at this time. The staff's rationale is based on the current conditions in the subbasin where small amounts of subsidence are occurring, but undesirable results, as defined in the GSP, have not been observed. Further, Department staff are aware of no significant impacts the existing land subsidence has caused in the basin, nor have public comments indicated current land subsidence in the basin is causing significant and unreasonable effects. Staff are not aware of inconsistencies or contrary information to what is presented in the GSP regarding other impacts from ongoing land subsidence to other beneficial uses or users in the Subbasin. However, the GSA should address the recommended corrective action before the next periodic evaluation to avoid or minimize subsidence during plan implementation.

4.3.2.6 Depletions of Interconnected Surface Water

SGMA defines undesirable results for the depletion of interconnected surface water as those that have significant and unreasonable adverse impacts on beneficial uses of

surface water and are caused by groundwater conditions occurring throughout the basin.[177] The GSP Regulations require that a Plan identify the presence of interconnected surface water systems in the basin and estimate the quantity and timing of depletions of those systems.[178] The GSP Regulations further require that minimum thresholds be set based on the rate or volume of surface water depletions caused by groundwater use, supported by information including the location, quantity, and timing of depletions, that adversely impact beneficial uses of the surface water and may lead to undesirable results.[179]

The GSP identifies connectivity between surface water and groundwater in five interconnected surface water management zones including Upper Cache Creek, Lower Cache Creek, Upper Sacramento River, Lower Sacramento River, and Putah Creek.[180] The identification was done by comparing with the stream bed elevations and near-stream groundwater levels. Department staff are satisfied the GSA has adequately identified interconnected surface water in the Subbasin.

The GSP quantifies the rate or volume of depletions due to groundwater pumping using the groundwater model (YSGA Model) developed for the Subbasin.[181] The values range from 330 acre-feet per year in Upper Sacramento River to 37,000 acre-feet per year in Lower Cache Creek. The GSP notes the depletion estimates may contain significant uncertainties associated with the model. However, the GSP does not utilize this information as the sustainable management criteria for depletions of interconnected surface water as required by the GSP Regulations. Instead, the GSP uses near-stream groundwater levels as a proxy for the depletions of interconnected surface water. [182] The GSP seeks to justify the use of groundwater levels as a proxy for depletions of interconnected surface waters because the correlation between groundwater levels and surface water levels has been seen in modeling results. However, even assuming this to be true, the fact that some correlation exists between surface and groundwater levels does not support the use of groundwater levels as a proxy for depletions of interconnected surface water because it provides no information regarding the rate or volume of surface water depletions or quantify the location, quantity, and timing of depletions of surface water as a result of groundwater use.

The GSP states that potential effects of depletion of interconnected surface water include reduced surface water flows, reduced suitable aquatic habitats, subsidence, and degraded groundwater quality.[183] The GSP describes significant and unreasonable impacts of depletion of interconnected surface water as the conditions that “affect the

[177] Water Code § 10721(x)(6).
[178] 23 CCR § 354.16 (f).
[179] 23 CCR § 354.28 (c)(6).
[180] Yolo Subbasin GSP, Section 3.8.1, p. 301.
[181] Yolo Subbasin GSP, Table 2-18, p. 227.
[182] Yolo Subbasin GSP, Section 3.8, p. 300.
[183] Yolo Subbasin GSP, Section 3.1.1.1, pp. 301-302.

reasonable and beneficial use of those surface waters by overlying users, including associated ecosystems".[184]

The GSP quantitively defines undesirable results as that "the Minimum Threshold is exceeded in over 50 percent of the interconnected surface water representative monitoring wells in two (2) or more interconnected surface water [management areas] in the same reporting year".[185] The GSP does not explain why the GSA selects the value of 50 percent and requires two (2) or more interconnected surface water management areas in the definition of an undesirable result. Department staff note that requiring two management areas to have minimum threshold exceedances could potentially neglect local or regional undesirable results. Department staff recommend the GSA provide additional discussion and amend the definition of undesirable results for the depletion of interconnected surface water. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result (see Recommended Corrective Action 4a).

The GSP sets the minimum threshold for interconnected surface water to "maintain interconnection of the local groundwater system to the critical surface water body at levels consistent with recent conditions (1971-2018)."[186] Staff note that the GSP considers a minimum threshold violation if it is exceeded in two consecutive years. The GSP also explains that the exceedance of the minimum threshold in two consecutive years representing departure from the historical near-stream hydrology that may lead to an undesirable result.[187] The GSP presents the minimum threshold values in tabular[188] and graphic formats.[189] The GSP notes that the characteristics of connectivity vary for different surface water bodies, so the method for developing the minimum threshold development varies for each interconnected surface management area. Department staff recommend staff identify specific beneficial users and uses of interconnected surface water for each reach and describe specifically what constitutes significant and unreasonable effects of depletion of interconnected surface water and use this information to potentially revise the sustainable management criteria (see Recommended Corrective Action 4b.)

The GSP sets the measurable objective for each representative monitoring well at "the average spring (March-May) groundwater elevation for water years 2000-2011."[190] The GSP explains that the measurable objective will ensure spring groundwater levels for maintaining the connectivity between surface water and groundwater and preventing

[184] Yolo Subbasin GSP, Section 3.8.1, p. 301.
[185] Yolo Subbasin GSP, Section 3.8.1, p. 301.
[186] Yolo Subbasin GSP, Section 3.8.2.1, p. 302.
[187] Yolo Subbasin GSP, Section 3.8.2.1.2, p. 303.
[188] Yolo Subbasin GSP, Table 3-4, p. 305.
[189] Yolo Subbasin GSP, Appendix H, pp. 919-997.
[190] Yolo Subbasin GSP, Section 3.8.3.1, p. 304, Table 3-5, p. 306.

undesirable depletion of interconnected surface water.[191] The GSP sets interim milestones equal to measurable objectives.[192]

Department staff understand that quantifying depletions of surface water from groundwater extractions is a complex task that likely requires developing new, specialized tools, models, and methods to understand local hydrogeologic conditions, interactions, and responses. During the initial review of GSPs, Department staff have observed that most GSAs have struggled with this new requirement of SGMA. However, staff believe that most GSAs will more fully comply with regulatory requirements after several years of Plan implementation that includes projects and management actions to address the data gaps and other issues necessary to understand, quantify, and manage depletions of interconnected surface waters. Accordingly, Department staff believes that affording GSAs adequate time to refine their Plans to address interconnected surface waters is appropriate and remains consistent with SGMA's timelines and local control preferences.

The Department will continue to support GSAs in this regard by providing, as appropriate, financial and technical assistance to GSAs, including the development of guidance describing appropriate methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water caused by groundwater extractions. Once the Department's guidance related to depletions of interconnected surface water is publicly available, the GSA, where applicable, should consider incorporating appropriate guidance approaches into their future periodic updates to the GSP (see Recommended Corrective Action 4c). GSAs should consider availing themselves of the Department's financial or technical assistance, but in any event must continue to fill data gaps, collect additional monitoring data, and implement strategies to better understand and manage depletions of interconnected surface water caused by groundwater extractions and define segments of interconnectivity and timing within their jurisdictional area (see Recommended Corrective Action 4d). Furthermore, GSAs should coordinate with local, state, and federal resources agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion (see Recommended Corrective Action 4e).

4.4 Monitoring Network

The GSP Regulations describe the monitoring network that must be developed for each sustainability indicator including monitoring objectives, monitoring protocols, and data reporting requirements. Collecting monitoring data of a sufficient quality and quantity is necessary for the successful implementation of a groundwater sustainability plan. The GSP Regulations require a monitoring network of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.[193]

[191] Yolo Subbasin GSP, Section 3.8.3.1, p. 304.
[192] Yolo Subbasin GSP, Section 3.8.4, p. 306.
[193] 23 CCR § 354.32.

Specifically, a monitoring network must be able to monitor impacts to beneficial uses and users,[194] monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds,[195] capture seasonal low and high conditions,[196] include required information such as location and well construction and include maps and tables clearly showing the monitoring site type, location, and frequency.[197] Department staff encourage GSAs to collect monitoring data as specified in the GSP, follow SGMA data and reporting standards,[198] fill data gaps identified in the GSP prior to the first periodic evaluation,[199] update monitoring network information as needed, follow monitoring best management practices,[200] and submit all monitoring data to the Department's Monitoring Network Module immediately after collection including any additional groundwater monitoring data that is collected within the Plan area that is used for groundwater management decisions. Department staff note that if GSAs do not fill their identified data gaps, the GSA's basin understanding may not represent the best available science for use to monitor basin conditions.

The GSP identifies and includes 62 monitoring wells for the Subbasin's groundwater level monitoring network.[201] The GSP indicates that all these 62 wells in the groundwater level monitoring network will be used as representative monitoring points for the Subbasin. However, staff note that there are a total of 59 wells uploaded to DWR's SGMA Portal Monitoring Network Module (MNM) and only 54 wells are identified as representative monitoring points. Staff recommend the GSA resolve the discrepancy.

The GSP proposes to use all of the representative wells in the groundwater level monitoring network as a proxy for the groundwater storage monitoring network because changes in groundwater storage are directly dependent on changes in groundwater levels.[202]

The GSP describes a dedicated degraded water quality monitoring network that leverages data from existing regulatory programs State Water Resources Control Board's Division of Drinking Water (DDW), wells from the Irrigated Lands Regulatory Program (ILRP), and future monitoring efforts under Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS).[203] The GSP states that data collected by the existing regulatory programs will be reviewed annually by the GSA and that data not publicly available will be obtained through coordination with the monitoring entities.[204] While the

[194] 23 CCR § 354.34(b)(2).
[195] 23 CCR § 354.34(b)(3).
[196] 23 CCR § 354.34(c)(1)(B).
[197] 23 CCR §§ 354.34(g-h).
[198] 23 CCR § 352.4 *et seq*.
[199] 23 CCR § 354.38(d).
[200] Department of Water Resources, 2016, Best Management Practices and Guidance Documents.
[201] Yolo Subbasin GSP, Section 4.4.1, p. 312.
[202] Yolo Subbasin GSP, Section 4.4.1, p. 312.
[203] Yolo Subbasin GSP, Section 4.6, pp. 317 - 322.
[204] Yolo Subbasin GSP, Section 4.6.4, p. 322.

GSP does provide a description and maps identifying the location of the representative monitoring sites for the degraded water quality monitoring network, Department staff have determined additional information should be provided in the GSP regarding the monitoring network for degraded water quality. The GSP did not report, in tabular format, the monitoring sites or measurement frequency for each site in the degraded water quality monitoring network as required by the GSP Regulations.[205] Including this information will provide the Department additional clarity on how monitoring in the Subbasin will comply with the requirements of the GSP Regulations and SGMA (see Recommended Corrective Action 5a).

The GSP states that in addition to utilizing DWR's Interferometric Synthetic Aperture Radar (InSAR) satellite data, three continuous global positioning system (GPS) sites and two DWR extensometers will be included in the monitoring network for land subsidence.[206]

The GSP proposes to use 17 groundwater level monitoring wells for the depletions of interconnected surface water monitoring network because changes in the depletions of interconnected surface water are directly dependent on changes in groundwater levels.[207] Of these 17 wells, 11 wells are also used in the chronic lowering of groundwater levels monitoring network and six are unique to the depletions of interconnected surface water monitoring network. All wells will be monitored on a semi-annual basis, following the same monitoring schedule as wells in the chronic lowering of groundwater levels monitoring network.[208]

The GSP Regulations require GSPs to provide specific information about each monitoring site per the data and reporting standards.[209] As an example, well construction information is required for monitoring sites, but is not provided for wells in the degraded water quality monitoring network. It is imperative the GSA work to ensure the information defining the monitoring network is consistent within the GSP, consistent with the Department's Monitoring Network Module, and follow the data and reporting standards. Department staff recommend there be a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations (see Recommended Corrective Action 5b.)

4.5 Projects and Management Actions

The GSP Regulations require a description of the projects and management actions the submitting Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the

[205] 23 CCR §§ 354.34 (h).
[206] Yolo Subbasin GSP, Section 4.7.1, pp. 322 - 323.
[207] Yolo Subbasin GSP, Section 3.8, p. 300.
[208] Yolo Subbasin GSP, Section 4.4.3, p. 315.
[209] 23 CCR §§ 352.4, 354.34(g)(2).

basin.[210] Each Plan's description of projects and management actions must include details such as: how projects and management actions in the GSP will achieve sustainability, the implementation process and expected benefits, and prioritization and criteria used to initiate projects and management actions. [211]

The Plan includes a total of 77 projects and 12 management actions that were divided into four designations by status: Conceptual, Not Yet Started, Initiated, and Ongoing.[212] For each designation, projects and management actions are grouped further based on expected benefits including: Surface Water Supply Augmentation, Groundwater Recharge, Water Quality Enhance, Monitoring Network/Data Gaps, and Others.

The Plan provides the following information for each project and management action: description, timetable for implementation, expected quantitative benefits, associated public noticing/ permitting/ regulatory process, estimated costs with a funding plan, and legal authority required for implementation.[213] Based on the information provided in the Plan, staff note that the total benefit for the proposed projects and management actions is estimated to be over 76,010 acre-feet per year. The largest amount of benefit comes from Ongoing projects (40,430 acre-feet per year) and Not Yet Started projects (31,180 acre-feet per year). Examples include: the ongoing projects include the conjunctive use program, Davis/Woodland Sacramento River project, YCFC&WCD's Winter Recharge project, etc. Not Yet Started projects/management actions refer to those that have undergone some initial evaluation but has advanced to an implementation phase likely requiring additional feasibility analyses. [214] Examples of Not Yet Started projects/management actions include Exchanges between CVP or SWP System and Cache Creek System, Winter Diversions from Tehama-Colusa Canal, Bird Creek Surface Water Storage, Zamora Area Winter Recharge, and Dunnigan Hills Winter Runoff Capture for Recharge etc.

Since meeting the sustainability goal for the Subbasin is largely dependent upon the implementation of these projects and management actions, failure to implement these projects or management actions, or making material modifications, may affect the Department's conclusions regarding the adequacy of the GSP or its implementation in future evaluations. Department staff understand that many of the project and management details will be developed during the next several years. Given the information presented in the Plan, Department staff note that the projects and management actions proposed in the Plan are long-term in nature and are not designed to respond to undesirable results that require immediate mitigation actions by the GSA.

[210] 23 CCR § 354.44 (a).
[211] 23 CCR § 354.44 (b) *et seq*.
[212] Yolo Subbasin GSP, Section 5.1.5, p. 347.
[213] Yolo Subbasin GSP, Appendix J, pp. 1041 – 1046.
[214] Yolo Subbasin GSP, Section 5.1.5, p. 347.

Staff encourage the GSA to provide more information about projects and management actions in future evaluations of the Plan.

Overall, staff conclude that the information included in the Plan for projects and management actions complies with the requirements outlined in the GSP Regulations.

4.6 Consideration of Adjacent Basins/Subbasins

SGMA requires the Department to "…evaluate whether a groundwater sustainability plan adversely affects the ability of an adjacent basin to implement their groundwater sustainability plan or impedes achievement of sustainability goals in an adjacent basin."[215] Furthermore, the GSP Regulations state that minimum thresholds defined in each GSP be designed to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.[216]

The Subbasin is adjacent to the following subbasins: Colusa to the north, Sutter to the northeast, North American to the east, South American to the southeast, and Solano to the south.[217] The GSP does not evaluate if the development of sustainable management criteria for the Subbasin will avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals, as required by the GSP Regulations.[218] As the GSP sets the minimum thresholds for groundwater levels at or near historical lows, Department staff infer that groundwater management under the Plan in the Subbasin probably may not, at this time, adversely affect the adjacent basins, but it remains a concern that the GSA must address. Department staff recommend the GSA provide such an analysis in the next periodic evaluation for the Department's review.

4.7 Consideration of Climate Change and Future Conditions

The GSP Regulations require a GSA to consider future conditions and project how future water use may change due to multiple factors including climate change.[219]

Since the GSP was adopted and submitted, climate change conditions have advanced faster and more dramatically. It is anticipated that the hotter, drier conditions will result in a loss of 10% of California's water supply. As California adapts to a hotter, drier climate, GSAs should be preparing for these changing conditions as they work to sustainably manage groundwater within their jurisdictional areas. Specifically, the Department encourages GSAs to:

[215] Water Code § 10733(c).
[216] 23 CCR § 354.28(b)(3).
[217] Yolo Subbasin GSP, Section 2.1.2.1.1, p. 98.
[218] 23 CCR § 354.28 (b) (3).
[219] 23 CCR § 354.18.

1. Explore how their proposed groundwater level thresholds have been established in consideration of groundwater level conditions in the Subbasin based on current and future drought conditions.
2. Explore how groundwater level data from the existing monitoring network will be used to make progress towards sustainable management of the Subbasin given increasing aridification and effects of climate change, such as prolonged drought.
3. Take into consideration changes to surface water reliability and that impact on groundwater conditions.
4. Evaluate updated watershed studies that may modify assumed frequency and magnitude of recharge projects, if applicable.

Continually coordinate with the appropriate groundwater users, including but not limited to domestic well owners and state small water systems, and the appropriate overlying county jurisdictions developing drought plans and establishing local drought task forces[220] to evaluate how their Plan's groundwater management strategy aligns with drought planning, response, and mitigation efforts within the basin.

5 STAFF RECOMMENDATION

Department staff recommend approval of the GSP with the recommended corrective actions listed below. The Yolo Subbasin GSP conforms with Water Code Sections 10727.2 and 10727.4 of SGMA and substantially complies with the GSP Regulations. Implementation of the GSP will likely achieve the sustainability goal for the Yolo Subbasin. The GSA has identified several areas for improvement of its Plan and Department staff concur that those items are important and should be addressed as soon as possible. Department staff have also identified additional recommended corrective actions that should be considered by the GSA for the first periodic evaluation of its GSP. Addressing these recommended corrective actions will be important to demonstrate that implementation of the Plan is likely to achieve the sustainability goal.

The recommended corrective actions include:

RECOMMENDED CORRECTIVE ACTION 1

Revise the proposed sustainable management criteria for the chronic lowering of groundwater levels as follows:

a. Clarify what significant and unreasonable effects for the chronic lowering of groundwater levels are in the Subbasin that the GSAs are managing the Subbasin to avoid.

[220] Water Code § 10609.50.

b. Provide additional discussion and amend the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result. Further, the GSA should clearly define a time component for when an undesirable result will occur.

c. Describe how the selection of minimum thresholds of groundwater levels will avoid undesirable results for other sustainability indicators.

RECOMMENDED CORRECTIVE ACTION 2

Revise the proposed sustainable management criteria for degraded water quality as follows:

a. Revise the definition of undesirable results for degraded groundwater quality so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSA has implemented projects or not, are considered in the assessment of undesirable results in the Subbasin.

b. The GSA should revise the GSP to provide the rationale to support their approach that TDS is the only quality constituent that requires the establishment of sustainable management criteria. Alternatively, the GSP should establish sustainable management criteria for all the constituents of potential concern identified in the Basin that have the potential to cause undesirable results.

RECOMMENDED CORRECTIVE ACTION 3

Revise the proposed sustainable management criteria for land subsidence as follows:

a. Identify critical infrastructure susceptible to land subsidence and describe what constitutes significant and unreasonable effects.

b. Revise the operational definition of undesirable results to consider localized instances of subsidence and how they would be determined to be significant and unreasonable. This should include describing how minimum thresholds being exceeded in multiple management areas or a quarter one of one management area does not constitute an undesirable result. Provide additional discussion and justification on the quantitative definition of undesirable results of subsidence: a) How the value of “25 percent of the management or sub-MA” mean was determined, and whether it means 25 percent of monitoring sites or 25 percent of area, and b) how to address local or regional undesirable results by requiring three (3) or more management areas or sub-MAs experiencing the minimum threshold exceedances.

c. Include a cumulative metric for land subsidence in the definition of the minimum threshold (such as 0.5 feet of land subsidence within a five-year period, or the maximum cumulative subsidence amount a specific structure can withstand) to ensure small amounts of annual land subsidence are not wrongly classified as

measurement error within the InSAR dataset, or, theoretically, to prevent unlimited or large amounts of subsidence from occurring as a result of the cumulative impact of many successive years of incremental subsidence. The GSA should elaborate on how the proposed management will avoid or minimize the land subsidence that has been occurring in the Subbasin. In addition, the GSA should establish a minimum threshold for the Capay Valley Management Area.

d. Revise the measurable objective and interim milestones for land subsidence to a value that achieves the sustainability goal for the basin within 20 years of Plan implementation and reflects sustainable management of the groundwater basin while also meeting the intent of SGMA (i.e., minimizing or avoiding land subsidence).

RECOMMENDED CORRECTIVE ACTION 4

Department staff understand that estimating the location, quantity, and timing of stream depletion due to ongoing, Subbasin-wide pumping is a complex task and that developing suitable tools may take additional time; however, it is critical for the Department's ongoing and future evaluations of whether GSP implementation is on track to achieve sustainable groundwater management. The Department plans to provide guidance on methods and approaches to evaluate the rate, timing, and volume of depletions of interconnected surface water and support for establishing specific sustainable management criteria in the near future. This guidance is intended to assist GSAs to sustainably manage depletions of interconnected surface water.

In addition, the GSA should work to address the following items by the first periodic update:

a. Provide additional discussion and amend the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result.

b. Identify specific beneficial users and uses of interconnected surface water for each reach and describe specifically what constitutes significant and unreasonable effects of depletion of interconnected surface water and use this information to potentially revise the sustainable management criteria.

c. Consider utilizing the interconnected surface water guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.

d. Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of interconnected surface water and define segments of interconnectivity and timing.

e. Prioritize collaborating and coordinating with local, state, and federal regulatory agencies as well as interested parties to better understand the full suite of

beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.

RECOMMENDED CORRECTIVE ACTION 5

Revise the monitoring network as follows:

a. Define the monitoring site type and data collection frequency in tabular format for the degraded water quality monitoring network in the GSP.

b. Conduct a reconciliation between the details of the monitoring network provided in the GSP with the requirements of the data and reporting standards in the GSP Regulations. Where requirements of the data and reporting standards are not provided, the GSA should include this information in the periodic update of the GSP. Also, updates to the monitoring network must be reflected in the SGMA Portal's Monitoring Network Module.